Office of River Protection, State of Washington Department of Ecology
Tank Waste Retrieval Work Plan/Functions and Requirements Modification Notice
(Per Hanford Federal Facility Agreement and Consent Order Section 9.3)

1. Document Title and Number: RPP-22393, Rev. 4B, 241-C-102, 241-C-104, 241-C-107, 241-C-108 and 241-C-112 Tanks Waste Retrieval Work Plan		
2. Minor Field Change: (Section 12.4 HFFACO Action Plan) ☐ Yes: (WRPS Signature Only – Attach signed form to Primary Document for record purposes) x No: Proceed to Box 3	**3.** Document Issue Date: 9/25/09 **4.** Document Modification Notice Date: 4/28/10	**5.** Notice Number: 2010-3
6. Do proposed changes require schedule changes? (Would this extend completion of retrieval beyond 12 months from date of initiation?) ☐ Yes x No	**7.** Do proposed changes include specific additions, deletions, or modification to scope and/or requirements which affect the overall intent of the plan? ☐ Yes x No	**8.** (Check only one box) ☐ Significant Modification (Check if the answer to question in either section 6 or 7 is "yes". Significant modifications require revision of the primary document.) Minor Modification x Requires modification of the document x Can be accomplished with Modification Notice.

9. Description and Justification of Change:

Change Description: A change is needed to add a description of the tool that will go into C-104 to try and move the debris keeping the pump from going to the bottom of the tank. This opportunity is being taken to clean up a number of out-of-date or inaccurate words in the TWRWP. The changes covered by this modification notice are shown in redline/strikeout on the attached redline/strikeout pgs. 2-5, 2-6, 2-8, 3-1, 3-2, 3-3, 3-5, 3-7, 3-13, 3-21, 3-22, 5-1, 5-9, and 5-10.

Justifications:

- Pgs 2-5 and 2-6 change 'conductivity probe leak detector' to 'leak detector probe' since may use a thermal probe as an alternate to conductivity probe. The words 'using the caisson' in the next to last paragraph are added for clarification.
- Pg 2-8 Table 2-2, Column 4, change 02-A pit to 04-A pit (2 rows) and 02-B pit to 04-B pit, this fixes typos.
- Pg 3-1, the deletion is made since sluicers may be used in risers not around the perimeter, this sentence should not have been in the document. The addition below it is made because with some tanks only a valving change is needed to provide water, no minor mod is required.
- Pgs 3-2, 3-21, 3-22, 5-1, 5-9 and 5-10 delete the past tank farm contractor name and add the general term 'tank operations contractor'.
- Pg 3-~~2~~ 3, the top deletion is made because the wording is too detailed, unnecessary, and out of date. The addition at the bottom adds the description of the tool that will be added to C-104.
- Pg 3-5 grammatical changes made to reflect there is more than one valve box in C-farm.
- Pg 3-7 deletions and additions made because tanks going to AN-106 are listed on pg 3-1 and the

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AN-101 pump wording updated to be more general to reflect new pump to be used.

- Pg 3-13 two paragraphs related to heel concentrations following flushing are deleted as the wording is out of date and misleading, and was removed from the more recent C-110 and C-111 TWRWPs when they were written and approved.

10. Impact of Change:

No impact.

11. Additional Requirements and/or Provisions[1]:

Approvals

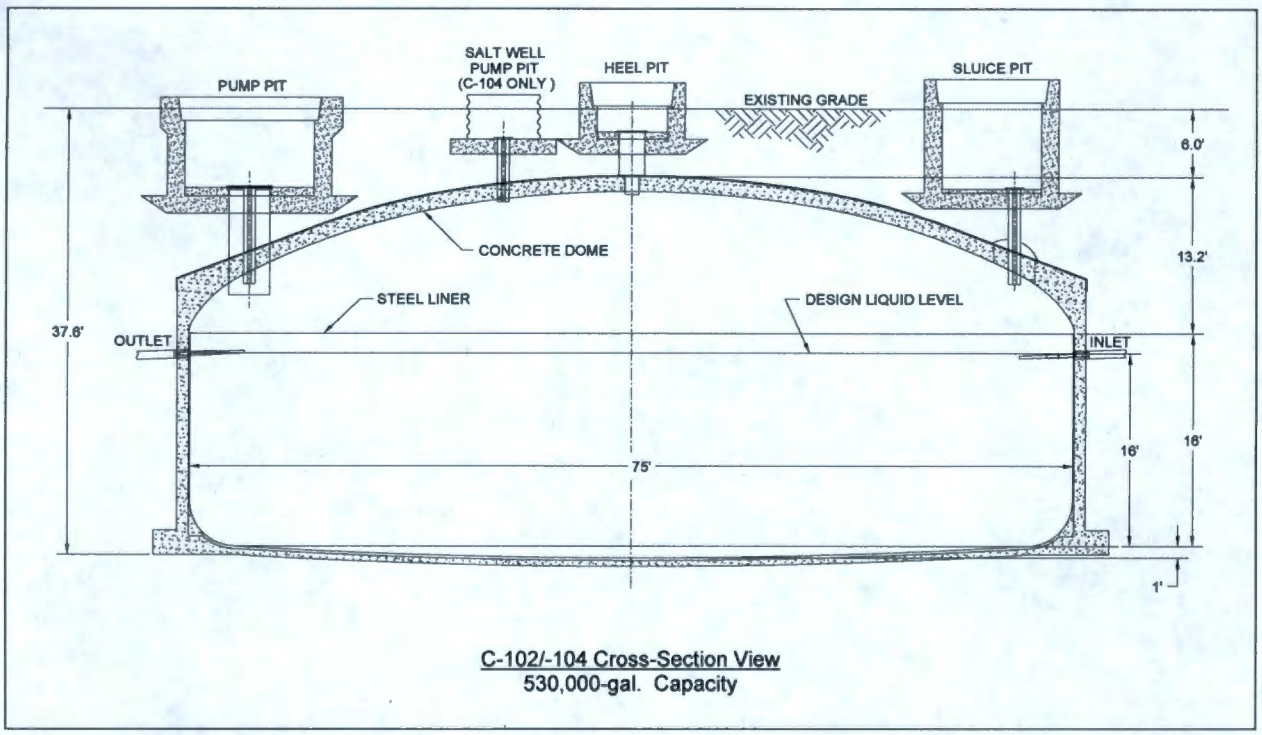
Washington River Protection Solutions, LLC.	Office of River Protection	State of Wash., Dept. of Ecology
☐ Provisional Approval[2] Date	☐ Provisional Approval[2] Date	☐ Provisional Approval[2] Date
☒ Final Approval Date 5/10/10	☐ Final Approval Date	☐ Final Approval Date 6/1/10

