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

Modification Date	Modification Number

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ATTACHMENTS

TERMS

ASTM	American Society for Testing and Materials
BCSO	Benton County Sheriff's Office
CHPRC	CH2M HILL Plateau Remediation Company
CFR	Code of Federal Regulations
COC	Chain of Custody
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
IQRPE	Independent Qualified Registered Professional Engineer
MTCA	*Model Toxics Control Act—Cleanup* (WAC 173-340)
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act of 1976
SAA	Satellite Accumulation Area
SAP	Sampling and Analysis Plan
SWOC	Solid Waste Operations Complex
VOA	Volatile Organic Analysis
VSP	Visual Sample Plan
WAC	Washington Administrative Code
WIDS	Waste Information Data System

H.1 Introduction

The purpose of this plan is to describe the Resource Conservation and Recovery Act (RCRA)/Hazardous Waste Management Act (HWMA), Chapter 70.105 Revised Code of Washington (RCW) closure process for the 277-T Building Dangerous Waste Management Unit (DWMU), hereinafter called the 277-T Building. The 277-T Building is located northeast of the central portion of the T Plant Complex in the 200 West Area of the Hanford Site (Figure H-1). The U.S. Department of Energy (DOE) and CH2M HILL Plateau Remediation Company (CHPRC), hereinafter called the Permittees, have agreed with the U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) through a Consent Agreement and Final Order (EPA Docket No. RCRA-10-2013-0113) to close this DWMU. The 277-T Building is no longer used for storage of dangerous or mixed waste and will be clean closed.

This closure plan complies with closure requirements in Washington Administrative Code (WAC) 173-303-610(2) through WAC 173-303-610(6), and WAC 173-303-630(10).

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

Minor deviations from this closure plan must be addressed in accordance with Permit Condition II.K.6.

Closure requirements also follow Ecology guidance (Ecology Publication #94-111, *Guidance for Clean Closure of Dangerous Waste Units and Facilities*). This closure plan is designed to fulfill the elements of the Data Quality Objectives (DQO) Process, as defined in EPA Publication EPA/240/B-06/001, *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4). A site-specific DQO has been incorporated into this closure plan.

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

- Removal of all dangerous and mixed waste.
- Records review (i.e., container storage, operating, and inspection records) for documented spills or releases of dangerous or mixed waste and subsequent cleanup activities.
- Visual inspection to evaluate the condition of the concrete surface and the likelihood of potential exposure pathways for contamination of the underlying soil.
- Decontamination of the concrete surfaces using an Ecology-approved site-specific decontamination method.
- Chip sampling of concrete flooring and sump to evaluate whether decontamination was successful and closure performance standards are met.
- Sampling of underlying soil to ensure closure performance standards are met.
- Transmit closure certification to Ecology.

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

Figure H-1 T Plant Complex Overview, 277-T Building Dangerous Waste Management Unit

H.1.1 Unit Description

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

Figure H-2 T Plant 277-T Building Exterior (looking southeast) (May 2017)

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2 **Figure H-3 T Plant 277-T Building Interior (looking southeast) (May 2017)**

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

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

H.1.2 Maximum Waste Inventory

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

H.1.3 Personnel Safety and Training Requirements

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

H.1.3.1 Health and Safety Requirements

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

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

- Objective of the activities.
- Individual tasks to be performed.
- Hazards associated with the planned tasks.
- Environment in which the job will be performed.
- Facility where the job will be performed.
- Equipment and material required.
- Safety protocols applicable to the job.
- Training requirements for individuals assigned to perform the work.
- Level of management control.
- Proximity of emergency contacts.

H.1.3.2 Training Requirements

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

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

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

Training Category Course Description[a]	Frequency of Training	Training Type[b]	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	X
ECO Training	Initial	OT				X		
Facility Health and Safety	Annual	GHFT, CPT	X[c]	X	X[c]	X	X	X
Sampler	Annual	GHFT, CPT						X

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

b. Training types defined in Permit Attachment 5.

c. This training is required only if workers are unescorted in the facility.

BED = Building Emergency Director
CPT = Contingency Plan Training
ECO = Environmental Compliance Officer
ECT = Emergency Coordinator Training
FS = Field Sampler
FWS = Field Work Supervisor
GHFT = General Hanford Facility Training
OT = Operations Training
SPOC = Single Point of Contact

H.1.4 Maintenance and Security During Closure

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

H.1.4.1 Inspections

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

Table H-2 277-T Building Inspection Schedule

Requirement Description	Frequency	DWMU Condition*
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.

H.1.4.2 Facility Security

The following sections document security measures in effect at the T Plant Complex.

H.1.4.2.1 Security Provisions

Located within the 200 West Area of the Hanford Facility, the T Plant Complex complies with access control and warning sign requirements pursuant to WAC 173-303-310(1) and (2), *Security*.

Security measures are used to control access to the active portions of the Hanford Facility in accordance with Permit Condition II.M, Security. The entire Hanford Facility is a controlled access area as described in Permit Attachment 3, *Security*. The security measures in Permit Attachment 3 and the unit-specific security measures prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock. [WAC 173-303-310(1)]

H.1.4.2.2 T Plant Complex Access Control

Unknowing entry and the possibility for unauthorized entry of persons or livestock onto the active portions of the T Plant Complex are minimized through implementation and maintenance of the following security measures.

Access to T Plant DWMUs is controlled by an approximate 2.4 m (8 ft) high chain-link fence encircling the operating boundary (Figure H-1). A two-part swinging chain link gate at the T Plant main entrance is open during operational hours to allow vehicle and personnel ingress to the parking lot and outdoor areas. Signs are posted at the main entrance instructing all visitors to check in at 271-T Building. This gate is closed and locked when personnel are away from T Plant. Alternate vehicle access gates, found about the fenced perimeter, are closed and locked except when in use. Keys to gates are controlled and accessible only by authorized personnel. [WAC 173-303-310(2)(c)]

Upon arrival at T Plant, visitors are required to sign in at the 271-T Building administration office, and must adhere to all personal protection requirements, and are subject to escorting protocols.

Section H.1.3.2 provides the personnel training requirements for T Plant Complex operators, workers, and visitors.

Access to the 277-T Building is restricted by the enclosed structure of the building, including a closed door with appropriate signage.

