FACT SHEET

FOR

THE HANFORD FACILITY
RESOURCE CONSERVATION AND RECOVERY ACT
DRAFT PERMIT
FOR THE TREATMENT, STORAGE, AND DISPOSAL
OF DANGEROUS WASTE

Publication Number 01-05-006

Permittees

United States Department of Energy
(Owner/Operator)
Office of River Protection/Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Bechtel National, Inc.
(Co-Operator)
3000 George Washington Way
Richland, Washington 99352

This Fact Sheet has been developed by the Washington State Department of Ecology (Ecology) in accordance with the requirements of Washington Administrative Code (WAC) 173-303-840(f). Its purpose is to present information on Ecology's tentative decision modify the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit for the proposed treatment, storage, and/or disposal (TSD) of dangerous and/or mixed waste at the Hanford Facility to include the River Protection Project-Waste Treatment and Immobilization Plant (WTP) as an operating unit.

This Fact Sheet is divided into several sections, which include:

1.0 Hanford Facility Permit Background
2.0 Procedures for Reaching a Final Decision on the Draft Permit
3.0 Proposed Modifications to the Hanford Facility RCRA Permit

1.0 Hanford Facility Permit Background

Ecology issued the Dangerous Waste Portion of the RCRA Permit (Permit) for the Hanford Facility in 1994.

The Permit for Hanford provides standard and general facility conditions, as well as, unit-specific conditions for the operation, closure, and post-closure of mixed and dangerous waste TSD units at Hanford.

The Permit is normally modified annually to incorporate newly permitted units, reflect Class 1/2/3 Modifications, and include minor changes in grammar, consistency, and presentation. 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.

Approximately 50 TSD units at Hanford are operating or closing under RCRA interim status standards. The unit described in this Fact Sheet will be incorporated into the Permit and constructed and operated under final status standards. After incorporating a TSD unit into the Permit, the general conditions (Parts I and II of the

Permit) apply. In addition, each TSD unit is subject to conditions based on its status as operating, undergoing closure, or in post-closure.

Conditions of the Hanford Facility RCRA Permit are presented in six parts:

- Standard Conditions (Part I)
- General Facility Conditions (Part II)
- Unit-Specific Conditions for Final Status Operations (Part III)
- Corrective Action for Past Practices (Part IV)
- Unit-Specific Conditions for Units Undergoing Closure (Part V)
- Unit-Specific Conditions for Units in Post-Closure (Part VI)

The draft WTP Permit includes proposed conditions and modifications that will add the WTP to the Unit-Specific Conditions for Final Status Operations (Part III) portion of the Permit. This Fact Sheet only addresses the WTP proposed conditions and modifications. This is a special modification to include the WTP in the Hanford Facility Permit. This modification will allow the United States Department of Energy and Bechtel National, Inc. to start construction of the WTP.

2.0 Procedures for Reaching a Final Decision on the Draft Permit

This Washington State Hazardous Waste Management Act, Chapter 70.105 Revised Code of Washington (RCW), and regulations promulgated in Chapter 173-303 of the Washington Administrative Code (WAC), regulate the management of dangerous waste in Washington. According to WAC 173-303-800, facilities that treat, store, and/or dispose of dangerous waste must obtain a permit for these activities.

A 45-day public comment period for the draft WTP modifications to the Hanford RCRA Permit begins on May 15, 2002, and ends on June 30, 2002. All comments received during the public comment period will be considered and responded to before final decisions are made on the proposed conditions. Regulatory requirements for the public review process (for permit modifications) are described in WAC 173-303-830(3) and in WAC 173-303-840(3). Comments must be post-marked or received by e-mail no later than June 30, 2002. Comments hand delivered by June 30, 2002, to the address below also will be accepted. Direct all written comments to:

Steve Skurla
Department of Ecology
1315 W. 4th Avenue
Kennewick, Washington 99336
E-mail address: ssku461@ecy.wa.gov

A public meeting will be held on June 12, 2002, at the Department of Ecology (address shown above). Verbal comments can be made at the meeting. Ecology will consider and respond to all written comments submitted by the deadline, and verbal comments submitted at the public meeting. 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 all who commented. If Ecology's decision includes substantial permit changes because of public comment, Ecology will initiate a new public comment period.

All commenters and the Permittees shall receive a copy of the responsiveness summary and a notification of the final permit decision. Ecology's final permit decision may be appealed within 30 days after the final permit decision has been received.

Copies of the Permit for the Hanford Facility, including the proposed, draft permit modifications are available for review at the Hanford Public Information Repositories listed below. [For additional information, call the Hanford Cleanup Hotline toll-free at (800) 321-2008].

HANFORD PUBLIC INFORMATION REPOSITORIES

Portland
Portland State University
Branford Price Miller Library
934 SW Harrison and Park
Portland, Oregon 97207
(503) 725-3690
Attn: Michael Bowman/Jocelyn Kramer
E-mail: bowman@lib.pdx.edu

Richland
Public Reading Room
2770 University Drive
Consolidated Information Center, Rm. 101L
Richland, Washington 99352
(509) 372-7443
Attn: Terri Traub
E-mail: reading_room@pnl.gov

Spokane
Gonzaga University
Foley Center
East 502 Boone
Spokane, Washington 99258-0001
(509) 323-3839
Attn: Connie Scarppelli
E-mail: carter@its.gonzaga.edu

Seattle
University of Washington Suzzallo Library
Government Publication Division
Seattle, Washington 98195
(206) 543-4664
Attn: Eleanor Chase
E-mail: echase@u.washington.edu
Public Service: (206) 543-1937

This Fact Sheet and proposed draft permit modifications are also available on the World Wide Web at http://www.ecy.wa.gov/programs/nwp/.

If special accommodations are needed for public comment, please contact Tim Hill, Department of Ecology, Nuclear Waste Program, at (509) 736-3026 (voice) or (360) 407-6006 (TDD).

3.0 Proposed Modifications to the Hanford Facility RCRA Permit

Proposed Modifications to the Hanford Facility RCRA Permit include:

- Permitting one operating unit (Part III):
  - Waste Treatment and Immobilization Plant (WTP)

3.1 Background on WTP Permitting

Ecology received a Dangerous Waste Permit Application for the WTP on April 28, 2000, from British Nuclear Fuels Limited (BNFL) (as owner/operator) and the United States Department of Energy (USDOE) (as land-owner). USDOE's Office of River Protection (ORP) terminated the privatization contract with BNFL in May 2000. Ecology reviewed the application and found it to be 'incomplete.' Ecology issued Notice of Deficiency (NOD) comments to ORP and CH_2M-Hill Hanford Co. (CHG) (interim contractor) on August 14, 2000. ORP and CHG submitted responses to the NOD comments on December 6, 2000. In December 2000, the contract to design and construct the WTP was awarded by ORP to Bechtel National Inc. (BNI). The NOD comments were discussed in workshops and revised NOD responses were submitted to Ecology by ORP and BNI on May 17, 2001.

On December 6, 2001, ORP (as owner/operator) and BNI (as co-operator) submitted a revised Dangerous Waste Permit Application to Ecology. Ecology has reviewed this application and originally judged it to be 'incomplete.' However, ORP and BNI submitted a demonstration, pursuant to WAC 173-303-806(4)(a), on February 6, 2002, that certain information needed for the permit application is not available at this time and suggested dates when the information will be available. Based on the fact that the WTP Dangerous Waste Permit Application addresses all the information requirements listed in WAC 173-303-806(4)(a), Ecology

has accepted the demonstration and has made allowances for the submission of additional information to supplement that material already provided.

