



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

**STATEMENT OF BASIS**

**Proposed Permit Modification of the  
*Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste  
Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste,  
Part III, Operating Unit Group 10, Waste Treatment and Immobilization Plant,  
WA7890008967***

June 2016

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## STATEMENT OF BASIS

### **Proposed Permit Modification of the *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste,* Part III, Operating Unit Group 10, Waste Treatment and Immobilization Plant, WA7890008967**

#### **Permittees**

United States Department of Energy  
Office of River Protection  
PO Box 450  
Richland, Washington 99352

Bechtel National, Inc.  
2435 Stevens Center Place  
Richland, Washington 99354

The Washington State Department of Ecology (Ecology) developed this Statement of Basis to fulfill the requirements of [Washington Administrative Code \(WAC\) 173-303-840\(2\)\(f\)\(iv\)](#).

The Statement of Basis provides information on Ecology's decision to modify the *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*, Part III, Operating Unit Group 10, Waste Treatment and Immobilization Plant (WTP), hereafter called the "WTP Permit."

This modification includes supporting technical information and engineering drawings for construction on the regulated portions of the WTP:

- Pretreatment Facility (PTF)
- Low-Activity Waste (LAW) Facility
- High-Level Waste (HLW) Facility
- Laboratory (LAB) Facility
- Balance of Facilities (BOF)

This modification also incorporates format changes to the WTP Permit appendices and changes to supporting information. Ecology chose to prepare a Statement of Basis as described in [WAC 173-303-840\(2\)\(f\)\(iv\)](#), rather than a Fact Sheet.

We prepared a Statement of Basis for previous major WTP Permit modifications. This process will be followed for all permit modifications that incorporate similar design package information and other changes to the WTP Permit Conditions.

This Statement of Basis is divided into four sections:

- 1.0 Hanford Facility Resource Conservation and Recovery Act Permit (Site-wide Permit).
- 2.0 The WTP Permitting Process.
- 3.0 Procedures for Reaching a Final Decision on the Draft WTP Permit Modification.
- 4.0 Proposed Modifications to the WTP Permit.

Also included at the end of the Statement of Basis are tables, provided by the Permittees, listing the design documents and drawings they submitted for incorporation into the WTP Permit.

## **1.0 HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT (SITE-WIDE PERMIT)**

Ecology first issued the Site-wide Permit in 1994. The Site-wide Permit provides standard and general facility conditions, as well as unit-specific conditions for the operation, closure, and post-closure care of mixed and dangerous waste treatment, storage, and disposal (TSD) units at Hanford.

Approximately 40 TSD units are operating or closing under Resource Conservation and Recovery Act final status standards.

Conditions of the Site-wide Permit are presented in six parts:

- Part I Standard Conditions.
- Part II General Facility Conditions.
- Part III Unit-Specific Conditions for Final Status Operating Units.
- Part IV Corrective Action for Past Practice Units.
- Part V Unit-Specific Conditions for Units Undergoing Closure.
- Part VI Unit-Specific Conditions for Units in Post-Closure.

The WTP TSD Unit was added to Part III of the Site-wide Permit on September 25, 2002. The WTP Permit portion was effective on October 25, 2002. The WTP TSD Unit is currently being constructed under final permit status standards.

The Washington State Dangerous Waste Regulations in [WAC 173-303-830](#) describe the types of changes or modifications that may be made to a Dangerous Waste Permit issued by Ecology.

The WTP Permit is modified as needed, typically one or more times a year, to incorporate Class 1, <sup>1</sup>1, 2, and 3 modifications; Agency-Initiated modifications; and minor changes in grammar, consistency, and presentation.

## **2.0 THE WTP PERMITTING PROCESS**

We are using a phased (or stepped) approach to permit the WTP TSD Unit. The first phase was completed on September 25, 2002, with issuance of a final Dangerous Waste Permit allowing construction of the LAW, PTF, HLW, LAB, and BOF facilities to start.

A WTP Interim Compliance Schedule for the United States Department of Energy provides Ecology additional detailed information addressing the submittal of design documents necessary to support construction of the rest of the WTP TSD Unit, and its eventual operation.

This second phase of permitting is included in the compliance schedule, and requires the Permittees to submit design and other information for Ecology approval before regulated portions of the WTP TSD Unit are constructed.