H.1.4.2.3 Warning Signs

Warning signs stating "Danger-Unauthorized Personnel Keep Out" are posted near the entrance gate of the T Plant Complex. Identical signs are posted along the perimeter fence lines at distances not to exceed 250 ft (76.2 m) between signs. Permittees must maintain warning signs at points described in this closure plan and ensure that signs are written in English, legible from a distance of 25 ft. (approximately 7.6 m) or more, and visible from all angles of approach. [WAC 173-303-310(2)(a)]

H.1.4.3 Preparedness, Prevention, Emergency Procedures

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

H.1.4.3.1 T Plant Building Emergency Plan

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

H.1.4.3.2 Hanford Emergency Management Plan

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

H.1.4.4 Facility Recordkeeping

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

Records will be stored in either electronic or hardcopy format. Documentation and records, regardless of medium or format, are controlled in accordance with internal work requirements and processes to ensure the accuracy and retrievability of stored records. Records required by the Tri-Party Agreement (Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order*) will be managed in accordance with the requirements therein.

H.1.5 Facility Contact Information

277-T Building Operator and Property Owner:

Doug S. Shoop, Manager
U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, WA 99352
(509) 376-7395

277-T Building Co-Operator:

L. Ty Blackford, President and Chief Executive Officer
CH2M HILL Plateau Remediation Company
P.O. Box 1600
Richland, WA 99352
(509) 376-0556

H.2 Closure Performance Standards

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

- Minimize the need for further maintenance.
- Control, minimize, or eliminate to the extent necessary to protect HHE, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or atmosphere.
- Remove all waste and waste residues and properly dispose of them in a RCRA permitted disposal facility.
- Decontaminate the concrete surface and perform concrete chip sampling to ensure concrete meets standard Model Toxics Control Act (MTCA) cleanup levels, or remove any concrete that cannot be so decontaminated.
- Perform soil sampling and analysis to ensure soils at the 277-T Building meet standard MTCA cleanup levels, and remove any soils contaminated above these levels.
- Return the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous waste activity.

H.3 Closure Activities

The 277-T Building will be clean closed.

The following closure activities are required to achieve and verify clean closure:

- Remove all dangerous and mixed waste inventory (completed; Section H.3.1).
- Review dangerous and mixed waste container storage, operating, and inspection records for documented spills or releases of dangerous or mixed waste during periods of waste storage and subsequent cleanup (completed; Section H.3.2).
- Perform initial visual inspection of the concrete surface to identify dangerous or mixed waste related staining, low points, cracks, holes, pits, or breaches significant enough to allow contamination to reach underlying soil. Evaluate surfaces to identify potential for focused sample locations (completed; Section H.3.2).
- Remove stored equipment and materials from the 277-T Building and perform a final visual inspection of the concrete surface to identify dangerous or mixed waste related staining, low points, cracks, holes, pits, or breaches significant enough to allow contamination to reach underlying soil. Evaluate surfaces to identify potential for focused sample locations (Section H.3.2).
- Decontaminate the concrete flooring and sump using a site-specific decontamination method (Section H.3.4).
- Perform chip sampling of the concrete flooring and sump (Section H.4.4).
- Perform soil sampling beneath the 277-T Building concrete flooring and sump (Section H.4.4).
- Confirm analytical results from chip and soil samples meet closure performance standards (Section H.5.1).
- Identify and manage contaminated environmental media (Section H.3.5).
- Identify and manage waste generated during closure (Section H.3.6).
- Transmit closure certification to Ecology (Section H.5.3).

H.3.1 Removal of Wastes and Waste Residues

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

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

H.3.2 Operating Records Review and Visual Inspection

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

- 271-T Cage.
- 211-T Pad.
- 221-T Sand Filter Pad.
- 277-T Outdoor Storage Area.
- 277-T Building.
- 221-T Railroad Cut.
- 2706-TB Tank System.
- 221-T Pipe Gallery Storage.
- 221-T R5 Waste Storage Area.
- 221-T Tank System.

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

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

Table H-3 Operating Records Review Summary

Document Title	Document Type	Time Frame of Records Reviewed		Items of Concern Noted
		Start Date	End Date	
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	1/2003	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.

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

Table H-4 277-T Building Waste Container Data

Container ID	Waste Package Type	Total Volume (m^3)	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

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

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

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

Supporting documentation for the visual inspections is included in Attachment A, T Plant Complex 277-T Building Visual Inspection Supporting Documentation.

H.3.3 Unit Components, Parts, and Ancillary Equipment

The 277-T Building does not have any unit components, parts, or ancillary equipment identified for removal as part of closure. The sampling locations will be sealed after sampling, and the 277-T Building will remain in place pending confirmation and acceptance of clean closure.

H.3.4 Inspection and Decontamination Activities

The following sub-sections discuss the final inspection of the 277-T Building, and the follow-on decontamination activities.

H.3.4.1 Inspection of Unit Before Decontamination

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

H.3.4.2 Decontamination

Decontamination of the concrete flooring of the 277-T Building will be performed using the site-specific decontamination method of high-pressure steam or water sprays.

Decontamination includes the following steps:

1. Ensure all stored materials and equipment is relocated or removed from the area.
2. Seal all significant cracks including joints/seams using an appropriate sealant material.
3. Decontaminate the concrete surface using the site-specific decontamination method as described below.

Site-specific decontamination method parameters have been evaluated, including water pressure, temperature, water spray distance and angle, in relation to the concrete surface. The water pressure applied to the concrete surface should not exceed a maximum of 2,000 – 2,500 psi. For worker safety protection, water temperature should not exceed 100° - 120°F. If the aid of a surfactant or detergent is necessary to achieve surface decontamination, then the product will be identified based on the nature of the staining and utilized in accordance with the manufacturer's instruction. The product, concentration used, and residence time of application will be documented in the clean closure certification.

The amount of water used will be minimized to prevent ponding and runoff. Water collection measures will be employed using portable berms to enclose the area subject to decontamination. A portable vacuum system will be used to control water accumulation throughout the duration of decontamination activities, and to collect rinsate from the surface area and collection sump. Residual material, including rinsate from decontamination activities, will be managed as newly generated waste in accordance with Section H.3.6.