Ecology has prepared a draft Permit, based on the information provided in the application, with a compliance schedule to submit additional information as it becomes available. This compliance schedule assures that even though the WTP Dangerous Waste Permit will have been issued, construction and operation of the WTP will proceed in a staged manner with Ecology's review and approval required at each stage.

Ecology's decision to proceed in this fashion is based on the unique circumstances surrounding the WTP construction. These circumstances include the grave threat to human health and the environment posed by approximately 53 million gallons of highly radioactive mixed waste stored in outdated, and in some cases, leaking underground tanks. The amount of time it would take to complete the detailed design and follow a traditional permitting process would delay construction up to four years. This would not allow the Permittees to comply with the Tri-Party Agreement milestone to begin operations in 2008 and would add to the risk that this waste poses to current residents and future generations.

The draft WTP Dangerous Waste Permit has been prepared in the format typically used statewide by Ecology. The Permit modification contains boilerplate conditions that are similar to most facilities in Washington State, and attachments, which are excerpts from the WTP Dangerous Waste Permit Application. This format follows the format used in Modification F of the Permit, which is different from what has been done in past modifications (e.g., incorporating the entire WTP Dangerous Waste Permit Application as an attachment to the Permit). It is the Ecology Nuclear Waste Program's intention to conform to state standards and to simplify the maintenance of the Hanford Facility RCRA Permit by using the new format.

In August 1996, an environmental impact statement titled *Final Environmental Impact Statement for the Tank Waste Remediation System* (DOE/EIS/0189) (EIS) was coauthored by Ecology and USDOE. The scope of the EIS included tank waste retrieval, tank continued operations, and waste treatment and waste disposal. The EIS was published to fulfill the requirements of both the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA) (WAC 197-11). The pretreatment and vitrification activities at the WTP are covered by the analysis represented in this EIS. A NEPA Record of Decision was issued and, following public comment, the SEPA Fact Sheet was issued August 30, 1996.

Because this document is by both Ecology and USDOE, the EIS serves as SEPA coverage for permitting activities related to the WTP, as long as the WTP stays within the bounds of the original analysis. It is Ecology's determination that the WTP, as presently planned, is within the bounds of the original EIS.

3.2 The WTP Permitting Process

The present lack of complete design information presents unique challenges in processing a permit for the WTP Facility. Currently, the overall design of the WTP is less than 30% complete and much of the detailed design information usually included in a permit application is not yet available.

For the reasons stated above, Ecology believes that it is in the best interest of the State of Washington for ORP to begin treating Hanford tank waste at the earliest possible time. Ecology will employ a permitting approach that is different from the usual process for issuing a dangerous waste permit in order to begin tank waste treatment as soon as practical. The permitting approach will be to modify the Hanford Facility RCRA Permit and allow construction to start without a complete design being available, subject to Ecology's review and approval authority over future, more detailed design submittals.

This approach to permitting the WTP will involve three major steps. First, the Permit will be issued with a compliance schedule to provide the additional detailed information necessary to ensure compliance with the standards applicable to a hazardous waste management facility. The initial Permit will include enough detailed design information so that ORP and BNI may start construction on the bottom floor of the facilities

(i.e., the floor and walls below grade). This public comment period covers this first step of construction of the WTP.

Second, design information packages will be prepared for each subsequent stage of facility construction (e.g., installing tanks in the subgrade portions and installing the ground floor). A number of these packages will be submitted during the construction process (e.g., level by level, system by system). This design information will be reviewed by Ecology, approved by Ecology, and incorporated into the Permit prior to construction of that portion of the WTP proceeding. Following public review of each design information package and incorporation into the Permit, Ecology's approvals will allow construction to proceed only on those regulated portions of the WTP that have been approved.

Third, a significant portion of the operations information will be submitted in a large, major (Class 3) modification of the Permit about 18 months before the start of cold (non-radioactive) commissioning of the WTP. This includes the operating portions of the Permit that need relatively complete design to finalize (e.g., training, contingency, and inspection plans).

At this point, all the information normally included in a permit application will have been submitted, reviewed, and approved through public comment, and the Permit will then be considered in compliance with WAC 173-303. After public comment, the Permit will be modified to include the supplemented information. The WTP will then be given approval to begin cold commissioning. Part of cold commissioning will be testing the melter systems to demonstrate performance of the melter systems with respect to emissions and glass production.

Ecology expects to add more conditions to the Permit as the project proceeds and more detailed information becomes available. It is expected that the Permit will be modified numerous times before the facility is operating.

The information needed to supplement the Permit will be submitted according to a compliance schedule included in Attachment 51, Appendix 1.0 of the Permit. Two slightly different modification processes are proposed for the WTP Permit. WAC 173-303-830(3) allows Ecology to modify, or revoke and reissue a permit based on information submitted as required in the Permit. Because the Permit requires the compliance schedule submittals, these submittals will be incorporated into the Permit as agency initiated modifications per WAC 173-303-830(3). Agency initiated modifications require a 45-day public comment period. Changes to information already in the Permit will follow a different modification process. Once information has been incorporated into the Permit, changes to the Permit information will follow the Permittee initiated modification process using Class 1, Class 2, or Class 3 modifications as described in WAC 173-303-830(4). Class 2 and 3 modifications require 60 day (for Class 2) and 45 and 60-day (for Class 3) public comment periods prior to approval by Ecology. The modification process described here is included in Permit Conditions III.10.C.2.e., III.10.C.2.f., and III.10.C.2.g.

Design is an optimization process in which various elements are balanced to provide the best value for a given cost. The types of elements that are balanced include things like process rate, treatment effectiveness, construction cost, operating cost, regulatory requirements, and closure costs. The design process normally results in a series of changes as the design is optimized. Under the usual permitting scenario, the design information in the permit application is complete, or nearly complete, before construction begins. Under the close-coupled design and construction approach, the optimization process continues after construction has started. Ecology will not require a permit modification resulting from a design change until construction on that portion of the WTP is ready to proceed. Before construction on that portion of the WTP can proceed, the Permit must be modified in accordance with WAC 173-303-830(4) to incorporate the changes into the Permit. In this way, Ecology does not interfere with the design optimization process and the administrative burden will be reduced, while still retaining approval authority over the construction activities. Changes to the drawings incorporated into the Permit, that do not effect a regulated area or activity in the building will be considered Class 1 modifications and will be incorporated into the Permit following the Hanford Site

permit process and are incorporated into the Permit quarterly. For example, if a general arrangement drawing in the Permit has one regulated cell on a level in the plant, changes to non-regulated areas (moving a stairwell, increasing the size of a change room, etc.) on that level would trigger a Class 1 modification.

A Permittee is allowed to request a temporary authorization to implement a Class 2 or 3 modification prior to public notice and comment, pursuant to WAC 173-303-830(4)(e). A temporary authorization must meet the criteria described in WAC 173-303-830(4)(ii)(A). The term of a temporary authorization is limited to 180 days with the potential for Ecology approval of two terms, with a maximum combined duration of 360 days. The purpose of a temporary authorization is to allow the timely implementation of a permit modification. Ecology may approve the request for a temporary authorization if the request meets one of the five criteria in WAC 173-303-830(4)(e)(iii)(B).