Notes

1 - For use by Ecology to identify any additional information needed to make a decision regarding the request for modifications. In addition, Ecology will identify actions, if any, regarding the modification request that DOE may take pending Ecology's final decision

2 – Provisional approval allows DOE and it's contractors to take specific actions identified in section 11, prior to final approval of this modification.

Figure 2-3. Tanks C-102 and C-104 Cross-Section View.*



* Adapted from RPP-13774, 2004, *Single-Shell Tank System Closure Plan*, Rev. 2, CH2M HILL Hanford Group, Inc., Richland, Washington.

Tanks C-102 and C-104 both have three reinforced concrete process pits that were installed after initial tank construction to facilitate waste retrieval. These pits are constructed of reinforced concrete and extend abovegrade. The pits provide secondary containment for the primary transfer piping within, and have removable cover blocks or plates that allow entry into the pits. The pit floors were constructed with drains that direct any liquid back into the tank through a tank riser located in the pit. For the purpose of retrieval of these two tanks, if the pit drains are plugged, any liquid (intrusion, tank waste, or other) will be pumped back to the associated SST. Pit pumping into the associated SST will occur so that the pit liquids may be removed before retrieval completion. The condenser hatchway (not shown in Figure 2-3) located above the outside edge of the tank provided an indirect access path into the tank for ventilation.

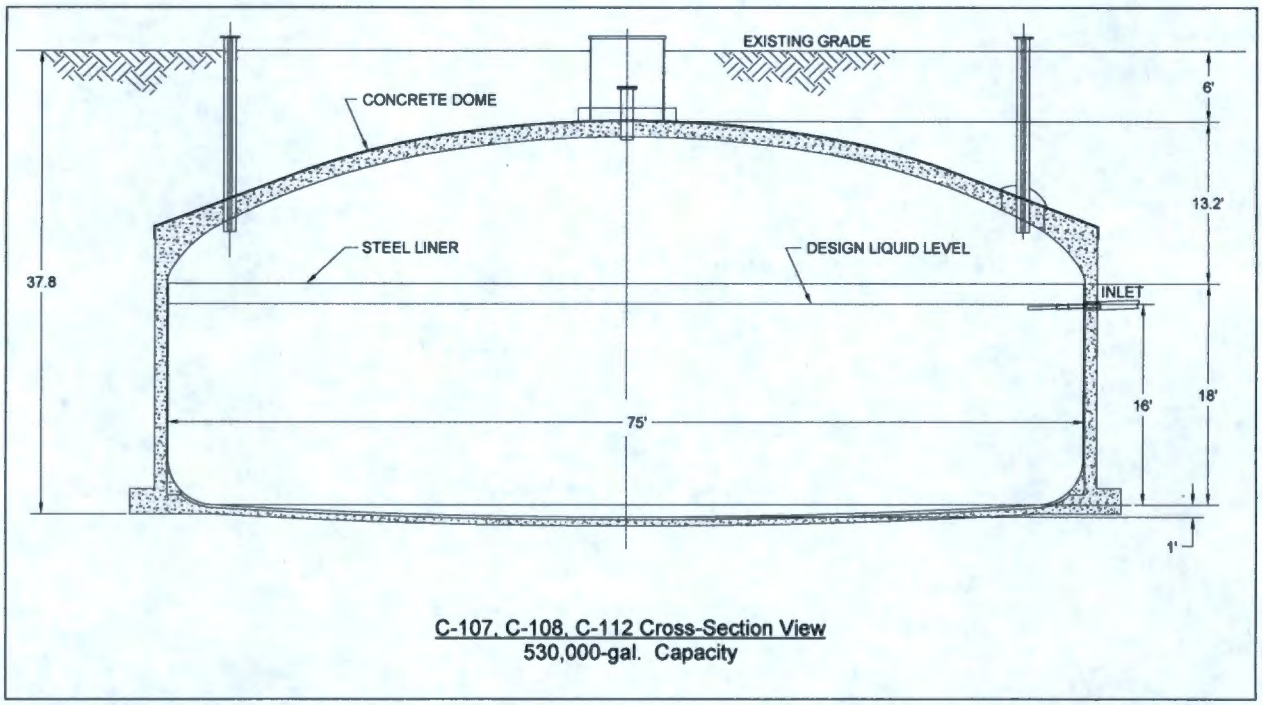
In addition, tank C-104 has a caisson made from a corrugated pipe embedded in a concrete base. The concrete base was sloped to a drain that connected to the tank riser so any leakage within the caisson would drain back into the tank. The caisson extends abovegrade and is closed off on the top with a coverplate. This caisson and the associated 12-in. riser were added to the tank to support saltwell pumping.