Equipment used during decontamination and sampling will be decontaminated for re-use or disposed of and managed as newly generated waste in accordance with Section H.3.6. A small temporary decontamination area (approximately 10 by 20 feet) may be established near the 277-T Building. This area will be constructed of Visqueen™ or an equivalent material, and will be used for decontamination of sampling equipment, personal protective equipment, and other miscellaneous small equipment used during decontamination and sampling efforts. When decontamination of equipment is completed, the Visqueen™ or equivalent material and rinsate will be removed and managed as newly generated waste in accordance with Section H.3.6.

H.3.5 Identifying and Managing Contaminated Environmental Media

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

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

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

The contaminated soil will be containerized, labeled, and sampled for waste characterization. Contaminated soil will be placed in U.S. Department of Transportation-compliant containers and sent to a RCRA permitted disposal facility or staged at central accumulation areas in accordance with all applicable requirements of WAC 173-303-200, *Conditions for exemption for a large quantity generator that accumulates dangerous waste*. Contaminated soil subject to the requirements of WAC 173-303-140, *Land Disposal Restrictions* (which incorporates by reference 40 Code of Federal Regulations [CFR] 268 *Land Disposal Restrictions*) will be characterized, designated, and stored or treated, as applicable, prior to disposal in a RCRA permitted disposal facility.

H.3.6 Identifying and Managing Waste Generated During Closure

Closure activities for the 277-T Building will result in waste generated during closure activities, requiring management and disposal. Small sections of concrete will be removed to access the underlying soil for focused sampling. Excess concrete will also be generated during chip sampling. Rinsate will be generated during concrete decontamination. Rinsate generated during concrete decontamination, and excess concrete generated during soil and chip sampling will be collected, containerized, labeled, and sampled to properly characterize such waste prior to disposal. The waste will be managed as a newly generated waste stream in accordance with WAC 173-303-610(5).

Newly generated waste will be managed in accordance with all applicable requirements of WAC 173-303-170 through WAC 173-303-230. Once waste characterization results are received, all waste will be designated and shipped to a RCRA permitted facility for treatment, storage, or disposal.

Dangerous and mixed waste will be treated, if necessary, to meet land disposal restrictions in WAC 173-303-140 (which incorporates by reference 40 CFR 268), then ultimately disposed in a RCRA permitted waste disposal facility.

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

H.3.7 Closure Performance Standards for Soil

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

- WAC 173-340-740(3), *Model Toxics Control Act (MTCA)—Cleanup, Unrestricted land use soil cleanup standards,* Method B (cancer and noncancer), that considers human health based on direct soil contact.
- WAC 173-340-740(2), Table 740-1, *Method A Soil Cleanup Levels for Unrestricted Land Uses* (WAC 173-340-900), which includes closure performance standards for human health based on unrestricted land use. MTCA Method A is only used if MTCA Method B is not available in the Cleanup Levels and Risk Calculation tables.
- WAC 173-340-747, *Deriving soil concentrations for groundwater protection,* which notes soil concentrations protective of groundwater.
- WAC 173-340-7493, *Site-specific terrestrial ecological evaluation procedures,* that considers ecological indicators (plants, biota, wildlife) in Table 749-3, *Ecological Indicator Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals (*WAC 173-340-900).
- WAC 173-340-750, *Cleanup standards to protect air quality,* that describes human health risks due to fugitive vapors and dust.

Of the exposure pathways listed above, MTCA Method B direct soil contact, or Method A as applicable, 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 rainwater 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 CHPRC 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. 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 site-specific decontamination method as discussed in Section H.3.4, followed by confirmatory concrete chip sampling to ensure analytical results meet closure performance standards and that decontamination was successful.

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

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

For the 277-T Building concrete flooring and sump, a site-specific decontamination method is an appropriate approach to achieve clean closure. Ecology Publication #94-111, Section 5.6.1, Decontamination Options for Concrete, acknowledges that concrete surface removal may not be necessary to achieve decontamination and may not be the best environmental solution considering the factors involved. In certain instances, site-specific closure performance standards may be the most viable approach. As stated in Ecology Publication #94-111, Section 5.3.2, Site-Specific Decontamination Methods:

> "An example of a site-specific decontamination method is high-pressure water washing for decontamination of concrete that is over 1.2 cm (approximately ½ inches) thick instead of removal of the top 0.6 cm (approximately ¼ inches) of the concrete surface."

On completion of decontamination activities, the concrete will be chip sampled. The viable exposure pathways considered for concrete are the same as for soil (Section H.3.7). Concrete chip sampling and analysis will be conducted in accordance with the closure plan SAP located in Section H.4. Analytical results of the concrete chip samples will be individually compared to the soil closure performance standards consistent with closure requirements. [WAC 173-303-610(2)(b)(i)]

If target analytes are found above closure performance standards, the contaminated concrete will be remediated and confirmatory sampling will be conducted in accordance with Section H.4.4.3. If failed constituents of concern do not meet closure performance standards after remediation, then the Permittees will meet with Ecology to determine a path forward for closure. The sample design for concrete chip samples is discussed in Section H.4.4.1.

H.3.9 Development of Closure Performance Standards

The target analytes considered for evaluation during closure sampling and analysis were determined by reviewing the waste management records associated with operations involving the 277-T Building. Table H-5 provides the closure performance standards for soil and concrete for each individual target analyte associated with the dangerous waste codes identified. A list of closure performance standard values for all exposure pathways was provided to Ecology in July 2017 as correspondence from DOE (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"), which Ecology acknowledged (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"). Values in Table H-5 have been adjusted to remove nonviable pathways as noted above.

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

CAS Number	Waste Code(s)[a]	Analyte	Closure Performance Standards		PQL[b] (mg/kg)
			Value (mg/kg)	Basis	
SW-846 Method 6010			**Accuracy Requirement ±20% Recovery[c] Precision Requirement ≤35 RPD[d]**		
7440-38-2	D004	Arsenic[e]	2.00E+01	Background[e]	1.00E+01
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
SW-846 Method 6020			**Accuracy Requirement ±20% Recovery[c] Precision Requirement ≤35 RPD[d]**		
7440-38-2	D004	Arsenic[e]	2.00E+01	Background[e]	1.00E+00
SW-846 Method 7196			**Accuracy Requirement ±20% Recovery[c] Precision Requirement ≤35 RPD[d]**		
18540-29-9	D007	Chromium (Hexavalent)	2.40E+02	Human Health – Direct Contact (noncancer)	5.00E-01