ORP has requested a temporary authorization to start the construction of the low activity waste (LAW) and high level waste (HLW) vitrification waste treatment facilities prior to issuance of the Permit modification. Ecology has determined that the request could meet three of the five criteria, namely: (I) To facilitate timely implementation of closure or corrective action activities; (III) To prevent disruption of ongoing waste management activities; and (V) To facilitate other changes to protect human health and the environment. Any delay in start of construction past July 1, 2002, is likely to have an adverse impact to the project schedule and delay the treatment of tank waste. The tank waste poses a very great risk to human health and the environment. ORP and BNI have submitted additional information prior to this public comment period to supplement the information in the permit application for the below ground level portions of the two buildings. This information has been incorporated into the draft Permit. Ecology has reviewed the supplemental information and is considering this request. Ecology will grant the temporary authorization only after the public comment period is complete, and only if no major public comments are received that would require major changes to the Permit. If granted, the temporary authorization will not exceed 180 days and will be only for the construction of sub-grade portions of the Law and HLW Vitrification Buildings.

In addition to the Permit modification review process, Ecology will be conducting an ongoing review process to ensure the design of the WTP is in compliance with the dangerous waste regulations. The review process, in part, will consist of reviews of preliminary drafts of key design drawings (e.g., process flow diagrams, piping and instrumentation diagrams). Ecology will also be conducting compliance inspections at the construction site and monitor BNI and ORP inspection activities.

One of the most difficult issues for Ecology during construction is how to balance need for design approval against the sheer volume of technical information being generated during the design process. The project is expected to generate tens of thousands of drawings. In a normal permitting situation, with nearly complete design, the permittee and the regulators sift through the drawings and select a small subset for demonstrating compliance with the regulations and incorporate these drawings into the Permit. Because the drawings are not available and will be issued continuously during the concurrent design and construction process, Ecology cannot determine in advance all the drawings that need to be incorporated into the Permit. As design proceeds, Ecology will review drawing types identified in Attachment 51, Appendix 3.0 for compliance with the Permit and may select a set of drawings to be incorporated into the Permit in addition to those supplied by the Permittees that will best demonstrate compliance with the regulations.

Ecology believes that this permitting approach meets the requirements of WAC 173-303. Normally, Ecology will not issue a final facility permit until a complete, or nearly complete, design has been received. Although the WTP Dangerous Waste Permit Application has addressed all the information requirements for a permit application listed in WAC 173-303-806(4)(a), much of the information has not been supplied to the level of detail Ecology demands, because some aspects of the WTP Facility design are not far enough along to have the information available. Applicable regulations give Ecology the discretion to determine when an application is 'complete.' Ecology's regulations further allow the agency to make allowances, on a 'case by case basis' for the submittal of additional supplementing information when the Permittee can demonstrate it cannot provide the full extent of information required by the regulations. For any information prescribed in

the Part B requirements, but not adequately provided in the permit application, Ecology, pursuant to WAC 173-303-806(4)(a), has required the Permittee to demonstrate in writing that the information cannot currently be provided to the extent required.

Ecology has received and evaluated the demonstration from ORP and BNI, and will make allowances for submission of supplementing information through schedules of compliance as described in WAC 173-303-815(3). Ecology is requiring the submittal of more information than shown on the completion schedule in the permit application or in the demonstration letter. Ecology has included in the permit schedules of compliance in Attachment 51, Appendix 1.0, numerous interim requirements, dates for their achievement, and a final date of permit compliance. A permit condition has been written that requires the permittee to notify Ecology, in writing, 14 days following each interim date, and the final date of compliance or noncompliance with the interim or final requirements. The ability of the WTP to start cold commissioning and hot commissioning will be contingent upon successful completion of the specified interim and final requirements. Operations will not be allowed to start until written authorization is provided by Ecology (Permit Condition III.10.C.2.a.). WAC 173-303-830, Appendix I, lists changes to interim compliance dates, with prior approval of Ecology, as a Class 1 modification and extension of the final compliance date as a Class 3 modification. The final compliance date is the date the WTP initially receives dangerous or mixed waste.

The owner/operator of a proposed facility is required by WAC 173-303-806(4)(a)(xi) to identify the seismic risk zone in which the proposed facility is intended to be located and to demonstrate that the facility can and will be designed to resist seismic ground motion and that the design is sufficient to withstand the maximum horizontal acceleration of a design earthquake specified in the demonstration. The WTP Dangerous Waste Permit Application, Supplement 1 (*Compliance with Uniform Building Code Seismic Design Requirements*) states that in accordance with Uniform Building Code, Figure 16-2, the USGS seismic hazards survey map, the WTP site is designated as seismic zone 2B. This report also provides information and concludes that structures, systems and components designed in accordance with the requirements established for the WTP project will adequately resist the maximum horizontal and vertical acceleration ground motions associated with the seismic zone 2B or site-specific seismic response spectra, as permitted by the Uniform Building Code, and thus satisfy the requirements of WAC 173-303-806(4)(a)(xi).

In a Memorandum of Understanding (MOU) dated April 2000, Ecology, Washington State Department of Health (DOH), and the USDOE's Office of Safety Regulation (OSR) agreed to coordinate regulatory activities for the design, construction, and operation of the WTP. The purpose of the MOU is to improve regulatory efficiency and effectiveness by eliminating duplicate efforts with no diminution of protection provided to the workers, the public, and the environment. Pursuant to this MOU, Ecology will utilize the results of the OSR Safety Evaluation Reports as additional evidence that regulatory requirements of WAC 173-303-806(4)(a)(xi) are being met. The OSR staff has the required expertise to review all phases of the safety documentation. BNI will submit a Construction Authorization Request (CAR) which will be reviewed and an evaluation for approval or disapproval will be contained in a Safety Evaluation Report.

The OSR uses a structured process to sequentially review each BNI submittal. The review process is based on review guidance prepared by the OSR prior to the BNI submittals. The review guidance, *Review Guidance for the Construction Authorization Request (CAR)*, RL/REG-99-05, was published by the OSR in May 1999 for use by the OSR reviewers in evaluating the Construction Authorization Request. The guidance document is part of the OSR public record.

As is the case with Ecology and DOH, OSR has agreed to do staged approvals to allow construction to begin. The HLW and LAW facilities Partial Construction Authorization Requests are being reviewed prior to BNI submittal of the Construction Authorization Requests to enable an early start for construction. The review will provide assurance that BNI's proposed partial construction activities will provide for adequate safety of the workers and the public.

Criteria for review of the facility structures for the BNI facilities are found in Section 1.2 of the Review Guidance Document. The review is conducted to ensure that BNI has adequately described the facility features that could affect potential accidents and their consequences. Examples of these features are the facility locations, facility design information, including seismic information, and the location and arrangement of the treatment facilities on the facility site.