Each pit or caisson used for waste retrieval will have a ~~conductivity probe~~ leak detector probe.

2.2.2 Tanks C-107, C-108, and C-112 Configuration

The configuration of tanks C-107, C-108, and C-112 is depicted in the cross-section view in Figure 2-4.

Figure 2-4. Tanks C-107, C-108, and C-112 Cross-Section View.*



Note: The cascade line configuration in these three tanks varies. Tank C-107 has only an outlet line. Tank C-108 has both an inlet and an outlet, and tank C-112 has only an inlet.

* Adapted from RPP-10435, 2002, *Single-Shell Tank System Integrity Assessment Report*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

Tanks C-107, C-108, and C-112 do not have any concrete pits, but do have a caisson that was installed over the center riser after initial tank construction to facilitate waste retrieval. The caissons are constructed of a section of corrugated pipe embedded in a concrete base. The concrete base was sloped to a drain that connected to the tank riser so any leakage within the caisson would drain back into the tank. The caisson extends abovegrade and is closed off on the top with a coverplate.

Drawing H-2-38597, *Salt Well Pump Pit Assembly for Std. 12" Riser*, shows the original installation of the corrugated caisson. The caisson was installed in a groove in the concrete bottom of the pit and sealed with grout. A drain, flush with the bottom of the pit, previously routed drainage to the 12-in. riser. Drawing H-14-106599, *241-C Sluice Retrieval Mechanical Equipment Installation*, shows the equipment installation to be used during SST retrievals using the caisson. A ~~conductivity probe~~ leak detector probe will be used in the pit. A sump pump is used to pump leakage into the tank.

Each pit or caisson used for waste retrieval will have a ~~conductivity probe~~ leak detector probe.

Table 2-2. Tanks C-102 and C-104 Riser and Fill/Cascade Line Descriptions.

Riser Number	Diameter (in.)	Use Description	
		Tank C-102	Tank C-104
R1	4	Unused temperature probe	Liquid level well, belowgrade
R2	12	Level gauge (ENRAF) [a]	Breather filter and benchmark
R3	12	Observation port/breather filter in weather covered pit (02-C pit)	Observation port in weather covered pit (04-C pit)
R4	4	Recirculating dip leg in weather covered pit (02-C pit)	Recirculating dip leg in weather covered pit (04-C pit)
R5	4	Recirculating dip leg in weather covered pit (02-A pit)	Recirculating dip leg in weather covered pit (04-A pit)
R6	12	Sluicing access riser in weather covered pit	Sluicing access riser in weather covered pit
R7	12	Temperature probe in riser through pit wall, flange weather covered pit (02-A pit)	Temperature probe in riser through pit wall (0~~2~~4-A pit)
R8	4	blind flange (obstruction)	Level gauge (ENRAF)
R9	36	sludge pump access riser in weather covered pit (02-A pit)	Sludge pump access riser in weather covered pit (0~~2~~4-A pit)
R13	12	Saltwell screen in weather covered pit (02-B pit)	Heel jet in 0~~2~~4-B pit
R14	4	NA	Blind flange
R15	12	NA	Empty
A [b]	3	Cascade overflow line to tank C-103	Cascade overflow line to tank C-105
B [b]	3	Cascade inlet line from tank C-101	NA
C1 [b]	3	Spare inlet, capped	Fill line V150
C2 [b]	3	Spare inlet, capped	Fill line V149, sealed in diversion box 241-C-153
C3 [b]	3	Spare inlet, capped	Fill line V148, sealed in diversion box 241-C-153
C4 [b]	3	Spare inlet, capped	Spare, capped

Note: Reference documents from TWINS, Web Site - http://twinsweb.pnl.gov/twins.htm and H-14-010613, 2003, *Waste Storage Tank (WST) Riser Data*, Sheet 2, Rev. 6, CH2M HILL Hanford Group, Inc., Richland, Washington (with ECNs).

ECN = engineering change notice.
NA = not applicable.
TWINS = Tank Waste Information Network System.

[a] Enraf is the supplier of the identified level gauges; ENRAF is a trademark of Enraf, Inc., Enraf B.V., Delft, The Netherlands.

[b] Cascade and/or fill line, not a riser.

3.0 PLANNED WASTE RETRIEVAL TECHNOLOGY

This section provides a description of the planned waste retrieval technology for retrieving the waste from tanks C-102, C-104, C-107, C-108, and C-112.

3.1 SYSTEM DESCRIPTION

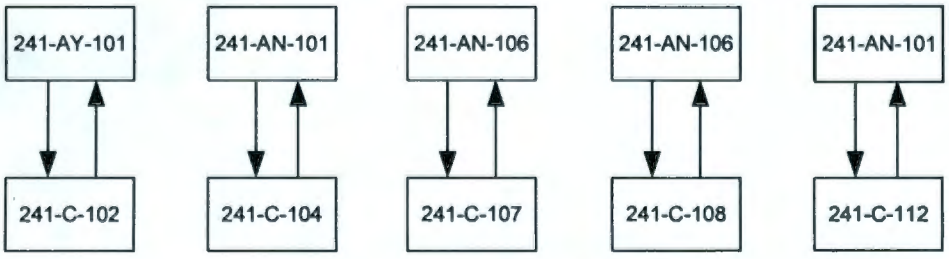
This section provides a description of the WRS and how it will be operated. Continued design development and incorporation of lessons learned may lead to changes in the design and/or operating strategy.

