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**PART V, CLOSURE UNIT GROUP 4 CONDITIONS
SINGLE SHELL TANK SYSTEM**

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PART V, CLOSURE UNIT GROUP 4 CONDITIONS
SINGLE SHELL TANK SYSTEM

UNIT DESCRIPTION

Between 1943 and 1964, 149 single shell tanks (SSTs) were constructed in the 200 East and 200 West Areas of the Hanford Site to store waste underground. All waste contained in the SSTs is considered to be mixed waste (MW) (radioactive and dangerous). Beginning in 1944, wastes were routed from spent fuel processing and other operations in the Hanford Site 200 East and 200 West Areas via buried lines to the SSTs for storage. Wastes were also routed from tanks to processing facilities and between tanks via miscellaneous underground storage tanks and facilities. The SSTs also received liquid radioactive wastes from Hanford facilities outside of the 200 Areas. The maximum quantity of waste in the SST System was approximately 77,500,000 gallons in 1966. As of November 30, 2011, the SSTs contained 27,510,000 gallons of mixed waste (*HNF-EP-0182, Waste Tank Summary Report, Rev. 284*). Some waste has leaked from the SST System or has been discharged in an unplanned manner. The estimated volume of leaked waste from the SSTs is approximately 3.8 million liter (1 million gallons).

The SST System includes twelve tank farms that contain 149 underground mixed-waste storage tanks, ancillary equipment, miscellaneous underground storage tanks, miscellaneous facilities, and soil and groundwater that are contaminated from leaks and unplanned releases. The SST System contains:

- 133 100-series SSTs (2 to 3.8 million liter [530,000 to 1 million gal] capacity)
- 16 200-series SSTs (200,000 liter [55,000 gal] capacity)
- Waste transfer vaults and associated miscellaneous underground storage tanks
- Tank pits, valve pits, and flush pits
- Pumps and valves
- Diversion boxes and diverter stations
- Numerous pipelines
- Above ground buildings and structures
- Other mechanical equipment
- Contaminated soils
- Contaminated groundwater

The 200 East Area SST Tank Farms are 241-A, 241-AX, 241-B, 241-BX, 241-BY, and 241-C. The 200 West Area SST Tank Farms are 241-S, 241-SX, 241-T, 241-TX, 241-TY, and 241-U. These twelve tank farms are geographically grouped into seven waste management areas (WMAs) for regulatory purposes. Most of the SST System is located within the WMAs; however, some components of the system, such as, ancillary equipment, transfer lines, and support facilities, are located outside WMA boundaries. Ancillary equipment, including transfer lines that are a part of the SST System, but outside of the WMA boundaries are in the 200-IS-1 Operable Unit (OU) and will be closed as a part of the 200-IS-1 OU. The SST System WMAs contain underground tank systems and components that are undergoing closure as MW storage and treatment units. The system is closing because all 149 SSTs have been identified as “unfit for use” pursuant to [40 CFR. § 265.191](#) (incorporated by reference in [WAC 173-303-400\(3\)](#)), as evidenced by *Single Shell Tank System Integrity Assessment Report*, RPP-10435, Revision 0, and Letter dated June 27, 2002, from James E. Rasmussen, Department of Energy, Office of River Protection, to Michael Wilson, Department of Ecology, and the system cannot achieve compliance with the Tank Systems requirements of the Washington State Dangerous Waste Regulations, [WAC 173-303-640](#), incorporated by reference, due in part to a lack of secondary containment. The system cannot receive additional dangerous waste for storage. Because of the complexity of the SST System, closure is expected to take decades to complete. Therefore, this closure Permit includes “pre-closure requirements” for the SST System as necessary to protect human health and the environment during the extended closure period. The SST System and its

1 associated ancillary equipment, containment systems, contaminated soil, and groundwater are subject to
2 the requirements of this Permit Chapter and [WAC 173-303](#).

3 Seven SST WMAs have been identified as follows:

Waste Management Area	Tank Farms	Total Number of SSTs
WMA A-AX:	241-A and AX tank farms	10
WMA B-BX-BY:	241-B, BX, and BY tank farms	40
WMA C:	241-C tank farm	16
WMA S-SX:	241-S and SX tank farms	27
WMA T:	241-T tank farm	16
WMA TX-TY:	241-TX and TY tank farms	24
WMA U:	241-U tank farm	16

4 All WMAs contain additional ancillary equipment, piping, and other equipment that supported the
5 operation of the tank systems. The WMAs also contain fill, soil, and vadose zone contaminated from
6 unplanned release (UPR) waste sites that will require remediation (corrective action) prior to final WMA
7 closure.

8 **WMA A/AX**

9 The 241-A tank farm is located in the 200 East Area and contains six 100 series tanks, each with an
10 operating capacity of 3.8 million liter (1 million gallons). The 241-A tank farm was built between 1954
11 and 1955 and the tanks ceased receiving waste between 1963 and 1980. The tanks are numbered 241-A-
12 101 through 241-A-106.

13 The 241-AX tank farm is located adjacent to the 241-A tank farm in the 200 East Area and contains four
14 100 series tanks, each with an operating capacity of 3.8 million liter (1 million gallons). The 241-AX
15 tanks were the last SSTs to be built. They operated from the 1960s to 1980. The tanks in the 241-AX
16 tank farm are numbered 241-AX-101 through 241-AX-104.

17 **WMA B/BY/BX**

18 The 241-B tank farm is located in the 200 East Area and was constructed between 1943 and 1944. These
19 tanks began receiving waste between 1945 and 1946 and ceased receiving waste between 1971 and 1978.
20 The 241-B tank farm contains twelve 100-series tanks with operating capacities of 1.9 million liters (0.5
21 million gallons) each, and four 200-series tanks each with operating capacities of 208,000 liters (55,000
22 gallons). The tanks in the 241-B tank farm are numbered 241-B-101 through 241-B-112, and 241-B-201
23 through 241-B-204.

24 The 241-BX tank farm contains twelve 100-series tanks with capacities of 1.9 million liters (0.5 million
25 gallons) each. The tank farm was built between 1946 and 1947, began receiving waste between 1948 and
26 1950, and ceased receiving waste between 1971 and 1980. The 241-BX tank farm is located adjacent to
27 the 241-BY tank farm, and the tanks are numbered 241-BX-101 through 241-BX-112.

28 The 241-BY tank farm is located north and adjacent to the 241-BX tank farm and contains twelve 100-
29 series tanks each with operating capacities of 2.8 million liters (0.75 million gallons). The tanks began
30 receiving waste between 1950 and 1953, and ceased receiving waste between 1971 and 1979. The tanks
31 in the 241-BY tank farm are numbered 241-BY-101 through 241-BY-112.

32 **WMA C**

33 The 241-C tank farm is located in the 200 East Area and contains sixteen buried SSTs. The 241-C tank
34 farm contains twelve 100-series tanks, each with operating capacities of 1.9 million liters (0.5 million
35 gallons), and four 200-series tanks, each with a tank operating capacity of 208,000 liters (55,000 gallons).
36 The 241-C tank farm was constructed between 1943 and 1944, and stopped receiving waste between 1976
37 and 1980.

1 **WMA S/SX**

2 The 241-S tank farm is located in the 200 West Area and is comprised of twelve tanks, each with
3 operating capacities of 2.8 million liters (0.75 million gallons). The tanks first received waste in 1950 and
4 1951, and ceased receiving waste between 1968 and 1980. The tanks in the 241-S tank farm are
5 numbered 241-S-101 through 241-S-112.

6 The 241-SX tank farm has fifteen 3.8 million liters (1 million gallons) tanks that were constructed in 1953
7 and 1954, and ceased receiving waste between 1958 and 1980. The tanks are numbered 241-SX-101
8 through 241-SX-115.

9 **WMA T**

10 The 241-T tank farm is located in the 200 West Area and contains twelve 100-series tanks, each with
11 operating capacities of 1.9 million liters (0.5 million gallons), and four 200-series tanks, each with a tank
12 operating capacity of 208,000 liters (55,000 gallons). The tanks were built in 1943 and 1944, and ceased
13 receiving waste between 1973 and 1979. The tanks in the 241-T tank farm are numbered 241-T-101
14 through 241-T-112, and 241-T-201 through 241-T-204.

15 **WMA TX/TY**

16 The 241-TX tank farm is located in the 200 West Area and contains eighteen 100-series tanks, each with
17 operating capacities of 2.8 million liters (0.75 million gallons). The tanks started receiving waste in 1949
18 and ceased receiving waste between 1969 and 1980. The tanks in the 241-TX tank farm are numbered
19 241-TX-101 through 241-TX-118.

20 The 241-TY tank farm is located adjacent to the 241-TX tank farm, and contains six 100-series tanks each
21 with capacities of 2.8 million liters (0.75 million gallons). The tanks were built in 1951 and 1952, and
22 ceased receiving waste between 1959 and 1980. The tanks in the 241-TY tank farm are numbered 241-
23 TY-101 through 241-TY-106.

24 **WMA U**

25 The 241-U tank farm is located in the 200 West Area and contains twelve 100-series tanks, each with
26 operating capacities of 1.9 million liters (0.5 million gallons), and four 200-series tanks, each with a tank
27 operating capacity of 208,000 liters (55,000 gallons). The 241-U tanks were constructed in 1943 and
28 1944, and ceased receiving waste between 1951 and 1980. The tanks in the 241-U tank farm are
29 numbered 241-U-101 through 241-U-112, and 241-U-201 through 241-U-204.

30 **200-IS-1 OPERABLE UNIT**

31 The 200-IS-1 OU contains all the ancillary equipment that is part of the SST System and outside of the
32 WMAs listed above in addition to ancillary equipment from other dangerous waste units and
33 Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) regulated ancillary
34 equipment.

35 **LIST OF ADDENDA**

36	Addendum A	Part A Form, March 1, 2011, rev. 13
37	Addendum B	SST Process Information
38	Addendum C	WMAs Process Information
39	Addendum D	Reserved, Groundwater Monitoring Plans
40	Addendum E	Reserved, Security
41	Addendum F	Tank Waste Retrieval Work Plans
42	Addendum G	Data Quality Objectives for Groundwater Monitoring
43	Addendum H	Reserved, Tier 2 Closure Plans
44	Addendum I	Reserved, SST System Inspection Schedule

1	Addendum J	Reserved
2	Addendum K	Contingency Plan
3	Addendum L	Reserved, Personnel Training
4	Addendum N	SST Sampling and Analysis Plans for Post-Retrieval and Closure Sampling
5	Addendum O	Reserved, Preparedness and Prevention
6	Addendum P	Compliance Schedule

7 **DEFINITIONS**

8 The following definitions are specific to the Single Shell Tank System. Other applicable definitions may
9 be contained in the Dangerous Waste Regulations ([WAC 173-303](#), incorporated by reference) and the
10 definitions section of the Site-Wide Permit.

11 **Ancillary equipment** means any device that is used to distribute, meter, or control the flow of dangerous
12 waste from its point of generation to a storage or treatment tank(s), between dangerous waste storage and
13 treatment tanks to a point of disposal onsite, or to a point of shipment for disposal offsite, in accordance
14 with [WAC-173-303-040](#), including, but not limited to, devices such as piping, fittings, flanges, valves,
15 pumps, and miscellaneous catch or storage tanks. Examples of ancillary equipment include components
16 both internal and external to the tank, such as pipelines (including hose-in-hose transfer lines [HIHTL]),
17 conduit, diversion boxes, , tank risers, pumps, measuring equipment (such as liquid level detection
18 systems), shield plugs, valve pits, flush pits, single shell tank pits, waste transfer vaults, transfer lines, and
19 miscellaneous structures.

20 **Aquifer** means a geologic formation, group of formations, or a part of a formation capable of yielding a
21 significant amount of groundwater to wells or springs.

22 **Best Basis Inventory** means a database developed by the U.S. Department of Energy (DOE) Hanford
23 Site to comply with the Data Access and Delivery Requirements in Section 9.6 of the [HFFACO](#). The
24 Best Basis Inventory is accessed through the Tank Waste Information Network System (TWINS).

25 **Catch tank** means underground tanks used to collect small amounts of waste drained from waste transfer
26 components, typically from pits and vaults. Catch tanks are associated with diversion boxes and diverter
27 stations designed to receive leakage from boxes, adjacent pipe encasements, and connected floor
28 drains. Waste is transferred from the catch tanks to double-shell tanks.

29 **Compliance schedule** means an enforceable schedule of required actions included in this Permit (for
30 example, actions, operations, or milestone events).

31 **Component** means, as defined in [WAC 173-303-040](#), incorporated by reference, either the tank or
32 ancillary equipment of a tank system. As used in this Permit, the term “component” is expanded to
33 include the subunits of a SST waste management area for which closure actions have been identified in
34 the SST System closure plan. For example, an individual tank, a piece or grouping of ancillary
35 equipment, a contiguous area of contaminated soil, and a groundwater plume are each defined as
36 components.

37 **Component closure activities** mean actions taken to close components in compliance with this permit.
38 By themselves, component closure activities do not constitute final closure of the SST System.

39 **Contaminant** means any chemical material that contaminates (pollutes) air, soil, or water. This term also
40 refers to any hazardous substance that does not occur naturally or that occurs at levels greater than those
41 naturally occurring in the surrounding environment (background).

42 **Corrective action** means the process taken to address past, present and potential future tank system waste
43 releases to the environment as necessary to protect human health and the environment, including all
44 releases from solid waste management units and areas of concern at the facility, releases that have
45 migrated beyond the facility boundary, and any other releases that would constitute a “facility” for
46 purposes of implementing corrective action as defined in [WAC 173-303-040](#) (incorporating

- 1 [RCW 70.105D.020](#)(4)), incorporated by reference. This process will comply with section 7.0 of the
2 [HFFACO](#), Condition II.Y of the Site-Wide Permit, [WAC 173-303-646W](#), incorporated by reference, and,
3 for releases from a regulated unit after closure, [WAC 173-303-645](#)(1)(c) , incorporated by reference.
- 4 **Cover block** means removable shields over cell openings, diversion boxes, valve pits, and pump pits.
- 5 **Dangerous Waste** means those solid wastes designated under [WAC 173-303](#) as dangerous or extremely
6 hazardous waste. As used in the Permit, the words “dangerous waste” will refer to the full universe of
7 wastes regulated by [Chapter 70.105 RCW](#) and [WAC 173-303](#) (including dangerous waste, hazardous
8 waste, extremely hazardous waste, the hazardous waste component of mixed waste, and acutely
9 hazardous waste).
- 10 **Data Quality Objective (DQO)** means a process implemented in accordance with the U.S.
11 Environmental Protection Agency (EPA), EPA/600/R-96/05 Guidance for the Data Quality Objectives
12 Process (EPA QA/G-4). The DQO serves as a tool for determining type, quantity, and quality of data
13 needed to support Agency decisions.
- 14 **Diversion box** means below-grade, reinforced concrete structures that provide a flexible method of
15 directing liquid waste from a given point to any other given point. The top of the diversion box is a cover
16 block that usually extends above-grade. Cover blocks vary in thickness from box to box. Some diversion
17 boxes are lined with steel. Transfer lines are connected in the diversion box by installing a jumper
18 between the connecting nozzles. Jumpers either can be fixed or flexible. Jumper installation or removal
19 can be a complex operation requiring a crane to remove and handle the cover block and to install the
20 jumper.
- 21 **Diverter station** means an in ground concrete vault similar to diversion boxes, except that gravity flow is
22 necessary.
- 23 **Double contained receiver tanks (DCRT)** means an interim underground receiver tank, generally at
24 25,000 gallons in capacity, constructed with an inner carbon steel containment vessel within a reinforced
25 concrete vault. DCRTs were intended primarily to receive interstitial liquid and serve as auxiliary or
26 catch tanks for other facilities. Leak detection instrumentation was usually placed in the annulus space
27 between the tank and concrete vault. A DCRT may be associated with a filter pit, pump pit, instrument
28 pit, flush pit, and a vault in which the DCRT is installed.
- 29 **Down gradient** a hydrologic term used to designate downstream (e.g., direction of groundwater flow).
- 30 **Dry Well** means a drainage receptacle constructed by digging a hole and refilling with coarse gravel; also
31 a watertight well casing used for inserting monitoring equipment.
- 32 **Dry Well Logging** means moisture detection and spectral or gross gamma-ray logging of dry wells to
33 determine moisture levels, and radionuclide levels of gamma-emitting radionuclides in soils and their
34 variability with depth, to detect whether tank leaks have occurred and to track mixed waste releases.
- 35 **ENRAF™ gauge** means an automated surface contact gauge that monitors the solid or liquid level of the
36 material in tanks.
- 37 **Exposure** means the contact of an organism with a chemical or physical agent (contaminant).
- 38 **Farm or Tank Farm** means an area containing a number of storage tanks, piping, ancillary equipment,
39 support facilities, soil and groundwater.
- 40 **Final Closure of the SST System** means the closure of all WMAs, and all SST components located
41 outside of the WMAs, in accordance with the requirements of this Permit, as certified pursuant to Permit
42 Condition V.4.G.1.c.
- 43 **Flush Pits** means the components for pipeline back flushing and decontamination operations. Cross-
44 connection control devices protect the flush pit system from contamination from mixed waste back
45 flowing into the raw water feed to the flushing system.

