WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 3A
WASTE ANALYSIS PLAN FOR THE BASELINE CONFIGURATION
CHANGE CONTROL LOG

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

Modification History Table

Modification Date	Modification Number

This page intentionally left blank.

CHAPTER 3A
WASTE ANALYSIS PLAN FOR THE BASELINE CONFIGURATION

This page intentionally left blank.

CHAPTER 3A
WASTE ANALYSIS PLAN FOR THE BASELINE CONFIGURATION

TABLE OF CONTENTS

TABLES

3A.1 Introduction

This Waste Analysis Plan (WAP) for the Baseline Configuration describes the sampling and analysis for dangerous waste constituents for the Hanford Tank Waste Treatment and Immobilization Plant (WTP) to comply with the Washington State Dangerous Waste Regulations contained in Washington Administrative Code (WAC) 173-303, *Dangerous Waste Regulations*. Records specific to the WTP WAP will be managed in the WTP Unit Specific Operating Record that is kept as a part of the Hanford Facility Operating Record WAC-173-303-300(2)(b).

The WAP also ensures the waste analysis is comprehensive and reflects the outcome of the *Regulatory Data Quality Objectives Optimization Report* (RDQO Optimization Report), 24590-WTP-RPT-MGT-04-001, and sample anaylsis performed on the tank waste feed stream to be treated by the Tank Operations Contractor and WTP. Sampling and analysis criteria identified in the RDQO related to meeting Resource Conservation and Recovery Act (RCRA) requirements are included as an integral part of this WAP.

Regulatory and saftey issues are addressed in this WAP and establish bounding conditions for waste to be received and treated at the WTP. These boundary conditions establish limits for waste acceptance.

3A.2 Scope

This WAP describes the general requirements for the collection and regulatory analysis of waste to be processed by the WTP, and the requirements for characterization of secondary wastes where process knowledge is inadequate to support designation.

The Tank Operations Contractor will characterize the staged Double-Shell Tank (DST) waste feed in conformance with the RDQO Report. Based on the results, the Tank Operations Contractor will develop a waste profile specific to the staged waste and the planned treatment campaign.

Prior to transferring waste, the WTP will evaluate the waste profile and characterization data for conformance with WTP waste acceptance criteria. The WTP will use this information to ensure the waste feed planned for receipt meets waste acceptance criteria. Analytical results will also be used to determine the appropriate treatment requirements for each campaign. The volume of the waste transferred from the Tank Operations Contractor will be compared with the volume received at WTP to confirm the waste transfer was completed as planned.

Simplified process flow figures for WTP processes are included in Chapter 4A of the Dangerous Waste Permit (DWP). The waste will be combined with glass-forming chemicals and melted into a solid glass form in a process known as vitrification.

Operation of WTP will generate secondary wastes, in solid and liquid form. These wastes will be designated according to available process knowledge or will be sampled and analyzed as necessary to fully address Treatment, Storage, or Disposal (TSD) unit waste acceptance criteria. Secondary wastes that are not treated by the WTP will be transported to an appropriate TSD unit, subject to that TSD unit's waste acceptance criteria.

3A.3 Facility Description

In the baseline WTP operating configuration, the Pretreatment (PT) Facility and the High-Level Waste (HLW) Facility are operational. The PT Facility will both separate and pretreat the Low-Activity Waste (LAW) and HLW and manage recycle waste streams produced from the LAW and HLW waste treatment operation. Within the PT Facility, LAW and HLW (including recycles) will be concentrated by water removal using evaporators; solids will be filtered out of LAW and transferred to the HLW fraction; and soluble, highly radioactive isotopes (primarily cesium) will be removed from LAW by ion exchange units and transferred to the HLW fraction. In some situations, prior to filtration, oxidation and/or precipitation will be used to dissolve solids or remove unwanted components from the LAW for transfer to the HLW fraction. Treated LAW and HLW will be transferred to the respective LAW and HLW Facilities for

vitrification. The three production process facilities (i.e., PT, LAW, and HLW) are also supported by the Analytical Laboratory (Lab).

Plant equipment will include the following:

- Pipelines, tanks, and ancillary equipment.
- Evaporation units.
- Ultrafiltration units.
- Ion exchange columns.
- Chemical addition equipment.
- LAW and HLW melters.
- Service and utility units.
- Container management units.
- Storage facilities.
- Offgas treatment systems.

3A.4 General Constituent Description

WTP is specifically designed to accept waste from the DST System. The mixed waste to be treated in the Baseline Configuration is an aqueous solution containing dissolved inorganic salts such as sodium, potassium, aluminum, hydroxides, nitrates, and nitrites with some tanks having detectable levels of heavy metals such as lead, chromium, cadmium, mercury. Small quantities of ammonia and organics, such as acetone, butanol, and tri-butyl phosphate, could be present. The physical consistency of the waste in the DST System ranges from aqueous supernate to thick sludge. The higher activity and higher solids portion of the Hanford tank waste is designated as HLW feed. The two different terms describing the tank waste are used because the LAW and HLW fractions of the waste feed are processed differently in the WTP.

In the Baseline configuration, characterized LAW and HLW are sent directly from the Hanford Tank Farms to the PT Facility. The mixed waste is pretreated in the PT Facility and sent to either the HLW Vitrification Facility or the LAW Vitrification Facility for processing, depending on the waste characterization. Underground waste transfer lines allow for the transfer of waste from the Hanford Tank Farms to the PT Facility, and to and from the LAW Vitrification Facility, HLW Vitrification Facility.

The PT Facility, in the Baseline configuration, uses tank systems, miscellaneous unit systems (defined in Operating Unit Group 10, Section III.10.G of this Permit), and containment buildings to prepare waste feed from the Hanford Tank Farms for vitrification.

The LAW Vitrification Facility uses miscellaneous treatment unit sub-systems and equipment (defined in Operating Unit Group 10, Section III.10.H and III.10.I of this Permit), tank systems, and containment buildings to vitrify LAW feed.

The HLW Vitrification Facility uses miscellaneous treatment unit sub-systems and equipment (defined in Operating Unit Group 10, Section III.10.J and III.10.K of this Permit), tank systems, containment buildings, and container storage areas to vitrify HLW feed.

A tank system and a container storage area are used at the Lab. Table 1 is the complete list of Dangerous Waste Numbers for WTP that will be managed under the baseline configuration.

Table 1 Summary of Dangerous Waste Numbers for Waste Treatment Plant

Characteristic Waste Numbers				Listed Waste Numbers		
D001	D003	D005	D006	F001	F002	F003
D002	D004	D009	D010	F004	F005	
D007	D008	D019	D022			
D011	D018	D030	D033			
D028	D029	D036	D038			
D034	D035	D041	D043			
D039	D040	WP01[a]	WP02[a]			
WT01[a]	WT02[a]					

[a] Washington State criteria.