3.1.1 Physical System Description

The WRS will consist of a modified sludge sluicing system to mobilize and retrieve waste from tanks C-102, C-104, C-107, C-108, and C-112. The sluicing system will consist of two (or more) sluice nozzles and a slurry pump in each tank. The sluice nozzles or hydraulic sluicers will be controlled from a control trailer located near the tanks. The sluice nozzles will be installed in existing tank risers ~~located around the perimeter of the tank~~. The sluice nozzles will have the capability to direct liquid at various locations in the tanks. The flow rate through the sluice nozzles will be adjusted based on the pump-out rate so that the rate of liquid introduction will approximately equal the rate of solution removal with the objective of minimizing the liquid waste volume in the retrieval tank. The waste retrieved from tanks C-102, C-104, C-107, C-108, and C-112 will be transferred to a DST. To minimize the overall volume of waste requiring storage in the DST system, the waste retrieval project plans to use DST supernate as the primary sluice liquid (see Section 3.1.2 for operating description). The WRS will also have the capability to use raw water for sluicing with valving change or minor modifications.

The waste retrieval plan as of mid March 2005 for using DSTs for waste receipt and as source tanks for supernate recycle is shown in Figure 3-1. The DSTs were selected based on their location, available space, and existing or planned equipment upgrades. Additional detail on the planned use of supernate during waste retrieval is discussed in Section 3.2.

Figure 3-1. Waste Retrieval Liquid Supply and Double-Shell Tank Receiver Tank Designation.



Various monitoring instruments will be used to collect data to support operation of the WRS and perform environmental monitoring. Cameras will be installed in each of the SSTs to provide the capability to visually monitor and aid in control of waste retrieval operations. Instrumentation will also be provided to monitor process control data (e.g., pressures and flow rates). This information will be used to support material balance calculations. The existing ENRAF[1] level gauges will be retracted during waste retrieval operations and will be used periodically to monitor waste levels.

Before initiating waste retrieval, a formal waste compatibility assessment will be performed in accordance with HNF-SD-WM-OCD-015, *Tank Farm Waste Transfer Compatibility Program*. Formal issuance of the compatibility assessment will not be completed until just before waste retrieval operations begin to ensure that current conditions are captured in the assessment.

During waste retrieval operations, the tank(s) being retrieved will be actively ventilated. The ventilation system will consist of skid-mounted high-efficiency particulate air filtered portable exhauster(s). The ventilation system(s) are designed to pass air through the tank, thereby reducing condensation and fog within the tank. The vent systems required by Washington State Department of Health (WDOH) include a heater, prefilter, demister, two high-efficiency particulate air filters and test sections, exhaust fan, and stack. Project plans include the design and installation of ventilation system(s) to support waste retrieval operations for the C farm tanks as shown in Figure 3-2. Condensate drainage from the exhauster(s) will be routed back to an SST being retrieved. Any change to this drainage routing will covered by a Change Notice Form to this TWRWP. Details of the ventilation systems are provided in AIR 05-407, *Categorical Tank Farm Facility Waste Retrieval and Closure: Phase II Waste Retrieval Operations*, and DE05NWP-002, *Notice of Construction (NOC) Application for Operations of Waste Retrieval Systems in the Single-Shell Tank (SST) Farms*.

ORP and the TOC ~~CH2M HILL Hanford Group, Inc. (CH2M HILL)~~, pursuant to federal requirements for protection of their workers, will develop and implement a personal exposure sampling and monitoring plan for SST waste retrievals. This plan will be developed and implemented by the operations Industrial Hygiene (IH) departments per the ~~CH2M HILL~~TOC Environmental Health Program with consideration of input from Ecology. Subsequent to issuance of the IH sampling and monitoring plan, changes to that portion of the plan pertaining to sampling exhauster emissions at the stack will be provided to Ecology for Ecology's information in as timely a manner as possible.

New equipment will be installed in the tanks to support waste retrieval. Existing equipment will be removed if and as required to make room for the new equipment. The new slurry pump will be installed in the center riser located in the center pit. Each pump may be mounted on a winch system that will allow the pump to be lowered as waste retrieval progresses. The pump suction will be installed just under the waste surface to start, so little or no water should be required for installation due to the sludge nature (i.e., not hard saltcake) of the waste and the small submergence of the pump suction. The system will be designed to allow the pump suction to be

[1] ENRAF is a trademark of Enraf, Inc., Enraf B.V., Delft, The Netherlands.

lowered as low as possible in each tank to facilitate maximum waste removal. This will allow approximately 10 ft of height adjustment.

The pump installation will be performed by lowering the pump into the tank with a crane. ~~The pump will be installed with the suction just into the waste surface a few inches. No water addition should be necessary for the pump installation because the pump suction will be located just under the waste surface. If the pump suction is too shallow when retrieval is started, the sluice nozzle discharges can be aimed at the pump inlet to enable to the pump to be inserted a little deeper.~~

A booster pump, if used, will be located within the central riser pit. The WRS for tanks C-107, C-108, and C-112 may require modifications to the saltwell pits to accommodate installation of a slurry pump in the center of the tanks.

The pump adjustment features described previously should allow the pump to be installed with little or no water additions. However, if tank conditions require water additions to successfully install the pumps (e.g., debris under the pump installation riser), water additions would be controlled in accordance with OSD-T-151-00013, *Operating Specifications for Single-Shell Waste Storage Tanks*, Section 4.1). This water would be added through one or both of the sluicers by lancing or by backflushing through the pump. Lancing refers to lowering a water lance into the waste and adding water to fluidize hard material under the addition point. The initial installation height of the pump will be determined using the in-tank video system.