Criteria for review of the facility seismic characteristics are found in Section 4.6 of the Review Guidance Document. The review is conducted to ensure that BNI has adequately described the selection and analysis of external Design Basis Events (e.g., seismic events), the potential hazards and accidents caused by such events, and how they will be acceptably mitigated. BNI's submittals on seismic event will be judged to be acceptable if the following information is provided:

1. Categorization of the performance of important-to-safety Structures, Systems, and Components that require qualification against seismic events.
2. Selection of seismic design criteria, including development of the seismic hazard curve and response spectra.
3. Facility preliminary seismic analysis, demonstrating that the preliminary design will meet applicable requirements for load when subjected to the design-basis earthquake. This analysis includes the modeling approach for the dynamic analysis of the facility. The modeling approach describes the treatment of live load mass, the proposed damping value, and stiffness modeling assumption for structural elements and connections.
4. Seismic acceptance criteria, including the process to compare the calculated seismic demand on important-to-safety Structures, Systems, and Components from the seismic analysis with the corresponding seismic capacity derived from the acceptance criteria of industrial codes and standards.
5. Detailing requirements, including the approach for connections, anchorage, bracing, and pipe supports.
6. Calculational methods used to assess Design Basis Events.
7. Accident prevention and mitigating features, including facility features that are relied on or required for seismic safety.

Following completion of the detailed review of the BNI construction requests, the OSR will issue a Safety Evaluation Report summarizing their evaluation and recommending either approval or disapproval of the Construction Authorization Requests. If the BNI request is approved, a Construction Authorization Agreement will be signed and issued by the Manager of ORP authorizing construction work to begin.

Ecology will review design submittal information submitted by BNI to confirm that all regulatory requirements and permit conditions have been met. Ecology will review the OSR Safety Evaluation Report, and, if found acceptable, will modify the Dangerous Waste Permit to allow construction to proceed.

3.3. WTP Design and Construction Process

Ecology and the public have questioned if construction of the WTP should begin before design is complete. The driving force for ORP to expedite the design and construction process is the requirement of the Hanford Federal Facility Agreement and Consent Order (HFFACO) [also known as the Tri-Party Agreement (TPA)] milestone to begin operation of the WTP by December 2007. With the change in contract from a privatization contractor to the traditional government owned-contractor operated style contract, valuable time was lost.

BNI was selected as the contractor, in part, because they have developed a system of managing complex projects using a concurrent design and construction approach. BNI calls this system the 'close coupled engineering, procurement, and construction (EPC) process.' This method reduces the time needed to get a facility from design, through construction, and into operation and is thought to be the only way ORP can meet the December 2007 TPA milestone. The current BNI project baseline shows that, using this method, they can meet the December 2007 TPA milestone if construction on the TSD facility starts in July 2002.

BNI provided, as part of the WAC 173-303-806(4)(a) demonstration documentation, a description of the EPC process. The BNI information is included in this Fact Sheet to inform the public on the EPC process.

"BNI uses a close coupled engineering, procurement, and construction (EPC) process to tightly coordinate the development and implementation of detailed design information.

In the close coupled EPC process as applied to large industrial facilities, the facility is divided into construction planning zones after major process and structural features are defined. Detailed design and procurement for a particular zone is completed to support construction of the items within that area in advance of other areas to be constructed later. For example, early design and procurement activities will focus on the elements associated with the lowest elevation of the facility and the first pour of structural concrete. Design and procurement activities then shift to support features on upper elevations that are constructed and installed later. This results in plant elements within the many construction planning zones that are at different stages of design, procurement, fabrication, and installation.

The Bechtel Group, including BNI, has successfully used the close coupled EPC process for decades to design and construct major capital projects across the industrial sectors Bechtel supports. Chemical and petrochemical facilities, fossil and nuclear power plants, mining and ore processing facilities, water and waste processing plants are typical of large projects where efficiency and time to market considerations dictate a close coupled EPC approach.

The success of major projects depends on close integration of fully engaged construction, procurement, and project planning personnel with detailed engineering execution. This is achieved most effectively if procurement and construction mobilize concurrently with the design effort in an integrated EPC team. This opportunity for real time coordination at a very detailed level contributes substantially to the quality and constructability of the design and the ultimate success of the project. It also allows early stages of procurement and construction to proceed in parallel with later stages of design.

Close coupled EPC process may be contrasted with the design-build approach used for some smaller facilities where design may be accomplished in a packaged effort in advance of the physical work or where commercial considerations dictate arms-length relationships between designers and builders.

Effective execution of the close coupled EPC strategy requires recognition and accommodation of the following considerations:

- ***Linkage of design, procurement and construction:*** *the design process must be organized in a logical sequence that generates the information needed for early project phases first. For example, plant layout and structural design, and thus initial procurement and construction activities, must be supported by early definition of system processes and major equipment. Design of commodities such as HVAC, piping, and pipe routing can follow because they support later installation activities. Very detailed, integrated schedules capture this logic and serve as the primary tool for tracking progress and highlighting problems areas.*
- ***Design input maturity:*** *design is typically based on inputs derived from multiple sources. A design deliverable is not issued for use by other design organizations, procurement, or construction until inputs are finalized for the purpose of supporting the specific deliverable.*

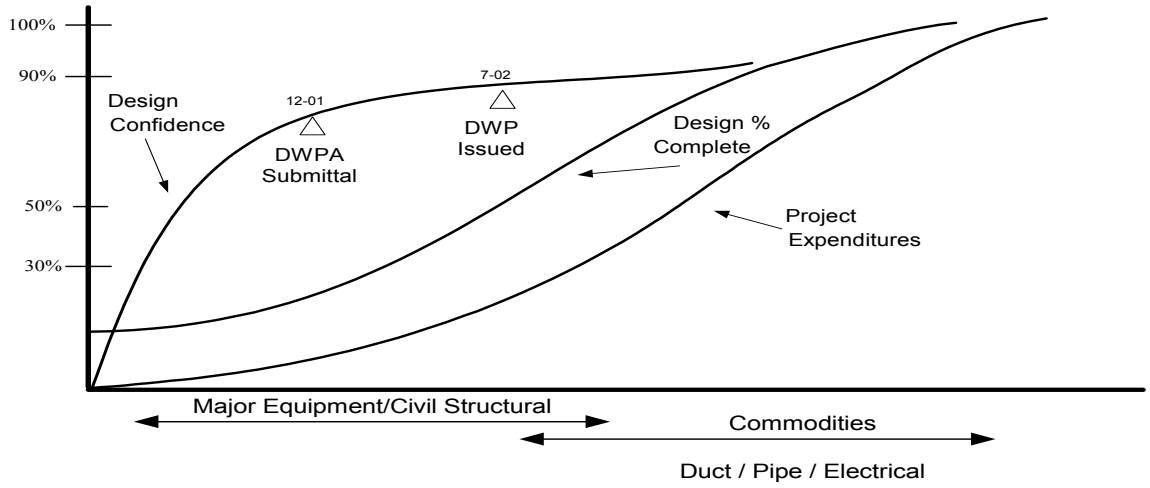
  For example, basic process features to pretreat and then vitrify the waste stream are approved on process flow diagrams (PFDs). These then serve as input to more specific representation of the sequence of equipment, piping, valve and control features shown on piping and

instrumentation diagrams (P&IDs). P&IDs then serve as input to the 3 dimensional computer model of the plant. The model allows optimization of the plant arrangement and footprint from various perspectives, including efficient space utilization, constructability, operability and maintainability.

