Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit Group 11

Integrated Disposal Facility

Index

Page 2 of 3: Description of Modification

Page 3 of 3 Revision Instructions

Submitted by Co-Operator:

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Alison Greene for Robert Bullock — Date

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Hanford Facility RCRA Permit Modification Form	
Unit: ***Integrated Disposal Facility***	Permit Part ***Part III, Operating Unit Group 11***

Description of Modification:

Appendix BB

The purpose of this modification is to update text that was revised due to the updated Risk Budget Tool (25-ECD-0069).

The changes were made in the following sections:

- BB.1.1 Updating new CPCCo document.
- BB.2.2.1 Clarification on grouting SSW.
- BB.3.1 Added clarification to treatment standards.
- BB.3.2 Updated reissue reference.
- BB.4 References Section updated.

Unit-Specific Permit Conditions

The purpose of this modification is to update text that was revised due to the updated IWTRD (HFO-72080) and Modeling Risk Budget Tool (25-ECD-0069).

The changes were made in the following sections:

- III.11.E.4.c Updated completion date for 2025.
- III.11.E.5.d.ii Updated PA Maintenance Plan from DOE/ORP-2000-01 to CHPRC-03348.
- III.11.E.10.a Updated new RBT document number. Updated language “Ecology comments will be dispositioned through the RCR process and comments will be reflected in further modeling to modify the IDF ~~ILAW~~ waste acceptance requirements as appropriate.”

WAC 173-303-830 Modification Class	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830:
(4)(d)(ii)(A) Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation.

Modification Approved: ☒ Yes ☐ No

Reviewed by Ecology:

E. J. Holbrook 2026.05.19 13:11:18 -07'00'

E. J. Holbrook — Date

Revision Instructions:

Revise following to incorporate the redlined changes to:

Appendix BB

Unit-Specific Permit Conditions

BB.1 INTRODUCTION

This appendix details the waste streams planned for treatment, storage, or disposal at the Integrated Disposal Facility (IDF) dangerous waste management units (DWMUs) that comprise Operating Unit Group (OUG) 11 of WA7890008967, Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit. Each waste stream is subject to the requirements and processes described in the Addendum B, "Waste Analysis Plan" (WAP) prior to acceptance at IDF for treatment, storage, or disposal.

The purpose of this appendix is to provide information on the regulatory background that defines the waste streams planned for disposal at IDF, corresponding waste stream descriptions, and compliance with applicable state and federal land disposal restrictions (LDRs) of Washington Administrative Code (WAC) 173-303-140, *Land disposal restrictions*, which includes by reference, 40 Code of Federal Regulations (CFR) 268, *Land Disposal Restrictions*.

The waste stream descriptions documented in this appendix do not replace or supersede generator-provided information evaluated during the IDF waste acceptance process. These descriptions serve to supplement the IDF portion of the Hanford Facility RCRA Permit and clarify the disposal mission of the IDF.

BB.1.1 Historical Background/Summary of Regulatory Decisions

The IDF was constructed in 2006 to provide a disposal location for waste generated by the Hanford Site Waste Treatment and Immobilization Plant (WTP). In 2012, U.S. Department of Energy (DOE) completed the DOE/EIS-0391, *Final Tank Closure and Waste Management Environmental Impact Statement* (TC&WM EIS) *for the Hanford Site, Richland, Washington*, which analyzed three key areas of Hanford environmental remediation. The three areas included waste retrieval, disposal, and closure of 177 underground tanks; the final end state of the Fast Flux Test Facility (FFTF) nuclear test reactor; and a Hanford Site disposal location for low-level waste (LLW) and mixed low-level waste (MLLW). The TC&WM EIS analyzed various cleanup alternatives for each area of closure and waste management. DOE ultimately published their Record of Decision (ROD) (78 Federal Register [FR] 75913) in 2013. DOE selected a waste management alternative that identified IDF as a Subtitle C disposal facility for LLW and MLLW from WTP and Effluent Treatment Facility (ETF) operations, on-site non-*Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) sources, FFTF decommissioning waste and on-site waste management waste.