The sluice nozzles in tanks C-102 and C-104 will be installed within the existing pump and sluice pits. The configuration of tanks C-107, C-108, and C-112 is different in that there are no concrete pits and only a single central corrugated metal saltwell pump pit. The WRSs for tanks C-107, C-108, and C-112 will require design and construction of riser extensions to support the installation of the two sluice nozzles and slurry pump. The in-tank imaging system will be installed in an available riser in the tank. Table 3-1 provides the planned riser usage for the tanks C-102, C-104, C-107, C-108, and C-112 WRSs. This riser usage may change.

An in-tank vehicle may be used to aid in removal of waste from a tank. This in-tank vehicle will have high pressure water spray nozzles and a movable blade. The high pressure water can be supplied at a nominal 3000 psig and a nominal 10 gpm. The blade will have a polymer 'squeegee' on the bottom when installed in the tank. The hydraulically powered vehicle will move about on polymer tracks. The in-tank vehicle will be designed to access the tank via a 12 in. diameter riser. The in-tank vehicle support system will include an above ground water supply skid and hydraulic power pack.

For C-104 a hydraulically operated tool will be inserted in riser 15 near the central pump pit. This tool will extend to the bottom of the tank and be used to attempt to move debris under the pump so the pump can be lowered. The tool is planned to also have water addition capability to aid retrieval if necessary.

Table 3-1. Planned Riser Usage for Tanks C-102, C-104, C-107, C-108, and C-112 Waste Retrieval System.

Riser Number	Tank C-102[2]	Tank C-104[2]	Tank C-107[2]	Tank C-108[2]	Tank C-112[2]
2	ENRAF[1] level gauge	Exhauster connection	Sluicer	Sluicer	Sluicer
3	Sluicer	Sluicer	Exhauster connection	Vacuum relief/camera port	Exhauster connection
5	--	--	--	--	ENRAF level gauge
6	Sluicer	Sluicer	Vacuum relief, camera port	Exhauster connection	Vacuum relief, camera port
7	Vacuum relief, camera port	Vacuum relief	Sluicer	Sluicer	Sluicer
8	--	ENRAF level gauge	ENRAF level gauge	ENRAF level gauge	--
13	Slurry pump	Slurry pump	Slurry pump	Slurry pump	Slurry pump
14	--	Camera port	--	--	--
Condenser hatchway	Exhauster connection	--	--	--	--

[1]ENRAF is a trademark of Enraf, Inc., Enraf B.V., Delft, The Netherlands.

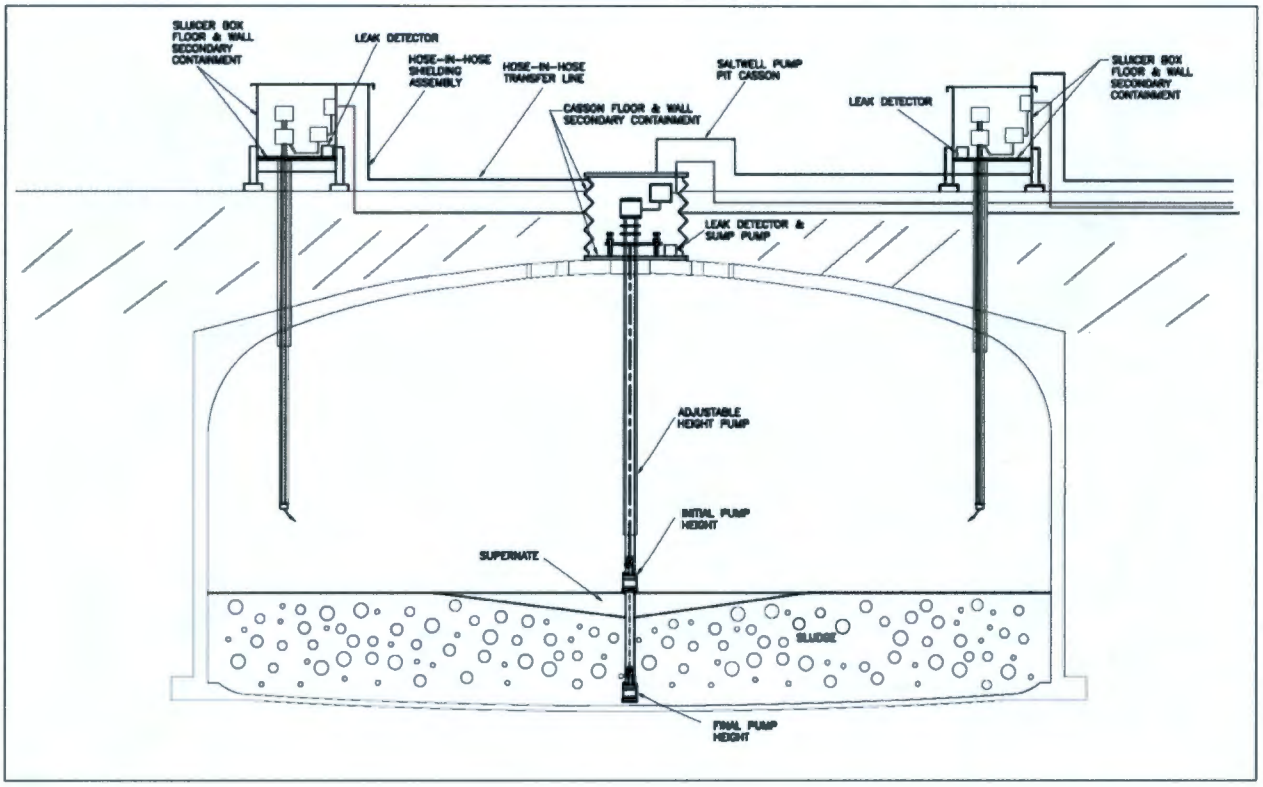
[2]Riser usage may change following detailed design and/or during operations. Should an in-tank vehicle be added to the tank to aid in waste heel removal the riser used will be selected during detailed design for the heel removal. For C-108 waste heel removal the riser used for the in-tank vehicle will be Riser 3 or 6.

