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FACT SHEET
PART V CLOSURE UNIT GROUP 4, SINGLE SHELL TANK SYSTEM

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2 **FACT SHEET**

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

4 **UNIT DESCRIPTION**

5 The Single Shell Tank (SST) System includes 12 tank farms. These tank farms contain a total of 149
6 underground storage tanks, related equipment, active and miscellaneous underground storage tanks,
7 miscellaneous facilities. It also includes soils and groundwater that are contaminated from leaks and
8 unplanned releases.

9 The SST System contains:

- 10 • 133 100-series SSTs (530,000 to 1 million gallon capacity).
11 • 16 200-series SSTs (55,000 gallon capacity).
12 • Waste transfer vaults and related tanks.
13 • Tank pits, valve pits, and flush pits.
14 • Pumps and valves.
15 • Diversion boxes.
16 • Numerous pipelines.
17 • Above-ground buildings and structures.
18 • Other mechanical equipment.
19 • Contaminated soils.
20 • Contaminated groundwater.

21 The 12 tank farms are geographically grouped into seven waste management areas (WMAs) for regulatory
22 purposes. WMA A-AX, C, and B-BX-BY are located in the 200 East Area of the Hanford Site. WMA T,
23 TX-TY, U, and S-SX are located in 200 West Area of the Hanford Site. Most of the SST System is
24 located within the WMAs. However, some components of the system, such as ancillary equipment,
25 transfer lines, and support facilities are located outside WMA boundaries. The associated equipment
26 outside the WMA boundaries is located within 200-IS-1 Operable Unit (OU).

27 In addition to SST components, the 200-IS-1 OU includes past-practice sites subject to the Hazardous
28 Waste Management Act (HWMA) corrective action and Comprehensive Environmental Response,
29 Compensation and Liability Act (CERCLA) remedial action requirements, and other tank storage and
30 disposal facilities that are not part of the SST System. The HWMA is Washington State's
31 implementation of the Resource Conservation and Recovery Act (RCRA), as delegated by the United
32 States Environmental Protection Agency (EPA).

33 **TYPE AND QUANTITY OF WASTE**

34 The 149 SSTs in the 200 East and 200 West Areas of the Hanford Site were built between 1943 and 1964
35 to store waste underground. Beginning in 1944, waste was routed via buried pipelines to the SSTs from
36 spent fuel processing and other operations. The SSTs also received liquid radioactive wastes from
37 Hanford facilities outside of the 200 Areas.

38 All waste in the SSTs is mixed waste (radioactive and dangerous) (see [WAC 173-303-040](#)). The type and
39 quantity of waste is listed in Addendum A of the SST Permit, and the United States Department of
40 Energy (USDOE) publication HNF-EP-0182, *Waste Tank Summary Report*, Rev. 284.

1 The maximum quantity of waste in the SSTs at one time was about 77.5 million gallons in 1966. As of
2 November 2011, the SSTs hold 27.51 million gallons of mixed waste (HNF-EP-0182, *Waste Tank*
3 *Summary Report*, Rev. 284).

4 Waste has leaked from the SST system or has been discharged in an unplanned manner. The estimated
5 volume of leaked waste from the SSTs is approximately 3.8 million Liters (1 million gallons).

6 **BASIS FOR PERMIT CONDITIONS**

7 Ecology cannot authorize the SST System to operate (treat, store, or dispose of dangerous waste) because
8 the tank system does not satisfy the requirements of [WAC 173-303](#). Specifically, the SST System has
9 been declared to be an unfit for use tank system under [WAC 173-303-400\(3\)](#) (incorporating by reference
10 [40 C.F.R. §265.191](#)). Unfit for use tank systems must be upgraded, repaired, or closed. USDOE has
11 chosen to close the SST System. This closure will follow the standards of [WAC 173-303-610](#)
12 (addressing dangerous waste facility closure generally) and [WAC 173-303-640\(8\)](#) (addressing closure for
13 dangerous waste tank systems).

14 [WAC 173-303-610\(4\)\(b\)](#) requires non-compliant facilities to be closed within 180 days. However, the
15 Permittees cannot practicably close the facility to meet the closure requirements within 180 days due to:

- 16 • The complexity of the Hanford SST System.
- 17 • The amount of waste in the system.
- 18 • The nature of the waste (mixed waste – both radioactive and dangerous).
- 19 • The fact that capacity to treat the waste is not yet on-line.
- 20 • The magnitude of soil and groundwater contamination caused by the discharge, spills, and leaks
21 from the SST System.

22 Ecology is incorporating into the SST Permit existing legal compliance schedules that dictate schedules
23 and certain requirements for completing the SST System closure. This will ensure that the closure
24 process protects human health and the environment; meets the dangerous waste regulations; and
25 minimizes long-term post closure care and environmental impact. These compliance schedules have
26 either been negotiated and agreed upon in the Hanford Federal Facility Agreement and Consent Order
27 ([HFFACO](#)) (also known as the Tri-Party Agreement [TPA]) (e.g., through its major Milestone M-045
28 series, Appendix H and Appendix I), or have been negotiated and agreed upon, and adopted as a judicial
29 order, in the consent decree entered in the *Washington v. Chu* Case, Case No. 08-5085 FVS, United States
30 Federal District Court for the Eastern District of Washington, entered on October 25, 2010,
31 (*Washington v. Chu* Consent Decree).