Following the selection of IDF to provide this instrumental role in the Hanford cleanup mission, a series of assessments were conducted to evaluate disposal of the proposed wastes while minimizing risk to human health and the environment. The RPP-RPT-59958, Rev. 1A, *Performance Assessment for the Integrated Disposal Facility, Hanford Site, Washington* provided an evaluation of the long-term performance of the disposal facility to contain LLW and MLLW in a near-surface disposal facility on the Hanford Site. Through computer modeling analysis, the *Performance Assessment* simulated impacts from radiological and hazardous constituents according to a defined set of exposure pathways (i.e., atmospheric, water, inadvertent intrusion). The 25-ECD-0069 *Risk Budget Tool (FY 2024) Update* ~~RPP-CALC-63176, *Integrated Disposal Facility Risk Budget Tool Analysis*~~ provided a similar evaluation specific to groundwater impacts and protection standards for the Washington State Department of Ecology (Ecology). These assessments consisted of modeling conducted for a series of waste streams planned for final disposal at IDF, as consistently referenced throughout the assessments and other documents discussed in this section.

BB.2 DESCRIPTION OF WASTE STREAMS

The IDF plans to receive MLLW and LLW generated by the WTP as a result of the vitrification process. Additional waste streams that are not a result of the WTP process are also planned for disposal at the IDF. Table BB-1 establishes the waste stream terminology that will be used throughout this appendix,

BB.2.1.4 Effluent Treatment Facility-Generated Secondary Solid Waste

The dangerous and mixed liquid waste streams generated at the WTP that cannot be incorporated back into the treatment process are sent to the Liquid Effluent Retention Facility/Effluent Treatment Facility (LERF/ETF) as hazardous aqueous waste, pending compliance with the LERF/ETF acceptance criteria. ETF-generated SSW results from WTP operations, which are categorized according to aqueous waste from processes, plant wastewater, and ETF effluents. This includes LLW and MLLW liquid effluent from the melter primary off-gas treatment system, the LAW vitrification secondary off-gas/vessel vent treatment system, process vessel washes, floor drains, sumps, and vessel vent header drains. In addition, liquid waste from WTP sources such as the radioactive liquid vessels and tanks including process condensates from evaporators, caustic waste from the LAW caustic scrubber, and spent reagents from the resin addition process are routed to the LERF/ETF for treatment.

After treatment at the ETF, the liquid portion of the treated waste stream is disposed of at the State-Approved Land Disposal Site while the byproduct waste generated from the ETF solidification process is designated, packaged for transportation, and will be treated, if needed, to meet LDR requirements (Section BB.3) prior to disposal at IDF. At disposal, the final waste form is anticipated to be solidified ETF-generated SSW in a cementitious waste form.

LERF/ETF also generates miscellaneous wastes such as paints, oils, lubricants, cleaning solvents, hydraulic fluids, adhesives, and off-specification chemicals. Maintenance waste that comes in direct contact with LERF/ETF effluents is designated, packaged for transportation, and will be treated, if needed, to meet LDR requirements (Section BB.3) prior to disposal at IDF.

BB.2.2 Non-Waste Treatment and Immobilization Plant-Generated Waste Streams

In addition to the disposal of WTP-generated waste streams, IDF provides further disposal capacity for non-WTP-generated waste streams to support Hanford Site cleanup.

BB.2.2.1 Secondary Waste Management Low-Level Waste and Mixed Low-Level Waste

Secondary LLW and MLLW includes workers' PPE, tools, debris, and other contaminated materials from operations of the:

- Low-Level Burial Grounds 200-W-254, mixed waste Trenches 31 and 34.
- Waste Receiving and Processing Facility.
- T Plant Complex.
- Tank farms (Double-Shell Tanks, Single-Shell Tanks, and the 242-A Evaporator).
- Low-Activity Waste Pretreatment System.
- 222-S Laboratory.

In addition, mixed waste is generated by IDF operations including waste resulting from treatment at IDF and waste generated from operations and maintenance activities. The waste described in this section will be treated, if needed, to meet LDR requirements (Section BB.3) prior to disposal at IDF. At disposal, the final waste form is anticipated to be grout-encapsulated SSW only when required to meet LDR treatment standards or subsidence requirements.