3A.5 Waste Pre-Acceptance and Acceptance Processes

This section describes the actions performed before every campaign to determine candidate feed tank waste is acceptable for treatment at WTP.

Step 1. The Tank Operations Contractor submits a waste profile. The content and format of the profile will be established prior to the transfer of waste feed. The following are examples of the information that will be provided in the profile:

- General information (e.g., the identification of the source DST tank from which the transfer will be made and the date of the proposed transfer).
- Physical properties of the waste feed (e.g., the proposed volume of each batch transfer and the presence or absence of a separate visible organic layer).
- Relevant process knowledge and historical analytical data (e.g., Total Organic Carbon [TOC]).
- Dangerous waste information (e.g., the designation of dangerous waste numbers) and Land Disposal Restrictions (LDR) information.

Step 2. WTP personnel perform a preshipment review by examining the waste profile and the analytical results to ensure compatibility and acceptability of the waste feed. If the review finds that the waste feed is acceptable, the WTP notifies the Tank Operations Contractor that the waste feed can be transferred. If the review finds that the waste feed is not acceptable, nonconformance actions are initiated.

Step 3. Non-conformance actions include a second review of the data and information and may include a second analysis of the split sample aliquot. If the waste feed continues to be outside of the waste acceptance criteria, adjustments may be used to change the waste composition such that acceptance criteria are met. Alternately, a change to the waste acceptance criteria may be made on a case-by-case basis (as long as there are no design or safety basis impacts and permit compliance is maintained). Otherwise, the waste will be refused for transfer (transferred to an alternative treatment or stored until other alternatives are identified).

Step 4. Once the transfer systems are confirmed as operational, the Tank Operations Contractor will transfer the waste feed to the PT Facility through a double-walled pipeline. The Tank Operations Contractor will water flush the pipeline after the transfer is complete.

Step 5. After waste feed is received into WTP, the Tank Operations Contractor and the WTP perform volume transfer and receipt comparison measurements to ensure that the volume of waste feed transferred is the volume of waste feed that was received.

The WTP feed acceptance criteria described in this section are consistent with those provided in the RDQO. The RDQO Report describes the constituents of regulatory concern and analytical methods appropriate for the characterization of the waste feed. The RDQO Report is designed to address the regulatory needs of the WTP in the Baseline configuration. The waste acceptance parameters are as follows:

Table 2 Waste Acceptance Parameters

Parameter	Analytical Method[a]	Sample Size (mL)[b]
TOC	9060A or 415.2	3
Polychlorinated biphenyls (PCBs)	8082A	2
pH	pH meter, 9040C	5
Compatibility	ASTM D5058-90	20
RCRA metals	6010D	3
Mercury (Hg)	7407A or 7471B	1
Selected anions	9056A	20
Ammonia/ammonium	SM 4500-NH_3-F or Environmental Protection Agency (EPA) Method 350.3	0.5
Semivolatile organics	8270D	3
Volatile organics	8260B	10
Organic acids	9056A	10
Cyanide	9010C / 9014 or 9012B	1
Organochlorine pesticides	8081B	3

[a]Methods are from EPA SW-846, as amended, unless otherwise indicated. The specified method revision or newer will be used.

[b]Sample sizes are subject to change as long as this substitution does not affect the overall quality of the analyses.

Estimated Sample Size

Collection of samples is performed to facilitate contamination control and to minimize sampler exposure. The RDQO Report specified a minimum 500 mL of liquid to complete the regulatory compliance testing for each WTP feed tank, however, it is anticipated that 170 mL of supernatant liquid per LAW sample shall be sufficient. Per the sampling event requirements described in the RDQO Report, the specific sample volume and number of samples to be collected are to be specified in the Tank Sampling and Analysis Plan (TSAP) for the corresponding staged feed. The sample material is collected in the field, and then subaliquoted (and centrifuged, if necessary) in the laboratory under controlled conditions to further reduce exposures. For tank waste samples, typically glass bottles with Teflon-lined screw caps or polyethylene bottles are used to collect samples. These are then subsampled and stored in screw cap glass vials (for organic analyses) and in polyethylene vials (for elemental and radiochemical analyses) during sample preparation and analyses in the laboratory. Per the guidelines established using the Performance Based Measurement System approach and safe handling procedures required to limit radiological dose, sample sizes may be reduced from those recommended in the cited analyses.

Total Organic Carbon

The waste feed will be analyzed to determine the TOC. The TOC has been chosen for analysis of the waste feed to ensure that the WTP is not required to comply with Subpart BB of WAC 173-303-691. The

analytical method is SW-846, *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 2014), Method 9060A or Method 415.2 (EPA 1997), using persulfate oxidation. The sample aliquot volume requirements for this analysis are expected to be 3 mL. This method typically measures TOC to levels of about 1 ppm. The criteria for waste acceptance is 10 wt% TOC, or less. Method 9060 (EPA 2014) will meet the 1% detection limit, as given in Table 6. The solids will be analyzed separately for TOC.

Polychlorinated Biphenyls

Most of the Hanford tank waste contains PCBs at concentrations below 50 ppm. These are regulated under the *Toxic Substances Control Act of 1976* (15 United States Code [USC] 2601 et seq.), and codified in 40 Code of Federal Regulations (CFR) 761.61, *Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions – PCB Remediation Waste*, as PCB remediation waste — agreed upon in the *Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste* (Ecology, EPA, and Department of Energy [DOE] 2000). Modification of the basic extraction procedure given in this method is expected to be needed to decrease the sample size and allow the extraction to be performed in a shielded glovebox. It is anticipated that a sample size of 2 mL would be required for liquids. If any single liquid sample contains more than 5% solids after centrifuging, the liquid and solid will be analyzed separately. The waste feed sample aliquots will be analyzed to ensure that the waste feed contains less than 50 ppm PCBs. This acceptance criteria of 50 ppm PCBs may change as a result of the risk-based approval of PCBs in the tank waste that is being prepared jointly by Ecology, EPA, and USDOE. The sample will be separated into solid and liquid phases and analyzed for PCBs by SW-846 Method 8082A (EPA 2014).

pH

The measurement of pH will ensure that the waste feed is compatible with the WTP materials of construction and treatment processes. Method 9040C of SW-846 (EPA 2014) will be used to measure pH. The estimated sample size is 5 mL. The decision criteria is greater than pH 12, as presented in Table 6. With a pH above 12, the effect of chloride on uniform corrosion, pitting, or cracking is negligible.