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

CAS Number	Waste Code(s)[a]	Analyte	Closure Performance Standards		PQL[b] (mg/kg)
			Value (mg/kg)	Basis	
SW-846 Method 7471			**Accuracy Requirement ±20% Recovery[c] Precision Requirement ≤35 RPD[d]**		
7439-97-6	D009, (U151)	Mercury[f]	2.40E+01	Human Health – Direct Contact (noncancer)	2.00E-01
SW-846 Method 8260			**Accuracy Requirement ±30% Recovery[c] Precision Requirement ≤20 RPD[d]**		
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	*n*-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
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

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

CAS Number	Waste Code(s)[a]	Analyte	Closure Performance Standards		PQL[b] (mg/kg)
			Value (mg/kg)	Basis	
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	1.10E+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
SW-846 Method 8270			**Accuracy Requirement ±30% Recovery[c] Precision Requirement ≤30 RPD[d]**		
95-48-7	F004	*o*-cresol[g]	4.00E+03	Human Health – Direct Contact (noncancer)	3.33E-01

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

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

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, 2005, Pub. #94-111, *Guidance for Clean Closure of Dangerous Waste Units and Facilities*. Section 5.6.2 states "…Ecology believes that MTCA unrestricted site use cleanup levels for soil represent very conservative assessments of the potential exposure risks posed by concrete."

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*.

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, *Model Toxics Control Act—Cleanup*, *Unrestricted land use soil cleanup standards*) (Ecology, 2019, *Cleanup Levels and Risk Calculation (CLARC) 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. Section 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.

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

CAS Number	Waste Code(s)[a]	Analyte	Closure Performance Standards		PQL[b] (mg/kg)
			Value (mg/kg)	Basis	

- 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 90th percentile of calculated Hanford Site background values.
- Closure performance standard values for all exposure pathways were provided to Ecology in July 2017 correspondence from DOE (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.

a. 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.

b. Highest allowable PQL will be defined in the individual laboratory contract with CHPRC. In practice, the laboratory PQL values have the potential to be lower.

c. 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.

d. 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.

e. 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.

f. 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.

g. 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.

h. 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.

i. 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
CHPRC = CH2M HILL Plateau Remediation Company
CLARC = Cleanup Levels and Risk Calculation
MTCA = *Model Toxics Control Act–Cleanup*
PQL = practical quantitation limit
RPD = relative percent difference

H.3.10 Conditions that will be Achieved when Closure is Complete

Upon completion of the closure activities, the 277-T Building will remain in an "as-is" state with the building remaining in place, and the focused soil sampling locations capped after sampling. The 277-T Building will continue to be used for equipment and material storage in support of the T Plant Complex operations. Once Ecology accepts the clean closure certification, a permit modification request will be submitted to remove the 277-T Building DWMU from the Permit.

H.4 Sampling and Analysis Plan

Sampling and analysis of the 277-T Building concrete and underlying soil will be conducted to confirm whether closure performance standards have been met. Sampling includes six focused soil samples, one focused concrete chip sample at the sump, and six non-statistical concrete chip samples (Figure H-5). Sampling and analysis will be performed in accordance with the sampling and quality standards established in this closure SAP.

H.4.1 Sampling and Analysis Plan Requirements

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

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

H.4.2 Sampling and Analysis Schedule

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

H.4.3 Project Management

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

H.4.3.1 Project/Task Organization

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

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

Project Manager and Technical Lead. The CHPRC Project Manager provides oversight of closure activities and coordinates with the U.S. Department of Energy, Richland Operations Office (DOE-RL), Ecology, and contract management. In addition, support is provided to the project technical lead to ensure that work is performed safely and cost effectively.

The Project Manager (or designee) for the 277-T Building closure sampling is responsible for direct management of sampling documents and requirements, field activities, and subcontracted tasks. The Project Manager is responsible for ensuring that project personnel are working to the approved version of the 277-T Building Closure Plan in the Permit and for providing updates to field personnel.

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

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

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

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

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

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

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

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

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

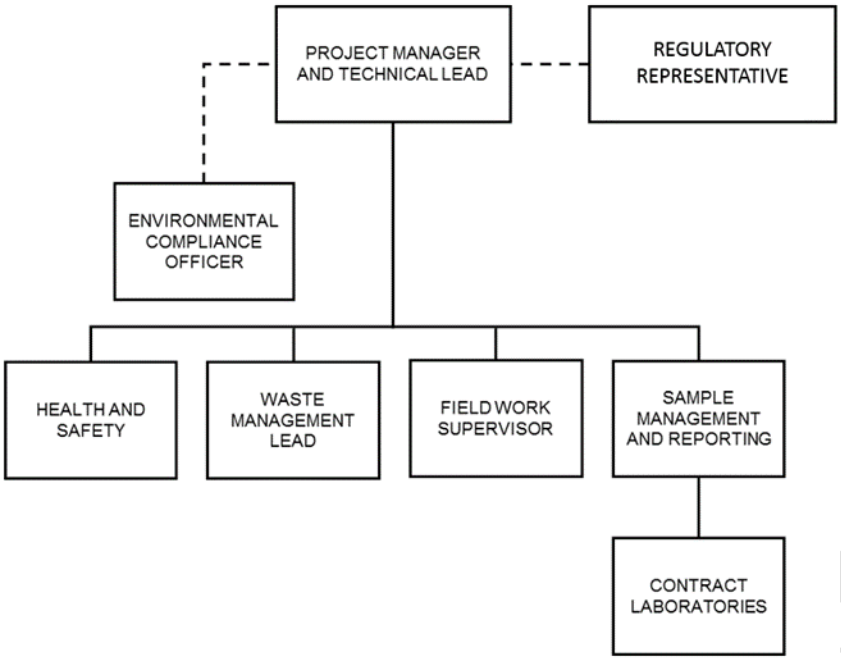

Figure H-4 Sampling and Analysis Plan Project Organization

H.4.3.2 Field Sampler Training/Certification

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

H.4.3.3 Sampling Documents and Records

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

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

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

- Field logbooks or operational records.
- Global positioning system data.
- Sample authorization forms.

- Data forms.
- COC forms.
- Sample receipt records.
- Inspection or assessment reports and corrective action reports.
- Interim progress reports.
- Final reports.
- Laboratory data packages.
- Data verification and validation reports.