32 The SST System cannot be closed within 180 days as required by [WAC 173-303-610\(4\)\(b\)](#). The closure
33 process will take an extended period so the waste stored in the SST System has to be safely managed,
34 even though the SST System is an unfit for use tank system and is not operating. To provide for this safe
35 management, pre-closure conditions are imposed in this Permit that requires the Permittees to:

- 36 • Undertake safety controls and hazards prevention.
- 37 • Perform tank leak and intrusion detection.
- 38 • Respond to leaks and spills.
- 39 • Comply with the contingency plan in Addendum K.
- 40 • Develop an inspection schedule, description of security procedures, and a training matrix
41 identifying worker categories and training categories of personnel involved with hazardous waste
42 management, tank waste retrieval, closure, and corrective action.
- 43 • Implement and comply with the requirements of the approved plans.

1 As stated in the HNF-EP-0182, *Waste Tank Summary Report*, Rev. 284, as of November 2011, the SSTs
2 still hold 27.51 million gallons of mixed waste. Tank waste must be retrieved and transferred into safer
3 storage for eventual treatment and disposal. *The Washington v. Chu* Consent Decree sets forth the
4 requirements and schedules for tank waste retrieval from 19 tanks. The rest of the SSTs are subject to
5 retrieval requirements and schedules of the [TPA](#). Those requirements and schedules are contained in,
6 and established under, [TPA](#) Milestones M-045 and M-062, Appendix H, and Appendix I, which are
7 incorporated into the Permit by reference.

8 Among the 149 SSTs, 67 tanks are leakers or assumed leakers. Waste has been leaked from the system or
9 discharged in an unplanned manner. The estimated volume of leaked waste from the SSTs is
10 approximately one million gallons. The Permittees are required to conduct corrective action under
11 [WAC 173-303-646](#) to address contamination caused by these releases. The Permit incorporates
12 corrective action requirements and schedules of the [TPA](#) where they exist for WMA C and for certain
13 interim actions. The Permit further requires development of a schedule and implementation plan for
14 completing corrective action at all other WMAs.

15 **PROCESS INFORMATION SUBMISSION AND UPDATING**

16 Conditions V.4.B contain the requirements for process information for the SST System, WMAs, and
17 200-IS-1 OU. To facilitate the SST System closure action, the Permit requires the Permittees to organize
18 and submit SST System process information in a manner corresponding with the three-tier approach for
19 closure plans described in [TPA](#) Appendix I, Section 2.0.

20 The process information for the SST System (Tier 1) will include a system-wide description of the SST
21 System processes, waste generation, transfer and storage procedures, diagram(s), drawing(s), service and
22 operating history, and list of tanks and ancillary equipment. The information will be submitted to update
23 Addendum B of this Permit.

24 WMA process information (Tier 2) shall include WMA-specific process information, waste information,
25 a list of components within the WMA, and any non-tank structures located within a WMA that may need
26 decommissioning before closure, or any components located outside a WMA but are proposed to be
27 closed with that WMA.

28 The Permittees will provide detailed information for each component of the WMA (Tier 3) for the review
29 and approval of closure plans, clean-closure impracticability demonstrations, and remedial or corrective
30 action for components located outside WMAs. The information will be submitted to update Addendum C
31 of this Permit.

32 The Permittees have been submitting annual updates to the Part A form (see Addendum A) to document
33 the SST System and WMAs. The annual update to the Part A form will no longer take place. When there
34 is new or revised information, the Permittees will provide updates that will be incorporated into
35 Addendum B (SST System Process Information) or Addendum C (WMAs Process Information). If the
36 Permittees have not identified new or revised information, they will notify Ecology.

37 Within 180 days of the effective date of the Permit, the Permittees will submit the SST System process
38 information that has been identified as of the effective date of the Permit. After that, they will submit
39 new or updated information annually by March 1 or notify Ecology that there is no new or revised process
40 information.

41 The Permittees are required to submit the process information for WMA C within 180 days of the
42 effective date of this Permit with the permit modification required by [TPA](#) Milestone M-045-82.

43 The Permittees are required to provide Ecology, by December 30, 2015, a schedule of permit
44 modifications for obtaining the process information for all other WMAs by December 30, 2025. Once the
45 process information for a WMA is submitted, the Permittees will continue to submit new or revised
46 process information annually by March 1, until that WMA is certified closed.

1 The Permittees will submit the process information for 200-IS-1 OU by the date specified in [TPA](#)
2 Milestone M-015-90.

3 **SST SYSTEM GROUNDWATER MONITORING**

4 Conditions V.4.C contain the requirements for SST System groundwater monitoring. The SST System is
5 a tank system (and not what is defined as a land-based “regulated unit”). It is not subject to groundwater
6 monitoring requirements under the Dangerous Waste Regulations.¹ However, because the SST system
7 is located underground, is unfit for use, and has already incurred releases to soils and groundwater,
8 Ecology has, under the authority of [WAC 173-303-815](#)(2)(b)(ii), chosen to require groundwater
9 monitoring of the system as if it were a regulated unit.

10 Prior to issuance of this SST System Permit chapter, groundwater monitoring of the SST System has been
11 managed by applying interim status facility standards incorporated under [WAC 173-303-400](#)(3). Under
12 these standards, groundwater at all seven SST WMAs has been placed for assessment monitoring starting
13 from various years (1993, 1996, 2000, 2005, and 2011) following the requirements in [40 Code of Federal](#)
14 [Regulations \(CFR\) 265, Subpart F](#). Subpart F specifies the requirements for groundwater monitoring
15 system, sampling and analysis, and evaluation and responses.

16 An interim monitoring plan was approved for each WMA except WMA B-BX-BY and WMA A-AX, for
17 which groundwater monitoring plans are pending approval.