Compatibility

The waste feed will be evaluated for compatibility with the residual aqueous waste in the LAW Concentrate Receipt Vessel before being accepted into the WTP. These evaluations will focus on the potential for a waste stream to react in an uncontrolled fashion with another waste (40 CFR 264, Appendix V, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Examples of Potentially Incompatible Wastes*). Although problems associated with co-mingling aqueous waste feeds are not expected, this evaluation will ensure the compatibility of two or more aqueous waste feeds from different DST System unit tanks.

Waste feed compatibility will be evaluated using American Society for Testing and Materials (ASTM) D5058-90, *Standard Test Methods for Compatibility of Screening Analysis of Waste*. This evaluation provides three test methods to determine compatibility. Test Method A, using a reduced sample volume, will be applied to the proposed DST System unit waste feed and the WTP feed receipt tank residual waste. This method prescribes the mixing of aliquots of the two waste streams and an evaluation of any temperature change of the mixture. The method also calls for a visual examination to determine whether viscosity has increased. These evaluations will be performed to test for potential incompatibilities that could adversely affect the management of the waste in the WTP. The waste acceptance criteria for compatibility is a temperature change less than ± 20 °C.

The recommended sample volume for this test method is 150 to 300 mL. The sample size will be decreased to 10 mL from each waste feed, for a total of 20 mL of the combined waste feeds for waste minimization and will comply with the as low as reasonably achievable philosophy, referred to as "ALARA."

Resource Conservation and Recovery Act Metals

The waste feed will be evaluated for toxicity characteristic metals, underlying hazardous constituent metals and metals of interest for potential future delisting of Immobilized High-Level Waste (IHLW). Waste feed metals will be determined using Methods 7470A or 7471B of SW-846 (EPA 2014) for mercury and Method 6010D of SW-846 (EPA 2014) for metals other than mercury. The waste feed metals are the following:

- Antimony.
- Arsenic.
- Barium.
- Beryllium.
- Cadmium.
- Chromium.
- Lead.
- Mercury.
- Nickel.
- Selenium.
- Silver.
- Thallium.

The recommended sample size for metals (except mercury) is 3 mL and the recommended sample volume for mercury is 1 mL.

Anions

Waste feed will be evaluated for the following anions using Method 9056A of SW-846 (EPA 2014):

- Fluoride.
- Chloride.
- Sulfate.
- Nitrite.
- Nitrate.
- Bromide.
- Phosphate.

The recommended sample size for anions analysis is 20 mL.

Organic Chemicals

The waste feed will be evaluated for organics. Three SW-846 (EPA 2014) methods will be used. Method 8270D will be used for analysis of semivolatile compounds; Method 8260B will be used for analysis of volatile compounds; and Method 8081B will be used to measure organochlorine pesticides. The recommended sample size for volatile organic compounds is 10 mL, and the recommended sample size for semivolatile organics and pesticides is 3 mL. These analytical methods are "catch-all methods," meaning the methods are capable of detecting multiple constituents. The requested analysis will include the request for reporting of all quantifiable constituents, with the minimum as specified by the analytical method.

Ammonia

Waste feed will be evaluated for ammonia using EPA Method 350.3 (EPA 1989) or Standard Method 4500-NH_3-F (APHA 1992). It is anticipated that 0.5 mL of liquid will be necessary for the analysis.

Cyanide

Waste feed will be evaluated for cyanide using Methods 9012B or 9010C / 9014 of SW-846 (EPA 2014). The recommended sample size for cyanide analysis is 1 mL of liquid and 0.2 g of solid.

Table 6 provides a summary of the waste analysis parameters, analytical methods, acceptance criteria and a description of action to undertake should a nonconformance occur.

Ignitable Waste

Four properties of a waste found in WAC 173-303-090(5)(a)(i through iv) are used to determine whether a waste exhibits the characteristic of ignitability.

WAC 173-303-090(5)(a)(i) states that waste is ignitable if the sample waste "…is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 degrees C (140 degrees F)…." Report HNF-SD-WM-SAR-067, *Tank Waste Remediation System Final Safety Analysis Report* (DOE-RL 1999), identifies 241-C-103 as the only tank, at this time, that contains a separate organic solvent phase. The flash point of the separate organic solvent phase on tank 241-C-103 was determined to be 118 ºC in report PNL-9403, *Waste Tank Organic Safety Project: Analysis of Liquid Samples from Hanford Waste Tank 241-C-103* (PNL 1994). This flash point is well above the regulatory threshold of 60 ºC for determining the characteristic of ignitability and represents a worst-case flash point for the liquid portion of the waste feed. Because the liquid portion of the waste feed is aqueous and contains a maximum of 10 wt% TOC, the flash point test will not be performed on the aqueous waste feed.

The WAC 173-303-090(5)(a)(ii) property of ignitability pertains to material that is not a liquid. Portions of the Hanford tank waste are in a solid (crust and salt cake) and semi-solid (sludge) form. Process knowledge indicates that this property of ignitability does not apply to the tank waste. Throughout the history of the Tank Farms — according to memorandum 82331-90-313, *Double-Shell Tank Waste Designation* (Westinghouse 1990) — there has been no evidence of the solid or semisolid portions of the tank waste "…causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard" [WAC 173-303-090(5)(a)(ii)].

WAC 173-303-090(5)(a)(iii) pertains to compressed gas. This definition does not apply because the Hanford tank waste is not a compressed gas.

WAC 173-303-090(5)(a)(iv) states that waste is an oxidizer if it "…yields oxygen readily to stimulate the combustion of organic matter." According to 49 CFR 173.127, *Shippers – General Requirements for Shipments and Packagings – Class 5, Division 5.1 – Definition and assignment of packing groups*, an oxidizer is defined as "…a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials." Nitrate and nitrite salts are present in the waste feed

(Westinghouse 1990) and can yield oxygen. However, report HNF-4240, *Organic Solvent Topical Report* (CH2M Hill 2000), determined that the nitrate and nitrite in the DST waste will not cause or enhance the combustion of other materials. Thus, the DST waste does not meet the definition of an oxidizer. Report HNF-4240 was independently reviewed and accepted by the Chemical Reactions Subpanel of the Tanks Advisory Panel, the Defense Nuclear Facilities Safety Board staff, and the Oregon Office of Energy — which is documented in memorandum 00-SHD-066, *Closure of the Organic Solvent Safety Issue and Removal of the Organic Solvent Tanks from the Watchlist* (DOE-ORP 2000).

49 CFR 173.128, *Shippers – General Requirements for Shipments and Packagings – Class 5, Division 5.2 – Definitions and types*, defines organic peroxides and is not applicable to the waste feed.

The dangerous waste number D001 for ignitability will be removed from the waste feed after it is received into the PT Facility, based upon the previous discussions of process knowledge.