BB.2.2.2 Fast Flux Test Facility Decommissioning Waste

In accordance with the ROD (78 FR 75913) that published DOE's selected tank closure and waste management alternatives, entombment was selected as the final end-state for the FFTF. This includes removal of all above-grade structures and treatment of certain remaining wastes, including the remote-handled special components and bulk-sodium inventories. Sodium residuals from FFTF components (e.g., the reactor and miscellaneous traps), are planned for disposal at IDF. In addition to

BB.3 LAND DISPOSAL RESTRICTIONS COMPLIANCE

LDR requirements ensure the treatment of dangerous and/or mixed waste prior to disposal in RCRA Subtitle C land disposal units; thereby, reducing dangerous waste toxicity and the potential for leaching of dangerous waste constituents into the environment. Dangerous and/or mixed waste must comply with the LDR requirements of WAC 173-303-140, which includes by reference 40 CFR 268, prior to disposal. IDF performs limited waste treatment using the immobilization technologies according to the alternative standards for hazardous debris (Table 1, 40 CFR 268.45, *Treatment standards for hazardous debris*), as further described in Section C.3 of Addendum C. Waste requiring treatment beyond IDF's capabilities is sent to an alternate on-site facility or off-site commercial vendor to meet LDR requirements prior to disposal at IDF. Secondary waste that can meet LDR requirements, as generated, would not require treatment prior to disposal.

BB.3.1 Land Disposal Restrictions Treatment Standards

Waste that does not meet LDR treatment standards at the point of generation must be treated to comply with the applicable concentration-based and/or technology-based treatment standards, prior to land disposal. Treatment standard(s) are determined according to the designated waste codes, subcategory (if any), and wastewater or nonwastewater category assigned to the waste.

When the concentration-based standards apply, the constituent concentration for the waste must be at or below those specified in 40 CFR 268.40, *Applicability of treatment standards,* and/or 268.48, *Universal treatment standards*, for underlying hazardous constituents. If the concentrations exceed these specified limits, treatment is required prior to land disposal. When the technology-based standards are used, the appropriate treatment technology must be performed in accordance with 40 CFR 268.40 and 268.42, *Treatment standards expressed as specific technologies,* Table 1, "Technology Codes and Description of Technology-Based Standards." For waste treated to the alternative treatment standards of 40 CFR 268.45, treatment technologies are performed in accordance with the technology description, performance and/or design and operating standard specified in Table 1, "Alternative Treatment Standards for Hazardous Debris." For contaminated soil, the alternative treatment standards of 40 CFR 268.49, *Alternative LDR treatment standards for contaminated soil,* could be used ~~apply~~. If a waste is designated with multiple waste codes, both concentration-based and technology-based standards could apply and such waste would be subject to more than one LDR treatment standard.

In order to confirm that a treatment was effective, the appropriate qualitative or quantitative standard must be met. During the acceptance process, IDF reviews generator documentation to evaluate compliance with these treatment standards according to the following methodologies:

- Concentration-based treatment standard shall be demonstrated through knowledge for the waste generated or confirmed via analysis of the treated waste.
- Technology-based treatment standard shall be demonstrated to conform to the specified technology performance standard.

For hazardous debris treated at IDF, effectiveness of treatment is a qualitative confirmation methodology performed according to the frequency specified in Table B-1 of the IDF WAP, in accordance with 40 CFR 268.45. For waste that meets the treatment standard(s) or approved variance (Section BB.3.2) at the point of generation, a one-time notice certifying that the waste complies with 40 CFR 268 must be provided to IDF by the generator. This notice must include the required information specified in 40 CFR 268.7, *Testing, tracking, and recordkeeping requirements for generators, treators, and disposal facilities*, and be replaced with a new notice if the waste changes.

LDR notification and certification statements are reviewed during the pre-shipment review to confirm the LDR-status of incoming waste to IDF, and to prepare for any additional treatment needs prior to disposal. Compliance with LDR requirements is tracked per dangerous waste container and is maintained in accordance with Section B.6 of the IDF WAP.