Details are developed in the model to support sequential construction activities. Major structural features, including floors and walls are finalized first so that structural analyses and structural details can be developed. Equipment locations are refined so that embedments for equipment anchorage can be designed. Piping systems, HVAC duct, and electrical distribution systems are routed so that fabrication details of these commodities can be developed.

Formal coordination, review, and approval processes precede release of each element of the design concept. The 3-D model and certain high level design documents contain a combination of some information that is relevant to early EPC activities and other information that supports later activities. The content of such design documents can be released in stages with information added and approved incrementally to support sequential design, procurement and construction activities.

Firm design concept: *substantial confidence must exist in the adequacy of the front*



end design concept. The figure above is a qualitative illustration of the distinction between design confidence, reflecting completion of front-end design decisions and supporting analyses (including safety and environmental), and design percent complete reflecting design hours expended divided by total hours forecast.

BNI confidence in the design increased with initial due diligence assessments that affirmed many areas of the front-end design, provided focus on areas of uncertainty, and supported development of systematic strategies to resolve or mitigate the impact of remaining uncertainties. Design confidence also advance substantially as safety and environmental analyses are completed that confirm the adequacy of the design approach and envelope detailed design development.

Review and approval of the DWPA will further enhance confidence that cost/schedule intensive detailed work can proceed with minimal uncertainty and risk. Detailed design work to-go is job-hour intensive and will generate substantial numbers of implementation documents. However, this remaining effort consists of conventional design activities within the envelope of the front-end design. These remaining activities carry limited residual uncertainty or risk to detract from

overall confidence that the design can be executed consistent with its mission and requirements."

Ecology believes that this course of action is the only practical way to complete construction of the WTP and begin this important cleanup task. In addition, BNI has a successful record implementing this methodology on other large construction projects.

3.4 WTP Facility Description

The WTP is a waste management unit that is to be constructed just outside the eastern boundary of the 200 East Area. The purpose of the facility is treat and store mixed and dangerous waste currently stored in 177 underground tanks located in the 200 East and 200 West Areas of the Hanford Site. The volume of waste stored in the tanks is about 53 million gallons. The initial WTP campaign requires that the WTP treat through vitrification, at least 10% of the tank waste by volume and 25% by radioactivity by 2018. The initial campaign would have to treat a minimum volume of 5.3 million gallons by 2018 to achieve a 10% reduction. The expectation is that the plant will be able to exceed this target. The WTP may also treat waste generated within the WTP Facility boundary or from other waste management units in addition to the 5.3 million gallons of tank waste. Current design allows waste to be received only through the Double-Shell Tank (DST) System. ORP has conducted a limited characterization of the waste in the initial campaign. The Waste Analysis Plan in this permit will require further characterization, principally for organics, before the waste is accepted in the WTP.

The WTP Facility consists of three permitted main processing buildings: Pretreatment Building, LAW Building, and HLW Building. Also included in this Permit are container storage buildings for mixed and dangerous waste containers and mixed waste melters and portions of the WTP Analytical Laboratory Building.

3.4.1 Pretreatment Building

The Pretreatment Building houses 70 regulated mixed waste tanks and 4 regulated miscellaneous units. The number of regulated tanks could increase as more design information becomes available. The regulated tanks are identified in Permit Section III.10.E. Four miscellaneous units as defined in WAC 173-303-680 is identified in the Pretreatment Building and consists of the Waste Feed Evaporation System, Cesium Nitric Acid Recovery System, Technetium Eluant Recovery Process System, and the Treated LAW Evaporation system. These miscellaneous unit systems include support systems such as tanks and share an air emission treatment train. The air emission treatment train, which is referred to as the Pretreatment Vessel Vent Process System, is also shared by the other mixed waste management operations (tanks systems, and containment building units) in the Pretreatment Building. The Pretreatment Vessel Vent Process System is primarily comprised of scrubbers, filters, absorbers, and a catalytic oxidizer to treat/remove constituents in the air emissions from the mixed waste management operations in the Pretreatment Building prior to release to the atmosphere from the Pretreatment Building Stack.

The Pretreatment Building receives waste from the Double-Shell Tank (DST) System. The DST waste is pumped to the WTP through new underground double-contained pipelines. The DST waste is received in batches as large as 1 million gallons and stored in four 388,000-gallon tanks with a total capacity of about 1.5 million gallons. These large tanks are equipped with mixers to keep the solids suspended.

Pretreatment consists of several treatment steps performed in equipment classified as tank systems in WAC 173-303-640. The purpose of pretreatment is to divide the waste into HLW and LAW waste streams for vitrification in separate HLW and LAW Vitrification Buildings. The process is designed to remove the solids that contain most of the radioactivity, and route the solids to the HLW Vitrification Plant. The LAW waste, mainly a solids-free liquid with much lower radioactivity, will be routed to the LAW Vitrification Plant. These pretreatment steps in this process include:

- Evaporation to concentrate the waste;
- Chemical precipitation of strontium in some waste feeds;
- Ultrafiltration to remove the solids;
- Ion exchange to remove cesium in solution;
- Ion exchange to remove the technetium in solution; and
- Evaporation of the remaining LAW feed to concentrate the waste.

The Pretreatment process creates a number of secondary waste streams. The volumes and compositions of the streams are being determined as part of the design process. The mixed/dangerous secondary waste streams, identified thus far, include:

- Process condensate from evaporation [routed to the RCRA permitted 200 Area Effluent Treatment Facility (ETF) for treatment and disposal];
- Spent ion exchange resins [dewatered and shipped to the Hanford RCRA permitted Central Waste Complex (CWC) for storage];
- Solid waste (e.g., failed pumps and other equipment) containerized and shipped to CWC; and
- Liquid (e.g., scrubber effluents) and solid wastes (e.g., filters, spent carbon, etc.) from the Pretreatment Vessel Vent Process System.

3.4.2 LAW Vitrification Building

The LAW Vitrification Building houses 16 regulated mixed waste tanks identified in the permit application. The number of regulated tanks could increase as more design information becomes available. Miscellaneous units, as defined in WAC 173-303-680, are identified in the LAW Vitrification Building and consist of the 3 LAW melter systems (consisting of the melters and the air emissions treatment trains). The 3 LAW melter systems include a primary and secondary off-gas treatment train. Each LAW melter system includes a dedicated primary off-gas treatment train primarily consisting of wet scrubbers. The LAW melter systems share the secondary off-gas treatment train with the other mixed waste management operations (container storage, tanks systems, and containment building units) in the LAW Vitrification Building. The secondary off-gas treatment train is primarily comprised of filters, a wet scrubber, a catalytic oxidizer, and a catalytic reduction unit. The LAW melter systems, including the primary and secondary off-gas treatment train treat/remove constituents in the air emissions from the mixed waste management operations in the LAW Vitrification Building prior to release to the atmosphere from the LAW Vitrification Building Stack.

Waste is received into the LAW Vitrification Building from the Pretreatment Building via a double-contained underground pipeline. The waste is stored in a receipt tank. The waste is transferred into a mixing tank where glass formers (such as silica and sucrose) are added to produce the desired glass quality. This slurry is transferred to a melter feed tank, and then into the melter. The melters are electrically powered and operate at temperatures between 900 to 1200 ^{o}C. Each melter is designed to produce 15 metric tons of glass per day, with an expected output of up to 30 metric tons per day of glass. As the waste is added to the melter, the liquids quickly evaporate and the solids are incorporated in the melt (molten solids). Melt is poured into large stainless steel canisters where it solidifies into glass. Lids are welded on the canisters. The outsides of the canisters are decontaminated. Canisters are then stored in the LAW Building before transport to a RCRA permitted onsite disposal area (to be constructed).