18 The groundwater monitoring under the current assessment monitoring plans have concluded that three
19 WMAs (C, U, A-AX) have impacted groundwater, and that groundwater under two WMAs (S-SX, and B-
20 BX-BY) have been impacted by multiple source locations. No conclusions have been drawn for WMA T
21 and TX-TY. Their groundwater monitoring plans were updated in 2009. However, remedial action is
22 being implemented for groundwater OU, 200-ZP-1, which is right under WMA T and TX-TY, The
23 Record of Decision (ROD) for 200-ZP-1 acknowledges widespread contamination within the unit,
24 without identifying specific sources.

25 Under the Permit, the current assessment monitoring plans will be implemented until new groundwater
26 monitoring plans are developed and approved. The Permittees are required to develop and implement
27 new plans to conduct groundwater compliance monitoring in accordance to [WAC 173-303-645](#)(8) and
28 (10), with specified groundwater protection standards established in the plans. These plans will be
29 developed on a WMA basis. The plans will be incorporated into this Permit as Addendum D.

30 With confirmed releases and groundwater contamination, the Permittees must conduct groundwater
31 monitoring as part of the RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) in
32 accordance with [WAC 173-303-646](#), and monitor for corrective action in accordance with [WAC 173-303-](#)
33 [645](#)(11) [the requirements of which are applied under the authority of [WAC 173-303-815](#)(2)(b)(ii)].

34 [TPA](#) Action Plan Section 5.5 specifies that “CERCLA past-practice authority may provide the most
35 efficient means for addressing mixed waste groundwater contamination plumes originating from a
36 combination of treatment, storage, and disposal (TSD) and past-practice units.” Consistent with this, the
37 Permit incorporates the requirements and schedules of operable unit (OU) groundwater performance
38 monitoring to satisfy corrective action performance monitoring.

39 Ecology reserves the authority to impose additional conditions through permit modification if
40 groundwater monitoring specified in Remedial Design/Remedial Action (RD/RA) Work Plans is found to
41 be inadequate to meet corrective action performance monitoring requirements.

42 To assist Ecology in overseeing the groundwater monitoring effort, Permittees are required to submit an
43 annual Hanford Site Groundwater Monitoring and Performance Report to Ecology for review and

¹ [WAC 173-303-640](#), requirements applicable to tank systems, and [WAC 173-303-645](#), groundwater monitoring requirements for regulated units.

1 approval no later than July 31 of each calendar year. The annual groundwater monitoring report will
2 summarize the groundwater monitoring results for the previous calendar year.

3 For any well installation and decommissioning, Permittees must follow the well construction standards
4 and decommissioning requirements of [WAC 173-160](#). Prior to the installation of any additional wells to
5 satisfy the Permit's groundwater monitoring requirements, the Permittees must submit, for Ecology's
6 approval, a well installation plan. The plan must specify the basis for well replacement (if applicable),
7 including, but not limited to:

- 8 • Any computer modeling results performed to determine new groundwater monitoring wells;
- 9 • Location of the proposed wells;
- 10 • Well design;
- 11 • Screen length and placement;
- 12 • Construction and installation procedures;
- 13 • Management of wastes generated during well construction.

14 Dry or "unsuitable for use" wells must be replaced within two years.

15 **CORRECTIVE ACTIONS**

16 Conditions V.4.D contain the corrective action requirements. Releases of mixed waste to soil have
17 occurred in each of the seven WMAs, and the groundwater contamination plumes have been found
18 associated with both SST System TSD and past-practice units. These releases require corrective action.

19 The [TPA](#) Action Plan has established milestones for WMA corrective action, including Milestones
20 M-045-61 and M-045-62. The Permit incorporates these requirements and schedules, which include
21 requirements to submit to Ecology a Phase 2 RFI/CMS Report and a Corrective Measures
22 Implementation (CMI) Work Plan for WMA C.

23 Further, under the Permit, the Permittees are required to submit a schedule and implementation plan no
24 later than December 31, 2014, for completing corrective action for all other WMAs. The schedule and
25 implementation plan must:

- 26 • Include the development of RFIs/CMSs, the submission of permit modification requests for the
27 selection of corrective actions, and the submission of CMI Work Plans, with schedules.
- 28 • Support the development of WMA closure schedules under [TPA](#) Milestones M-045-84 and
29 M-045-85, and allow Permittees to meet the date established in [TPA](#) Milestone M-045-00 for
30 completing the closure of all SST farms.
- 31 • Contain the elements of a RFI/CMS work plan as defined in [TPA](#) Action Plan Section 11.6 and
32 Appendix I.
- 33 • Be sufficiently aggressive to allow for the implementation of any early action deemed necessary
34 to reduce risk in accordance to the information provided in the Phase I RFI/CMS, annual Hanford
35 Site Groundwater Monitoring and Performance Report, and final tank closure and water
36 management Environmental Impact Statement.

37 The schedule and implementation plan will be considered during [TPA](#) WMA closure milestone
38 negotiations in accordance with [TPA](#) Milestones M-045-84 and M-045-85, including the respective [TPA](#)
39 change packages M-45-12-02 and M-045-12-03.

40 Additionally, Permittees shall complete implementation of interim measures including control of surface
41 water infiltration ([TPA](#) Milestone M-045-59), interim barrier installation ([TPA](#) Milestone M-045-92), and
42 interim measures in accordance with the requirements of [TPA](#) Milestone M-045-56, as incorporated in the
43 Permit.