The third phase of permitting is implementation of the last portion of the compliance schedule. This requires updating portions of the Dangerous Waste Permit Application and then modifying the WTP Permit prior to facility start-up operations. These portions (for example, Contingency Plan, Closure Plan, and Training Plan) of the WTP Permit are operational in nature and cannot be completed before the design is nearly complete.

When the three phases of permitting are completed, the WTP TSD Unit will comply with all the applicable requirements of [WAC 173-303](#). Then, after receiving written permission from Ecology, the Permittees can begin treatment and storage of dangerous and mixed waste at the WTP.

The design submittals (second permitting phase) were structured to allow the Permittees to provide design information in roughly the same order as the WTP facilities are constructed.

The design packages start at the lowest level of the facilities (below-grade levels) and are submitted for regulated areas of each level before construction begins. This process was adjusted for some design packages. When the facility process systems are installed on more than one level, the design packages will address the associated components for each level. This prevents confusion caused by one process system description being segmented into multiple design packages.

The WTP Permit organizes design packages into three general groups by the type of regulated equipment:

1. Primary containment (for example, tanks, miscellaneous units [evaporators and melters], and containment buildings).
2. Secondary containment.
3. Other associated regulated equipment (for example, ancillary equipment, equipment associated with miscellaneous units, and instrumentation).

Using tank systems as an example, secondary containment packages include details of the design of secondary containment that must be in place in regulated areas when the floors and walls are built for that level of each facility (for example, the floor slope, and sump locations).

The installation of tanks and other large equipment usually follows construction of the floors and walls. Therefore, a tank package on that level will be included in the WTP Permit before installation. The tank package would contain, for example, structural details for those tanks or miscellaneous units showing nozzle locations, unit volumes, and tank shell thickness.

The last equipment usually installed on a level for a tank system is the ancillary equipment (for example, piping, pumps, process instrumentation, and electrical equipment). Therefore, the ancillary equipment package provides details for the equipment on that level that will be included in the WTP Permit before installation. Information in the package would include, for example, materials of construction, and pump types and their operating limits.

Because each WTP facility consists of multiple levels, many design packages are required. Of the estimated 180 design packages, approximately 40 remain to be incorporated in the WTP Permit.

The primary containment, secondary containment, and the other associated regulated equipment design packages for different levels require repetitive information submittals in each package. Using tank systems as an example, most tanks will use the same construction specifications.

The WTP Permit allows the Permittees to reference the previously submitted design information, so some design packages consist mostly of references to information already provided.

### **3.0 PROCEDURES FOR REACHING A FINAL DECISION ON THE DRAFT WTP PERMIT MODIFICATION**

The Washington State Hazardous Waste Management Act ([Chapter 70.105](#), Revised Code of Washington [RCW]) and the rules declared in [WAC Chapter 173-303](#) regulate the management of dangerous waste in Washington State. [WAC 173-303-800](#) requires facilities that treat, store, and/or dispose of dangerous waste to obtain a permit for these activities.

Regulatory requirements for public notice and involvement on permit modifications are described in [WAC 173-303-840](#)(3) and (4). As required by [WAC 173-303-840](#)(3)(d), draft modifications to the WTP Permit will have at least a 45-day public comment period. The public comment period for this proposed permit modification begins on July 11, 2016, and ends on August 25, 2016.

Comments must be post-marked, received by e-mail, or hand-delivered no later than close of business (5:00 p.m. PST) August 25, 2016. Direct all written comments to:

Ginger Wireman  
Washington State Department of Ecology  
3100 Port of Benton Blvd.  
Richland, Washington 99354  
E-mail address: [hanford@ecy.wa.gov](mailto:hanford@ecy.wa.gov)

In accordance with [WAC 173-303-840](#)(10)(c), when a permit is modified, only the conditions subject to modification are open for comment. All other aspects of the existing Permit remain in effect for the duration of the modification.

Ecology will consider and respond to all written comments on this permit modification submitted by the deadline. Ecology will then make a final permit decision, which will become effective 30 days after Ecology provides notice of the decision to the Permittees and to all who commented. If the final decision includes substantial changes to the WTP Permit because of public comment, we will initiate a new public comment period.

Ecology will provide a Response to Comments document and a notification of the final permit decision to the Permittees and all others who commented. The final permit decision may be appealed within 30 days after issuance of that decision.

Copies of the WTP Permit, including the proposed permit modifications, are available for review at the Hanford Public Information Repositories. For additional information email [hanford@ecy.wa.gov](mailto:hanford@ecy.wa.gov).