BB.3.2 Land Disposal Restrictions Evaluation for Immobilized Waste

In 2017, an LDR treatability variance for Hanford tank waste was submitted to Ecology for review and approval (17-ECD-0050 REISSUE). The proposed action was a site-specific variance under 40 CFR 268.44, *Variance from a treatment standard*, Section (h) that specified high-level waste vitrification (HLVIT) as the method of treatment for Hanford tank waste processed through the WTP, for all applicable waste codes. The basis for the variance was the dose associated with repeated sampling and analysis that would otherwise be required to demonstrate compliance with concentration-based LDR treatment standards. The variance was approved by Ecology in 2019 (19-NWP-165), thereby determining HLVIT as the LDR treatment standard for the Hanford tank waste treated at WTP.

Compliance with the approved treatment variance must be identified on the LDR notification and certification statement.

BB.4 REFERENCES

17-ECD-0050 REISSUE, 2017, "Submittal of Land Disposal Restriction Treatability Variance Petition for Hanford Tank Waste" (letter to A.K. Smith, Washington State Department of Ecology from K.W. Smith, U.S. Department of Energy, Office of River Protection), July 27. Available at: https://pdw.hanford.gov/document/0069108H.

19-NWP-165, 2019, "Re: Approval of Land Disposal Restriction Treatability Variance Petition for Hanford Tank Waste" (letter to B.T. Vance, U.S. Department of Energy, Office of River Protection and V. McCain, Bechtel National, Inc. from S. Schleif, Washington State Department of Ecology), October 21. Available at: https://pdw.hanford.gov/document/AR-03170.

40 CFR 268, *Land Disposal Restrictions*, Code of Federal Regulations. Available at: https://www.govinfo.gov/content/pkg/CFR-2010-title40-vol26/xml/CFR-2010-title40-vol26-part268.xml.

268.7, *Testing, tracking, and recordkeeping requirements for generators, treaters, and disposal facilities*.

268.40, *Applicability of treatment standards*.

268.42, *Treatment standards expressed as specified technologies*.

268.44, *Variance from a treatment standard*.

268.45, *Treatment standards for hazardous debris*.

268.48, *Universal treatment standards*.

268.49, *Alternative LDR treatment standards for contaminated soil*.

78 FR 75913, 2013, *Record of Decision: Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*, Federal Register, Vol. 78, pp. 75913-75919 (December 13).

CPCC-01210, 2024, *Secondary Waste Form Technical Requirements Document Integrated Disposal Facility*, Rev. 0, Central Plateau Cleanup Company, Richland, Washington. Available at: https://pdw.hanford.gov/document/AR-32861.

25-ECD-0069, *Risk Budget Tool (FY 20254) Update* Rev 0, Central Plateau Cleanup Company, Richland, Washington.

DOE/EIS-0391, 2012, *Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*. U.S. Department of Energy, Washington, D.C.

~~RPP-CALC-63176, 2020, *Integrated Disposal Facility Risk Budget Tool Analysis*. U.S. Department of Energy, Richland, Washington. Available at: https://pdw.hanford.gov/document/AR-03422.~~

The initial IWTRD contained glass formulation data as required by Permit Condition III.11.E.4.a, and was submitted on December 18, 2006 (Administrative Record [AR] Accession # 0906020182). The Permittees submitted an updated IWTRD to Ecology on MayJune 209, 20215 (HFO-72080DOE-ORP-2015-01). The PA required by Permit Condition III.11.E.4.b was submitted on May 26, 2020; expectations for future PA revisions are ongoing. The QA/QC requirements process required by Permit Condition III.11.E.4.c was submitted to Ecology at least 180 days prior to the date the Permittees receive waste at the IDF. At a minimum, the Permittees will submit updates to the IWTRD to Ecology every five years or more frequently, if any of the following conditions exist:

- The Permittees submit a permit modification request allowing additional waste forms to be disposed of at IDF. New waste forms could include ILAW glass not previously described.
- The WTP or other vitrification facility change their glass formulations from those previously included in the IWTRD.
- An unanticipated event or condition occurs that Ecology determines would warrant an update to the IWTRD.