The LAW Vitrification process creates a number of secondary waste streams. The volumes and compositions of the streams are being developed as part of the design process. The mixed/dangerous waste secondary waste streams, identified thus far, include:

- Spent LAW melters (after openings are sealed) transferred to a melter storage building before final disposal in a RCRA compliant trench to be constructed;
- Solid waste (e.g., failed pumps and other equipment) containerized and shipped to the CWC;

- Liquid (e.g., scrubber effluents) and solid wastes (e.g., filters, spent catalyst, etc.) from the melter systems primary and secondary off-gas treatment train; and
- Condensates within the building are collected and will be routed to the ETF for treatment and disposal.

3.4.3 HLW Vitrification Building

The HLW Vitrification Building houses 12 regulated mixed waste tanks identified in the permit application. The number of regulated tanks may increase as more design information becomes available. Miscellaneous units, as defined in WAC 173-303-680, are identified in the HLW Building and consist of the HLW melter system (consisting of the melters and the air emissions treatment trains). The HLW melter system includes a primary and secondary off-gas treatment train. The HLW melter system's primary off-gas treatment train primarily consisting of wet scrubbers. The HLW melter system shares the secondary off-gas treatment train with the other mixed waste management operations (container storage, tanks systems, and containment building units) in the HLW Vitrification Building. The secondary off-gas treatment train is primarily comprised of filters, a catalytic oxidizer, a catalytic reduction unit, and a silver mordenite unit. The HLW melter system, including the primary and secondary off-gas treatment train treat/remove constituents in the air emissions from the mixed waste management operations in the HLW Vitrification Building prior to release to the atmosphere from the HLW Vitrification Building Stack. The HLW Vitrification Building is being constructed with two melter cells; one will be empty and can house a second melter at a later date.

Waste is received into the HLW Vitrification Building from the Pretreatment Building via a double-contained underground pipeline. The waste is stored in a receipt tank. The waste is transferred to a mixing tank where glass formers (such as silica and sucrose) are added to produce the desired glass quality. This slurry is transferred to a melter feed tank, and then into the melter. The melter is electrically powered and operates at temperatures between 900 to 1200 ^{o}C. The melter is designed to produce 1.5 metric tons of glass per day, with an expected output of up to 3 metric tons per day of glass. As the waste is added to the melter, the liquids quickly evaporate and the solids are incorporated in the melt. Melt is poured into large stainless steel canisters where it solidifies into glass. Lids are welded on the canisters. The outsides of the canisters are decontaminated. Canisters are then stored in the HLW Building before transport to a RCRA permitted Canister Storage Building located on the Hanford Site. The HLW canisters are designed to meet the disposal criteria for the National Repository located at Yucca Mountain, Nevada.

The HLW Vitrification process creates a number of secondary waste streams. The volumes and compositions of the streams are being developed as part of the design process. The mixed/dangerous secondary waste streams, identified thus far, include:

- Spent HLW melters in welded overpacks will be transferred to a melter storage building (final disposal pathway for spent and failed HLW waste melters has not been developed);
- Solid waste (e.g., failed pumps and other equipment) containerized and shipped to CWC;
- Liquid (e.g., scrubber effluents) and solid wastes (e.g., filters, spent catalyst, etc.) from the melter systems primary and secondary off-gas treatment train; and
- Condensates within the building are collected and can be routed to the ETF for treatment and disposal.

3.4.4 Analytical Laboratory

A standalone laboratory building will be constructed at the WTP to perform analyses in support of WTP operations. The laboratory is in the conceptual design phase and details are not available. The Analytical Building is planned to house 2 regulated mixed waste tanks identified in the permit application. The number of regulated tanks could change as more design information becomes available. The laboratory tank system will be connected to the Pretreatment Building by an underground double-contained pipeline that will allow laboratory waste to be transferred out of the Laboratory Building into the Pretreatment Building. This transfer of laboratory waste will be a regulated activity under this Permit.

As the design of the laboratory advances it may be determined that permitted storage areas may be required. These storage areas will be added to the Permit as a Class 3 modification. As in any laboratory, analytical work will generate secondary waste streams. The volumes and compositions of the waste streams are being determined as part of the design process. The mixed waste streams include waste from analyzing process and compliance samples. This waste will be returned to the Pretreatment Building for treatment or transferred to the ETF for treatment and disposal. Dangerous waste generated in the laboratory will be transferred to an offsite RCRA-permitted TSD for disposal. All waste generating activities within the analytical laboratory will be regulated under WAC 173-303-170 through 230. Dangerous and mixed waste management will be regulated under this Permit.

3.4.5 Other Regulated WTP Facilities

Four other buildings will include regulated dangerous and mixed waste container storage areas at the WTP site and are included in this Permit. They include the Central Waste Storage Facility, HLW Melter Out-of-Service Storage Area, LAW Melter Out-of-Service Storage Area, and the Non-Radioactive Dangerous Waste Container Storage Area. The volumes and compositions of the waste streams are being determined as part of the design process. As the design progresses, and before construction, these units will be incorporated into the Permit as a Class 3 modification.

3.5 Basis for Draft WTP Permit Conditions

The purpose of this section of the Fact Sheet is to describe the significant factual, legal, methodological, and policy questions considered in preparing the draft Permit modification. This section also will include a brief summary of the draft conditions and the regulatory basis for those conditions. This section describes the reasons for any alternatives to required standards and provides justification for those alternatives.

The major policy decision, of proceeding with the Permit and allowing construction before design was complete, was made several years ago by Ecology management (letter to Jackson Kinzer from Suzanne Dahl, 02/10/97 and Letter to Richard French from Thomas Fitzsimmons, 12/08/99). The reasons for this decision were given in the 'Permitting Process' section of the Fact Sheet.

This section will deal with the detailed description of conditions in the draft Permit modification. The WTP Permit modification differs from permit conditions for other units in the Hanford Facility RCRA Permit in that it contains many more conditions than that required for the typical Hanford TSD facility. Because the design of the facility is not complete, not all the information needed for the Permit is currently available. As a result, Ecology has written conditions that require compliance with the regulations in WAC 173-303 and have described, in as much detail as possible at this time, the information that must be submitted to supplement the Permit in order to allow construction and operations to begin. As design proceeds and new issues arise, Ecology will modify this Permit to include new conditions or modify existing conditions, as described in WAC 173-303-830(3) and WAC 173-303-840(2) and (3).

3.5.1 Unit–Specific Conditions for the WTP

This section discusses conditions in Sections III.10.A, III.10.B, and III.10.C of the Permit.

3.5.1.1 General Waste Management

Permit Condition III.10.C.2.a. does not allow the Permittees to accept dangerous or mixed waste into the WTP Facility until the Permittees have received a Permit modification allowing waste to be received and have submitted to Ecology a letter stating that the facility has been constructed in compliance with this Permit. The Permit modification allowing the start of operations will be processed in accordance with WAC173-303-830 (3) and WAC 173-303-840(2) and (3) and will have a public review period. Ecology reserves the right to inspect the facility for compliance prior to allowing the acceptance of waste.