1 **PRE-CLOSURE WASTE MANAGEMENT REQUIREMENTS**

2 Conditions V.4.E contain the pre-closure requirements. Although the SST System cannot be permitted as
3 an operating waste management unit and must be closed as an unfit for use tank system, waste will
4 continue to be managed in the system for years before closure can be completed. As a result, under the
5 authority of [WAC 173-303-815\(2\)\(b\)\(ii\)](#), Ecology is requiring the Permittees to comply with certain
6 operating requirements in [WAC 173-303](#) during the extended closure period in order to protect human
7 health and the environment. This period before closure is completed is referred to as the “pre-closure”
8 period. The pre-closure requirements are summarized below.

9 **1. Safety Controls and Hazards Prevention**

10 a. Preparedness and Prevention

11 Within 60 days of the effective date of this Permit, the Permittees are required to submit to
12 Ecology a description of the practices to prevent hazards (preparedness and prevention),
13 which will be incorporated into this Permit as Addendum O. The description shall include:

- 14 • Using and maintaining internal, communications, and emergency equipment
15 following the requirement of [WAC 173-303-340\(2\)](#).
- 16 • Operating and maintaining runoff controls and other systems to minimize run-on and
17 infiltration of liquids to SST tanks, catch tanks, vaults, pits, and any ancillary
18 equipment or structures in accordance with the requirements of [WAC 173-303-](#)
19 [640\(5\)](#).
- 20 • Conducting any pumping activities, such as removal of waste from SST ancillary
21 equipment or component, except for tank waste retrieval operations, in compliance
22 with [WAC 173-303-640\(5\)\(b\)](#).

23 b. Air Emissions

24 Ecology has already issued Hanford Site Air Operating Permit (#00-05-006) and “Criteria
25 and Toxic Air Emissions NOC Application for Operations of Waste Retrieval Systems in
26 SST Farms as Supplemented with C Farm Exhauster Operations” (Order # DE05NWP-002).
27 Permittees must conduct any SST pre-closure and closure activities in compliance with these
28 permits or orders.

29 c. Waste Management and Accumulation

30 Because the SST System is closing as an unfit for use tank system, the Permittees are not
31 authorized to introduce any additional dangerous waste into the SST System, except upon
32 prior written approval from Ecology. Permittees may use Double Shell Tank System
33 supernatant for the purpose of SST waste retrieval under an effective Tank Waste Retrieval
34 Work Plan (TWRWP).

35 The Permittees must maintain a current listing of any containerized waste accumulation areas
36 (e.g., 90-day and satellite accumulation areas) within the SST System footprint (i.e., WMAs).

37 The Permittees are not authorized to store waste in containers within the SST System
38 footprint for more than 90 days without an approved permit modification unless Ecology has
39 approved a 30-day extension.

40 Generator requirements are included in this Permit because the Permittees may become a
41 generator of dangerous waste and must handle the waste in accordance with all applicable
42 requirements of [WAC 173-303-170](#) through [WAC 173-303-230](#). See [WAC 173-303-610\(5\)](#).

43

1 d. Mapping and Marking

2 Permittees must develop a mapping and marking plan in accordance with [WAC 173-303-](#)
3 [640](#)(5) and [WAC 173-303-395](#)(6), and implement such plan to warn employees, emergency
4 response personnel, and the public of major risks associated with waste being stored or
5 otherwise held in SSTs, underground pipelines, diversion boxes, pits, and other structures
6 within the SST system.

7 e. Integrity Assessment of SSTs

8 The 149 SSTs were constructed between 1943 and 1964 with a design life of approximately
9 20 years. As a result, all of the SSTs are well past their service life. As of November 2011,
10 the 149 SSTs still hold 27.51 million gallons of mixed waste (HNF-EP-0182, *Waste Tank*
11 *Summary Report*, Rev. 284). Among the 149 SSTs, 67 tanks have leaked or are assumed to
12 have leaked.

13 Because under the current closure schedule some tanks may continue to hold waste for
14 another 30 years, the integrity of the SSTs is of a great concern. Therefore, to ensure SST
15 integrity, tank integrity assessments must be conducted throughout the entire pre-closure
16 period. The requirements and schedules of the [TPA](#) Milestone M-045-91 series are
17 incorporated by reference into the Permit with respect to performing SST System Integrity
18 Assessment.

19 The Permit presumes that the phrase “the end date of the mission” under [TPA](#) Milestone M-
20 045-91I means the date upon which the SST System is certified as closed. In the event this
21 phrase is interpreted differently, Ecology reserves the authority to modify the SST Permit to
22 require additional integrity assessment requirements to satisfy [40 CFR § 265.191](#) and [40 CFR](#)
23 [§ 265.196](#) (incorporated by reference in [WAC 173-303-400](#)[3]), as well as [WAC 173-303-](#)
24 [640](#)(2).

25 f. New SST Components

26 Even though the SST System is not authorized to operate, pre-closure activities may require
27 the Permittees to install new SST components or modify or repair existing SST components.
28 In such event, the Permittees are required to follow the requirements of [WAC 173-303-](#)
29 [640](#)(3) to conduct new component integrity assessment.

30 g. Temporary Waste Transfer Line Management

31 The Permittees must follow requirements of the temporary waste transfer lines specified in
32 Permit Condition V.4.F.5 for temporary waste transfer lines used in the SST System.

33 h. Leak Detection Monitoring Technology and Dry Well Data Logging

34 The Permittees will evaluate the leak detection monitoring technology every five years and
35 provide the evaluation to Ecology in a report. Within two years of the effective date of this
36 Permit, the Permittees are required to provide Ecology with a schedule for the leak detection
37 monitoring technology reports.

38 The Permittees are required to perform dry well data logging and include logging data in the
39 Hanford Operating Record, SST System file. The Permittees must provide a summary list of
40 dry well logging data including the tank farm or wells logged and dates of logging to Ecology
41 annually.