- 1 **Groundwater monitoring well** means boreholes drilled to groundwater at various depths, some of which
2 are completed as Resource Protection Wells per [WAC 173-160](#), incorporated by reference, where
3 instruments are lowered or water samples are taken to determine what is present in the well.
- 4 **Hose-in-Hose Transfer Line (HIHTL)**, a type of “**Temporary Waste Transfer Line**,” means a liquid
5 waste pipeline transfer system consisting of a primary hose encased in a secondary hose. The primary
6 hose is fitted with hose end connections suitable for attaching to valve manifolds with remote connectors.
7 For transfer lines too long to be made out of one continuous length of hose, two or more HIHTL
8 assemblies are joined at mid-point connections to establish the required route.
- 9 **Human intrusion** means person who might occupy the disposal site after closure and engage in normal
10 activities, such as agriculture, dwelling construction, or other pursuits in which the person might be
11 unknowingly exposed to hazards from the waste.
- 12 **Inactive Miscellaneous Underground Storage Tank (IMUST)** means underground tanks, generally
13 between 18,000 and 50,000 gallons in capacity, that were used for settling precipitates, neutralizing acidic
14 wastes before discharge, and capturing drainage from valves boxes, diversion boxes, and other spills from
15 the SSTs, and are no longer in use.
- 16 **Inadvertent intruder** means person who might occupy the disposal site after closure and engage in
17 normal activities, such as agriculture, dwelling construction, or other pursuits in which the person might
18 be unknowingly exposed to hazards from the waste.
- 19 **Initiation of waste retrieval** means initiation of the installation of equipment for retrieval of waste from
20 a tank or set of tanks.
- 21 **Interim stabilization** means actions taken to stabilize single-shell tanks to meet the criteria goal that a
22 tank contains less than 50,000 gallons of drainable interstitial liquid and less than 5,000 gallons of
23 supernatant liquid. The interim stabilization requirements are identified in United States District Court
24 Eastern District of Washington, No. CT-99-5076-EFS Consent Decree. This action was terminated and
25 all work has been completed. Current liquid volumes are estimated in HNF-EP-0182, Waste Tank
26 Summary Report, as revised monthly.
- 27 **Interlock** means circuitry and instrumentation that prevents activation or operation until required
28 conditions have been met.
- 29 **Institutional control** means methods to protect against person(s) who might occupy the disposal site
30 after closure and engage in normal activities, such as agriculture, dwelling construction, or other pursuits
31 in which the person might be unknowingly exposed to hazards from the waste on closed areas or waste
32 sites, or other exposure to contaminants left in place after SST closure. Institutional controls include site
33 access, restrictions, monitoring, and maintenance. Institutional controls must be maintained during a post-
34 closure period.
- 35 **Intrusion** means the inadvertent introduction of water or liquid waste into a tank or ancillary equipment
36 that commingles with wastes and affects the total volume of materials in the tanks or ancillary equipment.
- 37 **Isolation** means administrative and/or engineering controls to prevent liquid intrusion into a SST.
- 38 **Jumper** means a prefabricated piping device, usually remotely installed, that is used to make a temporary
39 connection between two waste transfer nozzles, or between a nozzle and a piece of equipment (e.g.,
40 pump, sluicer).
- 41 **Miscellaneous structures** mean special structures that support SST functions and do not fit into other
42 listing categories.
- 43 **Mixed waste**, as defined in [WAC 173-303-040](#), incorporated by reference, means a dangerous, extremely
44 hazardous, or acutely hazardous waste that contains both a nonradioactive hazardous waste component
45 and, as defined by the [10 CFR 20.1003](#), source, special nuclear, or by-product material subject to the
46 Atomic Energy Act of 1954 ([42 U.S.C. 2011](#) et seq.).

- 1 **Non-retrieval Mode** means any period in which a Single Shell Tank is not in retrieval mode, including
2 before retrieval when the SST still has waste stored in the tank, and after retrieval is complete, but the
3 SST has not yet been certified as closed.
- 4 **Nozzle** means the termination point for a transfer line in a diversion box designed to be a jumper
5 connection point.
- 6 **Particulate** means the particles in a gas stream that usually can be removed by filtration.
- 7 **pH** means a measure of the relative acidity or alkalinity of a solution. A neutral solution has a pH of 7,
8 acids have a pH of less than 7, and bases have a pH of greater than 7.
- 9 **Pit** means a covered, below grade facility, usually concrete, used for waste routing (with jumpers),
10 servicing, monitoring, and for equipment installation and connection. Major pits directly connected to
11 SSTs are heel pits, pump pits, salt well pits and sluice pits. Farm support pits include diversion boxes and
12 valve pits. Other pit facilities include condensate pump pits, condensate valve pits, condenser pits, flow
13 meter pits, flush pits, heat exchanger pits, hold-up tank pits, instrument pits, jet pump pits, leak detection
14 pits, receiver pits, salt tank pump pits, and service pits.
- 15 **Plume** means the distribution of contaminants a distance away from a point source in a medium such as
16 groundwater or air.
- 17 **Point of compliance**, unless otherwise specified, means a vertical surface located at the hydraulically
18 down gradient limit of the WMA that extends down into the uppermost aquifer underlying the WMA.
- 19 **Post-closure plan** means a document that describes how the owner and operator will meet applicable
20 requirements placed on portions of the SST System closed as a landfill or landfills after closure to ensure
21 environmental safety for a number of years after closure.
- 22 **Pre-closure period:** means the entire time period from the effective date of the Permit until a SST
23 closing unit (e.g. WMA, or a group of components) is certified as closed. The pre-closure period includes
24 the period preceding tank waste retrieval, the period during tank waste retrieval, the period following tank
25 waste retrieval before closure activities are initiated, and the period in which closure activities are
26 undertaken, up to the point that closure certification is obtained.
- 27 **Quarterly** means certain activities (e.g., groundwater monitoring) being performed four times a year
28 during January 1 through March 31, April 1 through June 30, July 1 through September 30 or October 1
29 through December 31.
- 30 **Retrieval** means the removal of liquid and solid wastes from SSTs and ancillary equipment.
- 31 **Retrieval Mode** means the period in which waste in a Single Shell Tank is subject to being retrieved. The
32 period begins under either of the following two conditions: 1) a primary leak detection or monitoring
33 device has been rendered out of service due to preparations for retrieval operations; or 2) waste has been
34 physically removed from the tank by retrieval operations. The period ends when retrieval of a Single
35 Shell Tank is certified as complete under *Washington v. Chu* Consent Decree, or is otherwise deemed
36 complete under the terms of [HFFACO](#) Action Plan, Appendix I, whichever is applicable.
- 37 **Riser** means the vertical access pipe through the dome and into the single shell tank. Risers generally
38 vary in diameter from ½” to 42”, and may terminate above grade on the floor of a pit.
- 39 **Sampling and analysis plan (SAP)** means a plan established for conducting sampling and analysis of
40 waste to support regulatory requirements.
- 41 **Single shell tank (SST)** means one of 149 underground reinforced concrete tanks located within 200 East
42 and 200 West Areas of the Hanford Facility, with a single carbon-steel liner, which are covered with 2 to
43 3 meters of earth. Capacity ranges from 209,175 liters to 3.79 million liters (55,000 gallons to 1 million
44 gallons) and are also identified as 100 or 200 series tanks. The tanks are used to store mixed waste.

- 1 **SST System** means the 100 and 200 series Single Shell Tanks, and all components related to that system,
2 following the definition of a “tank system” in [WAC 173-303-040](#), incorporated by reference. This
3 includes all process-waste pipeline systems including the extensive network of pipelines, tanks, diversion
4 boxes, catch tanks, waste vaults, valve pits, waste transfer lines, and related devices regardless of location
5 or “activity” status as defined in the Waste Information Data System (WIDS). The SST System consists
6 of multiple types of dangerous waste management units. The SST System is an unfit-for-use tank system.
7 Soils and groundwater that have been contaminated by the SST System are considered part of the SST
8 System for purposes of closure and corrective action.
- 9 **Single-shell tank pit** means the access ports located atop the tanks and provide a pathway into the tanks
10 for pumps and monitoring equipment.
- 11 **Stratigraphy** means the origin, composition, distribution, and succession of different layers or strata of
12 rock or earth.
- 13 **Supernatant** means the fluid lying above a settled residue at the bottom of a storage tank.
- 14 **Tank system** means a dangerous waste storage or treatment tank and its associated ancillary equipment
15 and containment system, as defined by [WAC 173-303-040](#), incorporated by reference.
- 16 **Tank Waste Retrieval Work Plan (TWRWP)** means a document that, among other matters, describes
17 how waste from an individual tank or tanks is to be retrieved, the technology to be used for retrieval, and
18 the type of monitoring used during retrieval. The TWRWP also includes a pre-retrieval risk assessment.
19 A more complete description of TWRWPs for purposes of the [HFFACO](#) is provided in [HFFACO](#) Action
20 Plan, Appendix I, section 2.1.3. A more complete description of TWRWPs for purposes of the
21 *Washington v. Chu* Consent Decree is provided in the Consent Decree Appendix C, Part 2.
- 22 **Temporary waste transfer line** means a line that is meant for temporary use that can be removed and
23 possibly used in another location and is in compliance with the requirements for ancillary equipment in
24 [WAC 173-303-640](#).
- 25 **Thermocouple** means a device consisting of two different conductors (usually metal alloys) that produce
26 a voltage proportional to a temperature difference, between either ends of the two conductors.
- 27 **Transfer lines** means piping (either temporary or permanent and above ground or below ground) used to
28 transfer waste from one location to another.
- 29 **Unconfined aquifer** means the subsurface water-bearing region that does not have impermeable
30 confining boundary layers to restrict water movement. In an unconfined aquifer the water table forms the
31 upper boundary.
- 32 **Vadose zone** means the subsurface zone of aeration. It is a subsurface zone containing water under
33 pressure less than that of the atmosphere, including water held by capillarity, and containing air or gases
34 generally under atmospheric pressure. This zone is limited above by the land surface and below by the
35 surface of the ‘zone of saturation’, i.e., the water table.
- 36 **Valve pits** means concrete structures located below ground that contain valve and jumper assemblies to
37 route liquid waste through the connected pipelines within a tank farm. Heavy, thick, grade-level blocks
38 cover each of the valve pits. When several tanks are undergoing simultaneous pumping to a single
39 receiver tank, the flow is routed to a valve pit. In the valve pit, the transfer lines of the sending tank are
40 manifolded to the receiver tank line by means of a series of valves and jumper connections. Two- and
41 three-way valves are built into each rigid jumper assembly to divert the flow in the required direction.
42 Waste also can be routed through the valve pit with stainless steel flex jumpers. Each valve pit is
43 equipped with a leak detection that is interlocked to shut down pumps. Each valve pit also has a flush
44 line connected to a flush pit or a drain line connected to an underground storage tank.
- 45 **Vault** means a below grade concrete structure consisting of one or more cells usually containing tanks.
46 Vaults were used as waste unloading points and for mixing and chemical adjustments prior to transfer to a
47 storage tank.

1 **Ventilation system** means equipment through which a structure (e.g., building, tank.) may be vented to
2 atmosphere pressure.

3 **Washington v. Chu Consent Decree** means the consent decree entered in *Washington v. Chu*, Case No.
4 08-5085 FVS, on October 25, 2010, providing certain requirements relating to SST retrieval and waste
5 treatment plant construction and initial operation.

6 **Waste Information Data System (WIDS)** means a database which identifies all waste management units
7 on the Hanford Site. It describes the current status of each unit, along with descriptive information (see
8 [HFFACO](#), Section 3.5).

9 **Waste Management Area (WMA)** means a tank farm or several tank farms that are grouped into a
10 contiguous area based on geographical proximity for dangerous waste management purposes. For the
11 SST System, the twelve tank farms are grouped into seven WMAs:

12	WMA A-AX:	241-A and AX tank farms
13	WMA B-BX-BY:	241-B, BX, and BY tank farms
14	WMA C:	241-C tank farm
15	WMA S-SX:	241-S and SX tank farms
16	WMA T:	241-T tank farm
17	WMA TX-TY:	241-TX and TY tank farms
18	WMA U:	241-U tank farm.

19 **Waste pile** means any noncontainerized accumulation of solid, nonflowing dangerous waste that is used
20 for treatment or storage.

21 **Waste transfer vaults** means shielded enclosures used to collect, clarify, and allow physical and
22 chemical modification of contents before such contents are transferred elsewhere.

23 **WMA Closure Actions** means actions that support and lead to final closure of a WMA (and ultimately to
24 final closure of the SST System).

25 **200-IS-1 Operable Unit (OU)** means a past practice unit designated under the [HFFACO](#) that includes:
26 (1) past-practice sites subject to HWMA corrective action and CERCLA remedial action requirements;
27 (2) SST System components that are located outside WMAs; and (3) TSD units that do not belong to SST
28 System (e.g., the CX Tank System, the Hexone Storage and Treatment Facility, and the 241-Z Treatment
29 and Storage Tanks). The 200-IS-1 OU includes more than 100 pipeline waste sites, pipeline component
30 waste sites (e.g., diversion boxes, catch tanks, valve pits, vaults, and control structures), and associated
31 waste sites that are the result of unplanned releases (leaks and spills) to the soil originating from the
32 pipelines or pipeline components.

33

1	<u>ACRONYMS</u>	
2	BBI	Best Basis Inventory
3	CFR	Code of Federal Regulations
4	CERCLA	Comprehensive Environmental Response, Compensation, and Liability
5		Act of 1980, as amended
6	CMI	Corrective Measures Implementation
7	DCRT	Double Contained Receiver Tank
8	DQO	Data Quality Objective
9	DOE	Department of Energy
10	DOE/RL	Department of Energy Richland Operational Office
11	DST	Double-Shell Tank
12	Ecology	Washington State Department of Ecology
13	HEPA	High Efficiency Particulate Air
14	<u>HFFACO</u>	Hanford Federal Facility Agreement and Consent Order
15	EHW	Extremely Hazardous Waste
16	EPA	Environmental Protection Agency
17	EIS	Environmental Impact Statement
18	HIHTL	Hose-In-Hose Transfer Line
19	HRR	High Resolution Resistivity
20	HWMA	Hazardous Waste Management Act
21	IQRPE	Independent Qualified Registered Professional Engineer
22	LDM	Leak Detection Monitoring
23	LDR	Land Disposal Restrictions
24	LOW	Liquid Observation Well
25	IMUST	Inactive Miscellaneous Underground Storage Tank
26	MRS	Mobile Retrieval System
27	MTCA	Model Toxics Control Act
28	MW	Mixed Waste
29	ORP	Office of River Protection
30	OU	Operable Unit
31	PA	Performance Assessment
32	QA	Quality Assurance
33	QC	Quality Control
34	RA	Risk Assessment
35	RD/RA	Remedial Design and Remedial Action
36	RAS	Radionuclide Assessment System
37	RCRA	Resource Conservation and Recovery Act of 1976
38	RCW	Revised Code of Washington

1	RMS	Radionuclide Monitoring System
2	RFI/CMS	RCRA Facility Investigation/Corrective Measures Study
3	SAP	Sample Analysis Plan
4	SGLS	Spectral Gamma Logging System
5	SST	Single Shell Tank
6	TFC	Tank Farm Contractor
7	TSD	Treatment, Storage, and Disposal
8	TWINS	Tank Waste Information Network System
9	TWRWP	Tank Waste Retrieval Work Plan
10	UPR	Unplanned Release
11	WAC	Washington Administrative Code
12	WIDS	Waste Information Data System
13	WMA	Waste Management Area

14

15 **V.4.A COMPLIANCE WITH PERMIT CONDITIONS**

16 **V.4.A.1** The Permittees will comply with all requirements in this Permit Chapter and its Addenda,
17 as set forth in the following conditions, for managing dangerous waste in the Single-Shell
18 Tank (SST) System. Permittees will comply with the requirements in Part I Standard
19 Conditions and, to the extent applicable, Part II General Facility Conditions.

20 **V.4.B FACILITY DESCRIPTION AND PROCESS INFORMATION**

21 **V.4.B.1 General Requirements**

22 **V.4.B.1.a** The Permittees will submit to Ecology three levels of SST facility process information
23 corresponding to the three-tiers of closure plans described in [HFFACO](#) Appendix I,
24 Section 2.0. The approved process information incorporated into this Permit will be used
25 to evaluate closure plans and closure activities for SST components, WMAs (including
26 contaminated soils within WMAs), and the entire SST.

27 **V.4.B.1.a.i** The SST System (Tier 1) process information, once approved by Ecology, will be
28 incorporated into this Permit as Addendum B, which will be a complete description of the
29 SST System.

30 **V.4.B.1.a.ii** WMA-level (Tier 2) process information, once approved by Ecology, will be
31 incorporated into this Permit as Addendum C.

32 **V.4.B.1.a.iii** Component specific (Tier 3) process information will be provided together with WMA
33 process information and will also be included in Addendum C.

34 **V.4.B.1.b** Any modifications to the SST System, WMA, or component specific process information
35 (e.g., to reflect changes to the SST System, or correct errors) must be submitted pursuant
36 to the permit modification process under Permit Condition I.C.3.

37 **V.4.B.1.c** When submitting updated SST System and WMA process information, any change shall
38 be summarized in a separate attachment to indicate components newly added, eliminated,
39 changed, or corrected to the SST System or WMAs.

40 **V.4.B.1.d** Permittees will describe all dangerous waste by its common name and dangerous waste
41 number(s) from [WAC 173-303-080](#) through [173-303-104](#), incorporated by reference.
42 When a dangerous waste contains multiple dangerous waste constituents, the waste
43 description will include all applicable dangerous waste numbers. For waste numbers that

1 are not listed in [WAC 173-303](#), incorporated by reference, the waste description must
2 include the following information:

- 3 a) Name of the process that generated the waste
- 4 b) Physical form (i.e., liquid, solid, sludge, or gas)
- 5 c) Weight, or volume and density, using one of the units of measure in
6 [WAC 173-303-380\(2\)\(c\)](#)
- 7 d) Date and management method for each waste including handling code specified in
8 [WAC 173-303-380\(2\)\(d\)](#).

9 **V.4.B.1.e** All wastes contained in the SSTs are currently designated as mixed waste (MW) in
10 accordance to [WAC 173-303-040](#), with the waste codes specified in SST Part A, Rev. 13.
11 Before any modification to this mixed waste designation or these waste codes, the
12 Permittees must submit a justification request to Ecology.

13 **V.4.B.1.f** All process information submitted must be certified in accordance with
14 [WAC 173-303-810\(13\)](#), incorporated by reference.

15 **V.4.B.2 SST System Process Information**

16 **V.4.B.2.a** The Permittees will submit the process information described in V.4.B.2.d that has been
17 identified as of the effective date of this Permit for the SST System to Ecology within
18 180 days after the effective date of this Permit. Permittees will submit such information
19 through a permit modification request in accordance with Permit Condition I.C.3. Upon
20 Ecology approval, the submitted information for SST System will update Addendum B to
21 this Permit.

22 **V.4.B.2.b** The Permittees will thereafter submit any new or revised SST System process
23 information to Ecology annually, by March 1 for review and approval if, over the past
24 calendar year, any new components or new or revised process information concerning the
25 SST System has been identified, or if any other changes need to be made. Permittees will
26 submit such information through a permit modification request in accordance with Permit
27 Condition I.C.3. For the purposes of this condition, a “new component” or new process
28 information is defined as a component or process information that has not previously
29 been included in Addendum A, Part A Form, Rev. 13, or previous SST System process
30 information submitted to Ecology and incorporated into this Permit.