A sketch of the WRS installation planned for tanks C-102 and C-104 is provided in Figure 3-3. A sketch of the WRS installation planned for tanks C-107, C-108, and C-112 is provided in Figure 3-4. A potential equipment layout in the tank farm is provided in Figure 3-2.

The portable valve boxes serves to control the routing and flow of liquid to the sluice nozzles and to control water additions to the waste retrieval process. The valve boxes provides secondary containment and the collection/detection of any leakage in a sump. The portable valve boxes haves a leak detectors that isare connected to the pump shutdown system in the control trailer. In the event that a leak is detected in the portable valve boxes, the transfer pumps in the SST being retrieved and in the receiver DST would be shut down. The portable valve boxes each hasve a sump and a sump pump that can be configured to transfer any leakage to the SST being retrieved.

Two portable diversion boxes will be added to the C-Farm retrieval system, both will be used for the tanks in this work plan. The transfer lines to and from up to three tanks will be routed through a valving arrangement in each box to permit switching retrieval operations between the tanks. The diversion boxes provide secondary containment and the collection/detection of any leakage in a sump. The diversion boxes each have a leak detector that is connected to the pump shutdown system in the control trailer. In the event that a leak is detected in a diversion box, the transfer pumps in the SST being retrieved and in the receiver DST would be shut down. The

Figure 3-4. Tank C-107, C-108, and C-112 Waste Retrieval System In-Tank Components.



3.1.2 Double-Shell Receiver Tanks

The supernate pump and slurry distributor installed in DST AN-106 in support of tank C-103 waste retrieval (RPP-21895) may continue to be used to pump supernate back to the C farm and distribute the sludge as received from ~~tanks C-107, C-108, and C-112~~ the SST. The pump ~~installed~~ in DST AN-101 ~~under Project W-211 may be~~will also be used to pump supernate in support of C farm retrieval. A new slurry distributor will be installed in DST AN-101 to distribute the sludge received from C farm tanks. A new supernate pump and a new slurry distributor are planned for DST AY-101 to support waste retrieval from C farm tanks.

Because the elevation of the AN farm is approximately 22 ft higher than the C farm and the elevation of the AY tank farm is approximately 32 ft higher than the C farm, the slurry distributor and the supernate pump incorporate anti-siphon devices to prevent unintentional flow from the DST to the SST. All waste transfers, including transfer of waste from the C farm tanks to the DSTs and the transfer of supernate from DSTs back to C farm tanks, will be performed using transfer lines that provide secondary containment. The waste retrieval project currently plans to use overground hose-in-hose transfer lines (HIHTLs) and the *Resource Conservation and Recovery Act of 1976* (RCRA)-compliant DST transfer system.

~~Assuming a 2,700-gal. liquid heel in a tank with no solids present before rinsing (solids are expected), rinsing with 33,333 gal. of fresh water, pumping down to 2,700 gal. and repeating twice more, the concentration of soluble constituents in the final 2,700 gal. in the tank would be approximately 5×10^{-4} of the original heel concentrations. If the pump heel is below 2,700 gal. or there are solids present in the heel, the dilution would be more. Performing the final tank flushes will remove residual solids to the extent practical on the walls and dilute soluble radionuclides and chemicals in the liquid in the tank.~~

The final flush volume will be dependent upon the final heel composition and volume. As a minimum, there will be three flushes with a minimum flush volume of three times the volume of the estimated waste heel volume.

~~The 'limit of technology' related to waste removal from a tank is predominantly concerned with solids removal; liquids can continue to be removed from the tank as long as the pump suction is submerged and not plugged by any solids or foreign material in the tank. The 'limit of technology' occurs when the point is reached that the quantity of waste removed per unit volume or per batch by the selected retrieval method has become so low as to no longer be effective on a meaningful scale. A final tank flush would not be expected to remove many insoluble solids, but it will proportionately dilute and remove any liquid heel. The 'technology' involved with liquid heel removal is dilution and pumping. As explained, a 2,700-gal. supernate heel subjected to three 30,000- to 35,000-gal. flushes will be diluted to a concentration of about 0.0005 of the initial starting concentration. This is a 99.95% removal. Should the 2,700 gal. contain more solids (and less liquid), the supernate dilution will be even greater. There is no 'limit of technology' wherein no more liquid is removed with dilution; the more dilution performed the more residual contaminated liquid that is removed. The question is one of benefit; when is the quantity of liquid removed per unit volume by a flush no longer of any significant meaning? RPP-21753 estimates the final technetium-99 concentrations in the tanks AY-101, AN-101, and AN-106 supernate solutions following completion of C tank farm waste retrieval to be in the nominal range of 2×10^{-5} to 2×10^{-4} Ci/L (2×10^{-2} to 2×10^{-1} µCi/mL). A 2,700-gal. supernate initial heel in one of the SSTs would thus be reduced to an estimated technetium-99 concentration range of 1×10^{-5} to 1×10^{-4} µCi/mL following three successive 30,000- to 35,000-gal. flushes. The technetium-99 concentrations in the tanks C-102, C-104, C-107, C-108, and C-112 wastes are estimated to be in the 7×10^{-4} to 2×10^{-1} µCi/mL range before retrieval. Thus, any heel flushing is expected to reduce the technetium-99 concentration in the liquid heel to below the average tank technetium-99 concentration before retrieval, and three 30,000- to 35,000-gal. flushes are expected to remove about 99.95% or more of the soluble constituents.~~