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

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

Records may be stored in either electronic or hard copy format. Documentation and records, regardless of medium or format, are controlled in accordance with internal work requirements and processes to ensure the accuracy and retrievability of stored records. Records required by the Tri-Party Agreement (Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order*) will be managed in accordance with the requirements therein.

H.4.4 Sampling Design and Analysis

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

H.4.4.1 Sampling Process Design

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

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

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

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

Evidence for additional areas of focused sampling could include:

- Visual or olfactory evidence of contamination including evidence based on direct reading field instrumentation or field test kits;
- Knowledge, such as reports by employees, inspectors, or others that releases have or may have occurred;
- Length of time the unit has been in existence;
- Entries into the unit operating record; and
- Soil gas surveys or soil borings.

Per the visual inspections (Section H.3.2) and additional professional judgment, six focused soil sample locations and one focused concrete chip sample location are identified. Identified are three low point soil samples, two construction joint/seam soil samples, and one sump soil sample. One focused concrete chip sample is identified for the sump (Figure H-5).

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

Any spill within the 277-T Building would likely drain and collect in the sump, therefore a focused concrete chip sample is identified.

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

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

Grid (Non-Statistical) Chip Sampling. The proposed site-specific decontamination method of high-pressure steam or water washing is chosen for decontamination of the concrete surfaces. As an evaluation criteria, concrete chip sampling results will be directly compared to the closure performance standards for soil (Section H.3.9).

Concrete chip samples are collected at regularly-spaced intervals over an area. An initial location or time is chosen at random, and then the remaining sampling locations are defined so the locations are at regular intervals over an area (grid). The Visual Sample Plan (VSP[1]) software was used to create a systematic triangular grid layout with a random starting point. Sample locations were determined using a non-statistical sampling approach with a predetermined number of samples.

Professional judgment determined that six chip samples would provide sufficient coverage to demonstrate successful decontamination (Figure H-5). Samples will be taken from the node locations indicated by the VSP software and will be assigned sample location identifications and sample numbers using the HEIS database.

Supporting documentation for the VSP software sampling designations is provided in Attachment B, T Plant 277-T Building Visual Sample Plan Supporting Documentation.

[1] Visual Sample Plan is a product of Pacific Northwest National Laboratory (PNNL), Richland, Washington.

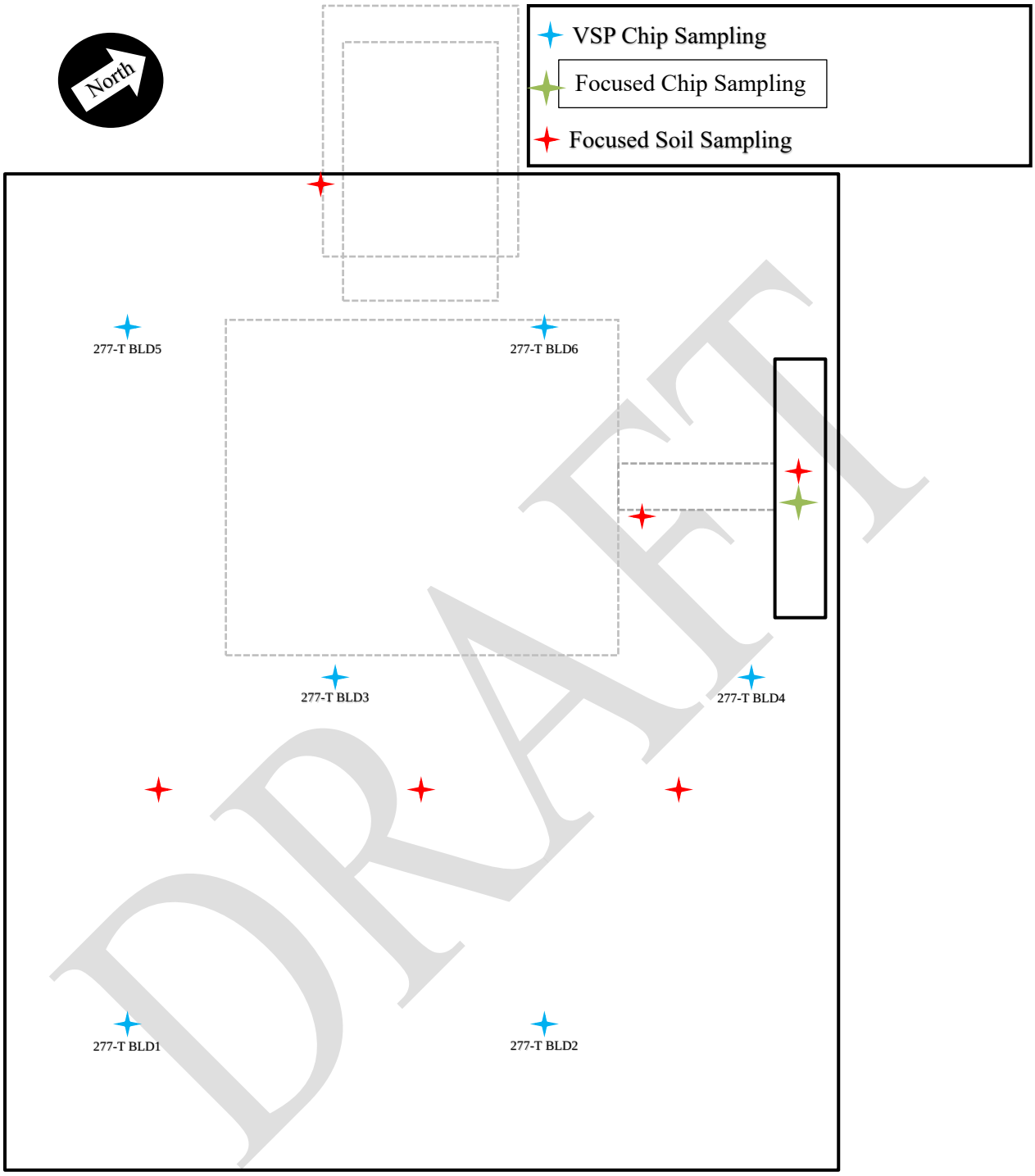

Figure H-5 277-T Building Sampling Locations

H.4.4.2 Sampling Methods and Handling

The grab sample matrix will consist of soil collected in clean sample containers. Soil will be collected at a depth of no more than 15 cm (6 in.) below ground surface, unless staining or discoloration indicates contamination is below that depth. For the purpose of this SAP, ground surface is defined as the exposed surface layer once concrete or loose gravel has been removed. Once the soil is collected, the sampled media will be screened to remove material larger than approximately 2 mm (0.08 in.) in diameter, which allows for a larger surface area-to-volume ratio. This ratio increases the likelihood of identifying any potential contamination in the sample.