31 **V.4.B.2.c** If no new or revised information is identified within the required updating time frame, the
32 Permittees will submit a letter in accordance with Permit Condition Part I.I, stating that
33 no new information has been identified.

34 **V.4.B.2.d The SST System process information consists of the following as it is
35 identified:**

- 36 a) All components of the SST System as defined in this Permit, including components
37 inside and outside the WMAs;
- 38 b) Incorporated diagram(s) and drawings of piping, inactive waste transfer lines, vaults,
39 pits, diversion boxes, and miscellaneous structures and other components located
40 inside and outside the WMAs, including newly identified components;
- 41 c) Dimensions, capacity, depth, and location (with coordinates and map) information for
42 all tanks;
- 43 d) Description of construction dates, service and operating history, waste transfer
44 history;
- 45 e) Waste generation, transfer, process flow and waste storage procedures;

- 1 f) Current waste types, amount (volume or other measure as appropriate) and
2 characterization;
3 g) Tank design or current vapors and emissions of acutely or chronically toxic
4 extremely hazardous waste (EHW) controls and air emission controls equipment.

5 **V.4.B.2.e** The Permittees shall maintain the SST System process information in the Hanford
6 Facility Operating Record, SST System file.

7 **V.4.B.3 WMA Process Information**

8 **V.4.B.3.a** The Permittees will submit the process information described in V.4.B.3.f and V.4.B.3.h
9 for each WMA to Ecology according to the schedules in V.4.B.3.b. to V.4.B.3.d.
10 Permittees will submit such information through a permit modification request in
11 accordance with Permit Condition I.C.3. Upon Ecology approval, the submitted
12 information for each WMA will update Addendum C to this Permit. Addendum C will
13 form the basis for the closure plan of each WMA.

14 **V.4.B.3.b** Within one hundred eighty (180) days of the effective date of this Permit, the Permittees
15 will submit process information for WMA C with the permit modification required to
16 meet [HFFACO](#) milestone M-045-82.

17 **V.4.B.3.c** By December 30, 2015, the Permittees will provide Ecology with a schedule of permit
18 modifications to be submitted to Ecology for review and approval for all WMA process
19 information other than WMA C. The schedule will define how all WMA process
20 information will be submitted to Ecology no later than December 30, 2025, with no more
21 than one WMA submittal to Ecology per year. Permittees will submit the WMA process
22 information permit modifications to Ecology in accordance with Permit Condition
23 V.4.B.3.a following the approved schedule. After submitting the permit modification for
24 the WMA process information and until that WMA is certified as closed, the Permittees
25 will submit to Ecology new or revised WMA process information annually, by March 1,
26 if new WMA components have been identified, or the WMA process information has
27 been changed over the past calendar year, including, but not limited to:

- 28 a) Waste retrieval;
29 b) Closure activities;
30 c) Reassignment of SST components located within 200-IS-1 OU or other OUs to
31 associated WMAs based on connectivity, proximity, process, waste type, or
32 characterization, or any other reasons, subject to Permit Condition V.4.G.5.f.

33 **V.4.B.3.d** If no new or revised process information is identified within the required updating time
34 frame, the Permittees shall submit a letter in accordance with Permit Condition I.I. stating
35 that no new information has been identified.

36 **V.4.B.3.e** Additional new or revised WMA process information may be submitted any time
37 necessary to support WMA closure plan submissions.

38 **V.4.B.3.f** The process information for each WMA, including 200-IS-1 OU in accordance with
39 Permit Condition V.4.G.5.c, will include, at a minimum, and as known at the time of
40 submission, the following:

- 41 a) A list of all single shell tanks within the WMA;
42 b) A list of all ancillary equipment located within the WMAs, including but not limited
43 to, temporary waste transfer lines, cross site transfer lines, catch tanks, double
44 contained receiver tanks (DCRT), and inactive miscellaneous underground storage
45 tanks (IMUST) and other piping;
46 c) Reserved

- 1 d) A description of major processes specific to the WMA including historical
- 2 operations, configuration changes, and current status;
- 3 e) A description of releases to soil and groundwater through overflows, spills, releases,
- 4 and leaks;
- 5 f) A detailed diagram of piping, and process flow for each tank and related waste
- 6 transfer lines, vaults, pits, diversion boxes, waste plies, and miscellaneous structures
- 7 and other components located inside the WMAs; WMA specific tank system
- 8 instrumentation;
- 9 g) Inventory or source contaminant concentrations of activities associated with each
- 10 item listed in f) above and m) below, including references to sampling data or process
- 11 knowledge;
- 12 h) A summary of tank integrity assessment and tank integrity status for each tank;
- 13 i) Description of the marking and labeling of the tanks;
- 14 j) Topographical maps with sufficient scales to show components included. Insert or
- 15 call-out maps may be used if necessary;
- 16 k) The area and boundary of the WMAs, to include map and description as necessary;
- 17 l) Maps to show the spatial distribution of tanks and ancillary equipment at surface, 10
- 18 feet, and 15 feet deep; in some cases, maps to show equipment distribution up to 50
- 19 feet depth may be necessary if the structures resides deeper than 15 feet, and
- 20 Permittees will identify such cases and include deep layer maps as necessary;
- 21 m) Identification of all non-tank system structures (e.g. septic systems, utilities,
- 22 groundwater wells, dry wells, buildings) that are located within the WMA boundary
- 23 and must be decommissioned before WMA closure.
- 24 n) Reserved

V.4.B.3.g

The process information for each component listed for a WMA will include the following items, if applicable (components may be grouped, with justification):

- 27 a) Construction (date, design, materials, completion)
- 28 b) Process description;
- 29 c) The current waste quantity (volume, weight, or density) information, using one of the
- 30 units of measure specified in [WAC 173-303-380\(2\)\(c\)](#), incorporated by reference,
- 31 and status of wastes;
- 32 d) Waste type, and physical form (i.e., liquid, solid, sludge, or gas);
- 33 e) The approximate location of each dangerous waste type left in components;
- 34 f) Waste constituents, chemical processes or reactions, occurred or occurring, if such
- 35 information is available or otherwise required in other provisions within this Permit;
- 36 g) Dimensions, capacity, depth and location;
- 37 h) The service history;
- 38 i) The transfer history, if applicable;
- 39 j) Release history (spills, leaks, overflows, or other incidents) including information
- 40 available through historic records regarding: the date, location, duration, type of
- 41 waste, and quantity of the release and mitigation measures and remedial actions
- 42 taken, if any. More detailed information will be provided by the deliverables
- 43 associated with [HFFACO](#) milestones M-045-61 and new deliverables established by
- 44 M-045-84 and M-045-85;
- 45 k) Integrity status;
- 46 l) Retrieval status;

- m) Temporary waste transfer lines status, if any;
- n) Leak test history and results for tanks and ancillary equipment;
- o) The operational status of field testing, leak detection monitoring (LDM) and mitigation, intrusion monitoring/control;
- p) A description of materials and equipment used to provide external corrosion protection, as required under [WAC 173-303-640](#)(3)(a)(iii)(B), incorporated by reference;
- q) Photographs, if available.

V.4.B.4 200-IS-1 OU Component Process Information

V.4.B.4.a By the date specified in [HFFACO](#) milestone M-015-90, incorporated by reference under the terms of Permit Condition I.A.4, Permittees will submit process information for SST components within 200-IS-1 OU as specified in Permit Condition V.4.B.3.f and V.4.B.3.g, where 200-IS-1 OU will be treated as a WMA in applying these conditions, through a permit modification process in accordance with Permit Condition I. C.3. Permittees may alternately satisfy this requirement by providing the same information in an RFI/CMS/RI/FS document submitted pursuant to [HFFACO](#) milestone M-015-90, which shall be incorporated by reference herein under the terms of Permit Condition I.A.4.

V.4.C SST SYSTEM GROUNDWATER MONITORING

V.4.C.1 Compliance Monitoring Requirements

V.4.C.1.a Initial Groundwater Monitoring Requirements

V.4.C.1.a.i Until WMA-specific groundwater monitoring plans pursuant to Permit Condition V.4.C.1.d are effective, the Permittees will follow the Dangerous Waste groundwater monitoring program described in the following documents for each WMA as interim groundwater monitoring requirements.

- a) “Interim Status Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area U” (DOE/RL-2009-74, Revision 0)
- b) “Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area C” (DOE/RL-2009-77, Revision 0)
- c) “Interim Status Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area S-SX” (DOE/RL-2009-73, Revision 0)
- d) “Interim Status Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area T” (DOE/RL-2009-66, Revision 0)
- e) “Interim Status Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area TX-TY” (DOE/RL-2009-67, Revision 0)
- f) “Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area A-AX” (DOE/RL-2009-70, Draft A) (upon approval)
- g) “Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area B-BX-BY” (DOE/RL-2009-72, Draft A) (upon approval)

V.4.C.1.a.ii Reserved

V.4.C.1.b Compliance Monitoring

V.4.C.1.b.i Permittees will implement compliance groundwater monitoring for each WMA under a groundwater monitoring plan in effect pursuant to Permit Condition V.4.C.1.d following the requirements of [WAC 173-303-645](#)(8) and (10), incorporated by reference, until each WMA is certified as closed.

- 1 **V.4.C.1.b.ii** Compliance groundwater monitoring will include the following minimum requirements:
- 2 a) Samples must be analyzed, at a minimum, for anions, cyanide, inductively coupled
3 plasma metals, and gross beta. A low-level gamma scan shall also be performed.
- 4 b) For the sole purpose of monitoring plume movement, tritium, chromium, cobalt-60,
5 Tc-99 and iodine-129 must be sampled and analyzed as characteristic tracers, along
6 with the monitoring parameters selected under this subsection of the Permit.
- 7 **V.4.C.1.b.iii** Permittees may request a release from the requirements of this section under the
8 following conditions, through the permit modification request under Permit Condition I.
9 C.3:
- 10 a) A WMA is certified as clean closed and is not subject to post-closure care;
- 11 b) A WMA is landfill closed and a post-closure care plan, including a post-closure
12 groundwater monitoring plan, has been approved and is in effect; or
- 13 c) A remedial action for contaminated soil or groundwater OU under a WMA
14 commences and is in operation, and Permittees demonstrate that continuation of the
15 compliance groundwater monitoring is impracticable and unnecessary.
- 16 **V.4.C.1.c Groundwater Protection Standard**
- 17 **V.4.C.1.c.i** Permittees will follow the requirements of this section to establish groundwater
18 protection standards in accordance with [WAC 173-303-645](#)(3), incorporated by
19 reference. The standards established in this section will provide the groundwater
20 protection standards to be utilized in groundwater monitoring plans developed under
21 Permit Condition V.4.C.1.d. The standards must include the compliance monitoring
22 requirements identified in Permit Condition V.4.C.1.b.ii
- 23 **V.4.C.1.c.ii** No later than sixty (60) days prior to any groundwater monitoring plan submittal under
24 Permit Condition V.4.C.1.d.ii, Permittees will submit a DQO for groundwater monitoring
25 to Ecology for approval through a permit modification request in accordance with Permit
26 Condition I.C.3. Once approved, the DQO for groundwater monitoring will be
27 incorporated in this permit as Addendum G. The groundwater monitoring plan shall be
28 developed following the DQO process and implement the SAP requirements of the DQO.
29 The DQO will:
- 30 a) Be developed in conjunction with the development of each WMA groundwater
31 monitoring plan and include WMA specific requirements;
- 32 b) Establish the contaminants of concern for groundwater monitoring, together with
33 concentration limits, as described in [WAC 173-303-645](#)(4) and (5), incorporated by
34 reference. Dangerous waste constituents listed in both Chemical Test Methods for
35 Designating Dangerous Waste, Appendix 5, Groundwater Monitoring List [as
36 provided in [WAC 173-303-110](#)(7)], and Tables 4-1, 4-2, and 4-4 of *Single-Shell Tank*
37 *Component Closure Data Quality Objectives (RPP-23403, Rev.4)* shall serve as a
38 guideline and basis for determining the contaminants of concern;
- 39 c) Establish the number of groundwater monitoring wells required, locations of the
40 wells, sampling methods, monitoring requirements, reporting requirements, and
41 alternative monitoring and sampling requirements within the vadose zone in the
42 absence of groundwater.
- 43 **V.4.C.1.c.iii** The DQO must include a SAP for each WMA, which will specify sampling and
44 analytical methods and procedures for dangerous waste constituents. The SAP will, at a
45 minimum:
- 46 a) Describe the analytical laboratory processes to be used to analyze the various
47 samples, constituents, and the uncertainties (range) of the measurements.

- 1 b) Describe the QA/QC processes to be employed for analytical data/processes.
2 Describe the statistical procedures to be used to make comparisons/determinations.
3 c) Identify Analytes of Concern following Permit Conditions V.4.C.1.c.i and
4 V.4.C.1.c.ii.
5 d) Specify groundwater monitoring well sampling methods and specify the methods and
6 procedures to be used in sample collection, preservation, transportation, and
7 documentation.
8 e) Specify water level measurements criteria and describe how water level
9 measurements will be made and documented.
10 f) Address the technical basis for the sampling pump intake position should any
11 groundwater monitoring well have a screen length exceeding 15 feet and the water
12 column exceeds 15 feet.

13 **V.4.C.1.d Groundwater Monitoring Plans**

14 **V.4.C.1.d.i** The Permittees are required to develop a groundwater monitoring plan for each WMA
15 and submit each plan to Ecology for approval as a permit modification request under
16 Permit Condition I.C.3, in accordance with the schedule specified in Permit Condition
17 V.4.C.2.d.ii. The approved groundwater monitoring plans will be incorporated into this
18 Permit as Addendum D. Each groundwater monitoring plan becomes effective, and must
19 be implemented beginning, 45 days after incorporation into this Permit.

20 **V.4.C.1.d.ii** The groundwater monitoring plan for WMA C will be submitted to Ecology for approval
21 within 120 days of the effective date of this Permit. Groundwater monitoring plans for
22 another three WMAs, as selected by the Permittees, will be submitted within one hundred
23 and eighty (180) days of the submittal of WMA C monitoring plan. Groundwater
24 monitoring plans for the remaining three WMAs will be submitted within three hundred
25 and sixty five (365) days of the submittal of WMA C monitoring plan.

26 **V.4.C.1.d.iii** Each groundwater monitoring plan submitted must be certified pursuant to
27 [WAC 173-303-810\(12\)](#) and [-810\(13\)](#), incorporated by reference.

28 **V.4.C.1.d.iv** The Permittees must include sufficient supporting background information in each WMA
29 groundwater monitoring plan to justify conditions proposed in the plan, including, but not
30 limited to:

- 31 a) Hydrogeologic data that may substantiate the direction of groundwater flow beneath
32 each WMA, the methods used to make this determination, and the degree of
33 uncertainty of this determination;
34 b) A detailed characterization and presentation of the soil column, including
35 stratigraphy, soil physical properties and parameters;
36 c) Characteristics of perched water, if any;
37 d) The characteristics of the uppermost aquifer beneath the WMA, and the hydraulic
38 connection between the uppermost aquifer and any other aquifer system(s);
39 e) A description of hydrogeologic conditions and contaminant concentrations, including
40 uncertainty for the unconfined aquifer at all the groundwater monitoring wells.

41 **V.4.C.1.d.v** The groundwater monitoring plans will describe the conditions under which Permittees
42 will monitor groundwater in each WMA to determine compliance with the groundwater
43 protection standard established in Permit Condition V.4.C.1.c, and include the following:

- 44 a) Address the groundwater flow system including the depth to groundwater, vertical
45 gradients, direction of groundwater flow, and flow rate in the uppermost aquifer.

- 1 b) Include a sufficient number of groundwater monitoring wells, and add new wells as
2 necessary, to catch the contaminant movements in the groundwater and identify the
3 compliance status.
- 4 c) Identify point(s) of compliance that satisfy [WAC 173-303-645](#)(6), incorporated by
5 reference, for each WMA. Groundwater monitoring wells shall be identified to
6 represent the point(s) of compliance. In the event no existing wells can be identified
7 to represent point(s) of compliance, new well(s) shall be proposed under [HFFACO](#)
8 M-24 milestones.
- 9 d) Specify the monitoring frequency for parameters based on their strengths,
10 concentrations, the need to evaluate compliance status, the need to evaluate
11 effectiveness of corrective action, the need to detect potential tank leaks, and the risk
12 to human health and the environment.
- 13 e) Specify responses and reporting procedures in the event that any dangerous waste
14 constituent concentration at the point of compliance exceeds applicable groundwater
15 standards. The Permittees shall specify in the groundwater monitoring plans a
16 written reporting procedure, including a reporting timeframe.

17 **V.4.C.1.d.vi** The Permittees must submit revised groundwater monitoring plans, in accordance with
18 Permit Condition I.C.3 and certified pursuant to [WAC 173-303-810](#)(12) and [-810](#)(13),
19 within ninety (90) days of any condition that warrants a plan modification. Conditions
20 that may warrant a plan modification include, but are not limited to:

- 21 a) Groundwater monitoring wells used in the groundwater monitoring system are
22 projected to “go dry” (i.e., no longer be suitable for sampling) within two (2) years of
23 the effective date of a groundwater monitoring plan, or within two years of the
24 submittal date of a groundwater report submitted pursuant to Permit Condition
25 V.4.C.2;
- 26 b) The current groundwater monitoring system is found to be inadequate and additional
27 groundwater monitoring wells (existing wells or new wells) are determined to be
28 needed;
- 29 c) The approved groundwater plan is found to no longer satisfy any part of the
30 requirements of [WAC 173-303-645](#)(8), (9), (10), or (11);
- 31 d) A SAP change is proposed, including sampling positions, frequencies, monitoring
32 methods;
- 33 e) A substantial change of existing conditions has been caused by tank leak, tank
34 failure, tank closures, or groundwater remedial actions;
- 35 f) A substantial change in hydrogeologic conditions.

36 **V.4.C.2 Corrective Action Monitoring**

37 **V.4.C.2.a** The following permit conditions are premised on [HFFACO](#) Action Plan Section 5.5,
38 which provides: “Ecology, EPA, and DOE agree that past-practice authority may provide
39 the most efficient means for addressing mixed waste groundwater contamination plumes
40 originating from a combination of TSD and past-practice units.” Ecology reserves the
41 authority to impose additional conditions through permit modification if groundwater
42 monitoring specified in RD/RA Work Plans incorporated through the following
43 conditions is found to be inadequate to meet corrective action performance monitoring
44 requirements.