The Permittees will update the IWTRD consistent with the above requirements for review by Ecology consistent with their respective roles and authority as provided under the Tri-Party Agreement (TPA). Ecology comments will be dispositioned through the Review Comment Record (RCR) process and will be reflected in further modeling to modify the IDF ILAW waste acceptance requirements in Addendum B, "Waste Analysis Plan," as appropriate.

III.11.E.4.d The Permittees will not dispose of any WTP ILAW not described and evaluated in the IWTRD.

III.11.E.5 Secondary Waste Form Technical Requirements Document and Secondary Solid Waste Verification Document

III.11.E.5.a SSW includes, but is not limited to, (1) WTP waste – equipment, carbon beds, high-efficiency particulate air filters, encapsulated other debris, melters; and (2) Grouted Effluent Treatment Facility brines and acetonitrile distillate from WTP Effluent Management Facility (EMF) overheads. For any SSW forms, produced in conjunction with producing ILAW glass, that the Permittees dispose in the IDF, the Permittees will provide to Ecology for review, a Secondary Waste Form Technical Requirements Document (SWTRD). EMF Concentrate is not approved for disposal at the IDF.

III.11.E.5.b The SWTRD is a forward-looking waste requirement document and will contain a description of each SW form as defined in the IDF Operating Unit Group 11 permit and the mechanisms of immobilization used on these forms.

III.11.E.5.b.i The SWTRD will include waste codes, location of where each SSW form originated from and a treatment plan.

The initial SWTRD will be submitted to Ecology by March 15, 2024, and subsequent submittals will be provided to Ecology every five years. The U.S. Department of Energy's (DOE) initial transmittal occurred on February 12, 2024 (24-ECD-0020). The next revision is due by March 15, 2029.

The Permittees will submit a Class [1]1 permit modification request pursuant to WAC 173-303-830(4)(a)(ii) in order to incorporate by reference the SWTRD. Ecology will incorporate by reference each revision of the SWTRD.

III.11.E.5.c The SSW Verification Document will include waste codes, location of where each SSW form originated from, a treatment plan including details of production of each SSW demonstrating compliance with grout performance in the Performance Assessment, and certification that each SSW form meets all applicable state and federal laws, regulations, LDR standards and environmental standards described in Permit Condition III.11.E.10.

The Permittees will submit the SSW Verification Document to Ecology by March 15, 2025, and then every two years thereafter.

III.11.E.5.d The Risk Budget Tool (RBT) provides a reasonable basis for assurance that each SSW formulation will, once disposed in the IDF in combination with the other waste volumes and waste forms planned for disposal at the entire IDF, be adequately protective of human health and the environment. Any updates to the RBT will be in accordance with Permit Condition III.11.E.10.

SSW streams proposed for IDF disposal which are currently not defined in the permit will be evaluated using the RBT and submitted for Ecology approval through the permit modification process prior to acceptance.

III.11.E.5.d.i

For SSW forms which demonstrate acceptable performance in the PA and in the modeling-RBT, grouted secondary waste disposed of at IDF must meet one of the grouts modeled in the IDF PA (RPP-RPT-59958) and PA Maintenance Plan (CHPRC-03348~~DOE/ORP-2000-01~~) which shows the grout meets agreed acceptable performance requirements at IDF.

III.11.E.5.d.ii

III.11.E.5.e The Permittees will not dispose of any SSW form not described and evaluated in the SWTRD and identified in the IDF Permit.

III.11.E.5.e.i For SSW packages that are out of specification of the PA, an unreviewed disposal question (UDQ) will be performed to determine whether a special analysis (SA) of the SSW is necessary. If the UDQ/SA process determines that the SSW packages will not have an impact on the performance of the IDF, then the waste on limited case by case disposal can occur with notification to Ecology. Upon notification to Ecology, if Ecology determines that the waste is unfit for disposal according to the IDF Permit Conditions and Permit herein, a letter will be issued to cease the disposal pending further discussion and review. For those wastes that are projected to impact the IDF performance, alternative disposal options will be explored.