## Hanford Public Information Repositories

### Richland

Washington State Department of Ecology  
Nuclear Waste Program Resource Center  
3100 Port of Benton Boulevard  
Richland, Washington 99354  
Contact: Valarie Pardue (509) 372-7950

United States Department of Energy  
Administrative Record  
2440 Stevens Drive  
Richland, Washington 99354  
Contact: Heather Childers (509) 376-2530

United States Department of Energy  
Reading Room  
2770 Crimson Way, Room 101L  
Richland, Washington 99354  
Contact: Janice Parthree (509) 375-3308

### Portland

Portland State University  
Branford Price Millar Library  
1875 Southwest Park Avenue  
Portland, Oregon 97207  
Contact: Claudia Weston (503) 725-4542

### Seattle

University of Washington  
Suzzallo Library  
PO Box 352900  
Seattle, Washington 98195  
Contact: Hilary Reinert (206) 543-5597

### Spokane

Gonzaga University  
Foley Center  
502 East Boone Avenue  
Spokane, Washington 99258  
Contact: John Spencer (509) 313-6110

This Statement of Basis and Public Notice for the proposed permit modification is also available online at <http://www.ecy.wa.gov/programs/nwp/commentperiods.htm>. If special accommodations are needed for public comment, contact Ginger Wireman, Ecology, at [hanford@ecy.wa.gov](mailto:hanford@ecy.wa.gov).

#### 4.0 PROPOSED MODIFICATIONS TO THE WTP PERMIT

This proposed permit modification contains the following package. New or revised documents submitted with the package are listed below. See [Table 1](#) at the end of this document for the entire list of package documents.

This package contains four documents that are classified as confidential business information. These documents were submitted for consideration according to the criteria of the [RCW 43.21A.160](#) and were found to meet the corresponding regulations in [WAC 173-303-810](#)(15). The documents are listed in [Table 1](#), but are not included for public distribution or comment.

##### ***Design Package No. LAW-016, Rev. 0, for Miscellaneous Treatment Unit Subsystem for LAW Facility LMP System at El. 3 ft.***

The Low-Activity Waste Facility permit package LAW-016 addresses installation of the two LAW melters at the 3 ft. elevation of the LAW Facility.

In the Low-Activity Waste Melter Process (LMP) System, LAW melter feed consisting of LAW waste concentrate mixed with glass former chemicals, is transferred as a slurry by air displacement pumps from the Melter 1 Feed Vessel (LFP-VSL-00002) to LAW Melter 1 (LMP-MLTR-0001) through feed nozzles in the melter lid. The process is the same for slurry transferred from the Melter 2 Feed Vessel (LFP-VSL-00004) to LAW Melter 2 (LMP-MLTR-00002).

In the melter, water and waste feed volatile constituents evaporate, leaving behind a layer of material known as the "cold cap". New slurry is added at about the same rate as the cold cap dissolves in the glass melt pool maintaining the quantity of cold cap material at a steady level. Waste feed components that remain in the cold cap undergo chemical reactions, are converted to their respective oxides, and dissolve in the melt pool. Bubblers inject air into the molten glass for agitation. As the slurry is fed, molten glass is formed that accumulates in the melt pool. When the melt level rises to a predetermined upper limit, and air lift mechanism is actuated and glass is discharged to a container. The evaporated water and waste feed volatile constituents are treated by the primary and secondary offgas-treatment systems, monitored, and released to the atmosphere.

Design package LAW-016, Rev. 0 consists of:

- An assessment report signed by an Independent, Qualified, Registered, Professional Engineer (IQRPE) certifying certain portions of the permit package.
- Melter assembly mechanical drawings.
- An engineering specification for the LAW melters.
- A specification change notice—update seismic clamp installation.
- A mechanical data sheet for each LAW melter.
- Corrosion evaluation for the LAW melters.

The complete list of documents included in the package is indicated by a "Y" in the "Included Column" in [Table 1](#).

#### **4.1 Incorporation of Class 1 and Class 11 Permit Modifications (PCNs) and Permit Equivalency Notices (PENs)**

Previously approved Class 1 and Class 11 PCNs and PENs are incorporated through the Quarterly Modifications. There will be no PCNs or PENs incorporated through this proposed modification.

#### **4.2 Supplemental Design Information**

[Table 1](#) lists the design information included in this proposed permit modification and the proposed location in the WTP Permit. At issuance of the final WTP Permit, Ecology will specify where each drawing or report resides in the WTP Permit.