45 **V.4.C.2.b** For the purpose of corrective action, the groundwater point of compliance is throughout a
46 contaminated plume as provided under [WAC 173-303-64620](#)(4)(g) and [WAC 173-340-](#)
47 [720](#)(8)(b), incorporated by reference, unless the criteria for approval of a groundwater
48 conditional point of compliance under [WAC 173-340-720](#)(8)(c) (and if triggered,

1 [WAC 173-340-720](#)(8)(d) are met. Groundwater monitoring systems shall include all
2 wells necessary to define the scope, concentrations, and migration of groundwater plumes
3 originating from the SST System.

4 **V.4.C.2.c Corrective action performance monitoring requirements for WMA T and**
5 **WMA TX-TY:**

- 6 a) Permittees will comply with the requirements and schedules of [HFFACO](#) Action Plan
7 Section 7.3.10 and [HFFACO](#) Milestone M-016-00 for performance monitoring for
8 the 200-ZP-1 OU (including *Performance Monitoring Plan for the 200-ZP-1*
9 *Groundwater Operable Unit Remedial Action, DOE/RL-2009-115, Revision 0*),
10 incorporated by reference under the terms of Permit Condition I.A.4.
- 11 b) Permittees will evaluate the effectiveness of the 200-ZP-1 OU remedial action for
12 groundwater contamination originating from the WMA T and WMA TX-TY after
13 200-ZP-1 OU remedial action commences, in the annual Hanford Site Groundwater
14 Monitoring and Performance Report submitted pursuant to Permit Condition V.4.C.2.

15 **V.4.C.2.d Corrective action performance monitoring requirements for WMA S-SX and**
16 **WMA-U:**

- 17 a) Permittees will comply with the requirements and schedules of [HFFACO](#) Action Plan
18 Section 7.3.10 and [HFFACO](#) Milestone M-16-00 for performance monitoring for the
19 200-UP-1 OU, incorporated by reference under the terms of Permit Condition I.A.4.
- 20 b) Permittees will evaluate the effectiveness of the 200-UP-1 OU remedial action for
21 groundwater contamination originating from the WMA S-SX and WMA-U after
22 200-UP-1 remedial action commences. Permittees will summarize the evaluation in
23 the annual Hanford Site Groundwater Monitoring and Performance Report submitted
24 pursuant to Permit Condition V.4.C.2.

25 **V.4.C.2.e Corrective action performance monitoring requirements for WMA B-BX-BY**
26 **and WMA-C:**

- 27 a) Permittees will comply with requirements and schedules of [HFFACO](#) Action Plan
28 Section 7.3.10 and [HFFACO](#) Milestones M-015-21A and M-016-00 for performance
29 monitoring for the 200-BP-5 OU remedial action, incorporated by reference under
30 the terms of Permit Condition I.A.4.
- 31 b) Permittees will evaluate the effectiveness of the 200-BP-5 OU remedial action for
32 groundwater contamination originating from the WMA B-BX-BY and WMA-C after
33 200-BP-5 OU remedial action commences. Permittees will summarize the evaluation
34 in the annual Hanford Site Groundwater Monitoring and Performance Report
35 submitted pursuant to Permit Condition V.4.C.2.

36 **V.4.C.2.f Corrective action performance monitoring Requirements for WMA A-AX:**

- 37 a) Permittees will comply with requirements and schedules of [HFFACO](#) Action Plan
38 Section 7.3.10 and [HFFACO](#) Milestones M-015-21A and M-016-00 for performance
39 monitoring for the 200-PO-1 OU remedial action, incorporated by reference under
40 the terms of Permit Condition I.A.4.
- 41 b) Permittees will evaluate the effectiveness of the 200-PO-1 OU remedial action for
42 groundwater contamination originating from the WMA A-AX, and WMA C after
43 200-PO-1 OU remedial action commences. Permittees will summarize the evaluation
44 in the annual Hanford Site Groundwater Monitoring and Performance Report
45 submitted pursuant to Permit Condition V.4.C.2.

46

1 **V.4.C.3 Groundwater Monitoring and Performance Report**

2 **V.4.C.3.a** Permittees will submit an annual Hanford Site Groundwater Monitoring and Performance
3 Report to Ecology for review and approval no later than July 31 of each calendar year.
4 The annual groundwater monitoring report will summarize the groundwater monitoring
5 results compiled under Permit Condition V.4.C.1.b.i for the previous calendar year. The
6 report will include, but not be limited to, the following information:

- 7 a) An evaluation of groundwater contamination and compliance status;
8 b) An evaluation of the effectiveness of groundwater remedial actions, if any.
9 c) An evaluation of tank leaks based on groundwater monitoring;
10 d) The calculated (or measured) rate of migration of dangerous waste or dangerous
11 waste constituents in the groundwater during the reporting period;
12 e) An evaluation of the monitoring system, including the need for well replacement,
13 new well addition, well malfunction and remedy, and need for modification of
14 monitoring plan;
15 f) Groundwater monitoring data to support the evaluation and analysis.

16 **V.4.C.3.b** The groundwater monitoring reports and monitoring records will be kept in the Hanford
17 Facility Operating Record, SST System file.

18 **V.4.C.4 Well Installation and Decommissioning**

19 **V.4.C.4.a** Prior to the installation of any additional wells to satisfy the groundwater monitoring
20 requirements of this Permit, the Permittees must submit, for Ecology's approval, a well
21 installation plan that specifies the basis for well replacement (if applicable), including,
22 but not limited to, any computer modeling results performed to determine new
23 groundwater monitoring wells; location of the proposed wells; well design; screen length
24 and placement; construction and installation procedures; and management of wastes
25 generated during well construction.

26 **V.4.C.4.b** New groundwater monitoring and resource protection wells will be constructed in
27 accordance with the resource well construction standards of [WAC 173-160](#), incorporated
28 by reference.

29 **V.4.C.4.c** For all newly constructed groundwater monitoring wells, the Permittees must justify the
30 placement and length of the screened interval based on groundwater sampling data
31 obtained during well construction.

32 **V.4.C.4.d** Wells that are no longer sampled due to water table decline (i.e., "dry wells"), and/or for
33 which there is no future use, must be decommissioned. For purposes of this Permit,
34 "potential future use" criteria consists of the well's use as documented in a work or
35 monitoring plan or the well's documented use within a period of two (2) years after the
36 "dry well" designation.

37 **V.4.C.4.e** Permittees must follow the decommissioning requirements of [WAC 173-160](#),
38 incorporated by reference, in decommissioning any groundwater monitoring well.

39 **V.4.C.4.f** In the event an "unsuitable-for-use," a "dry," or a "candidate for decommissioning" well
40 must be replaced to satisfy the monitoring requirements of this Permit, the Permittees
41 must replace the well within two (2) years from the date of the determination.

42 **V.4.C.5 Contingent Post-Closure Groundwater Monitoring**

43 **V.4.C.5.a** In the event that any portion of the SST System is closed as a landfill under Permit
44 Condition V.4.G 2.c., groundwater monitoring and reporting must be performed as part
45 of the post-closure care measures during the entire post-closure care period. The post-
46 closure groundwater monitoring must meet all the post-closure care groundwater

1 monitoring requirements specified in the Contingent Landfill Closure and Post-Closure
2 Plan developed under Permit Condition V.4.G.4.b.ii (c), as approved by Ecology under
3 Permit Condition V.4.G.4.a.iv.

4 **V.4.D CORRECTIVE ACTION**

5 **V.4.D.1** The Permittees will conduct corrective action for releases of dangerous waste and
6 dangerous waste constituents from the SST System as required by Permit Condition
7 II.Y.1, except as provided in Permit Condition II.Y.2 for work under the [HFFACO](#).

8 **V.4.D.2** Permittees will comply with the requirements and schedules of [HFFACO](#) milestone M-
9 045-61, which are incorporated by reference under the terms of Permit Condition I.A.4.,
10 with respect to submitting to Ecology a Phase 2 RFI/CMS Report for WMA C.

11 **V.4.D.3** Concurrent with submission of the report required under Permit Condition V.4.D.2,
12 Permittees will submit a permit modification request to Ecology for selection of a
13 corrective action related to WMA C.

14 **V.4.D.4** Permittees will comply with the requirements and schedules of [HFFACO](#) milestone M-
15 045-62, which are incorporated by reference under the terms of Permit Condition I.A.4.,
16 to submit to Ecology a Corrective Measures Implementation (CMI) Work Plan for WMA
17 C.

18 **V.4.D.5** No later than December 31, 2014, Permittees will submit a preliminary schedule and
19 enabling assumptions for completing corrective action at all remaining WMAs. The
20 schedule and documentation will address:

- 21 a) The development of RFIs/CMSs, the submission of permit modification requests for
22 the selection of corrective actions, and the submission of Corrective Measures
23 Implementation (CMI) Work Plans, with schedules.
- 24 b) The development of WMA closure schedules under [HFFACO](#) milestones M-045-84
25 and M-045-85, and allow Permittees to meet the date established in [HFFACO](#)
26 milestone M-045-00 for completing the closure of all SST farms.
- 27 c) The schedule for the elements of a RFI/CMS work plan as defined in [HFFACO](#)
28 Action Plan Section 11.6 and Appendix I.
- 29 d) Identify any early actions that are necessary to reduce risk in accordance to the
30 information provided in the Phase I RFI/CMS, annual Hanford Site Groundwater
31 Monitoring and Performance Report, and final tank closure and water management
32 EIS.

33 **V.4.D.6** Permittees will complete implementation of interim measures in accordance with the
34 requirements of [HFFACO](#) milestone M-045-56, which are incorporated by reference
35 under the terms of Permit Condition I.A.4.

36 **V.4.D.7** Permittees will control surface water infiltration in the WMAs in accordance with the
37 requirements of [HFFACO](#) milestone M-045-59, which are incorporated by reference
38 under the terms of Permit Condition I.A.4.

39 **V.4.D.8** Permittees will comply with the requirements of [HFFACO](#) milestone M-045-92, which
40 are incorporated by reference under the terms of Permit Condition I.A.4, with respect to
41 interim barrier installation.

42 **V.4.E PRE-CLOSURE REQUIREMENTS**

43 This section describes the requirements the Permittees must follow to provide for hazard
44 prevention, leak detection/intrusion monitoring, tank integrity assessment, and inspection
45 during the extended pre-closure period for the SST System. Unless otherwise specified,

1 the requirements of this Permit section apply to the SST System from the effective date
2 of this Permit until the SST System is certified as closed.

3 **V.4.E.1 Safety Controls and Hazards Prevention**

4 **V.4.E.1.a Preparedness and Prevention**

5 **V.4.E.1.a.i** Within 60 days of the effective date of the Permit, the Permittees will submit to Ecology
6 for review and incorporation into this Permit chapter, a description of the practices to
7 prevent hazards (Preparedness and Prevention) in the SST system pursuant to [WAC 173-](#)
8 [303-340](#) and [WAC 173-303-640\(5\)](#), incorporated by reference, or provide to Ecology a
9 justification of any request for a waiver(s) of the preparedness and prevention
10 requirements of [WAC 173-303-340](#). The description will be submitted through a permit
11 modification request under Permit Condition I.C.3. Once approved, the description of
12 Preparedness and Prevention will be incorporated into this Permit as Addendum O.

13 **V.4.E.1.a.ii** The Permittees will implement and maintain practices specific to the SST System, as
14 described in Addendum O, pursuant to [WAC 173-303-340](#). This will include:

- 15 a) Using and maintaining the internal and external communications and emergency
16 equipment specified in Addendum O, in accordance with the requirements of [WAC](#)
17 [173-303-340\(2\)](#), incorporated by reference.
- 18 b) Operating and maintaining runoff controls and other systems to minimize run-on and
19 infiltration of liquids to SST tanks, catch tanks, vaults, pits, and any ancillary
20 equipment or structures described in Addendum O, in accordance with the
21 requirements of [WAC 173-303-640\(5\)](#), incorporated by reference. Actions
22 undertaken in compliance with Permit Condition V.4.D.7 will go toward satisfying
23 this Condition.
- 24 c) Conducting any pumping activities (removal of waste from SST ancillary equipment
25 or component), except for tank waste retrieval operations conducted under Permit
26 Condition V.4.F, in compliance with [WAC 173-303-640\(5\)\(b\)](#). Permittees will
27 notify Ecology sixty (60) days prior to such pumping activities, with the notification
28 to include estimated duration of the operation, system design and basis for the
29 activity to include why the Permittees need to take this action and how the Permittees
30 estimated the duration of the pumping activity, description of the waste, and
31 anticipated plan for disposition of the waste. Upon completion of the pumping
32 activities, Permittees will provide Ecology with the actual duration of the operation
33 and final disposition of the waste. Should the Permittees determine pumping
34 activities must be conducted in less than sixty (60) days, Permittees will notify
35 Ecology with the schedule and a basis for conducting the pumping activities, along
36 with the information required in the 60-day notification. Permittees will notify
37 Ecology within 14 days if they exceed the estimated duration or volume of the
38 pumping activity.

39 **V.4.E.1.a.iii** The Permittees will implement the emergency procedures specified in Addendum K, in
40 the event of a fire, explosion, or release that could threaten human health or the
41 environment, in accordance with the requirements of [WAC 173-303-340](#) and [WAC-173-](#)
42 [303-360](#), incorporated by reference.

43 **V.4.E.1.b Air Emissions**

44 Pursuant to [WAC 173-303-810\(8\)\(c\)](#) and [WAC 173-303-395\(2\)](#), the Permittees must
45 conduct activities under this Permit so as to maintain compliance with, and not cause the
46 violation of any term of, Hanford Site Air Operating Permit (#00-05-006) and "Criteria
47 and Toxic Air Emissions NOC Application for Operations of Waste Retrieval Systems in

1 SST Farms as Supplemented with C Farm Exhauster Operations” (Order # DE05NWP-
2 002).

3 **V.4.E.1.c Waste Management and Accumulation**

4 **V.4.E.1.c.i** Because the SST System is closing as an unfit for use tank system, the Permittees are not
5 authorized to introduce any additional dangerous waste into the SST System, except upon
6 prior written approval from Ecology. The Permittees may utilize DST system
7 supernatant for the purpose of SST waste retrieval as specified in a TWRWP that has
8 become effective under the *Washington v. Chu* Consent Decree, or approved under the
9 [HFFACO](#), and following the waste compatibility assessment requirement of Permit
10 Condition V.4.F.1.a.v.

11 **V.4.E.1.c.ii** The Permittees must maintain a current listing of any containerized waste accumulation
12 areas (e.g., 90-day and satellite accumulation areas) within the SST System footprint (i.e.,
13 WMAs). Documentation of waste designation, container accumulation area management
14 and locations, and any contaminated equipment storage areas must be maintained in the
15 Hanford Facility Operating Record, SST System file.

16 **V.4.E.1.c.iii** The Permittees are not authorized to store waste in containers within the SST System
17 footprint (i.e., WMAs) for more than ninety (90) days without an approved permit
18 modification to this chapter in accordance with Permit Condition I.C.3. The Permittees
19 may request Ecology approval of a thirty (30)-day extension to store dangerous waste for
20 more than ninety (90) days without a permit modification if dangerous waste must remain
21 onsite due to unforeseen, temporary and uncontrollable circumstances.

22 **V.4.E.1.d Mapping and Marking**

23 **V.4.E.1.d.i** Within three hundred and sixty five (365) days after the effective date of this Permit, the
24 Permittees will develop a Mapping and Marking Plan for the SST System, including
25 piping and ancillary equipment. The Plan will be updated annually. The Permittees will
26 submit and update the plan pursuant to the permit modification process in Permit
27 Condition I.C.3.

28 **V.4.E.1.d.ii** The Mapping and Marking Plan for the SST System, at a minimum, will:

- 29 a) Include a schedule for implementation and must describe the methods to comply with
30 the requirements of Permit Conditions II.U, II.V, if applicable.
- 31 b) Describe methods to comply with, and all alternatives from the requirements of,
32 [WAC 173-303-640\(5\)\(d\)](#), incorporated by reference, for marking and labeling SST
33 System components located outside the WMA boundaries.
- 34 c) Specify that access points to the SST WMA and components located outside of the
35 WMAs be labeled to meet the requirements of [WAC 173-303-395\(6\)](#) and [WAC 173-](#)
36 [303-640\(5\)\(d\)](#), incorporated by reference. The access points must be marked to be
37 legible from a distance of 25 feet and must identify the waste stored in the tanks and
38 components. The label must adequately warn employees, emergency response
39 personnel, and the public of the major risks associated with the waste being stored.

40 **V.4.E.1.d.iii** Upon incorporation into the Permit under Permit Condition V.4.E.1.d.i, the Permittees
41 will implement the Mapping and Marking Plan in accordance with the schedule contained
42 therein.

43 **V.4.E.1.d.iv** Permittees will place the Mapping and Marking Plan into the Hanford Facility Operating
44 Record, SST System file.