III.11.E.6 In accordance with DOE's authority under the *Atomic Energy Act of 1954*, as amended and other applicable law, prior to disposing of any mixed ILAW in the IDF, DOE will certify to the State of Washington that it has determined that such ILAW is not HLW and meets the criteria and requirements outlined in DOE's consultation with the U.S. Nuclear Regulatory Commission (USNRC) beginning in 1993 (Letter from R.M. Bernero, USNRC to J. Lytle, DOE, dated March 2, 1993; Letter from J. Kinzer, DOE, to C. J. Paperiello, USNRC, "Classification of Hanford Low-Activity Tank Waste Fraction," dated March 7, 1996; and Letter from C.J. Paperiello, USNRC, to J. Kinzer, DOE, "Classification of Hanford Low-Activity Tank Waste Fraction," dated June 9, 1997). While the requirement to provide such certification is an enforceable obligation of this Permit, the provision of such certification does not convey, or purport to convey, authority to Ecology to regulate the radioactive hazards of the waste under this permit.

III.11.E.7 In accordance with DOE's authority under the *Atomic Energy Act of 1954*, as amended and other applicable law, prior to disposing of any mixed SSW from WTP in the IDF, DOE will certify to the State of Washington that it has determined that such SSW is not HLW and meets the criteria and requirements outlined in DOE's consultation with the USNRC beginning in 1993 (Letter from R.M. Bernero, USNRC to J. Lytle, DOE, dated March 2, 1993; Letter from J. Kinzer, DOE, to C. J. Paperiello, USNRC, "Classification of Hanford Low-Activity Tank Waste Fraction," dated March 7, 1996; and Letter from C.J. Paperiello, USNRC, to J. Kinzer, DOE, "Classification of Hanford Low-Activity Tank Waste Fraction," dated June 9, 1997). While the requirement to provide such certification is an enforceable obligation of this Permit, the provision of such certification does not convey, or purport to convey, authority to Ecology to regulate the radioactive hazards of the waste under this permit.

III.11.E.8 No WTP SSW may be disposed in the IDF until certification, as described in Permit Condition III.11.E.7, is provided by the Permittees via letter. Once certification is received by Ecology, disposal of the WTP SSW can become authorized.

III.11.E.9 Immobilized Low-Activity Waste Acceptance Verification

Six months prior to disposing of ILAW in the IDF, the Permittees will submit an ILAW verification plan to Ecology for review and approval. This plan will be coordinated with WTP, Ecology, and the IDF Permittee personnel. This plan will outline the specifics of verifying ILAW waste acceptance through WTP operating parameters, and/or glass sampling. The plan will include physical sampling requirements for batches, glass formulations, and/or feed envelopes.

III.11.E.10 Modeling–Risk Budget Tool

III.11.E.10.a The Permittees will maintain a modeling–RBT (25-ECD-0069~~RPP-CALC-63176~~), which models the future impacts of the planned IDF waste forms, including input from analyses performed as specified in Permit Conditions III.11.E.4.a through III.11.E.4.b and their impact to underlying vadose zone and groundwater. The RBT will be updated at least every five years. The model will be updated more frequently if needed, to support permit modifications or SEPA Threshold Determinations whenever a new waste stream or significant expansion is being proposed for the IDF. This RBT will be conducted in manner that is consistent with state and federal requirements, and represents a risk analysis of all waste previously disposed in all IDF landfill cells and those wastes expected to be disposed in the future for the entire IDF to determine cumulative impacts. The groundwater impact will be modeled in a concentration basis and should be compared against various performance standards including but not limited to drinking water standards (40 CFR 141 and 40 CFR 143). Ecology will review modeling

III.11.E.10.a.i assumptions, input parameters, and results and will provide comments to the Permittees. Ecology comments will be dispositioned through the RCR process and comments will be

III.11.E.10.a.ii reflected in further modeling to modify the IDF ~~ILAW~~ waste acceptance requirements as appropriate.

The RBT will include a sensitivity analysis reflecting parameters, and changes to parameters as requested by Ecology.

If these modeling efforts indicate results within 75% of a performance standard (including but not limited to federal drinking water standards [40 CFR 141 and 40 CFR 143]), Ecology and the Permittees will meet to discuss mitigation measures or modified waste acceptance criteria for specific waste forms.