Reactive Waste

WAC 173-303-090(7)(a)(i through viii) lists eight properties of a waste that would cause it to be designated as a reactive waste.

WAC 173-303-090(7)(a)(i) describes a waste that is unstable and will undergo violent change. The Hanford tank waste has not exhibited a violent change during the history of the Tank Farms. Differential thermal analysis or differential scanning calorimeter analysis has been performed on the tank waste. These tests have shown that the waste does not react under thermal stress (Westinghouse 1990).

WAC 173-303-090(7)(a)(ii), (iii), and (iv) involves waste that, when mixed with water, produces hazardous reactions, or generates toxic gases, vapors, or fumes. Because the Hanford tank waste is already a water solution, it does not meet the following definitions: (ii) “It reacts violently with water,” (iii) “It forms potentially explosive mixtures with water,” or (iv) “When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.”

Hydrogen, ammonia, oxides of nitrogen, and methane are generated in the Hanford waste tanks. These gases are generated primarily from the radiolytic decomposition of the waste and are not a result of mixing with water — according to report HNF-SF-1193, Rev 1, *Flammable Gas Project Topical Report* (PNNL 1996). Nevertheless, flammable gases produced by the waste’s radiolytic decomposition and, to a lesser degree, thermolytic decomposition, will be managed at the WTP through ventilation of the vessels that contain the waste feed.

WAC 173-303-090(7)(a)(v) concerns the generation of toxic gases, vapors, or fumes when a cyanide- or sulfide-bearing waste is exposed to pH conditions between 2 and 12.5, in a quantity sufficient to present a danger to human health or the environment. Hydrogen cyanide and hydrogen sulfide are the gases that would be generated from cyanide- or sulfide-bearing waste when exposed to acidic conditions. In 1985, the EPA published guidance for determining regulated thresholds for these gases as 250 mg/kg of waste for hydrogen cyanide and 500 mg/kg of waste for hydrogen sulfide. Although these numerical thresholds were rescinded by the EPA via memorandum *Withdrawal of Cyanide and Sulfide Reactivity Guidance* (EPA 1998), they are still useful as benchmarks for determining the characteristic of reactivity and are still accepted by Ecology.

Thirteen tanks have been investigated by the Pacific Northwest National Laboratory under CH2M Hill Hanford Group, Inc. (Project Number 41503) for their potential to generate these gases at a pH between 2 and 12.5. This report researched the analytical data for the concentrations of cyanide and sulfide in the supernatant and solids in the tanks, using the best basis inventory on the Tank Waste Information Network System database current to November 2000 (Lockheed Martin 1999). Analytical data for cyanide was available, but no data was available for sulfide because there is no history of sulfide addition to the Tank Farms. Consequently, the author used total sulfur and sulfate concentration values for the evaluation.

Standard chemistry principles were used to calculate the potential generation of hydrogen cyanide and hydrogen sulfide in acidic conditions. This investigation determined that hydrogen cyanide and hydrogen sulfide would not be generated at the respective benchmark levels of 250 and 500 mg/kg of waste for these tanks. Thus the waste feed contained in tanks scheduled for the first 10 years of WTP operation is not considered to be sulfide- or cyanide-bearing waste.

WAC 173-303-090(7)(a)(vi), (vii), and (viii) is concerned with waste that will detonate or explode. Process knowledge and history indicate that the Hanford tank waste does not detonate or explode. As mentioned previously, differential thermal analysis or differential scanning calorimeter analysis has been performed on the tank waste, showing that it does not react under thermal stress (Westinghouse 1990). Finally, the tank waste is not regulated as an explosive in 49 CFR 173.50, *Shippers – General Requirements for Shipments and Packagings – Class 1 – Definitions*.

3A.5.1 Generated Wastes

In addition to the vitrified glass product the WTP facilities' vitrification processes will generate a variety of solid, liquid, and gaseous waste streams. Some of these waste streams include waste derived from the incoming feed from the DST System unit. Other wastes include spent materials used in processing the waste feed, such as rinsate and scrubber solutions that come into contact with the waste feed or its derivatives, and contaminated equipment. General facility operations and maintenance activities will also generate dangerous waste.

This section describes the secondary waste streams generated by the WTP, including characterization of secondary waste, the associated sampling and analysis activities, and the ultimate TSD of regulated waste. Air emissions subject to regulation, commonly referred to as Subparts AA, BB, and CC, are discussed in Section 3A.6. Other regulated air emissions are addressed under the *Clean Air Act of 1990* (42 USC 7401 et seq.) and the *Washington State Clean Air Act of 1967* (Revised Code of Washington [RCW] 70.94 et seq.) permits and are not included in the following discussions.

Secondary waste streams that will be transferred back to the DST System unit will be designated with waste numbers based upon process knowledge or by characterization where process knowledge is inadequate. Waste transferred to the DST System unit will meet the DST waste acceptance criteria.

Secondary waste streams are divided into solid waste streams (discussed in Section 3A.5.2) and liquid waste streams (discussed in Section 3A.5.4). Dangerous waste streams generated within the WTP will meet the waste acceptance criteria or protocols established by the receiving TSD facilities' permits and operating authority. This document does not outline the details of sampling and analyzing each waste stream because each TSD receiving waste may update its waste acceptance criteria and thus alter the required waste analyses.

Also, disposable sampling equipment will eliminate the need for equipment decontamination after use, and is the preferred sampling option. If the use of disposable equipment is not practical, the sampling equipment will be decontaminated before and following each sample event.

The following general information related to waste classification applies to solid and liquid secondary waste streams:

- Waste streams can be designated using process knowledge. Acceptable process knowledge includes:
  - Historical analytical data.
  - Mass balance from a controlled process with a specified output for a specified input.
  - Safety Data Sheets (SDS).
  - Analytical data on the waste from a similar process.

- For mixed waste, process knowledge could include information from surrogate material (that is, a non-radioactive waste generated from an analogous activity or process).

- The listed waste numbers F001 through F005 will follow the secondary waste if the secondary waste is derived from the waste feed. F039 waste was never placed in the DST System unit and will not be designated to secondary waste. If the DST System unit receives F039 waste in the future, F039 will then be designated to secondary waste that contacts the DST waste feed.
- Secondary wastes not derived from the waste feed (e.g., Lab and maintenance waste) will be characterized and designated with the appropriate EPA hazardous waste numbers and Washington State dangerous waste numbers and managed accordingly.
- If analyses are required for determining waste numbers for a secondary waste, laboratory procedures will be prepared using applicable SW-846 methods (EPA 2014). Analytical procedures will be revised, as appropriate, if SW-846 methods are revised.
- Documentation of the process knowledge or analytical data used to designate the waste numbers will be maintained in the WTP operating record. Documentation is discussed in Section 3A.7 of this report.