- 1 **V.4.E.1.e Integrity Assessment of SSTs**
- 2 **V.4.E.1.e.i** Permittees will comply with the requirements and schedules of the [HFFACO](#), Milestone
3 M-045-91 series, incorporated by reference according to Permit Condition I.A.4 with
4 respect to performing SST System Integrity Assessment.
- 5 **V.4.E.1.e.ii** This Permit presumes that the phrase “the end date of the mission” under [HFFACO](#),
6 Milestone M-045-91I means the date upon which the SST System is certified as closed.
7 In the event this phrase is interpreted differently, Ecology reserves the authority to
8 modify this Permit to require additional integrity assessment requirements to satisfy
9 [40 CFR § 265.191](#) and [40 CFR § 265.196](#) [incorporated by reference in
10 [WAC 173-303-400W\(3\)](#)] and [WAC 173-303-640\(2\)](#).
- 11 **V.4.E.1.e.iii** Results of the integrity assessments will be maintained in the Hanford Facility Operating
12 Record, SST System file until the WMA is certified as closed.
- 13 **V.4.E.1.f New Component Design and Installation Requirements:**
- 14 **V.4.E.1.f.i** The Permittees will comply with the requirements of this Permit section for the design,
15 installation and certification by an IQRPE of any new SST tank component, or the
16 modification or repair of any existing SST tank component, (collectively referred to as
17 “new SST components”), not exempted from permitting requirements pursuant to
18 [WAC 173-303-200](#), with the exception of the design, installation, and certification by an
19 IQRPE of any new components in conjunction with tank waste retrieval activities, which
20 are subject to Permit Condition V.4.F.
- 21 **V.4.E.1.f.ii** Prior to the installation of any new SST components, the Permittees will provide the
22 following information concerning the components to Ecology for review and approval
23 pursuant to Permit Condition I.C.3:
- 24 a) Design standards;
- 25 b) Dangerous waste characteristics of the waste(s) to be handled and compatibility;
26 evaluation with the new component;
- 27 c) General arrangement diagrams;
- 28 d) System description purpose and length of service;
- 29 e) Piping and instrumentation drawings for the system;
- 30 f) Process flow diagrams;
- 31 g) Information to demonstrate compliance with [WAC 173-303-640\(3\)\(a\)](#), including an
32 assessment reviewed and certified by an IQRPE;
- 33 h) Description of the deposition or designation of the component or system at
34 completion of the operation.
- 35 **V.4.E.1.f.iii** Permittees must develop a schedule for conducting integrity assessment over the life of
36 any new SST component to ensure that the new component retains its structural integrity
37 and will not collapse, rupture or fail. The schedule must be based on the nature of the
38 new SST component, the results of past SST System integrity assessments, the age of the
39 SST tanks, the materials of construction, characteristics of the waste, and any other
40 relevant factors, in accordance with [WAC 173-303-640\(3\)\(b\)](#), incorporated by reference.
- 41 **V.4.E.1.f.iv** The Permittees must ensure that proper handling procedures are adhered to in order to
42 prevent damage to new SST components during installation. Prior to covering,
43 enclosing, or placing a new SST component in use, an independent, qualified installation
44 inspector or an IQRPE, trained and experienced in the proper installation of tank systems
45 or components, must inspect the system for the presence of any of the potential leaking
46 items listed in [WAC 173-303-640\(3\)\(c\)\(i\)](#) to (vi), incorporated by reference.

- 1 **V.4.E.1.f.v** For new SST components that are placed underground and that are back-filled, the
2 Permittees must employ a backfill material that is a non-corrosive, porous, homogeneous
3 substance. The backfill must be installed so that it is placed completely around the
4 component and compacted to ensure that the component is fully and uniformly supported
5 in accordance with [WAC 173-303-640\(3\)\(d\)](#), incorporated by reference.
- 6 **V.4.E.1.f.vi** All new SST components must be tested for tightness prior to being covered, enclosed, or
7 placed for use. If a new SST component is found not to be tight, all repairs necessary to
8 remedy the leak(s) in the system must be performed prior to the tank system being
9 covered, enclosed, or placed into use in accordance with [WAC 173-303-640\(3\)\(e\)](#),
10 incorporated by reference.
- 11 **V.4.E.1.f.vii** The Permittees must ensure that new ancillary equipment is supported and protected
12 against physical damage and excessive stress due to settlement, vibration, expansion, or
13 contraction in accordance with [WAC 173-303-640\(3\)\(f\)](#), incorporated by reference.
- 14 **V.4.E.1.f.viii** The Permittees must provide the type and degree of corrosion protection recommended in
15 the determination of the corrosion expert to meet the requirements of [WAC 173-303-
16 640\(3\)\(a\)\(iii\)](#), incorporated by reference for new tanks and ancillary equipment. The
17 installation of a corrosion protection system that is field fabricated must be supervised by
18 an independent corrosion expert to ensure proper installation in accordance with
19 [WAC 173-303-640\(3\)\(g\)](#), incorporated by reference.
- 20 **V.4.E.1.f.ix** Permittees will meet the requirements of [WAC 173-303-640\(3\)\(h\)](#), incorporated by
21 reference, to obtain, and keep on file in the Hanford Facility Operating Record, SST
22 System file, written statements by those persons required to certify the design of the tank
23 system and supervise the installation of the new SST components in accordance with the
24 requirements of [WAC 173-303-640\(3\)\(b\)](#) through (g), to attest that the new component(s)
25 were properly designed and installed and that any repairs, pursuant to
26 [WAC 173-303-640\(3\)\(c\)](#) and (e) were properly performed. The written certification must
27 include the certification statement required in [WAC 173-303-810\(13\)\(a\)](#).
- 28 **V.4.E.1.f.x** New SST components used for the storage or transfer of mixed wastes shall incorporate
29 leak detection design features and secondary containment in accordance with [WAC 173-
30 303-640\(4\)](#), incorporated by reference. If liquids or wastes are discovered within the
31 secondary containment, but cannot be removed from the secondary containment within
32 twenty-four (24) hours of discovery, Ecology shall be notified the next business day. The
33 notification to Ecology shall include the following at a minimum:
- 34 a) The reasons for delayed removal of liquids or wastes from secondary containment.
35 b) The measures employed to prevent releases from secondary containment to the
36 environment.
37 c) The actions and schedules to be taken to remove the liquids or wastes from secondary
38 containment.
- 39 **V.4.E.1.g Temporary Waste Transfer Line Management**
- 40 Permittees will comply with the requirements of Temporary Waste Transfer Line
41 Management specified in Permit Condition V.4.F.5 for any temporary transfer lines use
42 in the SST System.
- 43 **V.4.E.1.h Leak Detection Monitoring Technology and Dry Well Logging**
- 44 **V.4.E.1.h.i** The Permittees will evaluate the leak detection monitoring technology every five (5)
45 years and provide the evaluation to Ecology in a report, according to the following
46 criteria:

- 1 a) Within two (2) years after the effective date of this Permit, Permittees will provide
2 Ecology with a schedule for review and approval with the leak detection monitoring
3 technology evaluation reports.
- 4 b) Permittees will determine whether the current technology is the best available
5 detection technology applicable to the waste type and retrieval method.
- 6 c) Evaluate any new technology for the following:
7
 - 8 • the scale of the leak that could be detected
 - 9 • the impact of any environmental conditions around and under an SST, as practicable,
10 that might affect the technology
- 11 d) Specify monitoring procedures, schedules, and goals for the technology.

11 **V.4.E.1.h.ii Dry Well Logging Data Requirements**

12 Permittees will include dry well logging data in the Hanford Facility Operating Record,
13 SST System file. A summary listing of logging data, including the tank farm or wells
14 logged and dates of logging, must be sent to Ecology annually. Data must be provided to
15 Ecology on request that includes the following:

- 16 a) The number of dry wells logged;
- 17 b) The total depth, location, and configuration of each dry well;
- 18 c) The dry well logging frequency and schedule and how it coordinates with the
19 associated tank waste retrieval;
- 20 d) The logging rate (i.e., the speed of withdrawal of the tool from the dry well) and/or
21 logging methodology;
- 22 e) Logging tools used (e.g., spectral gamma, gross gamma) and their measuring
23 capabilities;
- 24 f) A description indicating whether the entire length of each borehole will be logged or
25 just selected intervals. If the Permittees plan to log selected intervals, a summary of
26 the depth ranges and rationale for selection of these intervals must be included;
- 27 g) A description of any data reduction or analysis was used;
- 28 h) The turnaround time for any analyses;
- 29 i) The estimated time to detect a leak from its onset during retrieval operations;
- 30 j) The estimated time to determine a leak rate and leak volume following the confirmed
31 detection of a leak;

32 **V.4.E.2 Tank Leak/Intrusion Detection and Responses to Leak/Spills**

33 **V.4.E.2.a Leak Detection Compliance Schedule**

34 **V.4.E.2.a.i** The monitoring requirements and schedule provided in *Single Shell Tank Leak Detection*
35 *and Monitoring Functions and Requirements, RPP-9937* are incorporated by reference
36 into this Permit upon the effective date of this Permit as, leak detection monitoring
37 requirements for the SST System. Such incorporation will expire two years after the
38 effective date of this Permit, unless *Single Shell Tank Leak Detection and Monitoring*
39 *Functions and Requirements, RPP-9937* has been updated under the [HFFACO](#), in which
40 case such update is incorporated under the terms of Permit Condition I.A.4.

41 **V.4.E.2.a.ii** In the event that an updated version of the *Single Shell Tank Leak Detection and*
42 *Monitoring Functions and Requirements, RPP-9937* is not incorporated into this Permit
43 within two years of the effective date of this Permit, the monitoring requirements and
44 schedules specified in V.4.E.2.b through V.4.E.2.f will take effect.

- 1 **V.4.E.2.a.iii** Should an updated version of the *Single Shell Tank Leak Detection and Monitoring*
2 *Functions and Requirements*, RPP-9937, be incorporated into this permit within two
3 years after the effective date of this Permit, the monitoring requirements and schedules
4 specified in Permit Conditions V.4.E.2.b through V.4.E.2.f specified in Permit Condition
5 V.4.E.2.a.ii will not take effect.
- 6 **V.4.E.2.b General Requirements**
- 7 **V.4.E.2.b.i** The leak detection monitoring (LDM) requirements in this Permit section apply to the
8 entire SST System (including SSTs, catch tanks, and miscellaneous tanks), and apply
9 until the identified SST components are certified as closed, except when tanks are in
10 retrieval mode as defined in this Permit. Leak detection and monitoring for tanks in
11 retrieval mode are specified in Permit Condition V.4.F.3.
- 12 **V.4.E.2.b.ii** The conditions in this section may be subject to change by Ecology through the permit
13 modification process based on circumstances including, but not limited to, on-going
14 retrieval and closure activities, or detection of leaks or intrusion.
- 15 **V.4.E.2.b.iii** In order to change the monitoring methods, devices, frequency, or any other requirement
16 of this Permit with respect to LDM, the Permittees must submit a permit modification
17 under the terms of Permit Condition I.C.3. Any new monitoring method or modification
18 of the approved methods, other than those identified in Permit Condition V.4.E.2.c.iii,
19 must meet the leak detection requirements and ensure that the data quality and integrity
20 are maintained, as justified in the modification request.
- 21 **V.4.E.2.c Leak/Intrusion Monitoring for SSTs**
- 22 **V.4.E.2.c.i** Intrusion monitoring will be performed for SSTs in which tank waste retrieval has been
23 certified as complete, or tanks in which waste retrieval has not been conducted and in
24 which in-tank leak detection is not feasible (e.g., in tanks that contain no drainable
25 liquid), pursuant to the following requirements.
- 26 a) Intrusion monitoring shall be performed semi-annually, with the two monitoring
27 dates at least five months apart.
- 28 b) In-tank intrusion of liquids monitoring shall be conducted using ENRAF™ gauges or
29 equivalent or intrusion.
- 30 **V.4.E.2.c.ii** Liquid monitoring for the purposes of determining changes in liquid volume will be
31 performed for all SSTs prior to tank waste retrieval, except for tanks in which in-tank
32 liquid detection is not feasible (e.g., in tanks that contain no drainable interstitial liquid),
33 pursuant to the following schedule and requirements.
- 34 a) SSTs that have any amount of drainable liquid as identified in DOE document *HNF-*
35 *EP-0182, Waste Tank Summary Report, Rev. 284*, incorporated by reference, will be
36 monitored at least quarterly for the determination of a change in liquid volume;
- 37 b) SSTs that are assumed leakers with no liquid, but with sludge form of waste, as
38 identified in DOE document *HNF-EP-0182, Waste Tank Summary Report, Rev. 284*,
39 incorporated by reference, will be monitored for liquid volume increases at least
40 semi-annually;
- 41 c) Permittees will submit a report within ninety (90) days after the effective date of this
42 permit, which identifies the methods and equipment used for monitoring liquid level
43 changes in the SSTs for Ecology review and approval pursuant to Permit Condition
44 I.C.3.

- 1 **V.4.E.2.c.iii** Approved in-tank leak detection monitoring methods include: liquid observation wells
2 (LOW), ENRAF™ gauges or equivalent, zip cords, dip tubes, or manual tape, whichever
3 are installed and available. The Permittees will repair and reinstall devices if existing
4 instrumentation has malfunctioned or is out of service.
- 5 **V.4.E.2.c.iv** Ex-tank dry well logging for all SSTs will be performed and reported by March 30, 2016.
6 Then additional logging will be completed at least every 10 years thereafter for all tanks
7 using all available and usable dry wells.
- 8 **V.4.E.2.d Leak Detection Monitoring (LDM) for Catch Tanks and Miscellaneous Tanks**
- 9 **V.4.E.2.d.i** LDM is required for catch tanks and miscellaneous tanks. Those catch tanks and
10 miscellaneous tanks identified in *RPP-PLAN-48438, Single Shell Tank System Catch*
11 *Tank Assumed Leak Response Plan, Rev. 1*, incorporated by reference, as requiring leak
12 detection monitoring must be monitored quarterly. Miscellaneous underground storage
13 tanks not requiring intrusion monitoring must be monitored at least annually.
- 14 **V.4.E.2.d.ii** For those catch tanks, and miscellaneous tanks identified in *RPP-PLAN-48438, Single*
15 *Shell Tank System Catch Tank Assumed Leak Response Plan, Rev. 1*, incorporated by
16 reference, as not requiring leak detection monitoring, the Permittees will perform
17 intrusion checks at least annually.
- 18 **V.4.E.2.e Leak Assessment and Data Reporting**
- 19 **V.4.E.2.e.i** The Permittees will conduct preliminary monitoring data review within 30 days after the
20 quarterly, semi-annual, or annual monitoring data are collected.
- 21 **V.4.E.2.e.ii** If a data review indicates that an anomaly exists that may be caused by a potential tank
22 leak or intrusion, the leak assessment process specified in *TFC-ENG-CHEM-D-42, Tank*
23 *Leak Assessment Process, Rev. B-4*, incorporated by reference, will be followed to
24 immediately conduct a leak assessment, in accordance with following steps:
- 25 a) Review available in-tank and ex-tank leak/intrusion monitoring data, including tank
26 surface level; flow rate; barometric pressure; tank process history; historical dry well
27 logs; photographs; or any other relevant data, and additional information needs.
- 28 b) Develop specific intrusion, leak, and non-leak hypotheses.
- 29 c) Assess leak probability.
- 30 d) Prepare a leak and intrusion assessment report that: 1) includes the information
31 reviewed; 2) discusses hypotheses considered; 3) summarizes assessment results; 4)
32 calculates mathematical probabilities; and 5) provides a final determination, which
33 may include long-term actions.
- 34 **V.4.E.2.e.iii** Ecology must be notified of the initiation of the Leak Assessment Process within seven
35 (7) days of the initiation of the process.
- 36 **V.4.E.2.e.iv** Permittees must complete the Leak Assessment Process within ninety (90) days. If the
37 Permittees cannot complete the Leak Assessment Process within 90 days, the Permittees
38 will notify Ecology of the reasons for the delay and when the leak assessment process is
39 projected to be complete.
- 40 **V.4.E.2.e.v** Ecology must be notified of the conclusion of the Leak Assessment Process within seven
41 (7) days of such conclusion.
- 42 **V.4.E.2.e.vi** Should the leak assessment conclude that a leak or potential leak has occurred, the
43 Permittees must follow the requirements of Permit Condition V.4.E.2.f.

- 1 **V.4.E.2.e.vii** No later than March 31 each year, Permittees will submit an Annual Leak Detection and
2 Intrusion Monitoring Report for the SST System to Ecology for approval that summarizes
3 the LDM system and data, identifies existing problems, and documents any leak events
4 for the previous calendar year. The report shall provide, but not be limited to, the
5 following information (with information provided on a tank specific basis as necessary).
- 6 a) Specification of all leak detection systems installed in the SST System.
 - 7 b) Specification of which portions of the existing leak detection system are functional
8 and in operation, identifying the need for any replacement, repair, or maintenance
9 needs.
 - 10 c) Specification of any changes in monitoring frequency or methodology that occurred
11 over the reporting period;
 - 12 d) A list of tanks and components for which monitoring was not conducted, and a
13 specification of the reasons for not conducting monitoring;
 - 14 e) Specification of the leak and intrusion detection method(s)/instrumentation employed
15 for each tank or component, identifying any uncertainties, if necessary;
 - 16 f) Description of instrument calibration and maintenance of leak detection and
17 monitoring equipment;
 - 18 g) The current surface and/or interstitial liquid level for each tank or component;
 - 19 h) An estimate of pumpable liquid based on the interim stabilization report and intrusion
20 monitoring for each tank;
 - 21 i) An estimate of drainable liquid for each tank or component;
 - 22 j) An estimate of the change in liquid volume in the last year;
 - 23 k) For tanks in which leaks, potential leaks, or intrusions are confirmed or suspected,
24 the specific actions (investigation, mitigation, repair, installation, decommission, etc.)
25 taken with action levels and reporting methods, based on approved documents as
26 supporting information.
 - 27 l) Specification of whether any leaks or intrusions were investigated in the last year for
28 each tank or component.
 - 29 m) A summary analysis of the monitoring data with regards to data quality, problems,
30 and need for improvement.
 - 31 n) A trend analysis, on a tank by tank basis as necessary, of the interstitial and surface
32 liquid levels.
 - 33 o) Specification of the surface level trend direction (positive, negative, stayed the same)
34 and explanation what the trend indicates in regard to a release or intrusion.
 - 35 p) A declaration that leak and/or intrusion is occurring or that the tank or component is
36 stable.

37 **V.4.E.2.f Response to Leaks, Intrusions, and Spills**

38 **V.4.E.2.f.i** In the event the leak assessment process indicates a leak for catch tanks and
39 miscellaneous tanks, the Permittees must take necessary steps to mitigate the risk
40 following the requirements of RPP-PLAN-48438, *Single-Shell Tank System Catch Tank*
41 *Assumed Leak Response Plan*, incorporated by reference.

42 **V.4.E.2.f.ii** In the event a leak, intrusion, or spill is validated for SSTs, the Permittees must, within
43 twenty-four (24) hours after detection of the leak or release from a tank system, remove
44 as much of the waste from the tank system as is necessary to prevent further release to the
45 environment in accordance with [WAC 173-303-640\(7\)\(b\)\(i\)](#), incorporated by reference.