Chip sampling is appropriate for porous surfaces (concrete) and will be accomplished with either a hammer and chisel, or an electric hammer. The sampling device will be laboratory cleaned and wrapped in clean, autoclaved aluminum foil until ready for use. Donning a new pair of disposable gloves, the concrete surface will be broken and sampled. An effort will be made to avoid scattering pieces out of the sampling area boundary. Any pieces that fall outside the sampling area will not be used. The area will be chipped to less than one-quarter inch (preferably 1/8 in.). Chipped pieces will be collected using a dedicated, decontaminated dustpan and natural bristle brush and transferred directly into the sampling bottle. Samples will be stored out of direct sunlight and cooled to ≤6°C, then delivered to the laboratory for analysis.

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

- Preparation and review of sampling paperwork such as COC or labels.
- Sample container and equipment preparation.
- Field walk down of sample area (includes locating and marking sample locations).
- Sample collection.
- Sample packaging and shipping.

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

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

EPA Method	Analysis (Analytes)	Preservation Requirement	Holding Time	Bottle Type
6010	ICP-AES (Metals)	None	180 days	G/P
6020	ICP-MS (Metals)	None	180 days	G/P
7196	Colorimetric (Hexavalent Chromium)	Cool to ≤6°C	30 days from sampling to extraction; 7 days from extraction to analysis	G/P
7471	Cold Vapor Atomic Absorption (Mercury)	Cool to ≤6°C	28 days	G/P
8015	GC/Flame Ionization Detector (Nonhalogenated Organics [Methanol])	Cool to ≤6°C	14 days	G

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

EPA Method	Analysis (Analytes)	Preservation Requirement	Holding Time	Bottle Type
8260	GC/MS (Volatile Organic Compounds)	Frozen*	14 days	G
8270	GC/MS (Semivolatile Organic Compounds)	Cool to ≤6°C	14 days from sampling to extraction; 40 days from extraction to analysis	Amber Glass

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
EPA = U.S. Environmental Protection Agency
GC = gas chromatography
ICP = inductively coupled plasma
MS = mass spectrometry
G/P = glass/plastic

A sampling and data-tracking database (e.g., HEIS) is used to track the samples from the point of collection through the laboratory analysis process. HEIS sample numbers are issued to the sampling organization for the project. Each sample is identified and labeled with a unique HEIS sample number.

To prevent potential contamination of the samples, clean equipment will be used for each sampling activity. Equipment used during sampling will be decontaminated or disposed of and managed as newly generated waste in accordance with Section H.3.6. Level I EPA pre-cleaned sample containers will be used for samples collected for chemical analysis. Container sizes may vary, depending on laboratory-specific volumes/requirements for meeting the PQL.

The date and time of sample collection, and the sample location, depth, and corresponding HEIS numbers will be documented in the sampler's field logbook. A custody seal (e.g., evidence tape) will be affixed to each sample container (except for Volatile Organic Analysis [VOA] sample containers) or the sample collection package in such a way as to indicate potential tampering. The custody seal will be inscribed with the sampler's initials and date. Custody tape is not applied directly to VOA sample containers based on the potential for affecting analyte results or fouling of laboratory equipment. Alternatively, VOA vials are placed in a sealable plastic bag affixed with custody seals and any other required labels/documentation.

Data verification and validation will also note any issues with sample collection and analysis. Each sample container will be labeled with the following information on firmly affixed, water-resistant labels:

- Sample authorization form and form number.
- HEIS number.
- Sample collection date and time.
- Sampler identification (e.g., initials).
- Analysis required.
- Preservation method (if applicable).
- COC identification number.

In addition to the container label information, sample records must include:

- Sample location.
- Matrix (e.g., soil).

Sample custody will be maintained in accordance with existing Hanford Facility protocols to ensure maintenance of sample integrity throughout the analytical process. COC protocols will be followed throughout sample collection, transfer, analysis, and disposal to ensure that sample integrity is maintained. A COC record is initiated in the field at the time of sampling and will accompany each set of samples shipped to any laboratory. At a minimum, the following information must be identified on a completed COC record:

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

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

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

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

H.4.4.3 Sampling and Analysis Requirements to Address Removal of Contaminated Soil and Concrete

If focused soil or chip sample results based on direct comparison (Section H.4.4.1) indicate contamination above closure performance standards, then sample location(s) will be remediated to remove contaminated soil or concrete. Following remediation, confirmatory sampling will be performed. Analytical results of confirmatory sample(s) collected at focused and chip sample location(s) will be directly compared to the closure performance standards to confirm remediation efforts were effective and the area is clean. If after remediation the soil or concrete does not meet closure performance standards, then the Permittees will meet with Ecology to determine a path forward for closure.

H.4.4.4 Analytical Methods

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

H.4.4.5 Quality Control

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

- Field trip blanks.
- Field transfer blanks.
- Equipment rinsate blanks.
- Field duplicates.

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

- Method blanks.
- Laboratory duplicates.
- Matrix spikes.
- Matrix spike duplicates.
- Surrogates.
- Laboratory control samples.

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
Field QC		
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.

Table H-7 Project Quality Control Sampling Summary

QC Sample Type	Frequency	Characteristics Evaluated
Laboratory QC*		
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.
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.

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% 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% of the analytical results will undergo Level C validation.

H.4.5.3 Data Quality Assessment

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

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

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

H.5 Confirmation and Certification of Closure Activities

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

H.5.1 Confirmation of Clean Closure

The 277-T Building will be clean closed through confirmation of successful decontamination determined by chip sampling of the concrete flooring and sump, and sampling of soil beneath the concrete flooring and sump.

H.5.1.1 Confirmation of Site-Specific Decontamination

On completion of decontamination at the concrete flooring and sump, those areas will be chip sampled to confirm whether decontamination was successful.

The following is identified in Ecology Guidance Publication # 94-111.