3A.5.2 Secondary Solid Waste Streams

Solid waste will be generated from WTP operations and includes a wide variety of wastes – such as waste derived from routine maintenance activities, nonroutine maintenance activities, and daily operating activities. The following sections describe the various mixed and variable solid waste types to be generated. Refer to the WAP glossary for additional details on the specific waste types.

Solid waste streams that will come into contact with the waste feed during any stage of the treatment processes will be designated as mixed waste by process knowledge or by characterization where process knowledge is inadequate. These secondary waste streams are listed in Table 3. EPA hazardous waste numbers and Washington State dangerous waste numbers will be assigned to these mixed waste streams, based on the characterization of the waste feed. Each waste stream discussed below will meet the waste acceptance criteria of the receiving facility. A discussion of each of these mixed waste streams is provided.

Table 3 Secondary Solid Mixed Waste Streams

Waste Stream	Characterization	Disposal
Out-of-service melters	Designated by process knowledge or by characterization where process knowledge is inadequate.	Disposal of out-of-service melters is currently under development.
HLW glass residue		Determined case-by-case.
Melter components		These wastes will be packaged and transferred to the appropriate Hanford TSD unit.
Offgas treatment system components: • High-Efficiency Mist Eliminators (HEMEs). • High Efficiency Particulate Air (HEPA) filters. • Silver mordenite canisters.		
Spent carbon and catalyst from offgas treatment		
Spent ion exchange resins		

Table 3 Secondary Solid Mixed Waste Streams

Waste Stream	Characterization	Disposal
Spent ultrafilters		
Out-of-service equipment		
Entrained solids		Entrained solids may be returned to the DST System unit via pipeline as a slurry or added to the low-activity or HLW feed for vitrification.

Out-of-Service Melters

It is anticipated that melters will require replacement at some point, due to the harsh conditions of the vitrification process. Residual molten glass is vitrified. The melter will be allowed to cool and then will be disconnected.

The LAW melters will be provided to the disposal facilities in a shielded and seal-welded melter package. The melters may require a LDR treatability variance to allow land disposal at the Hanford Site. The Tank Operations Contractor, with the Plateau Remediation Contractor, has been tasked with developing a disposal path for the WTP LAW melters. A determination has yet to be made if the LAW melter will require additional treatment at the disposal facility. Due to the extreme weight of a spent or failed LAW melter, treatment (if needed) would have to be completed at or near the disposal site. If treatment will occur at the disposal facility, the appropriate permit modifications will be required to include this activity.

Current data indicate that the concentration of Transuranic (TRU) waste constituents will cause some HLW melters to be designated as a TRU waste. The LDR treatment standards for the HLW melter are met by the macroencapsulation of the melter in an 8-inch thick welded carbon steel shielded overpack. The Tank Operations Contractor, with the Plateau Remediation Contractor, has been tasked with developing a disposal path for the WTP HLW melters. The HLW melters may require an LDR treatability variance to allow land disposal at the Waste Isolation Pilot Plant (WIPP) or another offsite facility. If future waste characterization data validates that some HLW melters will be TRU waste, permitting and approval for long-term storage of this TRU waste at the Central Waste Complex will then be needed. Facilities to grout, size reduce, and package the melters to meet the WIPP waste acceptance criteria or a yet to be established HLW disposal facility do not exist.

High-Level Waste Glass Residue

The disposal path for HLW glass residue that may be removed from an out-of-service HLW melter will be determined case-by-case. Final disposal will be based on the radionuclide content and dangerous characteristics of the glass residue. It is anticipated that this secondary waste will be classified as remote-handled, mixed LAW. These wastes will be packaged for transportation in shielded transportation casks and treated for disposal at a commercial vendor to meet the LDR.

Ancillary Equipment

Melters will be fitted with various ancillary equipment (e.g., bubbler assemblies, heating elements, and thermocouples) that will require periodic replacement. The ancillary equipment will be removed, designated by process knowledge as mixed waste, and packaged and transferred to an appropriate TSD unit. It is anticipated that LAW melter components will be contact-handled, mixed LAW. This secondary waste stream will be packaged for transportation and treated for disposal at a commercial vendor to meet the LDR.

Ancillary equipment (e.g., pumps, valves, piping, motors, and electrical equipment) no longer fit for use, will be removed from service and designated as out-of-service equipment. Out-of-service equipment that has been in contact with the waste feed will be sampled or designated by process knowledge, packaged, and transferred to an appropriate TSD unit.

Offgas Treatment System Components

HEMEs, HEPA filters, and silver mordenite canisters will be components of the offgas treatment system incorporated to remove contaminants from the offgas streams prior to discharge. These components will periodically be replaced to maintain treatment efficiency. They will be designated by process knowledge or by characterization where process knowledge is inadequate, packaged, and transferred to an appropriate TSD unit.

Spent Ion Exchange Resins

Ion exchange resins used for cesium removal will periodically be replaced to maintain treatment efficiency. These resins will be designated by process knowledge and managed as mixed waste. They will be eluted, removed from their respective columns, dried and packaged in high-integrity containers, and finally transferred to an appropriate TSD unit.

Spent Ultrafilters

Ultrafilters may be periodically replaced to maintain treatment efficiency. They will be designated as mixed waste by process knowledge, packaged, and transferred to an appropriate TSD unit.

Entrained Solids

Entrained solids will be generated by pretreating the LAW feed via ultrafiltration. The separated solids will be washed and again concentrated via ultrafiltration. The entrained solids will either be incorporated into the IHLW or the ILAW or returned to the DST System unit in the form of a slurry via pipeline.

Spent Carbon and Catalyst from Offgas Treatment

Spent carbon and catalyst from offgas treatment will periodically be replaced to maintain treatment efficiency. These materials will be designated by process knowledge or characterization where process knowledge is inadequate and managed as mixed waste. They will be removed from their respective equipment, packaged, and transferred to an appropriate TSD unit.

3A.5.3 Variable Solid Waste Streams

The waste streams listed in Table 4 can be radioactive waste, dangerous waste, or mixed waste, depending on the source of the waste and whether it had contact with the waste feed. The EPA hazardous waste numbers and Washington State dangerous waste numbers will be assigned to these waste streams, based on the designation of the waste by process knowledge or by characterization where process knowledge is inadequate. In addition to the waste streams listed in Table 4, raw process materials and chemicals will be brought onto the WTP site. Some of these substances may subsequently become waste and will require characterization for proper waste management. The SDS is useful when characterizing and designating material waste codes and waste streams. Vendors will be required to provide SDS for substances that will be brought onto the WTP site, and an SDS file will be maintained by the WTP. Examples of these types of substances are process and laboratory chemicals, lubricants (e.g., oils and greases), and maintenance products (e.g., paints, solvents, and adhesives).