46 **V.4.E.2.f.iii** In the event of a release, the Permittees must immediately conduct an inspection of the
47 release and, based upon that inspection:

- a) Direct immediate actions necessary to stabilize the facility/operation to a safe condition, prevent and stop the flow or addition of liquids into the tank;
- b) Inspect the system to determine the cause of the leak, intrusion or spill, and document the as found conditions for subsequent investigation;
- c) Ensure that trained personnel respond to spills by quickly evaluating the situation, and implementing the Building Emergency Plan and the Contingency Plan as necessary;
- d) Determine if the spill or release exceeds reportable quantity for the material specified in 40 CFR 302, "Designation, Reportable Quantities, and Notification."
- e) Notify the appropriate regulatory agencies in accordance with *TFC-ESHQ-ENV-FS-C-01, Environmental Notification*, incorporated by reference. This includes notification to Ecology pursuant to the requirements of [WAC 173-303-145](#), as well as the Washington State Department of Health, if the Contingency Plan as specified in V.4.E.3 has been implemented in response to the leak;
- f) Prevent further migration of the leak or spill to soils or surface water;
- g) Remove, and properly dispose of, any visible contamination of the soil or surface water;
- h) Within twenty-four (24) hours after detection of the leak or release to a secondary containment system, remove the released materials in accordance with [WAC 173-303-640\(7\)\(b\)\(ii\)](#), incorporated by reference. If the Permittees demonstrates that released materials cannot be removed within 24 hours, the material must be removed as soon as possible to prevent harm to human health and the environment.

V.4.E.3 Contingency Plan

V.4.E.3.a The Permittees will comply with Addendum K in addition to the requirements of Permit Condition II.A, when applicable. [[WAC 173-303-350](#)]

V.4.E.3.b The Permittees shall keep summary reports and details of all incidents that require implementation of the Contingency Plan in the Hanford Facility Operation Record, SST System file according to the requirements of Permit Condition II.A.1.

V.4.E.4 Training Plan

V.4.E.4.a Within sixty (60) days of the effective date of this Permit, the Permittees will submit a training matrix identifying worker categories and training categories to comply with the requirements for training in Permit Condition II.C, Attachment 5. The matrix will reflect the hazardous waste training requirements consistent with [WAC 173-303-330](#) for personnel involved with waste management, tank waste retrieval, closure, and corrective action activities conducted at the SST System.

V.4.E.4.b The training matrix will be submitted pursuant to the permit modification process specified in Permit Condition I.C.3. Once approved by Ecology, the matrix will be incorporated into this Permit as Addendum L.

V.4.E.4.c Permittees will develop written training plans and include training requirements as specified in the training matrix and implement the plans for corresponding facilities.

V.4.E.4.d The Permittees will comply with the requirements for training in Addendum L and Permit Condition II.C, Attachment 5.

V.4.E.5 Security

V.4.E.5.a Within ninety (90) days of the effective date of this Permit, the Permittees will submit a description of security procedures specific to the SST System implementing the

1 requirements of Permit Condition II.L and Attachment 3, [WAC 173-303-310](#), and
2 [WAC 173-303-395](#)(1), (2), and (6), incorporated by reference.

3 **V.4.E.5.b** The SST System security description will be submitted pursuant to the permit
4 modification process specified in Permit Condition I.C.3. Once approved by Ecology,
5 the SST System security description will be incorporated into this Permit as Addendum
6 E.

7 **V.4.E.5.c** The Permittees shall comply with all security provisions of Addendum E and
8 [WAC 173-303-310](#) and [WAC 173-303-640](#)(5)(d), incorporated by reference.

9 **V.4.E.6 Inspections**

10 **V.4.E.6.a** The Permittees are required to inspect the SST System in accordance with the
11 requirements of [WAC 173-303-320](#) and [WAC 173-303-640](#)(6), incorporated by reference
12 except as described in Permit Condition V.4.E.6.d.

13 **V.4.E.6.b** All operational and monitoring equipment, safety and emergency equipment, security
14 devices, and operating and structural equipment that prevents, detects, or responds to
15 hazards to the public health or the environment is also subject to inspection requirements.
16 Such equipment may include, but is not limited to:

- 17 a) All aboveground SST System leak detection instrumentation;
18 b) All aboveground external-tank monitoring equipment, and tank ventilation equipment
19 including vapor monitoring devices;

20 **V.4.E.6.c** The Permittees will submit a written SST Inspection Schedule within 90 days of the
21 effective date of this Permit through the permit modification process of Permit Condition
22 I.C.3. Once approved by Ecology, the SST System Inspection Schedule will be
23 incorporated into this Permit as Addendum I.

24 **V.4.E.6.d** The SST System Inspection Schedule shall provide for inspections that meet the
25 requirements of [WAC 173-303-320](#)(1) and (2), [WAC 173-303-395](#)(1)(d), and
26 [WAC 173-303-640](#)(6), incorporated by reference, and the following:

27 **V.4.E.6.d.i** During retrieval or transfer activities, areas at risk of potential spills must be inspected
28 daily when in use;

29 **V.4.E.6.d.ii** Portions of the tank system in non-retrieval mode must be inspected weekly;

30 **V.4.E.6.d.iii** All inactive, above ground structures located outside the SST Tank Farms must be
31 inspected annually.

32 **V.4.E.6.d.iv** SST System Inspection Schedule will include descriptions of the following:

- 33 a) The types of problems that are to be looked for during inspections;
34 b) The equipment to be inspected,
35 c) Method(s) of inspection;
36 d) The frequency of inspection for specific items;
37 e) Calibration and maintenance of monitoring equipment, including liquid level
38 monitors, thermocouple trees, ventilation systems, and high efficiency particulate air
39 (HEPA) filters and vapor monitors, with inspection to ensure the equipment is being
40 operated according to its design.
41 f) The nature of inspections required for the tank system during non-retrieval periods to
42 document compliance with all requirements under [WAC 173-303-640](#)(6),
43 [WAC 173-303-320](#), incorporated by reference, and this Permit.

- 1 g) The nature of inspections required for each tank retrieval activity to document
2 compliance with all requirements under [WAC 173-303-640\(6\)](#), [WAC 173-303-320](#),
3 incorporated by reference, and this Permit.
4 h) The nature of inspections required for closure activities required by the component
5 activity closure plans to document compliance with all requirements under
6 [WAC 173-303-320](#), incorporated by reference, and this Permit.

7 **V.4.E.6.d.v** The SST System Inspection Schedule must indicate the frequency of inspection for
8 specific items. The frequency should be based on the rate of possible deterioration of
9 equipment and the probability of an environmental or human health incident; basis for
10 frequency to be provided to Ecology for review and approval if different than a
11 regulatory specified interval. Inspections must be conducted often enough to identify
12 problems in time to correct them before they harm human health or the environment. At
13 a minimum, the inspection schedule must also include the applicable items and
14 frequencies required for the specific waste management methods described in
15 [WAC 173-303-320\(2\)\(c\)](#), incorporated by reference. Factors that may be considered in
16 developing this schedule include, but are not limited to, the following:

- 17 a) Age and condition of the component;
18 b) Location;
19 c) Use/storage history;
20 d) Leak and incident history;
21 e) Engineering design;
22 f) Limitations of inspection and monitoring devices;
23 g) Manufacturer's recommended calibration/functionality test procedures and
24 maintenance procedures;
25 h) Malfunctions and deterioration;
26 i) Integrity assessment records;
27 j) Retrieval status;
28 k) Worker safety.

29 **V.4.E.6.e** Permittees will comply with Permit Condition II.X.4 and remedy problems revealed by
30 an inspection on a schedule which prevents hazards to the public health and the
31 environment. Where a hazard is imminent or has already occurred, Permittees will
32 conduct remedial action immediately. Permittees will record the date and nature of any
33 repairs or remedial actions taken, or the scheduled date of such repairs or remedial
34 actions, in the inspection log required by Permit Condition II.X.2.

35 **V.4.E.6.f** The Permittees must review and modify, as appropriate, pursuant to the permit
36 modification process of Permit Conditions I.C.3, the inspection schedule and
37 requirements within thirty (30) days after any of the following events occur:

38 **V.4.E.6.f.i** Implementation of the contingency plan pursuant to Permit Condition II.A.1;

39 **V.4.E.6.f.ii** Changes to the SST System.

40 **V.4.E.6.g** The Permittees will place inspection records (e.g., inspection logs or summaries) in the
41 SST System file of the Hanford Facility Operating Record, SST System file, as required
42 by Permit Condition II.X.3.

43 **V.4.F TANK WASTE RETRIEVAL REQUIREMENTS**

44 This section describes the requirements the Permittees must follow in conducting tank
45 waste retrieval, including retrieval operation, leak detection and response to spills, and
46 reporting.

- 1 **V.4.F.1 General Requirements**
- 2 **V.4.F.1.a Tank Waste Retrievals**
- 3 **V.4.F.1.a.i** For those SST retrievals within the scope of the *Washington v. Chu* Consent Decree,
4 Permittees must complete the retrieval of tank waste from SSTs in compliance with the
5 requirements and schedules of:
- 6 a) Section IV-B, Appendix B, and Appendix C of the *Washington v. Chu* Consent
7 Decree, which are incorporated by reference under the terms of Permit Condition
8 I.A.5;
- 9 b) Those portions of TWRWPs established under the *Washington v. Chu* Consent
10 Decree that, once established, constitute a [HFFACO](#) Action Plan primary document
11 for enforcement purposes, which are incorporated by reference under the terms of
12 Permit Condition I.A.4;
- 13 c) Sections 2.1.4, 2.1.5, and 2.1.6 of [HFFACO](#) Appendix I, as they are defined to be
14 applicable under Appendix C, Part 3, of the *Washington v. Chu* Consent Decree,
15 which are incorporated by reference under the terms of Permit Condition I.A.4, and
16 d) [HFFACO](#) Milestone M-045-86 with respect to submitting retrieval data reports for
17 SSTs retrieved under the *Washington v. Chu* Consent Decree, which are incorporated
18 by reference under the terms of Permit Condition I.A.4.
- 19 **V.4.F.1.a.ii** For those SST retrievals within the scope of the [HFFACO](#), Permittees must complete the
20 retrieval of tank waste from SSTs in compliance with the schedules and requirements
21 contained in, and established under, [HFFACO](#) Milestones M-045 and M-062, Appendix
22 H, and Appendix I, which are incorporated by reference under the terms of Permit
23 Condition I.A.4.
- 24 **V.4.F.1.a.iii** The Permittees shall transfer all retrieved waste into only the DST waste system, unless
25 other approval is obtained from Ecology in the TWRWPs and/or another Ecology
26 approval process.
- 27 **V.4.F.1.a.iv** Only upon prior written approval from Ecology, the SST System is authorized to accept
28 DST system supernatant for purpose of SST waste retrieval. The Permittees are not
29 authorized to introduce any other dangerous waste into the SST System.
- 30 **V.4.F.1.a.v** Before initiating waste retrieval and before initiating transfer of SST waste to the DST
31 system, a formal waste compatibility assessment must be performed in accordance with
32 the waste acceptance criteria of the DST System (Operating Unit Group 12, Addendum
33 B).
- 34 **V.4.F.1.a.vi** Mixed waste can be transferred from the SST System only in accordance with the
35 receiving unit's waste acceptance criteria, as specified in the DST System Permit,
36 Addendum B, Waste Analysis Plan (Operating Unit Group 12).
- 37 **V.4.F.1.a.vii** The Permittees must conduct waste retrieval activities and maintain the retrieved tanks
38 before closure in a manner that minimize the environmental impact and protect human
39 health pursuant to [WAC 173-303-283](#)(3)(i). To ensure these requirements are met, the
40 Permittees will employ the leak mitigation strategy specified in the Ecology-approved
41 TWRWP to reduce leak loss potential.
- 42 **V.4.F.1.a.viii Reserved**
- 43 **V.4.F.2 TWRWP Requirements**
- 44 **V.4.F.2.a** TWRWPs submitted to Ecology under the requirements of the *Washington v. Chu*
45 Consent Decree, or the [HFFACO](#), must ensure compliance with the requirements of
46 Permit Conditions V.4.F.3 and V.4.F.5.

- 1 **V.4.F.2.b** The Permittees will maintain TWRWPs that have become effective under the
2 *Washington v. [Chu](#)* Consent Decree, or been approved under the [HFFACO](#), in the
3 Hanford Facility Operating Record, SST System file.
- 4 **V.4.F.3 Tank Leak Detection Monitoring**
- 5 **V.4.F.3.a Leak Detection Monitoring and Mitigation Plan**
- 6 **V.4.F.3.a.i** Prior to the initiation of any waste retrieval operations, Permittees must have a Leak
7 Detection Monitoring and Mitigation Plan included in a TWRWP that has become
8 effective under the *Washington v. [Chu](#)* Consent Decree, or been approved under the
9 [HFFACO](#).
- 10 **V.4.F.3.a.ii** The Leak Detection Monitoring and Mitigation Plan will satisfy the following
11 requirements:
- 12 a) Identify the best available leak detection technology applicable to the tank waste type
13 and retrieval method in order to detect as small a scale leak as practicable. For the
14 ex-tank technologies, evaluate and implement improvements on the currently used
15 HRR as practicable. Evaluate and compare alternate ex-tank leak detection
16 technologies when initiating the first tank retrieval for each WMA.
- 17 b) Show that current leak detection HRR, or other technology, configuration is
18 sufficient to investigate completely around and under a SST, as practicable.
- 19 c) Describe how system capabilities including tracking of the lateral and vertical
20 movement of a leak within tank farm boundary and how close to the specific tank
21 being retrieved the system can measure.
- 22 d) Identify monitoring schedules, procedures, specify frequency of data gathering and
23 evaluations, and specify the anticipated effectiveness of the technologies
24 performance.
- 25 **V.4.F.3.a.iii** The Leak Detection Monitoring and Mitigation Plan must describe utilization of both ex-
26 tank and in-tank leak detection methods, as well as any other methods that may be
27 approved by Ecology on a case by case basis.
- 28 a) For the primary ex-tank leak detection methods, the current best available
29 technologies are: High Resolution Resistivity (HRR) and dry well logging; and
- 30 b) For the primary in-tank leak detection methods, the current best available
31 technologies are: ENRAFT™ gauges, manual tape, and LOW.
- 32 **V.4.F.3.a.iv** Groundwater monitoring will be used as a supplementary ex-tank leak detection method
33 during retrieval operations. Groundwater sampling must be performed within a 3-month
34 period prior to and after retrieval, following the requirement of Permit Condition
35 V.4.C.1.b.ii (b).
- 36 **V.4.F.3.b Ex-Tank Leak Detection/Monitoring with HRR**
- 37 **V.4.F.3.b.i** HRR monitoring must be used as primary ex-tank leak detection method during tank
38 waste retrieval operations.
- 39 **V.4.F.3.b.ii** The HRR LDM system must be used with following specifications:
- 40 a) A pre-retrieval HRR baseline measurement/survey must be performed.
- 41 b) HRR leak detection requirements and approved procedures must be implemented by
42 trained and designated personnel prior to the start of tank waste retrieval operations.
- 43 c) Functions and requirements necessary to support design and operation of proposed
44 LDM system(s) must be consistent with TWRWP.

- 1 d) Any changes to HRR LDM field monitoring activities that the Permittees propose
2 must be documented and the documentation maintained in the Hanford Facility
3 Operating Record, SST System file.
4 e) The equipment must be operated continuously except when down for repairs,
5 calibrations, electrical outages, or similar reasons.
6 f) Should a problem occur that renders the HRR leak detection system inoperable for
7 more than seven (7) consecutive days, dry well monitoring must be used as a backup
8 means of leak detection.
9 g) Ecology may review the HRR data during any Ecology working hours. Such data
10 must be made available upon Ecology request.
11 h) If an unexplained HRR anomaly exists, Ecology must be informed as soon as
12 practicable and the Leak Assessment and Leak Mitigation process in this subsection
13 must be followed.
14 i) If after three months of the discovery of the unexplained HRR anomaly, the anomaly
15 has not been resolved, Permittees will consult with Ecology regarding possible
16 changes to groundwater monitoring and analyte monitoring frequency.

17 **V.4.F.3.c Ex-Tank Leak Detection with Dry Well Monitoring**

18 **V.4.F.3.c.i Requirements for dry well loggings prior to initiation of retrieval:**

- 19 a) In order to provide baseline soil moisture information, gamma scans and moisture
20 scans must be obtained for each dry well listed in a TWRWP prior to initiation of
21 retrieval operations in a tank.
22 b) Should a prior-to-retrieval gamma scan show an unexpected presence of radioactivity
23 in the soil adjacent to any of the dry wells listed in a TWRWP, and the unexpected
24 reading is confirmed, the tank leak assessment process in procedure *TFC-ENG-*
25 *CHEM-D-42 Tank Leak Assessment Process, Rev. B-4* (CH2M Hill, 2008) must be
26 implemented.
27 c) Retrieval activities cannot commence until the unexpected reading had been
28 evaluated and is shown to not alter the leak status for the tank whose waste was to be
29 retrieved.

30 **V.4.F.3.c.ii Requirements for dry well logging during retrieval:**

- 31 a) After retrieval operations have been initiated, dry well logging will only be
32 performed as a backup leak detection method if the HRR system becomes inoperable.
33 b) When dry well logging is employed as a backup leak detection method, it shall be
34 performed to monitor specific region(s) of interest for increases in soil moisture (or
35 gamma) content. These may include the interval from above the existing waste
36 surface to below the base of the tank, and the depth interval to log.
37 c) Should dry well moisture logging be initiated for leak detection due to inoperable
38 HRR monitoring during waste retrieval, the prior-to-retrieval moisture logging will
39 be used as a baseline for comparison.
40 d) Ecology must be informed within seventy-two (72) hours of discovery of any missed
41 required dry well monitoring (missed intervals or entire dry well).
42 e) In the event that moisture logging demonstrates significant increases in soil moisture
43 levels, a gamma scan must be performed within seven (7) days as a follow-up to
44 determine if the moisture increase is due to a tank waste leak. If unable to perform
45 gamma scan within seven (7) days, Ecology will be informed.
46 f) If there is an unexplained increase in soil moisture content observed during moisture
47 logging and access is not practicable for any gamma monitoring system, Ecology

1 must be informed within seventy-two (72) hours of confirmation of the increase in
2 soil moisture content, and the Permittees must propose an alternate means of
3 investigation for Ecology approval.