Section 5.3.2 Site-Specific Decontamination Methods

"At a minimum, requests for approval of site-specific decontamination methods must include:

- Information demonstrating that the proposed decontamination method is incompliance with the closure performance standard at WAC 173-303-610(2), including information demonstrating that the proposed decontamination method or standard will control, minimize, or eliminate post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, and dangerous waste decomposition products to the ground, surface water, ground water, and air.
- Information demonstrating that the proposed decontamination method is in compliance with federal, state, and local requirements.
- Information demonstrating that the proposed decontamination method is protective of human health and the environment.

- Proposed evaluation criteria to measure the effectiveness of the site-specific decontamination method. For example, MTCA unrestricted site use cleanup levels might be used to define when debris is considered decontaminated."

Section 5.6.1 Decontamination Options for Concrete

"…in some cases, decontamination of concrete using high-pressure steam or water washing, with appropriate site-specific performance standards, may be a better option than removal of the top 0.6 cm of concrete surface. If high-pressure steam or water washing is used, the site-specific decontamination performance standard might involve comparing concrete chip samples with MTCA unrestricted site use cleanup levels."

This confirmatory step will be documented. Documentation will include photos, dimensions (depth and area), and locations of chip sampling. Chip sample results from the contract analytical laboratory will be reviewed to confirm that target analytes have met closure performance standards (Table H-5). Once it has been determined that analytical results from chip sampling are below the closure performance standards, that portion of the 277-T Building DWMU will be considered clean.

H.5.1.2 Confirmation of Soil Sample Results

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

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

H.5.2 Role of the Independent Qualified Registered Professional Engineer

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

- Review 277-T Building visual inspection documentation.
- Observe and/or review decontamination of concrete surface and sump.
- Verify that locations of chip and soil samples are as specified in the SAP.
- Observe and/or review concrete chip and soil sampling activities.
- Review sampling procedures and results.
- Observe and/or review contaminated environmental debris removal (as applicable).
- Observe and/or review newly generated waste management and disposition records.
- Verify that closure activities were performed in accordance with this closure plan.

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

H.5.3 Closure Certification

Within 60 days of completion of closure of the 277-T Building DWMU, a certification that the DWMU has been closed in accordance with the specifications in this closure plan will be submitted to Ecology by registered mail. The certification will be signed by the Permittees and by the IQRPE. At the time of the closure certification submittal, the Permittees will submit to Ecology information to support the closure certification. [WAC 173-303-610(6)]

The supporting information will include at least the following:

- All field notes and photographs related to closure activities.
- A description of any minor deviations from this closure plan and justification for the deviations.
- Documentation of the removal and final disposition of any unanticipated contaminated environmental media.
- Documentation of the removal and final disposition of any newly generated waste.
- All laboratory and/or field data, including sampling procedures, sampling locations, QA/QC samples, and COC procedures for all samples and measurements, including samples and 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 be completed no more than 180 days after the effective date of the approved permit modification incorporating this closure plan. [WAC 173-303-610(4)(b)]

Should an unexpected event occur and an extension to the 180-day 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 expiration of the 180 days. [WAC 173-303-610(4)(c)]

The permit modification request will include the statement that closure activities, will of necessity, take longer than 180 days to complete, including 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
Closure Activities		
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).	

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

Activity	Description	Duration
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
	Perform concrete chip sampling and analysis in accordance with the SAP (Section H.4.4)	
	Perform data verification/validation and data quality assessment (Section H.4.5).	
	If necessary, remove contaminated concrete, resample, and analyze (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
Complete Closure of the 277-T Building DWMU	Complete closure activities within 180 days after the date on which the closure plan is effective. Request extension if necessary.	180 Days
Closure Certification		
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, C*losure and post-closure*

1

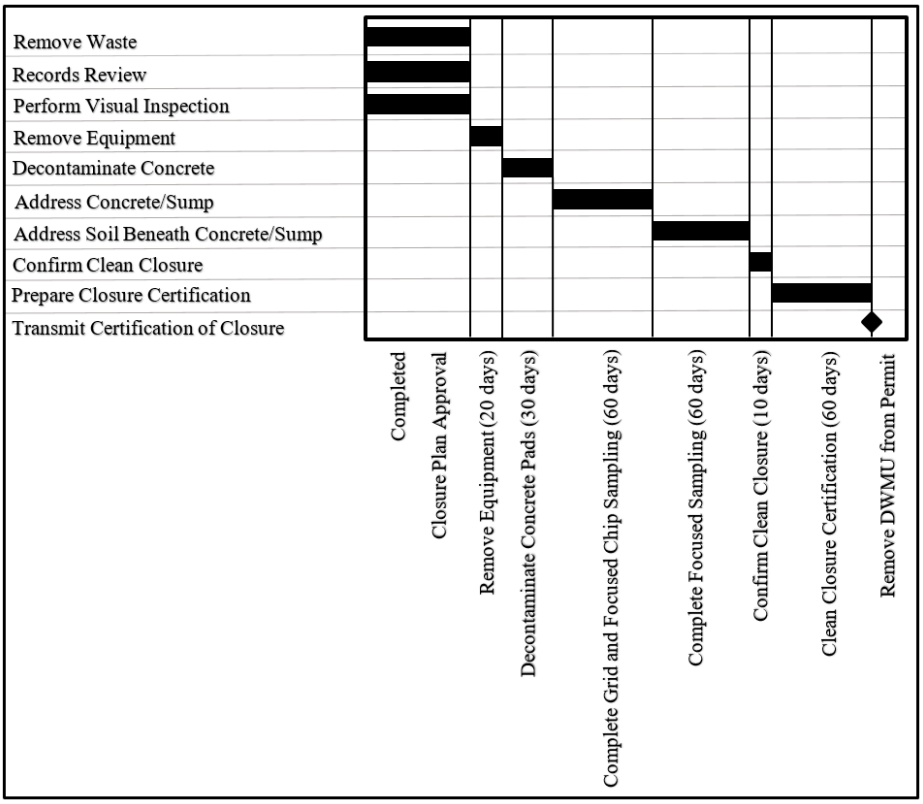

Figure H-6 277-T Building Closure Schedule Activities

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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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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ATTACHMENT B
T PLANT 277-T BUILDING
VISUAL SAMPLE PLAN SUPPORTING DOCUMENTATION

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Predetermined Number of Systematic Sampling Locations