Table 4 Variable Solid Waste Streams

Waste Stream	Characterization	Disposal
Non-wastewater laboratory waste	Each generation event of these wastes will be individually designated by process knowledge or by characterization where process knowledge is inadequate and will comply with the receiving TSD waste acceptance criteria.	The wastes will be packaged and transferred for disposal to an appropriate TSD unit.
Personal protective equipment (PPE)		
Maintenance waste		

Subcontractors to the WTP will be required to have an SDS for the substances that they bring onto the WTP site.

Laboratory Waste

Non-wastewater laboratory waste derived from the waste feed will be designated as mixed waste by process knowledge or by characterization where process knowledge is inadequate, packaged, and transferred to an appropriate TSD unit. Other non-wastewater laboratory wastes (e.g., off-specification laboratory chemicals and spent or unused simulant) will be designated by process knowledge or by characterization where process knowledge is inadequate and managed accordingly. These wastes will be packaged and disposed of at an appropriate TSD unit.

Personal Protective Equipment

Personnel performing certain tasks such as facility maintenance, treatment process operations, and waste packaging activities, may wear PPE. Used PPE may be returned to the vendor for cleaning and refurbishment. Used PPE that cannot be recycled to the vendor and has had contact with waste feed or other sources of radiological contamination will be designated as radioactive or mixed waste by process knowledge or by characterization where process knowledge is inadequate, packaged, and transferred to an appropriate TSD unit. The PPE nonradioactive waste designated as dangerous waste by process knowledge or by characterization where process knowledge is inadequate, and will be packaged and disposed of at an appropriate TSD unit.

Maintenance Waste

Maintenance wastes (e.g., paints, lubricants, cleaning solvents, adhesives, and off-specification chemicals) will be generated at the WTP. Maintenance waste that comes in direct contact with waste feed will be designated as mixed waste. Waste contaminated by indirect contact will be designated based on process knowledge as radioactive waste or mixed waste as appropriate, and transferred to an appropriate TSD unit. Those not derived from the waste feed and designated as dangerous waste by process knowledge or by characterization where process knowledge is inadequate and will be packaged and disposed of at an appropriate TSD unit.

3A.5.4 Liquid Waste Streams

The dangerous and mixed liquid waste streams generated at the WTP that cannot be incorporated back into the treatment process (recycled) will be managed in accordance with the Liquid Effluent Retention Facility/Effluent Treatment Faclity (LERF/ETF) waste acceptance criteria (WRPS 2018). The LERF/ETF will receive hazardous aqueous waste generated at WTP. The waste will meet the acceptance criteria as outlined in the LERF/ETF waste acceptance criteria. The LERF and ETF allow process knowledge to be used in lieu of some analyses in instances where process knowledge is adequate, and a LERF or ETF representative will work with a WTP representative to identify the waste acceptance criteria and analyses appropriate for liquid waste characterization.

Aqueous waste streams listed in Table 5 will be collected in an effluent collection tank. Samples will be taken from the effluent collection tank, in accordance with a sampling procedure which is included in the Operating Record.

Table 5 Liquid Mixed Waste Streams

Waste Stream	Characterization and Disposal	Sampling Point	Sampling Frequency
Waste feed evaporator condensate	The waste streams, not subject to recycling, will collect in a mixer tank, be designated as mixed waste by process knowledge and analysis, as necessary, and will be transferred to the LERF or ETF (or tanker truck, as a contingency), or DST System unit.	The streams collected in a mixed tank are grab sampled by autosampler or manually.	Sampling will be performed under the following circumstances: • Before initial discharge. • At major process change or upset. • At request for resampling by the receiving facility.
LAW melter feed evaporator condensate			
PT, HLW, and LAW off-gas condensate			
LAW and HLW melter off-gas scrubber blowdown			
Laboratory wastewater			
Plant wastewater containing waste feed			

A discussion of each aqueous waste stream is presented below.

Aqueous Waste from Processes

Table 5 lists the aqueous waste streams that will be generated by the WTP from processing the DST waste feed. The analytical laboratory will also generate aqueous waste. These waste streams will contain both radioactive and dangerous waste components and will be similar to the process condensate stream described in DOE/RL-90-42, *242-A Evaporator Dangerous Waste Permit Application* (DOE-RL 1997).

Plant Wastewater

Wastewater will be generated primarily from decontamination and wash-down activities in the WTP. The wastewater will be designated as mixed waste by process knowledge or by characterization where process knowledge is inadequate, since it will contain dilute waste feed constituents.

3A.5.5 Land Disposal Restrictions Evaluation for Immobilized Waste

This section describes the approach for addressing the LDR program requirements applicable to the land disposal of ILAW.

The LDRs are codified in WAC 173-303-140, Dangerous Waste Regulations – *Land disposal restrictions*, which incorporates 40 CFR 268, *Land Disposal Restrictions*, by reference. In 40 CFR 268.40, *Land Disposal Restrictions – Applicability of treatment standards*, the treatment standards for land disposal of a dangerous waste are identified as follows:

> "(a) A prohibited waste identified in the table "Treatment Standards for Hazardous Wastes" may be land disposed only if it meets the requirements found in the table. For each waste, the table identifies one of three types of treatment standard requirements:
>
> (1) All hazardous constituents in the waste or in the treatment residue must be at or below the values found in the table for that waste ("total waste standards"); or

(2) The hazardous constituents in the extract of the waste or in the extract of the treatment residue must be at or below the values found in the table ("waste extract standards"); or

(3) The waste must be treated using the technology specified in the table ("technology standard"), which are described in detail in §268.42, Table 1 – Technology Codes and Description of Technology-Based Standards."

The total waste standards and waste extract standards require repeated sampling and analysis of the waste to demonstrate that the dangerous constituents in the waste are at or below the values found in the table. These standards are appropriate for a limited dangerous waste stream, but are not a good choice for a mixed waste stream of extended duration because of repeated human exposure during sampling and analysis.