Permit Conditions III.10.C.2.a. and III.10.C.2.e. authorizes the Permittees to accept waste specified on the Part A Permit Application and in accordance with the Waste Analysis Plan included in the Permit in Chapter 3.0. WAC 173-303-806(2)(a) requires the Permittees submit a Part A Permit Application with the Part B Permit Application. The Part A has been attached to the Permit in order to document waste codes and quantities to be treated or stored at the WTP. WAC 173-303-300 requires analysis of waste prior to storage, treatment, or disposal and to have a Waste Analysis Plan for characterizing the waste.

In addition to not having design information, some treatment units characterized in the permit application as 'tanks' by BNI, under WAC 173-303-640, are being reclassified as 'miscellaneous units' according to WAC 173-303-680 by Ecology. The rationale for this recharacterization is given in Section 3.5.5 of this Fact Sheet. In addition, some units within the WTP, which the Permittees thought were not regulated, will be included as regulated units in the Permit. The rationale for this determination is given in Section 3.5.3 of this Fact Sheet. Normally, these differences are resolved during the permit application review process. So as not to delay the Permit issuance, the Permittees will be required, in a compliance schedule, to update the Permit to include the reclassified units/equipment in the Tables in Sections C, E, G, I, J, K, and L and to update the quantity of waste treated in the Part A Permit Application. Permit Condition III.10.C.2.i. requires the Permittees to update and resubmit the Part A to reflect the changes in the quantities and types of waste stored at the WTP.

3.5.1.2 Waste Analysis Plan (WAP)

According to WAC 173-303-300(5), each facility owner or operator is required to develop and maintain a WAP that must be kept at the facility and must include, at a minimum: what each dangerous waste will be analyzed for; a justification as to why the parameters selected will provide adequate information to ensure proper waste management; how and why each dangerous waste will be analyzed; how the waste will be representatively sampled; how often the waste analysis will occur and when it will be repeated; what information will be provided by the waste generator; and how the movement of waste will be tracked through the facility. The purpose of the plan is to document how the owner or operator will obtain information about the waste they produce and/or store, treat, or dispose. Knowledge of waste characteristics is necessary to ensure the owner or operator appropriately manages any dangerous waste. According to WAC 173-303-300, the owner or operator is required to obtain a detailed chemical, physical, and/or biological analysis of a dangerous waste before it is stored, treated, or disposed. The knowledge obtained through the analysis must be adequate to ensure management of the waste in compliance with all requirements specified in WAC 173-303.

Because the design of the facility and its waste processing systems is not complete, not all the information needed for the WAP is currently available. As a result, Ecology has written Conditions III.10.C.3.a. through III.10.C.3.e. that require compliance with the regulations in WAC 173-303-300 and have described, in as much detail as possible at this time, the information that needs to be submitted to comply with the requirements for a WAP.

Permit Condition III.10.C.3.e. requires the Permittees to submit a revised WAP and Waste Analysis Quality Assurance Project Plan to Ecology, for approval, prior to the receipt of any waste. The revised WAP will be incorporated into this Permit in accordance with the compliance schedule in Attachment 51, Appendix 1.0.

3.5.1.3 Recordkeeping

The WTP must maintain detailed operating records at the facility, as described in Attachment 51, Chapter 12.0. These records document compliance with conditions of the Permit and dangerous waste regulations. Records must also be made of spills, releases, incidents of noncompliance, and emergency situations.

Permit Condition II.I.1. requires the Permittees to maintain a written Facility Operating Record until ten (10) years after post-closure, or corrective action is complete and certified for the Facility, whichever is later. Except as specifically provided otherwise in this Permit, the Permittees shall also record all information referenced in this Permit in the Facility Operating Record within seven (7) working days after the information becomes available. This requirement applies to all Hanford final permitted units, including the WTP.

3.5.1.4 Procedures to Prevent Hazards

This section of the Permit requires that the Permittees construct and operate the WTP with the security, communications, and emergency equipment described in Attachment 51, Chapter 6.0 of the Permit. Condition III.10.C.5.b. requires that the Permittees update this section of the permit with additional details in accordance with the compliance schedule in Attachment 51, Appendix 1.0. Condition III.10.C.5.e. requires the equipment be maintained to be available in case of an emergency.

The facility inspection schedule is included in Attachment 51, Chapter 6.0. The inspection schedule details the frequency and method of inspecting the regulated units within the WTP as required by WAC 173-303-395(1)(d), -630(6), -640(4)(a)(i), -670(7), -680(3), and 40 CFR 264.1101(c)(4). In general, the regulations require daily, weekly, or monthly inspections. Permit Condition III.10.C.5.c. requires that the inspection schedule will be updated prior to operations and in accordance with the compliance schedule in Attachment 51, Appendix 1.0.

WAC 173-303-395 and –640(6) requires inspections, but does not specify that the inspections must be visual. At most dangerous waste facilities, visual inspections are the most convenient way to meet the inspection requirement. The WTP presents some unique challenges for inspections due to the extremely high radiation fields surrounding many of the tanks and miscellaneous treatment units. Routine human access to most of these areas is not possible while in operation.

The Permittees have proposed that the routine inspections for the high radiation areas be accomplished using sumps with continuous leak detection. The Permittees are required to provide calculations that demonstrate nearly all the cells containing tanks or miscellaneous units can detect a leak of 0.1 gallons per hour within a 24 hour period as suggested by EPA guidance. The equivalent of 0.1 gallons per hour is 12 ounces per hour. Permit Condition III.10.E.9.ii., III.10.G.10.e.ii., III.10.H.5.e.ii., and III.10.J.5.e.ii. address leak rate for tanks and miscellaneous units and allows for the Permittees to request a case by case exception. Ecology has accepted the continuous monitoring approach as being adequate to protect human health and the environment, considering the fact that these cells are located in a massive concrete building, with welded stainless steel secondary containment, and extensive ventilation controls. The Permittees will need to provide access to these cells for the periodic integrity assessments required by WAC 173-303-640 (3)(b) and for inserting video cameras for visual inspections, if unusual circumstances require a visual inspection.

3.5.1.5 Contingency Plan

Each owner or operator of a dangerous waste TSD facility is required by WAC 173-303-350 to have a contingency plan at the facility to use in emergencies or sudden or nonsudden releases which threaten human health and the environment. At Hanford, the contingency plan consists of two parts. One part of the contingency plan requirement is met by the *Hanford Emergency Management Plan* (DOE/RL-94-02). This

plan covers sitewide emergency requirements such as sirens, agreements with local authorities, and site evacuations plans. This plan is Attachment 4 to the Hanford Facility Permit.

The other portion of the WAC 173-303-350 requirements are met by a WTP-specific contingency plan. The WTP requirements are contained in the *River Protection Project – Waste Treatment Plant Emergency Response Plan* (24590-WTP-PL-OP-01-003) and is included in Attachment 51, Chapter 7.0 of this Permit modification. This plan includes the specific responses to emergencies that may occur at the WTP. The format and level of detail of the attached WTP plan is similar to that used at other TSD Facilities at Hanford. Because the design is not complete, all the information usually available (e.g., evacuation plan, list of emergency equipment, alarms, and decontamination equipment) is not available at this time.