Paper copies of the page changes to the WTP Permit that result from this modification will be placed in the Administrative Record.

The letter issuing the final WTP Permit decision to the Permittees and Hanford contractors will include the current WTP Permit with the modifications on a DVD.

#### **4.3 Identifying Changes in this Proposed Permit Modification**

As the WTP TSD Unit is constructed, Ecology will modify the WTP Permit for many reasons, including to clarify text, add new conditions, delete existing conditions, correct errors, or add information. To communicate the changes, proposed permit modifications will include page changes showing all significant proposed changes to the WTP Permit. The text to be deleted will be struck-out with a single line, and the new text will be redlined. Only the text being changed in the current modification will be indicated by redlines and strikeouts.

Newly added documents and drawings are provided for review in this proposed permit modification. New document and drawing numbers and titles are shown in redline/strikeout text in the affected appendix drawing lists.

When a WTP Permit modification is issued, “clean” pages incorporating permit modifications will be issued to the Permittees and placed in the Administrative Record. All redlines and strikeouts will be removed. Documents and drawings listed in the appendices will not be redlined and will be incorporated by reference only.

Ecology publication number 07-05-006, *Responsiveness Summary* (September 27, 2007), explains the reason for replacing permit version documents with source documents to which the WTP is constructed. Source documents are in a state of constant revision as design details are finalized and additional information is added to provide clarity and to correct typographical errors.

The Permittees use Document Change Notices to track changes not yet incorporated into source documents. In some cases, Document Change Notices are issued at the time of Ecology’s review. These are not provided for public comment, but will appear in the next revision of the WTP Permit for review. Source documents have been replacing permit version documents since September 2007.

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**Table 1 – Design Information Submitted by Permittees**

**Design Package No. LAW-016, Rev. 0  
Miscellaneous Treatment Unit Subsystem for the LAW Facility LMP System at El. 3 ft**

**For Incorporation into the WTP Permit**

**Table of Contents**

Engineering Document Title	Document Number	Revision	Permit Condition	Included	Remarks
IQRPE Independent Assessment Report	24590-CM-HC4-HXYG-00240-02-00014		III.10.H.5.c.i	Y	To be included in Appendix 9.11
<b>Permit Package Drawings</b>					
General Arrangement Plans	24590-LAW-P1-P01T-00002	7	III.10.H.5.c.ii	N	In Appendix 9.4
Process Flow Diagrams	24590-LAW-M5-V17T-00004	4	III.10.H.5.c.ii	N	In Appendix 9.1
	24590-LAW-M5-V17T-00005	4			
Piping and Instrument Diagrams	24590-LAW-M6-LMP-00001001 CBI	0	III.10.H.5.c.ii	N	In Appendix 9.2
	24590-LAW-M6-LMP-00002001 CBI, 00002002 CBI	0			
	24590-LAW-M6-LMP-00003001	0			
	24590-LAW-M6-LMP-00040001	0			
	24590-LAW-M6-LMP-00005001 CBI	0			
	24590-LAW-M6-LMP-00007001, 00007002	0			
	24590-LAW-M6-LMP-00008001	0			

Engineering Document Title	Document Number	Revision	Permit Condition	Included	Remarks
	24590-LAW-M6-LMP-00010001	0			
	24590-LAW-M6-LMP-00012001	0			
	24590-LAW-M6-LMP-00031001 CBI	0			
	24590-LAW-M6-LMP-00032001 CBI, 00032002 CBI	0			
	24590-LAW-M6-LMP-00033001	0			
	24590-LAW-M6-LMP-00035001 CBI	0			
	24590-LAW-M6-LMP-00037001, 00037002	0			
	24590-LAW-M6-LMP-00038001	0			
	24590-LAW-M6-LMP-00042001	0			
	24590-LAW-M6-LMP-00013001, 00013002, 00043001	0			
	24590-LAW-M6-LOP-00004001, 00004002	0			
	24590-LAW-M6-LOP-00005001, 00005002	0			
<b>Mechanical Drawing</b>					
LAW Melter Assembly - Isometric View	24590-LAW-MF-LMP-00001 CBI	0	III.10.H.5.c.ii III.10.H.5.c.vi	Y	To be included in Appendix 9.6
LAW Melter Assembly - Plan View	24590-LAW-MF-LMP-00002 CBI	0		Y	To be included in Appendix 9.6
LAW Melter Assembly – East, West and North Elevation	24590-LAW-MF-LMP-00003 CBI	0		Y	To be included in Appendix 9.6