Table 1 in 40 CFR 268.42, *Land Disposal Restrictions – Treatment standards expressed as specified technologies*, includes the technology-based standard "HLVIT" (high-level waste vitrification). At the request of DOE, the HLVIT treatment technology was promulgated by the EPA to treat the tank waste at the Savannah River Site (refer to *Land Disposal Restrictions for Third Third Scheduled Wastes; Rule* [EPA 1990]). According to the table in 40 CFR 268.40 regarding treatment standards for hazardous wastes, HLVIT is the technology for the treatment of the following dangerous waste numbers from radioactive high-level wastes generated during the reprocessing of fuel rods:

D002	Corrosivity (pH)
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium (total)
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver

Similar to the treatment of the Savannah River Site tank waste, the treatment of the Hanford tank waste will require many years of WTP operation. Rather than repeated sampling and analysis of the waste to demonstrate LDR using the total waste standard or the waste extract standard, it would be appropriate to treat the Hanford tank waste to a specific treatment standard (e.g., the HLVIT technology-based standard described above for the Savannah River Site tank waste). WTP has submitted a petition for a site-specific variance as directed under 40 CFR 268.44(h) that would specify HLVIT as the method of treatment for Hanford tank waste processed through the WTP for all applicable waste codes.

3A.5.6 Waste Feed Rejection Policy

Confirmatory action (e.g., re-analysis and data review) will be performed for each analytical result that does not initially meet the acceptance criteria presented in Table 6. Re-analysis of a sample that fails an acceptance criterion will consist of two repeat analyses for the failed criteria. If both of the repeat analyses pass, then the sample will be considered to meet that acceptance criteria. If one or both of the repeat analyses fail, the waste will be considered nonconforming. If the waste feed is determined to be nonconforming, then the WTP, the Tank Operations Contractor, or both, will determine and execute corrective actions necessary to be able to transfer and process the waste feed. Such actions may include:

- Waste feed adjustment to meet the WAC requirements.

- Change acceptance criteria requirements if there is no impact to the WTP design, safety basis, or permit requirements (on a case-by-case basis).

If no feasible alternative is found and the feed cannot be accepted, the following actions will be implemented:

- Continued waste storage until an alternative is identified.

The nonconformance decisions, corrective actions, supporting data, and the names and titles of the individuals making these decisions will be documented and retained as a Quality Assurance (QA) record, according to procedures described in Chapter 3B, "Quality Assurance Project Plan for the Waste Analysis Plan" (herein referred to as the QAPjP).

3A.5.7 Discrepancy Policy

If discrepancies, such as improper container labeling, improper packaging, nonconformance issues, or manifest inconsistencies, are discovered during the container receipt inspection, discrepant containers or shipments will not be accepted into WTP until the discrepancies have been resolved using one or more of the following alternatives:

- Incorrect or incomplete entries on the Uniform Hazardous Waste Manifest or onsite shipping paperwork can be corrected upon receipt at WTP with concurrence from the generator. Corrections are made by drawing a single line through the incorrect manifest entry. Corrected entries are initialed and dated by the individual making the correction.
- The waste package(s) can be held at WTP and segregated from other stored waste, in which case, the generator must provide written instructions for correcting the discrepancies.
- The waste package may be returned to the generator for a detailed chemical, physical, and/or biological analysis of waste.

If the waste container or shipment is damaged to such an extent, or the waste is in such a condition as to present a hazard to the public health or the environment in the process of further transportation, then actions must be taken in accordance with Chapter 7, "Building Emergency Plan."

A generator may be contacted to provide additional information or requested to provide corrective actions. If conformance issues are unable to be resolved, waste will not be accepted into the WTP. The verification rate for that waste stream will be increased to 100 percent, and the generator's other waste streams will be evaluated to determine whether all waste streams or a subset of waste streams might be subject to the same type of conformance issue. Also, the physical screening frequency for each waste stream that might be subject to the same type of verification failure will be adjusted to 100 percent.

3A.5.8 Sampling Strategies and Frequency

The samples collected for characterization of the waste feed, by the Tank Operations Contractor, for transfer to the WTP will be collected as described in the RDQO. A minimum of one sample will be collected from the waste feed tank for characterization of the waste stored in that tank.

Samples will be accompanied by a chain-of-custody at all times, ensuring accountability of the sample and associated records. At a minimum, the following information must be identified on a completed chain-of-custody record:

- Collector(s) names.
- Project designation.
- Unique sample numbers.
- Date, time, and location (or traceable reference thereto) of sample collection.

- Chain of possession information (i.e. signatures/printed names of all individuals involved in the transfer of sample custody and sample locations, dates of receipt and relinquishment).
- Additional information regarding the sample and specific analytical instructions may also be identified.

Sample preservation, storage, and holding times for the samples collected to support characterization of the DST waste feed are discussed in the RDQO Report.

3A.5.9 Analytical Parameters and Test Methods

The analytical methods that will be used to obtain the necessary data for characterizing the DST waste feed are addressed in the RDQO Report.

The WTP will contract with other laboratories to provide analytical services, as necessary, based on a review of the ability of each laboratory to provide acceptable data for the types of waste handled by the WTP. The review will include an onsite surveillance of the laboratory facilities, and a review of its documentation. Evaluation of candidate laboratories will be based on the following criteria:

- Licenses or permits issued by the applicable government authority, allowing the laboratory to handle waste samples that contain chemical and radiological components.
- Laboratory accreditation.
- Analytical capacity, including number and type of analytical instruments, sample preparation facilities, and sufficient uncommitted capacity, or a commitment to procure sufficient capacity to handle the sample load.
- Adequate number of qualified technical staff.
- Demonstrated history of performing acceptable analyses.
- Adequate sample tracking system.
- A demonstrated QA program and participation in performance evaluation.

3A.5.10 Quality Assurance/Quality Control and Data Reporting

The QA and Quality Control (QC) for waste feed characterization are addressed in the RDQO. Additional QA and QC requirements for sampling and analysis in support of the characterization of the waste feed and the characterization of secondary waste streams are provided in Chapter 3B of this permit.

3A.6 Air Emissions

Emissions from the stacks that vent the WTP processes will be monitored according to the provisions of the *Hanford Air Operating Permit*, as required by WAC 173-303-395(2), Dangerous Waste Regulations – *Other General Requirements*. Monitoring and sampling to address air emissions concerns under these permits will not be addressed in this application. However, the applicability of the air emissions requirements found in WAC 173-303 will be evaluated in the following sections. Details of the air emissions control systems for the WTP are provided in Chapter 4 of the DWP.

- *Air Emission Standards for Process Vents* (Subpart AA)

  WAC 173-303-690, Dangerous Waste Regulations – *Air Emission Standards for Process Vents*, commonly referred to as "Subpart AA," regulates process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air- or steam-stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppm by weight. WAC 173-303-690 incorporates the provisions of 40 CFR 264, Subpart AA, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Air Emission Standards for Process Vents*, by reference. The WTP does not employ any of these listed devices or processes; therefore, the WTP is not subject to regulation under Subpart AA.

Refer to 24590-WTP-RPT-ENV-01-001, Rev 0, *RCRA Subpart AA Applicability*, for the regulatory analysis that resulted in this conclusion.