42 **2. Tank Leak/Intrusion Detection and Responses to Leak/Spills**

43 For the reasons described above with respect to integrity assessments, leak detection is also
44 required to be performed until the SST System is closed.

1 Requirements for leak and intrusion monitoring, including reporting, are incorporated into this
2 Permit. Permittees will submit a report within 90 days after the effective date of this Permit that
3 identifies the methods and equipment used for monitoring liquid level changes in the SSTs for
4 Ecology review and approval. Ex-tank drywell logging for all SSTs will be performed and
5 reported by March 30, 2016, and every 10 years thereafter.

6 Leak and intrusion detection is required for tanks that have not been retrieved or for tanks where
7 retrieval has been completed. Appropriate response actions must be taken in a timely manner in
8 the event of spill, leak, or intrusion. Monitoring requirements and schedules provided in the RPP-
9 9937, *Single Shell Tank Leak Detection and Monitoring Functions and Requirements*, are
10 incorporated by reference into this Permit. Such incorporation expires two years after the
11 effective date of this Permit, unless RPP-9937 has been updated under the [TPA](#), in which case the
12 update is incorporated under the terms of Permit Condition I.A.4.

13 If RPP-9937 is not updated within two years, the monitoring requirements of Permit Conditions
14 V.4.E.2.b through V.4.E.2.f will take effect. If RPP-9937 is updated, then the requirements of
15 Permit Conditions V.4.E.2.b through V.4.E.2.f will not take effect.

16 **3. Contingency Plan**

17 The Permittees will follow the requirements of the Contingency Plan in Addendum K of this
18 Permit and keep reports and details of any incidents that require implementation of the
19 Contingency Plan.

20 **4. Training**

21 Within 60 days of the effective date of this Permit, the Permittees are required to submit a
22 training matrix identifying worker categories and training categories. The matrix will reflect the
23 training requirements to be included in the SST System training plan specific to the waste
24 management, tank waste retrieval, closure, and corrective action activities conducted at the SST
25 System. The Permittees shall implement such training plans for corresponding facilities. The
26 training matrix will be incorporated into this Permit.

27 **5. Security**

28 Within 90 days of the effective date of this Permit, the Permittees are required to submit a
29 description of the security procedures specific to the SST System that implement the security
30 requirements of Site-Wide Permit Condition II.L and Attachment 3, [WAC 173-303-310](#), and
31 [WAC 173-303-395](#)(1), (2), and (6). The description of the security procedures specific to the
32 SST System will be incorporated into this Permit as Addendum E.

33 **6. Inspections**

34 The Permittees are required to inspect the SST System in accordance with the requirements of
35 [WAC 173-303-320](#) and [WAC 173-303-640](#)(6). Within 90 days of the effective date of this
36 Permit, the Permittees are required to submit an inspection schedule and to implement the
37 inspection schedule upon approval. The SST System Inspection Schedule will be incorporated
38 into this Permit as Addendum I.

39 **TANK WASTE RETRIEVAL**

40 Tank waste retrieval requirements are in Conditions V.4.F. There are still 27.51 million gallons of mixed
41 waste stored in the SSTs as of November 2011 (HNF-EP-0182, *Waste Tank Summary Report*, Rev. 284).
42 The Permittees are required to conduct tank waste retrieval from SSTs before the SST System can be
43 closed. The retrievals will be undertaken to meet the retrieval requirements of the *Washington v. Chu*
44 Consent Decree, Case 12 No. 08-5085 FVS, entered on October 25, 2010, and the [TPA](#).

1 **1. Tank Waste Retrieval Schedules, Criteria, and TWRWPs**

2 The *Washington v. Chu* Consent Decree provides the requirements and schedules for tank waste retrieval
3 of 19 tanks (10 tanks in WMA C and 9 additional tanks). The permit incorporates the requirements and
4 schedules of *Washington v. Chu* Consent Decree, for completing the retrieval of the nineteen tanks.
5 Specific requirements include Section IV-B, Appendix B and Appendix C of the *Washington v. Chu*
6 Consent Decree, the application of TWRWP requirements established under the Decree, residual tank
7 waste characterization, and retrieval data report.

8 The *TPA* Action Plan provides the requirements and schedules for the retrieval of all remaining SSTs not
9 addressed under *Washington v. Chu* Consent Decree. The permit incorporates the requirements and
10 schedules of the *TPA*, including applicable portions of the M-045 Milestone series, the M-062 Milestone
11 series, Appendix H, and Appendix I, for completing the retrieval of all remaining tanks. This includes
12 incorporating the requirements of TWRWPs approved by Ecology under the *TPA*.

13 **2. Residual Tank Waste Characterization**

14 The chemical constituents of the single-shell tank waste are approximated by the Best Basis Inventory
15 (BBI), maintained and updated quarterly by the Permittees in the Tank Waste Information System
16 (TWINS). The TWINS is a database for characterization of the overall waste in the SSTs, including two
17 levels of waste inventories: tank-by-tank waste inventories and global waste inventories. The best-basis
18 global inventories are independent estimates of the total amount of chemical and radionuclide
19 components in all tanks. The chemical analyte list selected represents 99 percent by weight of the tank
20 contents, and the radionuclides represent over 99 percent of the activity.

21 Information used to establish global inventories originated from key historical records (e.g., essential
22 material purchase records), from various chemical flowsheets used in reprocessing of irradiated Hanford
23 Site reactor fuels, and from calculations of radionuclide isotope generation and decay. These inventory
24 estimations are adjusted, as necessary, when tank-specific chemical analyses are completed.

25 Before the SST system can be closed, the waste in the SSTs must be retrieved and transferred to other
26 storage facilities for safer storage and eventual treatment. However, a certain amount of residual waste
27 may remain in the tanks after the retrieval is complete due to the limitations of current retrieval
28 technologies.