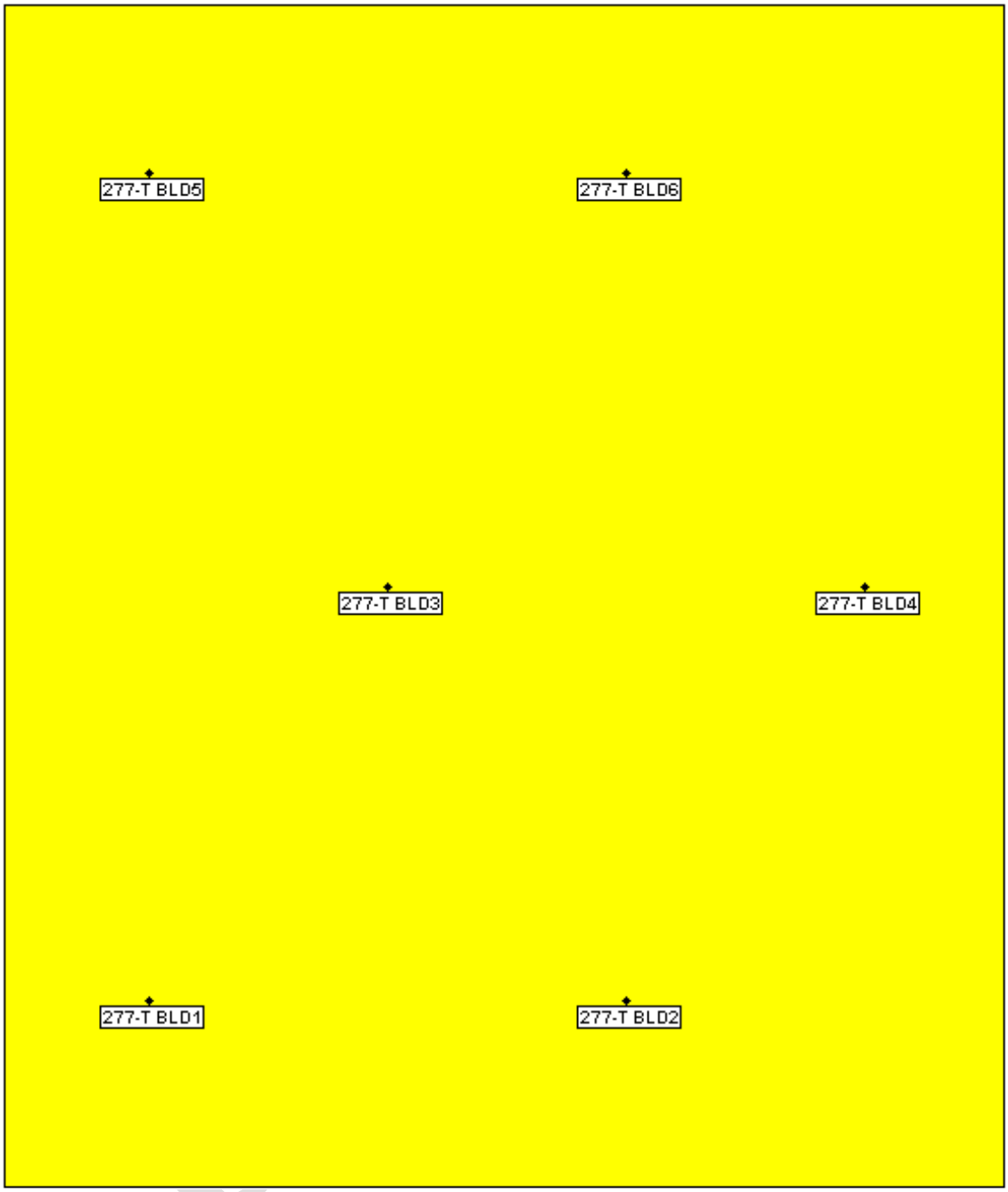
Summary

This report summarizes the sampling design, associated statistical assumptions, as well as general guidelines for conducting post-sampling data analysis. Sampling plan components presented here include how many sampling locations to choose and where within the sampling area to collect those samples. The type of medium to sample (i.e., soil, groundwater, etc.) and how to analyze the samples (in-situ, fixed laboratory, etc.) are addressed in other sections of the sampling plan.

The following table summarizes the sampling design. A figure that shows sampling locations in the field and a table that lists sampling location coordinates are also provided below.

SUMMARY OF SAMPLING DESIGN	
Primary Objective of Design	Direct Comparison of chip sample results to numeric closure performance standards
Sample Placement (Location) in the Field	Systematic with a random start location
User specified number of samples	6
Number of samples on map [a]	6
Number of selected sample areas [b]	1
Specified sampling area [c]	1287.00 ft^2
Size of grid / Area of grid cell [d]	15.738 feet / 214.5 ft^2
Grid pattern	Triangular

[a] This number may differ from the calculated number because of 1) grid edge effects, 2) adding judgment samples, or 3) selecting or unselecting sample areas.
[b] The number of selected sample areas is the number of colored areas on the map of the site. These sample areas contain the locations where samples are collected.
[c] The sampling area is the total surface area of the selected colored sample areas on the map of the site.
[d] Size of grid / Area of grid cell gives the linear and square dimensions of the grid used to systematically place samples.



(0, 0) South Corner

Area: Area 1						
X Coord	**Y Coord**	**Label**	**Value**	**Type**	**Historical**	**Sample Area**
4.8046	6.1562	277-T BLD1		Systematic		
20.5425	6.1562	277-T BLD2		Systematic		
12.6736	19.7857	277-T BLD3		Systematic		
28.4115	19.7857	277-T BLD4		Systematic		
4.8046	33.4152	277-T BLD5		Systematic		
20.5425	33.4152	277-T BLD6		Systematic		

Primary Sampling Objective

The primary purpose of sampling at this site is unknown to Visual Sample Plan. The number of samples may have been calculated in another sampling design in Visual Sample Plan, or may have been calculated externally to VSP. Alternatively, the purpose may be based entirely on professional judgment.

Selected Sampling Approach

This sampling approach is to determine if decontamination is successful. Systematic non-statistical sampling was created with a pre-determined number of samples based on professional judgement. Locating the sample points over a systematic grid with a random start ensures spatial coverage of the site and eliminates bias when selecting sampling locations. Locating the sample points systematically provides data that are all equidistant apart and ensures that all portions of the site are equally represented.

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Software and documentation available at http://vsp.pnnl.gov

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