Engineering Document Title	Document Number	Revision	Permit Condition	Included	Remarks
LAW Melter Assembly – Section A-A	24590-LAW-MF-LMP-00004 <b>CBI</b>	0		Y	To be included in Appendix 9.6
<b>Engineering Specifications:</b>					
Pressure Vessel Design and Fabrication	24590-WTP-3PS-MV00-T0001	5	III.10.H.5.c.ii III.10.H.5.c.iii III.10.H.5.c.vi	N	In Appendix 7.7. Rev 5 is going in LAW-025
Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-MV00-T0002	3		N	In Appendix 7.7
Pressure Vessel Fatigue Analysis	24590-WTP-3PS-MV00-T0003	3		N	In Appendix 7.7
Positive Material Identification (PMI) for Shop Fabrication	24590-WTP-3PS-G000-T0002	9		N	In Appendix 7.7. Rev 9 is going in LAW-028
Low Activity Waste Melters	24590-LAW-3PS-AE00-T0001	6		Y	To be included in Appendix 9.7
Specification Change Notice – Update Seismic Clamp Installation	24590-LAW-3PN-LMP-00002	N/A		Y	To be included in Appendix 9.7
<b>Mechanical Data Sheets:</b>					
Low-Activity Waste Melter 1	24590-LAW-M0D-LMP-00001	3	III.10.H.5.c.ii III.10.H.5.c.vi	Y	To be included in Appendix 9.6
Low-Activity Waste Melter 2	24590-LAW-M0D-LMP-00002	3		Y	To be included in Appendix 9.6
Secondary Containment Design	24590-WTP-PER-CSA-02-001	10	III.10.H.5.c.ii III.10.H.5.c.iii	N	In Appendix 7.5
Corrosion Protection for Buried Components	N/A	-	III.10.H.5.c.iv	N	There are no buried components in contact with soil or water in the LAW facility El. 3 ft.
Corrosion Evaluation: LAW Melter 1 and Melter 2 Gas-barrier and Cooling Panels	24590-LAW-N1D-LMP-00001	1	III.10.H.5.c.iii III.10.H.5.c.v	Y	To be incorporated into Appendix 9.9
LAW Vitrification Offgas System Bypass Analysis	24590-LAW-PER-PR-03-001	2	III.10.H.5.c.ix	N	In Appendix 9.18
Installation of Tank Systems and Miscellaneous Unit Systems	24590-WTP-PER-CON-02-001	6	III.10.H.5.c.x	N	In Appendix 7.12.

Engineering Document Title	Document Number	Revision	Permit Condition	Included	Remarks
Completed Permit Tables for Primary Containment Sumps and Floor Drains	Not Applicable	-	III.10.H.5.c.vii	N	There are no primary containment sumps or floor drains in the LAW facility El. 3 ft.

**For Incorporation into the Administrative Record**

Engineering Document Title	Document Number	Revision	Permit Condition	Included	Remarks
Structural Support Calculations Specific to Off-Specification, Non-Standard and Field Fabricated Subsystems	Not Applicable	-	III.10.H.5.c.iii	N	There are no off-specification, non-standard and field fabricated subsystems in the LAW facility El. +3 ft
Low-Activity Waste Melter Process System Design Description	24590-LAW-3ZD-LMP-00001	0	III.10.H.5.c.vii	Y	For incorporation into Administrative Record
Flowsheet Bases, Assumptions, and Requirements	24590-WTP-RPT-PT-02-005	7	III.10.H.5.c.viii	N	In Administrative Record (CCN 282694)
2010 WTP Material Balance and Steady State Flowsheet Assessment, Deliverable 2.7	24590-WTP- RPT-PET-10-022	0	III.10.H.5.c.viii	N	In Administrative Record (CCN 241137)
Steady-State (AES) Model Run Report for 2010 Material Balance and Process Flowsheet Analysis Assessment Report	24590-WTP-MRR-PET-10-010	0	III.10.H.5.c.viii	N	In Administrative Record (CCN 241137)
Control of Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems	24590-WTP-PER-PR-03-002	3	III.10.H.5.c.xi	N	In Administrative Record (CCN 178564)
Prevention of Hydrogen Accumulation	LAW Miscellaneous Treatment Unit Hydrogen Accumulation Document for the DWP Administrative Record (CCN 280210)	N/A	III.10.H.5.c.xii	N	Incorporate into Administrative Record. Submitted with LAW-025.