

**WASTE TREATMENT AND IMMOBILIZATION PLANT**  
**CHAPTER 3.0**  
**WASTE ANALYSIS PLAN**  
**CHANGE CONTROL LOG**

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

Modification History Table

<b>Modification Date</b>	<b>Modification Number</b>
06/24/2020	8C.2020.3F
06/2011	

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**WASTE ANALYSIS PLAN**

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**ACRONYMS**

ALARA	As Low As Reasonably Achievable
CRV	Concentrate Receipt Vessel
DOE	US Department of Energy
DST	Double-Shell Tank
DWP	WTP Dangerous Waste Permit
Ecology	Washington State Department of Ecology
EMF	Effluent Management Facility
EPA	US Environmental Protection Agency
ETF	Effluent Treatment Facility
FRP	Waste Feed Receipt Process System
HEME	High-Efficiency Mist Eliminator
HEPA	High-Efficiency Particulate Air (filter)
HLVIT	High-Level Vitrification
HLW	High-Level Waste
ICN	Integrated Control Network
ID	Identification
IHLW	Immobilized High-Level Waste
ILAW	Immobilized Low-Activity Waste
Lab	Analytical Laboratory
LAW	Low-Activity Waste
LDR	Land Disposal Restrictions
LERF	Liquid Effluent Retention Facility
LIMS	Laboratory Information Management System
NRC	US Nuclear Regulatory Commission
PCB	Polychlorinated Biphenyl
PDWRS	Plant Data Warehouse and Reporting System
PIN	Plant Information Network
PPE	Personal Protective Equipment
PT	Pretreatment (Facility)
QA	Quality Assurance
QAPP	<i>Quality Assurance Project Plan for the Waste Analysis Plan</i>
QC	Quality Control
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RDQO	Regulatory Data Quality Objectives
SBS	Submerged Bed Scrubber
SDS	Safety Data Sheet
SWTD	Solid Waste Tracking Database
TOC	Total Organic Carbon

TRU	Transuranic
TSD	Treatment, Storage, or Disposal
WAC	Washington Administrative Code
WAP	Waste Treatment Plant Waste Analysis Plan
WESP	Wet Electrostatic Precipitator
WIPP	Waste Isolation Pilot Plant
WTP	Hanford Tank Waste Treatment and Immobilization Plant

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**GLOSSARY**

2 This Waste Analysis Plan (WAP) relies on the definitions of terms as contained in Appendix 3B of the  
 3 *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 2013)  
 4 and other portions of the Waste Treatment Plant (WTP) Dangerous Waste Permit (WA7890008967,  
 5 herein referred to as the DWP) except as supplemented or amended below.

Batch	A portion (finite volume) of a waste campaign with similar physical and chemical properties where the required waste processing parameters do not vary.
Campaign	Volume of waste feed staged by the Tank Operations Contractor, consisting of multiple batches, that is to be treated using a similar processing strategy.
Dangerous Waste	Solid wastes designated in Washington Administrative Code (WAC) 173-303-070 through 173-303-100 as dangerous, extremely hazardous, or mixed radioactive and dangerous waste. Where information regarding treatment, management, and disposal of the radioactive component of mixed waste has been incorporated it is not incorporated for the purpose of regulating the radiation hazards of such components under this permit (see Condition III.10.A).
Feed Acceptance	Feed acceptance criteria are the technical and administrative requirements that a waste must meet in order for it to be accepted at a storage, treatment, or disposal facility (DOE M 435.1-1, <i>Nuclear Waste Policy Act</i> [DOE 2004], adapted from DOE 5820.2A, <i>Radioactive Waste Management</i> ).
Feed Confirmation	The activities the WTP will perform after receiving the waste feed, to confirm that the waste feed received is the same as the waste feed accepted for delivery.
High-Level Waste	High-Level Waste or HLW means: (1) irradiated reactor fuel; (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel; or (3) solids into which such liquid wastes have been converted (10 Code of Federal Regulations [CFR] 60.2, <i>Disposal of High-Level Radioactive Wastes in Geologic Repositories, Definitions</i> ). HLW is the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation (DOE 2004).
Immobilization	The act or process of reducing the mobility of waste constituents to limit their potential for long-term transport in the biosphere and subsequent exposure to humans, animals, and plants. Vitrification is an example of an immobilization process.
Immobilized Waste	Liquid waste feed that has had its constituents solidified by processing, such as in a Vitrification Plant.
Incidental Waste	Waste resulting from reprocessing spent nuclear fuel that is determined to be incidental to reprocessing is not HLW, and shall be managed under Department of Energy's (DOE) regulatory authority in accordance with the requirements for transuranic waste or low-activity waste, as appropriate (DOE 2004).
Low-Activity Waste	Low-Activity Waste (LAW) is radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e.(2) of 42 USC 2011 et seq., <i>Atomic Energy Act of 1954</i> , or naturally occurring radioactive material (DOE 2004).