29 Considering the nature and limitations of the retrieval technologies used (sluicing, high-pressure spray,
30 and the mobile retrieval system [MRS]) and the physical and chemical heterogeneity of the tank wastes, it
31 is likely that the residual wastes remaining in the tanks after retrieval may be significantly different from
32 the BBI, and potentially significantly different among tanks. Therefore, waste analysis is critical for the
33 safe closure of the SST System. To evaluate risk and guide the closure decision, the Permit incorporates
34 the requirements of *TPA* Appendix I, Section 2.1.6 for the Permittees to conduct residual tank waste
35 characterization after retrieval.

36 **3. Tank Leak Detection During Retrieval**

37 Because of the introduction of liquids during tank waste retrieval (e.g., double-shell tank supernatant and
38 potentially water or other liquids), leak detection during retrieval is critically important to protect the
39 environment. The requirements for leak detection included in TWRWPs are necessary to ensure the
40 Permittees will provide adequate leak detection during waste retrieval, respond to leaks/spills, and take
41 necessary actions to mitigate leaks/spills if they occur.

42 To assist in the development of TWRWPs, the permit establishes baseline requirements on these topics.
43 Among other matters, monitoring frequencies are greater during retrieval than during periods in which
44 tanks are not undergoing retrieval operations.

45

1 **4. Data Quality Objectives (DQO) and Sampling and Analysis Plans (SAP)**

2 The Permittees will develop both DQOs and SAPs in coordination with Ecology. The DQOs will be
3 written to incorporate the rationale for selecting the parameters for which each sample will be analyzed so
4 the analysis will provide sufficient information to comply with [WAC 173-303-300](#)(1), (2), (3), and (4).
5 The Permittees will develop the SAP based on the DQO requirements.

6 Once approved by Ecology, the SAP for post-retrieval and closure sampling will be incorporated into this
7 permit as Addendum N. Finally, the Permittees will develop a tank or component specific SAP (TSAP)
8 and provide that TSAP to Ecology. The TSAP will be implemented unless Ecology notifies the
9 Permittees within three calendar days that it takes exception to the TSAP.

10 **5. Temporary Waste Transfer Line Management**

11 Because most waste transfers during tank waste retrievals are done using temporary waste transfer lines,
12 the management of the temporary waste transfer lines (e.g., hose-in-hose transfer lines [HIHTL]) must be
13 managed to meet the requirements set forth in the *Temporary Waste Transfer Line Management Program*
14 *Plan* (RPP-12711, Rev. 3K), which are incorporated in the permit.

15 In the event a leak occurs, the Permittees are required to respond to leaks or spills following the
16 requirements of RPP-12711. To provide for leak and spill response for temporary waste transfer lines, the
17 Permittees are required to submit a revision to RPP-12711 to incorporate a leak response plan within 180
18 days of the effective date of the Permit.

19 The Permittees will update the HIHTL tracking system information within 20 days of the end of each
20 quarter and provide it to Ecology within 30 days after the end of the quarter. The submittal of a quarterly
21 update is a corrective measure that resulted from a notice of violation for management of HIHTLs and a
22 subsequent inspection that determined the HIHTLs were not being managed as required in RPP-12711
23 (Re: *Notice of Violation for Unfit-for-Use Hazardous Tank System Components*, dated May 14, 2007).

24 The requirements for HIHTLs in RPP-12711 include how long the HIHTLs may be used before they must
25 be removed. It also contains an extension waiver process the Permittees must use if they require use of an
26 HIHTL beyond three years if deployed in the field, or beyond seven years if stored. HIHTLs cannot be
27 used after 10 years. (Re: *Conditional Approval of the Updated Temporary Waste Transfer Line*
28 *Management Program Plan, RPP-12711, Revision 3K, Approval of the Hose in Hose Transfer Line*
29 *(HIHTL) Compliance Removal Schedule, and Resolution of Ecology's HIHTL Outstanding Notice of*
30 *Violation (NOV)*, dated May 5, 2008.) The Permittees must provide formal notification to Ecology of the
31 determination to extend the service life of an HIHTL.

32 **SST CLOSURES**

33 The SST System closure requirements are in Conditions V.4.G.

34 **1. Closure General Requirements**

35 The SST System has been grouped into seven WMAs. Closure of SST System shall be performed on
36 WMA-by-WMA basis. The SST System will not be regarded as closed until all tanks, ancillary
37 equipment, contaminated soil, and contaminated groundwater included in the system are closed. The
38 closure of individual SST component or groups of components within WMAs can only be certified as
39 complete prior to the closure of the associated WMA if the component(s) are clean closed and meet clean
40 closure performance standards.
41

42 Before any WMA closure activities can be performed, the Permittees must conduct and complete pre-
43 closure requirements, including tank waste retrieval, residual tank waste characterization, risk assessment
44 (RA), and additional mitigation measures required by Ecology if the results of the RA indicate that risk
45 associated with a final WMA closure is unacceptable.

2. Closure Performance Standards

As required by [WAC 173-303-610\(2\)\(b\)](#) and [WAC 173-303-640\(8\)\(a\)](#), all dangerous waste, waste constituents, dangerous waste residues, equipment, bases, liners, any materials containing or contaminated with dangerous waste or waste residue, and contaminated soils and groundwater throughout the closing unit must be removed or decontaminated. General closure performance standards are specified in the permit and apply to any closure scenario. Under any scenario, closure must:

- Minimize the need for further maintenance.
- Control, minimize, or eliminate to the extent necessary the post-closure escape of dangerous waste to the environment.
- Return the land to the appearance and use of surrounding land to the degree possible given the nature of previous dangerous waste activity.