- *Air Emission Standards for Equipment Leaks* (Subpart BB)

  WAC 173-303-691, Dangerous Waste Regulations – *Air Emission Standards for Equipment Leaks*, applies to facilities that treat, store, or dispose of hazardous waste, and regulates air emissions from equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight (wt%). WAC 173-303-691 incorporates 40 CFR 264, Subpart BB, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Air Emission Standards for Equipment Leaks*, by reference. This provision does not apply to the WTP, because the WTP will not accept wastes with organic concentrations at or above 10 wt%. (refer to Section 3A.5). Compliance with this provision will be documented through analysis, as described in Section 3A.6.1.

- *Air Emission Standards for Tanks, Impoundments, and Containers* (Subpart CC)

  The regulations specified under WAC 173-303-692, Dangerous Waste Regulations – *Air Emission Standards for Tanks, Surface Impoundments, and Containers*, and 40 CFR 264, Subpart CC, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Air Emission Standards for Tanks, Surface Impoundments, and Containers*, incorporated by reference, do not apply to the WTP mixed waste tank systems and containers. These tanks and containers are excluded under WAC 173-303-692(1)(b)(vi) because they qualify as waste management units "…used solely for the management of radioactive mixed waste in accordance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act." Containers or tanks bearing nonradioactive, dangerous waste (e.g., maintenance and laboratory waste) that are not excluded under WAC 173-303-692(1)(b)(ii) or 40 CFR 264.1082(c) will comply with the container and tank standards specified under 40 CFR 264, Subpart CC.

3A.7 Recordkeeping

Records generated for environmental compliance will be legible, identifiable, and retrievable, and will be protected against damage, deterioration, or loss. Requirements and responsibilities for record transmission, distribution, retention, maintenance, and disposal will be established and documented. The requirements contained in WAC 173-303-380(a, b, and c), Dangerous Waste Regulations – *Facility Recordkeeping*, are addressed in this WAP and will be managed through the waste tracking system record-keeping policies. Additional requirements listed under WAC 173-303-380 are addressed in the QAPjP. Records generated to support activities described in this WAP will be considered QA records. These may be in electronic or hard copy format, and will be managed according to the requirements outlined in the QAPjP.

The following documents that support this WAP are considered QA records:

- Sample information provided by the Tank Operations Contractor, including constituents of concern from sampling activities, laboratory analysis results, waste certifications, and shipping and transfer papers.
- Documentation used for any discrepancy resolution and nonconformance action.
- Confirmation volume measurement data, including any discrepancy resolution.
- Documentation used for LDR evaluation.
- Sampling and analytical data developed for meeting the waste acceptance criteria of receiving facilities.
- Calibration data from analytical equipment.

- Shipment and waste transfer documentation, including waste profile sheets and LDR information forms.

Table 6 Waste Feed Analysis, Waste Acceptance Criteria, and Nonconformance Actions

Parameter	Analytical Method[a]	Target Minimum Reportable Quantity	Acceptance Criteria	Nonconformance Actions
TOC using persulfate oxidation method	Method 9060A or Method 415.2 (EPA 1997)	1 wt%	TOC < 10 wt%	Reject waste feed
PCBs	Method 8082A	0.025-0.05 mg/L (supernate) 0.1-0.25 mg/kg (sludge)	PCBs < 50 ppm	Reject waste feed
pH	pH meter, Method 9040C	Not established; per the method, bracket the expected pH of the sample by three pH units or more apart during calibration	Acceptable pH range >12	Corrective actions to correct pH
Compatibility	ASTM D5058-90	Temperature Change = 1 °C	Acceptable temperature change < ± 20 °C No viscosity change adversely affecting waste processing	Corrective actions to eliminate incompatible conditions
RCRA Metals: Sb, As, Ba, Be, Cd, Cr, Pb, Ni, Se, Ag, Tl[c]	Method 6010D	0.05-015 mg/L (supernate) 15.0-100 mg/kg (sludge)	per Permit Condition Table III.10.H.D	Determination of toxicity characteristic metals, underlying hazardous constituents
Hg	Method 7470A or 7471B	0.025-1.0 mg/L (supernate) 0.10-3.5 mg/kg (sludge)	Hg < 1.4E-05 mol/mol sodium	Determination of toxicity characteristic metals
Anions – Ratio to Sodium[b]	Method 9056A	150-500 mg/L (supernate) 2.50-50.0 mg/kg (sludge)	Cl < 3.7E-2 mol/mol sodium F < 9.1E-2 mol/mol sodium SO4 < 7.0E-2 mol/mol sodium	Corrective actions to eliminate incompatible conditions
Ammonia / ammonium	SM 4500-NH_3-F (APHA 1992) or EPA Method 350.3 (EPA 1989)	0.08-15.0 mg/L (supernate only)	Ammonia/Ammonium < 0.04 M	Corrective actions to eliminate incompatible conditions

Table 6 Waste Feed Analysis, Waste Acceptance Criteria, and Nonconformance Actions

Parameter	Analytical Method[a]	Target Minimum Reportable Quantity	Acceptance Criteria	Nonconformance Actions
Semivolatile organics	Method 8270D	0.25-5.00 mg/L (supernate) 1.50-5.00 mg/kg (sludge)	Not applicable	Potential risk driver during facility performance demonstration
Volatile organics	Method 8260B	0.10-1.0 mg/L (supernate) 0.25-1.0 mg/kg (sludge)	Not applicable	Potential risk driver during facility performance demonstration
Organic acids	Method 9056A	4000 mg/L (supernate) 2000 mg/kg (sludge)	Not applicable	Organic acids are not expected to affect the ability of the WTP to comply with risk assessment or air permitting limits
Cyanide	Method 9010C / 9014 or 9012B	2.50-10 mg/L (supernate) 0.50-3.50 mg/kg (sludge)	Not applicable	Potential risk driver during facility performance demonstration
Organochlorine pesticides	Method 8081B	0.025-0.07 mg/L (supernate) 0.01-0.07 mg/kg (sludge)	Not applicable	Potential risk driver during facility performance demonstration

[a] Since many types and sizes of glassware and supplies are commercially available, and since it is possible to prepare reagents and standards in many different ways, the apparatus, reagents, and volumes included in these methods may be replaced by any similar type as long as this substitution does not affect the overall quality of the analysis.

[b]Nitrate, Nitrite, Bromide, and Phosphate Acceptance Criteria limits will be added when the WAP is updated for Baseline operations.

[c]The acceptance criteria for RCRA metals refers to the limiting feed rate of RCRA metals into the melter, as determined by the Environmental Performance Demonstration Test. This acceptance criterion does not apply to the acceptance of DST waste into the LAW Facility.

1