The timing for transfers out of tanks C-102, C-104, C-107, C-108, and C-112 is dependent upon personnel resource availability, equipment availability, and DST conditions. Once waste retrieval is started, it should follow the general pattern described, but no liquid additions or removals to/from these tanks can be predicted for more than a day or two in advance; therefore, no detailed timeline can be developed showing all liquid additions and removals. The water or supernate addition/removal may be intermittent or continuous. Based upon experience with tanks S-112 and C-203 waste retrieval, it will likely last 8 to 16 hours, then be followed by at least a few days wait, then continue. Work continuity will be dependent upon resource availability and external influences. Ideally the retrievals could be completed within a few

3.9 DISPOSITION OF WASTE RETRIEVAL SYSTEM FOLLOWING WASTE RETRIEVAL

3.9.1 Disposition of New Waste Retrieval System Components

Following completion of waste retrieval, the in-tank equipment will be left in place for disposition during component closure actions. The abovegrade equipment (e.g., transfer lines, portable valve and diversion boxes) will be reused to the extent possible for future waste retrieval activities in the C tank farm. Transfer lines and the portable valve and diversion boxes will be flushed to reach acceptable exposure rates for disconnecting and relocating the equipment. Any abovegrade equipment that needs to be removed and is not suitable for reuse will be packaged and disposed of onsite in accordance with the approved waste acceptance criteria for the Hanford Site burial grounds and TFC-OPS-WM-C-10, *Contaminated Equipment Management Practices*. The HIHTLs will be managed in accordance with RPP-12711, *Temporary Waste Transfer Line Management Program Plan.*

3.9.2 Disposition of Existing Ancillary Equipment

Ancillary equipment associated with tanks C-102, C-104, C-107, C-108, and C-112 is limited to waste transfer lines and equipment installed in pits and abovegrade risers. The current status of the ancillary equipment associated with tanks C-102, C-104, C-107, C-108, and C-112 is described in Section 2.6. Any contaminated equipment located within risers that needs to be removed following waste retrieval will be packaged and disposed of onsite in accordance with the approved waste acceptance criteria for the Hanford Site burial grounds and TFC-OPS-WM-C-10.

In accordance with the SST system closure plan (RPP-13774), disposition of the ex-tank ancillary equipment, including pipelines, will be performed in accordance with a separate component closure activity plan. Closure plans will be incorporated into the SST permit.

3.10 AIR MONITORING PLAN

ORP and ~~CH2M HILL~~the TOC, pursuant to federal requirements for protection of their workers, will develop and implement IH monitoring plans for exhauster stack emissions for the retrieval of tanks C-102, C-104, C-107, C-108, and C-112. The plans will be developed and implemented pursuant to the requirements of TFC-PLN-43, *Tank Farm Contractor Health And Safety Plan.* The constituents of potential concern (COPCs) for which exhauster stack sampling and analysis will be conducted will be identified in the IH monitoring plans for each tank retrieval. The COPCs identified in the IH monitoring plans will be all or a subset, as determined to be appropriate by ~~CH2M HILL~~ the TOC IH, of those constituents listed in RPP-20949, *Data Quality Objectives For The Evaluation Of Tank Chemical Emissions For Industrial Hygiene Technical Basis*, Table 4-1, developed with input from Ecology. Once the initial subset of

COPCs is identified and listed in the IH monitoring plans, no COPC shall be dropped from that list without 90 days prior notification to and approval from Ecology. If ORP notifies Ecology of its desire to cease exhauster stack sampling for a COPC initially identified and listed in an IH monitoring plan and no response is received from Ecology within 90 days, the COPC will be deleted from the IH monitoring plan and sample and analysis activities for that COPC will cease. New COPCs may be added to an IH monitoring plan without notification to or approval from Ecology and without modifying or revising this tank waste retrieval work plan.

The sampling and analysis methods shall be EPA, National Institute for Occupational Safety and Health-approved, or Occupational Safety and Health Administration (OSHA)-approved methods or an equivalent ~~CH2M HILL~~TOC-approved method, as identified in RPP-20949. The exhauster stack samples will be analyzed at the 222-S Laboratory, the Waste Sampling and Characterization Facility, or an equivalent laboratory consistent with the quality assurance/quality control procedures for that laboratory. Further, laboratory analysis data will be kept on file at the laboratory consistent with the laboratory record keeping procedures for that laboratory for a period of not less than 5 years and will be available to Ecology, within 24 hours, upon request.

Ecology and ORP understand and agree that the activities discussed above do not restrict ORP and ~~CH2M HILL~~ the TOC from taking any and/or all steps necessary as ORP and ~~CH2M HILL~~the TOC deem appropriate to protect its workforce in response to data and information generated by an IH monitoring plan or incidents as they might arise during waste retrieval. Ecology and ORP also understand and agree that the preceding sampling and analysis discussion is presented to ensure ORP is achieving the agreed to sampling and analysis for the protection of the public and its workers and does not modify the exemption from the requirements of 40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities," and 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities," Subpart CC, granted to ORP under 40 CFR 265.1080(b)(6). Therefore, this discussion does not imply any change to the respective authority of either Ecology or ORP regarding the sampling, analysis, monitoring, and control of airborne emissions from Hanford Site tanks.