Mixed Waste	<p>A dangerous, extremely hazardous, or acutely hazardous waste that contains both a nonradioactive hazardous component and, as defined by 10 CFR 20.1003, source, special nuclear, or byproduct material subject to the <i>Atomic Energy Act of 1954</i> (42 USC 2011 et seq.).</p> <p>Waste that contains both source, special nuclear, or byproduct material subject to the <i>Atomic Energy Act of 1954</i> (42 USC 2011 et seq.), and a hazardous component subject to the Resource Conservation and Recovery Act (DOE 2004).</p>
Radioactive Waste	<p>10 CFR 60.2 defines radioactive waste as HLW and other radioactive materials other than HLW that are received for emplacement in a geologic repository. Within the context of this document, radioactive waste also includes secondary waste streams, any garbage, refuse, sludges, and other discarded material, including solid, liquid, semisolid, or contained gaseous material that must be managed for its radioactive content. (DOE 2004)</p>

### 1   **3.0   WASTE ANALYSIS PLAN**

2   The River Protection Project – Hanford Tank WTP WAP addresses sampling and analysis activities  
3   necessary for compliance with the Washington State Dangerous Waste Regulations contained in  
4   WAC Chapter 173-303.

5   The WTP will be operated in two processing configurations. For near-term operations, WTP will be  
6   operated in a Direct Feed Low-Activity Waste (DFLAW) operating configuration involving the  
7   Low-Activity Waste (LAW) Facility, the Effluent Management Facility (EMF), and the Analytical  
8   Laboratory (Lab). In the DFLAW operating configuration, the waste is pretreated within the Hanford  
9   tank farms to remove cesium and solids. In this configuration, the pretreated LAW feed will bypass the  
10   Pretreatment (PT) Facility and be fed directly from the tank farms to the LAW Facility. The LAW  
11   Facility is where the low-activity fraction of the waste is solidified by vitrification. Liquid effluents  
12   generated in the LAW Facility and Lab are transferred and treated at the EMF. EMF will reduce the  
13   effluent volume from the LAW Facility and Lab by evaporation. The WTP Waste Analysis Plan for the  
14   DFLAW Configuration is provided in Chapter 3C.

15   The WTP will later be operated in the baseline WTP operating configuration when the PT Facility and the  
16   HLW Facility become operational. The PT Facility will separate LAW and HLW, pretreat both LAW  
17   and HLW, and manage recycle waste streams produced from LAW, HLW and Lab waste treatment  
18   operation. Within the PT Facility, LAW and HLW (including recycles) will be concentrated by water  
19   removal using evaporators; solids will be filtered out of LAW and transferred to the HLW fraction; and  
20   soluble, highly radioactive isotopes (primarily cesium) will be removed from LAW by ion exchange units  
21   and transferred to the HLW fraction. In some situations, prior to filtration, oxidation and/or precipitation  
22   will be used to dissolve solids or remove unwanted components from the LAW for transfer to the HLW  
23   fraction. Treated LAW and HLW will be transferred to the respective LAW and HLW Facilities for  
24   vitrification. The three production process facilities (i.e., PT, LAW, and HLW) are also supported by the  
25   Lab. The WTP Waste Analysis Plan for the Baseline Configuration is provided in Chapter 3A.  
26   Information in Chapter 3A will be updated to align with the Interim Compliance Schedule for PT  
27   (Appendix 1.2) and HLW (Appendix 1.5).

28   The Quality Assurance Project Plan (QAPjP) for both the baseline configuration and the DFLAW  
29   configuration Waste Analysis Plan is provided in Chapter 3B. The QAPjP will be updated to align with  
30   the Interim Compliance Schedule for PT (Appendix 1.2) and HLW (Appendix 1.5).

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