4 **V.4.F.3.c.iii Requirements for post-retrieval dry well loggings:**

- 5 a) Gamma scans must be obtained for each dry well listed in a TWRWP no sooner than
6 three months, but no later than six months, following the completion of waste
7 retrieval from any tank subject to the TWRWP.

8 **V.4.F.3.c.iv The dry well logging will be performed to meet the following requirements:**

- 9 a) All dry well loggings will be obtained for the entire dry well column from near the
10 ground surface to near the bottom of each dry well.
11 b) Gamma logging may be performed with the radionuclide assessment system (RAS
12 truck), the radionuclide monitoring system (RMS), or the spectral gamma logging
13 system (SGLS).
14 c) Moisture logging will be performed with hand-held moisture probes or any of the
15 vehicle mounted systems.
16 d) Logging equipment will be calibrated annually or anytime when there is any
17 indication of an erroneous result that indicates recalibration is warranted.

18 **V.4.F.3.c.v** The logging systems will be deployed by qualified personnel in accordance with the
19 applicable procedures for that equipment. Established methods must be followed when
20 conducting dry well logging. Dry well logging data must be reviewed, processed, and
21 interpreted by qualified personnel.

22 **V.4.F.3.d In-Tank Leak Detection/Monitoring**

23 **V.4.F.3.d.i** Under following conditions, liquid level measurement may be used for leak detection and
24 monitoring during waste retrieval:

- 25 a) The tank level gauge must be an ENRAF™ gauge or equivalent of the type normally
26 used in tank farms;
27 b) There must be a liquid surface under the ENRAF™ gauge or equivalent plummet or
28 tape;
29 c) There are no active retrieval operations being performed;
30 d) The tank is not being actively exhausted;
31 e) The measured waste level is not increasing.

32 **V.4.F.3.e Leak Assessment and Leak Mitigation**

33 **V.4.F.3.e.i** The Permittees must conduct initial data review for the LDM in a timely manner. For
34 LDM during SST tank waste retrieval, the initial data review must not be more than 24
35 hours after the data are collected.

36 **V.4.F.3.e.ii** If a data review indicates that an unexplained anomaly exists that may be caused by a
37 potential tank leak, or intrusion, Permittees will follow Permit Condition V.4.E.2.e.ii to
38 immediately conduct a leak assessment or updated document approved in the *Single Shell*
39 *Tank Leak Detection and Monitoring Functions and Requirements, RPP-9937*.

40 **V.4.F.3.e.iii** Permittees must notify Ecology of the initiation of the Leak Assessment Process within
41 seventy-two (72) hours of the initiation of Leak Assessment Process.

42 **V.4.F.3.e.iv** Permittees must complete the Leak Assessment process within forty-five (45) days. If
43 the Permittees cannot complete the leak assessment process within 45 days, the

1 Permittees will notify Ecology of the reasons for the delay and when the leak assessment
2 process is projected to be complete.

3 **V.4.F.3.e.v** Permittees must notify Ecology of the conclusion of the Leak Assessment within seventy-
4 two (72) hours of completion.

5 **V.4.F.3.e.vi** In the event a leak occurs or the leak assessment process is initiated during retrieval, the
6 Permittees must follow the Response to Leaks, Intrusions, and Spills requirements of
7 Permit Condition V.4.E.2.f.

8 **V.4.F.3.e.vii** The leak detection monitoring results during waste retrieval will be summarized and
9 included in the Annual Leak Detection and Intrusion Monitoring Report for the SST
10 System following Permit Condition V.4.E.2.e.vii.

11 **V.4.F.4 Data Quality Objectives (DQO) and Sampling and Analysis Plan (SAP)**

12 **V.4.F.4.a** DQO and Sampling and Analysis Plan (SAP) documents developed under [HFFACO](#)
13 Appendix I, Section 2.1.6 in coordination with Ecology for residual tank waste
14 characterization, are subject to following conditions:

- 15 a) The DQO will be developed in accordance with EPA guidance EPA/600/R-96/05
16 Guidance for the Data Quality Objectives Process (EPA QA/G-4), incorporated by
17 reference.
- 18 i. Permittees will provide the rationale for selecting the parameters for which each
19 sample will be analyzed [i.e., how analysis for these parameters will provide
20 sufficient information on the waste to comply with [WAC 171-303-300](#)(1), (2),
21 (3) and (4)].
- 22 ii. The Permittees will coordinate the development of the DQO with Ecology and
23 resolve any issues and comments. The resolution of issues and comments are
24 documented via approval of the SAP required by Permit Conditions V.4.F.4.a (b)
25 and V.4.F.4.a (c).
- 26 iii. The DQO requirements in the *Single-Shell Tank Component Closure Data*
27 *Quality Objectives (RPP-23403 Rev.4)*, incorporated by reference, may be
28 amended to include components. Should the DQO be amended, the Permittees
29 will submit a revised SAP following the requirements of Permit Condition
30 V.4.F.4.a(d) to Ecology for review and approval.
- 31 iv. A new DQO may be developed for components. Upon development of a new
32 DQO, the Permittees will submit a new sampling and analysis plan for post-
33 retrieval and closure sampling following the requirements of Permit Condition
34 V.4.F.4.b and in accordance with Permit Condition I.C.3 to Ecology for review
35 and approval.
- 36 b) The Permittees will follow the requirements of the *Sampling and Analysis Plan for*
37 *Single-Shell Tank Closure (RPP-PLAN-23827, Revision 2)*, incorporated by
38 reference.
- 39 c) The Permittees will follow the requirements of any SAP submitted as a result of
40 Permit Condition V.4.F.4.a.iv.
- 41 d) The requirements incorporated into Permit Conditions V.4.F.4.a (b), and
42 V.4.F.4.a.(c), may be modified as necessary under the terms of Permit Condition
43 I.C.3. An approved sampling and analysis plan for post-retrieval and closure
44 sampling, once approved by Ecology, will be incorporated into this permit as
45 Addendum N.

46 **V.4.F.4.b** As part of the DQO process, the Permittees will implement and maintain the SAPs
47 following Permit Conditions V.4.F.4.a (b) and V.4.F.4.a (c), for post-retrieval and closure

1 sampling and residual tank waste characterization pursuant to the requirements of
2 [HFFACO](#), Section 6.5 and Appendix I, Section 2.1.6 incorporated by reference. At a
3 minimum, the SAP must include:

- 4 a) Waste description
- 5 b) The parameters for which each sample will be analyzed;
- 6 c) The methods of obtaining or testing for these parameters;
- 7 d) The methods for obtaining representative samples of wastes for analysis;
- 8 e) A description of the sampling techniques to be utilized for sample collection;
- 9 f) Quality Assurance and Quality Control (QA/QC) for sample collection and
10 laboratory analysis;
- 11 g) Data reporting requirements.

12 **V.4.F.4.c** Following development of a SAP, in accordance with Permit Conditions V.4.F.4.a (b)
13 and V.4.F.4.a (c), the Permittees will develop a tank or component specific sampling and
14 analysis plan (hereafter referred to as a TSAP). The TSAP will support the SAP and the
15 Permittees will follow the TSAP for post-retrieval and closure sampling and residual tank
16 waste characterization. The TSAP will be submitted to Ecology for review and will be
17 implemented unless Ecology notifies the Permittees that it takes exception to the TSAP
18 within three (3) calendar days. Exceptions to TSAPs and the resolutions will be
19 documented in the Hanford Facility Operating Record, SST System file.

20 **V.4.F.4.d** Upon Ecology approval, Permittees may use the same SAP, or a previously approved
21 SAP, for multiple tanks or components that share similar waste characteristics.
22 Permittees must provide information adequate to justify this approach.

23 **V.4.F.5 Temporary Waste Transfer Line Management**

24 **V.4.F.5.a** The Permittees will have leak detection sufficient to meet the requirements of WAC 173-
25 303-640(4)(c), incorporated by reference, for each SST temporary waste transfer line.

26 **V.4.F.5.b** Prior to using any temporary waste transfer lines, Permittees must comply with the
27 requirements of Permit Condition V.4.E.1.f., except for V.4.E.1.f.ii and V.4.E.1.f.iii.

28 **V.4.F.5.c** Prior to use of a temporary waste transfer line, the Permittees will have IQRPE
29 certification, that having considered the entire configuration of the system impacted by
30 the use of the temporary waste transfer line, attests the temporary waste transfer line is fit
31 for use per the requirements of [WAC 173-303-640](#)(4)(b) and (c).

32 **V.4.F.5.d** Secondary containment for SST temporary waste transfer lines must be provided for the
33 transfers of waste from the SST System to the DST System, and for the transfers of
34 supernatant from the DST System back to the SST System.

35 **V.4.F.5.e** In the event a leak occurs, the Permittees must respond to the leak and any spill by
36 following the requirements of RPP-12711, *Temporary Waste Transfer Line Management*
37 *Program Plan*, Rev. 3K, incorporated by reference,

38 **V.4.F.5.f** The Permittees will comply with the following additional requirements specific to hose-
39 in-hose transfer lines (HIHTL) used for temporary waste transfer:

- 40 a) The Permittees will follow the requirements of RPP-12711, *Temporary Waste*
41 *Transfer Line Management Program Plan*, Rev. 3K, incorporated by reference,
42 which are incorporated by reference, to manage HIHTLs;
- 43 b) The requirements incorporated into Permit Condition V.4.F.5.f (a) may be modified
44 as necessary under the terms of Permit Condition I.C.3. Any changes made to RPP-
45 12711, except changes to Tables A1 and A2 must be approved by Ecology;

- 1 c) Permittees will update the HIHTL tracking system information pursuant to RPP-
2 12711, Rev. 3K, for the SST System temporary waste transfer lines within twenty
3 (20) days of the end of each quarter. A copy of the quarterly updates will be
4 submitted to Ecology within thirty (30) days after the end of the quarter;
- 5 d) The Permittees will submit formal notification of the determination to extend the
6 service life of an HIHTL to Ecology;
- 7 e) The Permittees cannot use a HIHTL that is greater than 10 years of age;
- 8 **V.4.F.5.g** Within 180 days of the effective date of this Permit, the Permittees must submit a
9 revision to RPP-12711, *Temporary Waste Transfer Line Management Program Plan*,
10 Rev. 3K to include a leak response plan for leaks from any temporary waste transfer line
11 that occurs from the primary to secondary containment, and from the secondary
12 containment to the environment.
- 13 **V.4.F.5.h** Permittees will place the following documents in the Hanford Facility Operating Record,
14 SST System file:
- 15 a) a description of the installation, maintenance, operation, and leak detection methods
16 of each SST System temporary waste transfer line;
- 17 b) Documentation of the leak detection method used for each SST System temporary
18 waste transfer line;
- 19 c) The latest version of RPP-12711, *Temporary Waste Transfer Line Management*
20 *Program Plan*, within 7 days after issuance;
- 21 d) a list of all temporary waste transfer lines deployed within the SST System;
- 22 e) the HIHTL tracking system information;
- 23 f) Any completed HIHTL extension waiver package.
- 24 **V.4.G SST SYSTEM CLOSURE**
- 25 **V.4.G.1 General Requirements**
- 26 **V.4.G.1.a** The Permittees will close the entire SST System, including tanks, ancillary equipment,
27 contaminated soil, and contaminated groundwater, in accordance with the closure
28 performance standards specified in Permit Condition V.4.G.2.
- 29 **V.4.G.1.b** Final closure of the SST System will not be complete until all WMAs, and all SST
30 components outside WMAs, are certified as closed.
- 31 **V.4.G.1.c** Permittees must provide a certification of closure in accordance with
32 [WAC 173-303-610\(6\)](#), incorporated by reference, at the WMA level, and for all SST
33 components outside WMAs.
- 34 **V.4.G.1.d** Closure activities for individual SST component or groups of components within WMAs
35 can only be certified as complete prior to the closure of the associated WMA if the
36 component(s) are clean closed and meet the clean closure standards specified in Permit
37 Condition V.4.G.2.b.
- 38 **V.4.G.1.e** Unless otherwise approved by Ecology, before any WMA closure activities can be
39 performed, the Permittees must conduct the following pre-closure activities within the
40 WMA:
- 41 **V.4.G.1.e.i** Complete tank waste retrieval as required under Permit Condition V.4.F.
- 42 **V.4.G.1.e.ii** Complete tank waste characterization as required under Permit Condition V.4.F.1.a.i (c)
43 or V.4.F.1.a.ii, whichever condition applies.
- 44 **V.4.G.1.e.iii** Complete a RA in compliance with the requirement specified in Permit Condition
45 V.4.G.6.

- 1 **V.4.G.1.e.iv** Complete any additional mitigation measures required by Ecology under this Permit if
2 the results of the RA indicate that the risk associated with a final WMA closure is
3 unacceptable. Such mitigation measures may include additional tank waste retrieval,
4 stabilization, isolation, or cleanup activities for any part of a WMA, individual tanks, or
5 SST components.
- 6 **V.4.G.1.f** The Permittees must properly dispose of or decontaminate all equipment, structures, and
7 soils generated during the partial and final closure periods, and handle all dangerous
8 waste generated during closure, as required by [WAC 173-303-610](#)(5), incorporated by
9 reference.
- 10 **V.4.G.2 CLOSURE PERFORMANCE STANDARDS**
- 11 **V.4.G.2.a General Closure Performance Standards**
- 12 **V.4.G.2.a.i** The Permittees must close SST System in a manner that achieves the following closure
13 objectives, in accordance with [WAC 173-303-610](#)(2)(a):
- 14 a) Minimizes the need for further maintenance.
- 15 b) Controls, minimizes or eliminates to the extent necessary to protect human health and
16 the environment, post-closure escape of dangerous waste, dangerous constituents,
17 leachate, contaminated runoff, or dangerous waste decomposition products to the
18 ground, surface water, groundwater, or the atmosphere.
- 19 c) Returns the land to the appearance and use of surrounding land areas to the degree
20 possible given the nature of the previous dangerous waste activity.
- 21 **V.4.G.2.a.ii Reserved**
- 22 **V.4.G.2.b Clean Closure Performance Standards**
- 23 **V.4.G.2.b.i** Except as provided in Permit Condition V.4.G.2.c (Landfill closure), the Permittees must
24 meet the requirements of [WAC 173-303-610](#)(2)(b) and [WAC 173-303-640](#)(8)(a) in
25 closing the SST System: All dangerous waste, waste constituents, dangerous waste
26 residues, equipment, bases, liners, any materials containing or contaminated with
27 dangerous waste or waste residue, and contaminated soils and groundwater throughout
28 the closing unit must be removed or decontaminated. The removal or decontamination
29 must assure that the levels of dangerous waste or dangerous waste constituents or
30 residues do not exceed:
- 31 a) For soil and groundwater in any areas affected by releases from the SST System, the
32 numeric cleanup levels pursuant to unrestricted use exposure assumptions in the
33 Model Toxics Control Act (MTCA) regulations, [WAC 173-340](#), incorporated by
34 reference. These are the numeric cleanup levels calculated according to MTCA
35 Method B, although Method A may be used as appropriate.
- 36 b) For all structures, equipment, bases, liners, etc., clean closure standards as applicable
37 in Ecology document #94-111, Guidance for Clean Closure of Dangerous Waste
38 Units and Facilities, incorporated by reference.
- 39 **V.4.G.2.b.ii Reserved**
- 40 **V.4.G.2.c Landfill Closure Performance Standards**
- 41 **V.4.G.2.c.i** Before the Permittees may close any portion of the SST System under landfill closure
42 standards, the Permittees must demonstrate that clean closure of such portions is
43 impracticable.
- 44 a) The “Impracticability Demonstration” must be made under the definition of
45 “practicability” under [WAC 173-340-200](#), incorporated by reference, and following

1 the demonstration procedures and criteria of [WAC 173-340-360](#)(3)(e) and (f),
2 incorporated by reference.

- 3 b) The “Impracticability Demonstration” must be undertaken for any WMA that is
4 proposed to be closed in whole or part as a landfill. The demonstration for one WMA
5 cannot be used to determine landfill closure for any other WMA or for the entire SST
6 System.
- 7 c) The “Impracticability Demonstration” must be undertaken at the WMA level. The
8 demonstration shall include a component level evaluation of all tanks, ancillary
9 equipment, and contaminated soils within the WMA that the Permittees believe
10 cannot practicably meet clean closure standards. Permittees may group similar
11 components together for the purpose of this demonstration.
- 12 d) The “Impracticability Demonstration” must be submitted as an integrated part of the
13 proposed closure plans for the closure unit (component, group of components, or
14 WMAs).

15 **V.4.G.2.c.ii**

16 If the Permittees demonstrate that all or part of the SST System, including contaminated
17 soils, cannot be practicably removed or decontaminated as required by Permit Condition
18 V.4.G.2.b., the Permittees must, upon Ecology approval, close those portions of the SST
19 System as a landfill and perform post-closure care in accordance with the closure and
20 post-closure care requirements that apply to landfills under [WAC 173-303-665](#)(6)
21 (including internal references to [WAC 173-303-610](#)(7),(8),(9), and (10)), incorporated by
22 reference, with the following exceptions and requirements:

23 a) Exceptions:

- 24 • The liner and leachate collection requirements of [WAC 173-303-665](#)(6)(b)(ii)
25 and (iii) are not applicable; and
- 26 • The post-closure care period under [WAC 173-303-610](#)(7)(a) is designated as
27 500 years.
- 28 • Under [WAC 173-303-610](#)(7)(c), the security requirements of [WAC 173-303-310](#)
29 will be continued throughout the post-closure care period.