5.0 REGULATORY REQUIREMENTS IN SUPPORT OF RETRIEVAL OPERATIONS

Retrieval of waste from the SSTs will be performed under the requirements of HFFACO, *Atomic Energy Act of 1954*, RCRA, Chapter 70.105 RCW and its implementing regulations, and WAC-173-303. The SSTs do not provide secondary containment and are not compliant with RCRA and Chapter 70.105 RCW interim facility standards of Subpart J of 40 CFR 265. The SSTs are currently authorized to continue operations under Chapter 70.105 RCW pending closure in accordance with WAC 173-303-610, "Closure and Post-Closure," under the authority of the HFFACO Milestone M-45-00, "Complete Closure of all Single Shell Tanks Farms." Except as otherwise modified by HFFACO Milestone M-45-00, DOE conducts day-to-day operations of the SSTs in accordance with the interim facility standards established in WAC-173-303-400(3), "Interim Status Facility Standards." WAC 173-303-400(3) incorporates by reference the interim status performance standards set forth by the EPA in 40 CFR 265. Additionally, the SSTs are governed by federal regulations promulgated under the authority of the *Atomic Energy Act of 1954* and various DOE directives incorporated into the contract between ORP and ~~CH2M HILL~~ the TOC (DE-AC27-99RL-14047). These requirements are implemented through operating plans and procedures by the Tank Farm Contractor.

Interim status facility standards in WAC 173-303-400(3)(a) incorporate, by reference, the interim status standards set forth by EPA in 40 CFR 265 Subpart J for tank systems. Elements of the interim status standards relevant to the WRS along with the WRS features and/or operating plans and procedures are summarized in Table 5-1.

If necessary, DOE will seek approval to retrieve waste that could contain polychlorinated biphenyls from tanks C-102, C-104, C-107, C-108, and C-112 using supernate from the receiver DST and transfer the resulting slurry to the respective receiver DST from EPA before initiating waste retrieval operations. DST supernate is classified as polychlorinated biphenyl remediation waste in accordance with Ecology et al. (2000), *Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste*. Because the DST supernate is polychlorinated biphenyl remediation waste, the retrieval of waste from SSTs, when using DST supernate, requires a Risk-Based Disposal Approval, approved by EPA, pursuant to the *Toxic Substances Control Act of 1976*.

Table 5-1. 40 CFR 265 (WAC 173-303-400) Interim Status Standards Applicable to Waste Retrieval. (9 Sheets)

Regulation	Requirement	Compliance Method
	appropriate, at least bimonthly (c) The owner or operator must document in the operating record of the facility an inspection of those items *(above)*	
265.196 [WAC 173-303-400 (3)(c)(vii)], Response to leaks or spills and disposition of leaking or unfit-for-use tank systems	A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements; (a) Cessation of use; prevent flow or addition of wastes (b) Removal of waste from tank system or secondary containment system (c) Containment of visible releases to the environment (d) Notifications, reports	Response to leak or spills is defined in Section 4.0
WAC 173-303-283 (3), Performance standards	The owner/operator must design, construct, operate, or maintain a dangerous waste facility that to the maximum extent practical given the limits of technology prevents: (a) Degradation of ground water quality; (b) Degradation of air quality by open burning or other activities; (c) Degradation of surface water quality; (d) Destruction or impairment of flora and fauna outside the active portion of the facility; (e) Excessive noise (f) Conditions that constitute a negative aesthetic impact for the public using rights of ways, or public lands, or for landowners of adjacent properties; (g) Unstable hillsides or soils as a result of trenches, impoundments, excavations, etc.; (h) The use of processes that do not treat, detoxify, recycle, reclaim, and recover waste material to the extent economically feasible; and (i) Endangerment of the health of employees, or the public near the facility.	The following plans and procedures and their implementation provide the preventative measures required: (a) Groundwater monitoring plan (PNNL-13024). (b) No open burning is allowed. (c) Berms and gutters are in place to prevent surface runoff and surface run-on. (d) No destruction or impairment of flora and fauna occur outside of the tank farms. (e) Noise is monitored per ~~CH2M HILL~~ TOC procedures. (f) The tank farms are within the dangerous waste facility (i.e., Hanford site). (g) Appropriate permits are obtained before excavation work is started. No excavation work is associated with tank waste retrieval. (h) The waste retrieval process is designed, constructed and will be operated to treat

Table 5-1. 40 CFR 265 (WAC 173-303-400) Interim Status Standards Applicable to Waste Retrieval. (9 Sheets)

Regulation	Requirement	Compliance Method
		and recover waste to the limits of technology in accordance with HFFACO milestone M-45-00 (see Section 3.4). (i) The public is protected by the NOC per WAC 173-303-400 & 460. Workers are protected per TFC-PLN-43.
WAC 173-303-400, Interim Status Facility Standards	Incorporates by reference 40 CFR 265 with the exception of 265.1 (c)(4), 265.149-150 and 265.430. Replaces federal terms in 40 CFR 265 (i.e., regional administrator, hazardous) with state terms (i.e., department, dangerous)	

Note: Documents references information is provided in Section 9.0 of this document.

~~CH2M HILL = CH2M HILL Hanford Group, Inc.~~
DST = double-shell tank.
HFFACO = *Hanford Federal Facility Agreement and Consent Order.*
HIHTL = hose-in-hose transfer line.
IQRPE = independent, qualified, registered professional engineer.
ITEM = Integrated Training Electronic Matrix.
NOC = notice of construction.
SST = single-shell tank.
TOC = tank operations contractor
TSD = treatment, storage, and/or disposal.