Clean closure performance standards are specified in the permit and are consistent with [WAC 173-303-610\(2\)\(b\)](#). For soils and groundwater affected by releases from the SST System, clean closure requires meeting the numeric cleanup levels for unrestricted land use under the Model Toxics Control Act (MTCA), [WAC 173-340](#) (generally as calculated under MTCA Method B). For structures and equipment, clean closure standards are incorporated from Ecology document [#94-111](#), Guidance for Clean Closure of Dangerous Waste Units and Facilities.

Under [WAC 173-303-640\(8\)\(b\)](#) (Tank System Closure),

“If the owner or operator demonstrates that *not all contaminated soils can be practicably removed or decontaminated* as required in (a) of this subsection, then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills [see [WAC 173-303-665\(6\)](#)].” (*Emphasis added.*)

In the event that landfill closure of any portion of the SST System is proposed, the Permittees must provide an “Impracticability Demonstration” in the relevant WMA closure plan(s) to demonstrate that clean closure is not practicable for that portion of the system. “Practicable” is not defined under the [Dangerous Waste Regulations](#). The Permit therefore directs the Permittees to make this demonstration applying the MTCA definition of “practicable” ([WAC 173-340-200](#)) and following the demonstration procedures and criteria of [WAC 173-340-360\(3\)\(e\)](#) and (f). The demonstration is to be undertaken at a WMA level.

This approach to demonstrating the “impracticability” of clean closure follows the Single-Shell Tank Waste Management Area C Closure White Paper (Attachment 2 to the *Waste Management Area C Closure Demonstration Project Plan*, RPP-PLAN-46484, Rev 1A), which identified MTCA’s analytical approach to practicability as a reference.

The tool under MTCA for determining whether it is justified to leave contaminated soils in place (i.e., that it is not *practicable* to remove or decontaminate all contaminated soils to meet MTCA unrestricted land use standards) is MTCA’s “permanent to the maximum extent practicable” requirement, which outlines a disproportionate cost evaluation. See [WAC 173-340-360\(3\)](#). Further, the same analytical tool (the disproportionate cost evaluation) is also employed in making corrective action decisions to leave contamination in place (which would also be applicable in a decision to leave contaminated soils in place). See [WAC 173-303-64620\(4\)](#).

Under the SST System closure permit, this “practicability” concept is extended to include not just landfill closure of contaminated soils, but also underground tanks system components that contain tank waste residues. EPA documents refer to landfill closure of the “tank system” when clean closure of contaminated soils is not practicable. [An example EPA document is [51 Fed. Reg. 25457](#); *Questions and Answers Regarding the July 14, 1986 Hazardous Waste Tank System Regulatory Amendments*, [EPA/530-SW-87-012](#) (October 1987).

1 The permit further provides that before any SST System tanks or ancillary equipment may be landfill
2 closed, the Permittees must meet all land disposal restriction requirements or obtain Ecology's approval
3 for a site-specific treatability variance of such requirements under the criteria of [40 C.F.R. 268.44\(h\)](#),
4 incorporated by reference in [WAC 173-303-140\(2\)](#).

5 Finally, landfill closure performance standards are also specified in the Permit. The Permit incorporates
6 the landfill closure and post-closure care requirements of [WAC 173-303-665\(6\)](#), with certain exceptions
7 and more specific requirements. These more specific requirements relate to the unique circumstances of
8 the SST System and the Hanford Site.

9 Should the SST System close as a landfill, this Permit provides for three exceptions to the landfill closure
10 performance requirements:

- 11 • The liner and leachate collection requirements of [WAC 173-303-665\(6\)\(b\)\(ii\)](#) are not applicable
12 because the system cannot meet the requirements.
- 13 • The period provided for post-closure care and use of property is extended to 500 years based on
14 cover designs, results of modeling efforts, and the natural systems around us. Ecology finds that
15 the extended period is necessary to protect human health and the environment. (For example,
16 leachate or groundwater monitoring results indicate a potential for migration of dangerous waste
17 at levels that may be harmful to human health and the environment [*see* [WAC 173-303-](#)
18 [610\(7\)\(b\)\(ii\)](#)]). The requirements for cover systems also require the cover to be designed for an
19 estimated 500-year design life.
- 20 • Under [WAC 173-303-610\(7\)\(c\)](#) security requirements of [WAC 173-303-310](#) will be continued
21 throughout the post closure care period.

22 The landfill closure performance standards provide for groundwater and/or vadose zone monitoring
23 systems during the post-closure care period. The intent is to use currently available moisture monitoring
24 (such as neutron moisture logging) or other technology that could be used in the future.

25 **3. Closure Schedules**

26 Existing legal closure schedules have been incorporated from the [TPA](#) M-045 Milestone series.
27 Permittees shall follow [TPA](#) Milestone M-045-00 to:

- 28 • Close all Single-Shell Tank Farms.
- 29 • Close WMA C following [TPA](#) Milestone M-045-083.
- 30 • Close a second WMA following [TPA](#) Milestone M-045-84.
- 31 • Close the remaining WMAs following the schedule of [TPA](#) Milestone M-045-85.

32 **4. Closure Plans**

33 To complete the SST System closure following the closure performance standards and meet the closure
34 schedules in [TPA](#) milestones, the Permittees must develop closure plans following [TPA](#) Action Plan
35 Appendix I, Sections 2.2, 2.3, 2.4, 2.5, and 3.0. Those sections outline the closure plan development for
36 WMAs. The Permit also identifies specific closure plan requirements for clean closure, impracticability
37 demonstration, and landfill closures. The Permittees will submit the closure plans to Ecology for review
38 and approval, based on the requirements specified in the permit. Approved closure plans will be
39 incorporated into the Permit in Addendum H.