30 b) Requirements for Cover System(s): The Permittees must design, construct, and
31 maintain a cover that:

- 32 • Ensures long-term isolation of wastes with minimal maintenance requirements;
- 33 • Has low permeability to minimize the infiltration of precipitation into
34 contaminated soil or debris, thereby minimizing the driving force for downward
35 migration of contaminants;
- 36 • Minimizes the migration of windblown dust originating from contaminated
37 surface soils and limits water erosion, and includes re-vegetating the barrier
38 surface areas to enhance evapotranspiration and blend into the surrounding
39 landscape;
- 40 • Minimizes the potential for direct exposure of inadvertent intruders to
41 contamination, including minimizing the potential for intrusion and destructive
42 effects by plants and burrowing animals;
- 43 • Prevents human intrusion and ecological receptors, and attenuates the risk from
44 covered contaminants;
- 45 • Include design features to ensure that the cover’s structural integrity is
46 maintained;
- 47 • Is based on site-specific evaluations, subject to approval by Ecology, ensuring
48 that designs are appropriate for specific WMA characteristics;

- 1 • Does not inhibit future groundwater remediation;
- 2 • Has an estimated 500-year design life.
- 3 c) Requirements for Groundwater/Vadose Zone Monitoring System(s): The Permittees
4 must provide for and maintain vadose zone monitoring as part of groundwater/vadose
5 zone monitoring system(s) during the post-closure care period, and perform
6 mitigation actions as necessary if a leak is detected.
- 7 d) Requirements for Construction Phase Monitoring and Inspection: The Permittees
8 must provide for monitoring and inspections as necessary during construction, or
9 installation period, in accordance with the requirements of [WAC 173-303-665](#)(4).
- 10 e) Requirements for Institutional and Administrative Controls: The Permittees must
11 implement and maintain institutional controls during the post-closure care period to
12 ensure the protection of human health and the environment. The Permittees will place
13 each WMA in a period of administrative control during which monitoring and
14 maintenance activities will take place. The institutional controls may include:
- 15 • Non-engineered restrictions on activities, access, or exposure to land,
16 groundwater, surface water, waste, and waste disposal areas or media;
- 17 • RA and reporting of controls;
- 18 • Permanent markers, signs, and monuments on the landfill areas, and
- 19 • Distributed records that pass on information regarding the nature and location of
20 hazards to future generations
- 21 f) Inspection Requirements: The Permittees must provide for post-closure inspections
22 for the engineered surface barriers after the final closure for vegetation conditions,
23 signs of intrusion; run on/run-off control; and specify maintenance if problems are
24 discovered during inspections.
- 25 **V.4.G.2.c.iii** No landfill closure actions can be undertaken for any component or groups of
26 components within a WMA before a closure plan allowing for such actions is approved
27 for the WMA.
- 28 **V.4.G.2.c.iv** Before any SST System tanks or ancillary equipment may be landfill closed, the
29 Permittees must meet all land disposal restriction (LDR) requirements specified in
30 [WAC 173-303-140](#), incorporated by reference, or obtain Ecology’s approval for a site-
31 specific LDR treatability variance under the criteria of [40 CFR.268.44](#)(h), incorporated
32 by reference in [WAC 173-303-140](#)(2)(a) and incorporated by reference into this Permit,
33 otherwise allowing for the *in situ* disposal of such components.
- 34 **V.4.G.3 SST System Closure Schedule**
- 35 **V.4.G.3.a** The Permittees will comply with the requirements and schedules of [HFFACO](#) milestone
36 M-045-00, which are incorporated by reference under the terms of Permit Condition
37 I.A.4., for completing the closure of all Single Shell Tank Farms.
- 38 **V.4.G.3.b** The Permittees will comply with the requirements and schedules of [HFFACO](#) Milestone
39 M-045-082, which are incorporated by reference under the terms of Permit Condition
40 I.A.4., for submitting permit modification requests to support final closure of WMA C.
- 41 **V.4.G.3.c** Permittees will comply with the requirements and schedules of [HFFACO](#) milestone M-
42 045-83, which are incorporated by reference under the terms of Permit Condition I.A.4,
43 for completing the closure of WMA C.
- 44 **V.4.G.3.d** Permittees will comply with the requirements and schedules of, and requirements and
45 schedules developed under, [HFFACO](#) milestone M-045-84, which are incorporated by
46 reference under the terms of Permit Condition I.A.4, for closing a second WMA.

- 1 **V.4.G.3.e** Permittees will comply with the requirements and schedules of, and requirements and
2 schedules developed under, [HFFACO](#) milestone M-045-85, which are incorporated by
3 reference under the terms of Permit Condition I.A.4, for closing all remaining WMAs.
- 4 **V.4.G.3.f** Permittees will comply with the requirements and schedules of, and requirements and
5 schedules developed under, [HFFACO](#) milestone M-045-92B, which are incorporated by
6 reference under the terms of Permit Condition I.A.4, for submitting all applicable
7 information to be included in the Corrective Measures Study & Feasibility Study Report
8 and Proposed Corrective Action Decision Plan for SST ancillary equipment in the 200-
9 IS-1 Operable Unit.
- 10 **V.4.G.4 Closure Plan Submission**
- 11 **V.4.G.4.a General Requirements**
- 12 **V.4.G.4.a.i** The Permittees will develop and submit closure plans (also called Closure Action Plans
13 under the [HFFACO](#)) in a timely manner to support the closure schedules specified in
14 Permit Condition V.4.G.3.
- 15 **V.4.G.4.a.ii** The closure plans will be developed following the requirements of [HFFACO](#) Action Plan
16 Appendix I, Sections 2.2, 2.3, 2.4, 2.5, and 3.0, which are incorporated by reference
17 under the terms of Permit Condition I.A. 4.
- 18 **V.4.G.4.a.iii** Closure plans will be submitted on both WMA (“Tier 2”) and component-specific (“Tier
19 3”) levels.
- 20 **V.4.G.4.a.iv** Closure plans will be submitted as permit modification requests under Permit Condition
21 I.C.3.
- 22 **V.4.G.4.a.v** If the Permittees propose closure under alternative requirements pursuant to
23 [WAC 173-303-610](#)(1)(e) (e.g., relying on corrective action to satisfy closure of
24 contaminated soils), the closure plan must include either the alternative requirements or a
25 reference to the enforceable document that contains the alternative requirements.
- 26 **V.4.G.4.b WMA (Tier 2) Closure Plans**
- 27 **V.4.G.4.b.i** General Requirements: Unless otherwise approved by Ecology, and consistent with
28 [HFFACO](#), Appendix I, the following general requirements apply:
- 29 a) Tier 2 Closure Plans will be developed for each WMA.
- 30 b) The Tier 2 Closure Plans will address how compliance will be achieved with the
31 closure requirements of [WAC 173-303-610](#), [WAC 173-303-640](#)(8), and, as
32 applicable, [WAC 173-303-660](#)(9) and [WAC 173-303-665](#)(6), incorporated by
33 reference, and the requirements of this Permit.
- 34 c) Each Tier 2 Closure Plan will be accompanied or preceded by a group of Tier 3
35 Closure Plans for all components within that WMA if the components have not
36 already been certified as clean closed. The Tier 2 plan must address closure issues for
37 the entire WMA.
- 38 d) The Tier 2 Closure Plan for each WMA must address closure actions for all the
39 components (tanks, ancillary equipment, contaminated soils and groundwater
40 included within the WMA) based on the process information for that WMA within
41 Addendum C to this Permit.
- 42 e) The Tier 2 Closure Plan for each WMA must be accompanied by a final RA report
43 following the requirements of Permit Condition V.4.G.6, with updated assessment
44 results reflecting the most updated component closure activities, residual waste
45 volume, constituent concentrations, and all other characterization information
46 necessary for the closing units.

1 **V.4.G.4.b.ii** Specific content: The Tier 2 Closure Plans must include the following:

2 a) Clean Closure Description:

- 3 • A description of how each WMA will be closed in accordance with the closure
- 4 performance standards specified in Permit Condition V.4.G.2.a, and V.4.G.2.b;
- 5 • A detailed description of the methods to be used during closure, including, but
- 6 not limited to, methods for removing, transporting, treating, storing, or disposing
- 7 of all dangerous wastes;
- 8 • Identification of the type(s), location, and schedule of availability of any off-site
- 9 dangerous waste management units to be used;
- 10 • A detailed description of the steps needed, or technologies and capabilities
- 11 needed, to remove or decontaminate all dangerous waste residues and
- 12 contaminated containment system components, equipment, structures, and soils
- 13 during closure, including, but not limited to, procedures for cleaning or
- 14 removing equipment and contaminated soils;
- 15 • Methods for sampling and testing surrounding soils, and criteria for determining
- 16 the extent of decontamination required to satisfy the closure performance
- 17 standard;
- 18 • A detailed description of other activities necessary during the closure period to
- 19 ensure that the closure satisfies closure performance standards, including, but not
- 20 limited to, groundwater monitoring, and run-on and runoff control;

21 b) Clean Closure Impracticability Demonstration:

- 22 • If the Permittees propose that closure in accordance with the closure performance
- 23 standards specified in Permit Condition V.4.G.2.b is not practicable for all or part
- 24 of a WMA and that closure in accordance with the closure standards specified in
- 25 Permit Condition V.4.G.2.c.i should be approved, the Permittees must include an
- 26 “Impracticability Demonstration” in the closure plan as specified in Permit
- 27 Condition V.4.G.2.c.ii,

28 c) Contingent Landfill Closure and Post-Closure Description: For any portion of the

29 SST System proposed to be closed as a landfill, the closure plan must include:

- 30 • A description of how the WMA will be closed and post-closure care conducted,
- 31 in accordance with the closure performance standards specified in Permit
- 32 Condition V.4.G.2.a and the landfill closure performance standards specified in
- 33 Permit Condition V.4.G.2.c.
- 34 • A detailed description of the steps needed, technologies and capabilities needed,
- 35 and landfill cover construction procedures necessary to accomplish closure as a
- 36 landfill of all dangerous waste residues and contaminated tanks, containment
- 37 system components, ancillary equipment, structures, and soils subject to such
- 38 closure within the WMA.
- 39 • A landfill design and an operating and maintenance plan (addressing
- 40 construction, installation, inspection, monitoring and leak detection, surveying,
- 41 recording and reporting) for each WMA to meet the [WAC 173-303-665](#)
- 42 requirements.
- 43 • A Response Action Plan for each WMA pursuant to [WAC 173-303-665](#)(8) and
- 44 (9) during landfill operating period and during post-closure care period.
- 45 • A petition for a site-specific LDR treatability variance under the criteria of
- 46 [40 CFR 268.44](#)(h), incorporated by reference in [WAC 173-303-140](#)(2)(a) and
- 47 incorporated by reference into this Permit, with respect to any tanks and/or
- 48 ancillary equipment proposed to be disposed of *in situ*. Such petitions will be
- 49 submitted pursuant to the requirements of [40 CFR 268.44](#)(h)-(m), incorporated

1 by reference in [WAC 173-303-140](#)(2)(a) and incorporated by reference into this
2 Permit.

3 d) The Permittees may submit items (a) and (b) prior to submittal of (c).

4 **V.4.G.4.c Tier 3 Closure Plan and Component Closure:**

- 5 a) Tier 3 closure plans are required for all SST component(s) or groups of components
6 within WMAs, and components outside WMAs if they are to be closed in
7 conjunction with the WMAs.
- 8 b) If a grouping of components is proposed for component closure, the Permittees will
9 provide sufficient information to support such grouping such as waste transfer
10 history, process information, similarity of waste characteristics, geographic
11 proximity, risk levels, and connectivity.
- 12 c) To carry out [HFFACO](#) Action Plan Appendix I, Section 2.2.2 (incorporated in Permit
13 Condition V.4.G.4.a.ii), Tier 3 closure plans will include an Ancillary Equipment
14 Waste Inventory and Retrieval Plan that includes DQOs, work schedules, work
15 procedures, leak detection, and post-retrieval waste characterization if waste retrieval
16 is necessary before closure, or otherwise demonstrating it is not necessary to conduct
17 waste retrieval.
- 18 d) Tier 3 closure plans must provide detailed closure procedures for the component, or
19 groups of components, which, upon approval, shall provide operable guidance for
20 field closure activities.
- 21 e) The closure of components or groups of components must meet the clean closure
22 standards specified in Permit Condition V.4.G.2.b.i of this Permit, unless the
23 Permittees provide sufficient information to demonstrate that it is impracticable to
24 clean close these components following Permit Condition V.4.G.2.c.i.
- 25 f) The closure of a component or groups of components must not interfere with or
26 preclude final or adjacent component closure actions. The Tier 3 closure plan shall
27 address the effects of closing these components or group of components on other
28 components or WMA closures.

29 **V.4.G.5 Closure Requirement for SST Components within 200-IS-1 OU**

30 **V.4.G.5.a** All SST components located within 200-IS-1 OU must be closed to meet the closure
31 performance standards specified in Permit Condition V.4.G.2.a.

32 **V.4.G.5.b** All SST components located within 200-IS-1 OU will be closed to meet the clean closure
33 performance standards specified in Permit Condition V.4.G.2.b., unless Permittees
34 demonstrate that such components cannot be practicably removed or decontaminated
35 under the “Impracticability Demonstration” outlined in Permit Condition V.4.G.2.c.i, in
36 which case the components must be closed in compliance with the landfill closure
37 performance standards of Permit Condition V.4.G.2.c.

38 **V.4.G.5.c** Permittees will develop and submit Tier 2 and Tier 3 closure plan(s) for SST components
39 located within 200-IS-1 OU following the requirements of Permit Condition V.4.G.4.
40 For the purposes of this condition, the collection of SST components located within 200-
41 IS-1 OU will be treated as a WMA in applying the Tier 2 requirements of Permit
42 Condition V.4.G.4.

43 **V.4.G.5.d** Permittees may prepare a 200-IS-1 OU RFI/CMS/RI/FS document that presents SST
44 component closure requirements pursuant to [HFFACO](#) Section 5.5, incorporated by
45 reference. If this approach is taken, Permittees will structure the RFI/CMS/RI/FS
46 document such that the closure requirements for SST components located in 200-IS-1 OU
47 are clearly identified for separate review and approval through the permit modification
48 process.

- 1 **V.4.G.5.e** Any reassignment of SST components located in 200-IS-1 OU to a WMA must occur
2 before the submission of the corresponding closure plan for that WMA, and the
3 reassigned components must be included in that closure plan. Reassignment of
4 components after the closure plan is submitted will require amendment of the closure
5 plan in accordance with Permit Condition I.C.3.
- 6 **V.4.G.5.f** Reserved
- 7 **V.4.G.6 RISK ASSESSMENT**
- 8 **V.4.G.6.a** Prior to undertaking closure activities, the Permittees are required to conduct a risk
9 assessment (RA) to evaluate the protectiveness of closure conditions for each WMA.
10 The requirements of [HFFACO](#) Appendix I, Section 2.5, are incorporated by reference
11 under the terms of Permit Condition I.A.4 to satisfy this requirement. The inclusion of an
12 assessment of radiological contaminants of concern in an integrated PA as described in
13 [HFFACO](#) Appendix I, Section 2.5 is necessary for effective closure decision-making
14 under the scope of this Permit.
- 15 **V.4.G.6.b** An RA of the scope described in Permit Condition V.4.G.6.a must include all the tanks,
16 ancillary equipment, and contaminated soils and other components, as well as all waste
17 residue inventories and waste characterization information after tank retrieval, for each
18 WMA. The waste residue inventories and waste characterization shall be consistent with
19 the process information in Addenda B and C of this Permit.
- 20 **V.4.G.6.c** An RA of the scope described in Permit Condition V.4.G.6.a must consider all relevant
21 exposure pathways. It must include cleanup levels for the WMA contaminants
22 addressing protection of human health direct contact, protection of soils, groundwater and
23 surface water, and protection of air. It must also include ecological screening and site-
24 specific analyses in accordance with [WAC 173-340-7490](#) through [-7494](#), incorporated by
25 reference. Any modeling work performed must be consistent with [WAC 173-340](#)
26 requirements, incorporated by reference, and supporting data shall be provided to
27 Ecology, as attachment(s) to the RA as necessary.
- 28 **V.4.G.6.d** Before a final RA report of the scope described in Permit Condition V.4.G.6.a is
29 submitted for a WMA closure, an interim RA report will be submitted to Ecology for
30 review. The interim RA must be submitted to Ecology at least three years prior to the
31 closure plan submittal. The interim RA will be updated as necessary until the final RA is
32 approved by Ecology along with the closure plan.
- 33 **V.4.G.6.e** Final RA reports of the scope described in Permit Condition V.4.G.6.a must be submitted
34 as part of the closure plan for each WMA, in accordance with Permit Condition
35 V.4.G.4.e.vi.
- 36 **V.4.G.6.f** In the event the RA results indicate that the risk is not acceptable for a WMA, Ecology
37 reserves the authority to modify the Permit to require the Permittees to conduct additional
38 risk mitigation measures, including, but not limited to, additional waste retrieval to
39 remove waste residue left in the tanks or ancillary equipment, removal and
40 decontamination of SST components or groups of components (equipment, soils,
41 dangerous wastes, etc.), changing the closure plan to incorporate new closure designs,
42 and/or changing the institutional control plan, until the risk is mitigated and reduced to an
43 acceptable level.
- 44 **V.4.H POST-CLOSURE CARE**
- 45 Post-closure care is required after closure for any WMA in which the closure
46 performance standards of Permit Condition V.4.G.2.b are not met upon closure (i.e.,
47 waste has been left in place). In this event, the WMA will enter a post-closure care
48 period during which surface barrier inspection, barrier maintenance and performance

1 monitoring, administrative controls, and groundwater monitoring will be implemented
2 and performed.

3 **V.4.H.1 General Requirements**

4 **V.4.H.1.a** If any portion of the SST System is closed as landfill, the Permittees will perform post-
5 closure care for that portion closed as a landfill in accordance with the following
6 requirements.

7 **V.4.H.1.b** Post-closure care will be performed on WMA basis. If any portion of the 200-IS-1 OU is
8 closed as landfill(s) separate from WMAs, post-closure care will be performed for that
9 portion of the 200-IS-1 OU, unless otherwise approved by Ecology.

10 **V.4.H.1.c** The Permittees will implement the post-closure care requirements specified in the
11 Contingent Landfill Closure and Post-Closure Plan developed under Permit Condition
12 V.4.G.4.b.ii (c), as approved by Ecology under Permit Condition V.4.G.4.a.iv.

13 **V.4.H.1.d** The potential integration of WMA closures with other cleanup activities will not change
14 SST System points of compliance, which remain the physical boundaries of subject
15 WMAs.

16 **V.4.H.2 Certification of Post-Closure Performance**

17 **V.4.H.2.a** No later than 60 days after completion of the established post-closure care period for each
18 WMA and the entire SST System, the Permittees shall submit by registered mail a
19 certification that the post-closure period for the WMA (or the SST System, as
20 appropriate) was performed according to permit conditions and specifications in the
21 approved Contingent Landfill Closure and Post-Closure Plan. The certification will be
22 signed by the Permittees and an IQRPE. Documentation supporting the IQRPE's
23 certification must be supplied to Ecology within 60 days of completion of post closure.

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