40 Closure plans are to be developed following the requirements of [TPA](#) Action Plan Appendix I, Sections
41 2.2, 2.3, 2.4, 2.5, and 3.0. Closure plans are to be developed on both a WMA ("Tier 2") basis and
42 component-specific ("Tier 3") basis.

1 Each Tier 2 closure plan will be accompanied by a group of Tier 3 closure plans for the components
2 located within that WMA, if the components have not already been certified as clean closed.

3 Closure plans shall include a description of clean closure methods for removing, transporting, treating,
4 storing, or disposing of all dangerous waste. If landfill closure is proposed, the plans must include an
5 impracticability demonstration and description of contingent landfill closure procedures, including the
6 technologies and capabilities needed, cover system construction procedures, and a landfill design and
7 operating and maintenance plan.

8 All SST components located within 200-IS-1 OU must be closed to meet the closure performance
9 standards. The Permittees will treat 200-IS-1 OU as a WMA. The Permittees shall submit a Tier 2 Plan
10 accompanied by a group of Tier 3 plans for all SST components located within 200-IS-1 OU.

11 Alternatively, the Permittees may prepare a 200-IS-1 OU RFI/CMS and Remedial Investigation /
12 Feasibility Study (RI/FS) document that presents the SST component closure requirements in the
13 [TPA Action Plan](#), Section 5.5. If this approach is taken, Permittees will structure the RFI/CMS/RI/FS
14 document such that the closure requirements for SST components located in 200-IS-1 OU are clearly
15 identified for separate review and approval through the permit modification process.

16 **5. Risk Assessment**

17 Before starting closure activities, the Permittees are required to conduct a RA to evaluate the
18 protectiveness of closure conditions for each WMA. This requirement is to ensure that Ecology has a
19 sufficient basis to judge whether clean closure is “practicable” or “not practicable” for the purposes of
20 [WAC 173-303-640\(8\)](#). The requirements of [TPA](#) Appendix I, Section 2.5, in which the Tri-Parties have
21 already described a risk assessment approach, are incorporated by reference into the permit to satisfy this
22 requirement. The inclusion of an assessment of radiological contaminants of concern in an integrated PA
23 as described in [TPA](#) Appendix I, Section 2.5 is necessary for effective closure decision-making under the
24 scope of this Permit.

25 An RA must include all the tanks, ancillary equipment, and contaminated soils and other components, as
26 well as all waste residue inventories and waste characterization information after tank retrieval, for each
27 WMA. The waste residue inventories and waste characterization shall be consistent with the most
28 updated information.

29 An RA must consider all relevant exposure pathways. It must include preliminary remediation goals for
30 the WMA contaminants addressing protection of human health direct contact, protection of soils,
31 groundwater and surface water, and protection of air. It must also include ecological screening and site-
32 specific analyses in accordance with [WAC 173-340-7490](#) through [-7494](#), incorporated by reference. Any
33 modeling work performed must be consistent with [WAC 173-340](#) requirements, incorporated by
34 reference, and supporting data shall be provided to Ecology, with the RA, as necessary.

35 Before a final RA report is submitted for a WMA closure, an interim RA report will be submitted to
36 Ecology for review. The interim RA must be submitted to Ecology at least three years prior to the closure
37 plan submittal. The interim RA will be updated as necessary until the final RA is approved by Ecology
38 along with the closure plan.

39 Final RA reports must be submitted as part of the closure plan for each WMA. In the event the RA
40 results indicate that the risk is not acceptable for a WMA, Ecology reserves the authority to modify the
41 Permit to require the Permittees to conduct additional risk mitigation measures until the risk is mitigated
42 and reduced to an acceptable level. Those additional measures include, but are not limited to:

- 43 • Additional waste retrieval to remove waste residue left in the tanks or ancillary equipment.
- 44 • Removal and decontamination of SST components or groups of components (equipment, soils,
45 dangerous wastes, etc.)

- 1 • Changing the closure plan to incorporate new closure designs.
- 2 • Changing the institutional control plan.

3 **POST-CLOSURE CARE**

4 Conditions V.4.H contain post-closure care requirements of any WMA in which the clean closure
5 performance standards cannot be met upon closure and waste has been left in place. If any portion of the
6 SST System is closed as a landfill, the Permittees will provide post closure care for that portion. The
7 requirements for surface barrier inspection, barrier maintenance and performance monitoring,
8 administrative controls, and groundwater monitoring will be implemented.

9 **SST CLOSURE COMPLIANCE SCHEDULE**

10 The compliance schedule for this Permit is in Addendum P.

11 **REQUESTED VARIANCES OR ALTERNATIVES**

12 The Dangerous Waste Regulations for closure ([WAC 173-303-610](#)) specify that the Permittees must
13 complete closures in 180 days or less for a tank system that does not meet the requirements of [WAC 173-](#)
14 [303-640](#). However, the permit will allow the Permittees to close the SST System following the closure
15 schedules of [TPA](#) Milestone M-045 series. The extra time is needed due to the complexity of the system,
16 the amount of waste, the nature of the waste (mixed waste – both radiological and dangerous), the lack of
17 current ability to treat the waste, and magnitude of the soil and groundwater contamination, and at the
18 Hanford facility.

19 **STATE ENVIRONMENTAL POLICY ACT (SEPA) DETERMINATION**

20 The SEPA determination for this unit is in the Hanford-Wide Permit Fact Sheet.

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