Permit Condition III.10.C.6.b. requires the Permittees to submit a revised and updated WTP emergency response plan 18 months before the start of cold commissioning. This revision will include the information that is not currently available. The facility will not be allowed to start operations until the plan is approved by Ecology and incorporated into the Permit.

3.5.1.6 Training Plan

Requirements for personnel training are contained in WAC 173-303-330. The program's overall goal is to teach personnel to perform their duties in a way that ensures the facility's compliance with the Dangerous Waste Regulations, teaches the personnel dangerous waste management procedures relevant to the position in which they are employed, and ensures that facility personnel can effectively respond to emergencies. The personnel training requirements for the WTP are included in Attachment 51, Chapter 8.0 of this Permit modification.

At Hanford, an agreement has been reached between the USDOE and Ecology to include a brief description of the facility's training program in the facility-specific portion of the Hanford Facility Permit. Permit Condition III.10.C.7.e. requires the facility's entire training plan be submitted to Ecology separate from the Permit, allowing Ecology to ensure that the requirements in Chapter 8.0 are being met yet providing the facility the flexibility to update the plan as needed to reflect current facility operations.

Permit Condition III.10.C.7.a.ii. requires that all categories of personnel whose activities directly affect emissions from the LAW and HLW Vitrification Systems be provided with specialized training. As the LAW and HLW Vitrification Systems included in this Permit are complex thermal treatment systems, this specialized training is critical to assure Ecology that the systems are operated, as well as designed, to be protective of human health and the environment. This permit condition is based on WAC 173-303-680(2).

Permit Condition III.10.C.7.a. requires the Permittees to submit a revised and updated WTP training plan 18 months before the start of cold commissioning. This revision will include the information that is not currently available. The facility will not be allowed to start operations until the plan is approved by Ecology.

3.5.1.7 Closure

Requirements in WAC 173-303-610 address the requirements for closing a dangerous waste TSD facility. The WTP Closure Plan is included in Attachment 51, Chapter 11.0 of this permit modification. A closure plan must address how each dangerous waste management unit at the WTP will be closed in conformance with the applicable closure performance standard. These standards are defined in the closure plan and must be in accordance with the requirements of WAC 173-303-610(2). The plan also includes methods used to remove or decontaminate equipment, structures, and soils.

The Permit includes conditions that require the Permittees to resubmit the closure plan 180 days prior to a partial closure. Submit a Sampling and Analysis Plan 180 days before starting closure. Approved plans must be in place before beginning closure. The Permit also specifies the requirements for the independent,

qualified, registered professional engineer when certifying closure. Ecology reserves the right to require additional sampling.

Permit Condition III.10.C.8.b. requires the Permittees to submit a revised and updated WTP closure plan 18 months before the start of cold commissioning. This revision will include the information that is not currently available. The facility will not be allowed to start operations until the plan is approved by Ecology.

3.5.1.8 Critical Systems

In the Hanford Facility Permit definitions the term "Critical Systems" is defined as follows:

> *"The term "**Critical Systems,**" as applied to determining whether a Permit Modification is required, means those specific portions of a TSD unit's structure, or equipment, whose failure could lead to the release of dangerous waste into the environment, and/or systems which include processes which treat, transfer, store, or dispose of regulated wastes. A list identifying the critical systems of a specific TSD unit may be developed and included in Part III, V, and/or VI of this Permit. In developing a critical system list, or in the absence of a critical system list, WAC 173-303-830 Modifications shall be considered."*

The design of WTP is broken down by plant and each plant is broken down into smaller design "systems." Each system is designated by a name and a three-letter code [e.g., Technetium Ion Exchange System (TXP), Waste Feed Evaporation Process system (FEP)]. Many of the WTP design systems are described in the permit application. Based on the permit application, a list of WTP critical systems (systems which include processes which treat, transfer, store, or dispose of regulated wastes) was developed and included in Attachment 51, Appendix 2.0 of this Permit. This departs somewhat from the critical systems definition used in the Hanford Facility Permit definition above, which, in addition to defining equipment that treat, transfer, store, or dispose of regulated wastes, also includes the facility's structure and equipment that prevents dangerous and mixed waste from escaping to the environment. The structures and equipment are mainly the secondary containment systems and the air emissions control systems. In Section III.10 of this Permit, secondary containment, containment buildings, and air emissions control equipment shall be considered part of the individual tank, container, or miscellaneous unit and will be included with the appropriate critical system in Attachment 51, Appendix 2.0. As design information becomes available, Ecology reserves the right in Condition III.10.C.9.b. to add additional systems to the critical systems list.

This section also includes requirements for Ecology review and approval of design change notices and nonconformance reports that are generated during the construction of the WTP.

3.5.1.9 Equivalent Materials

Permit Condition III.10.C.10.a. allows the Permittee the flexibility to substitute equivalent or superior equipment, materials, and administrative information (such as names, phone numbers, addresses) for those specified in this Permit. Use of such equivalent or superior items are not considered a modification of the Permit as long as the equipment etc, is within the limits (e.g., ranges, tolerances, and alternatives) already clearly specified in sufficient detail in the attachments to this Permit. If Ecology determines that the change is not equivalent, Permit Condition III.10.C.10.b. requires the Permittee use the permit modification process in WAC 173-303-830.

3.5.1.10 Risk Assessment

The Permit requires the Permittees to perform a risk assessment consistent with WAC 173-303-680 and WAC 173-303-812(2)(b)(ii) pursuant to EPA's policy that the permitting processes for hazardous waste combusters (i.e., includes incinerators) or thermal treatment process of similar or greater complexity (e.g., with respect to design, operations and potential emissions) must address site-specific risks not otherwise

addressed by existing regulations. On July 30, 1999, EPA's Administrator signed the rule for "Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors" (40 CFR Part 63 Subpart EEE). As part of the preamble to the final rule, EPA outlined some of the limitations of the national risk assessment which was performed for the final rule including: (1) No assessment of risk from nondioxin products of incomplete combustion, and (2) By its nature, a national risk assessment cannot address unique site-specific considerations. As a result of these limitations, Ecology continues to recognize the need for site-specific analysis to assure that a given hazardous waste combustor or thermal treatment process of similar or greater complexity is operated in a manner that is protective of human health and the environment as required under the Dangerous Waste regulations. Unique site-specific considerations for the WTP include the presence of sensitive receptors with potentially significantly different intakes/exposures (e.g., Native Americans), presence of significant ecological considerations [proximity to particular sensitive ecosystems (e.g., salmon, eagles, etc.)] and the special considerations associated with the radioactive components of the emissions.

This risk assessment will include an evaluation of risks from people eating foods and breathing air potentially contaminated by the emissions from the WTP. The risk assessment will also be required to look at risks to plants and animals living in areas potentially contaminated by the emissions from the WTP. The risk assessment will be used to determine if any operating conditions, in addition to those specified in the regulations are needed to ensure that the WTP will be protective of human health and the environment.

Two phases of risk assessment are required to be performed under the Permit. The first phase is a Preliminary Risk Assessment which will be performed prior to operation of the facility based on estimated emissions from the proposed waste management operations. The second phase is the Final Risk Assessment to be performed after WTP construction and demonstration testing of the LAW and HLW Vitrification Systems. This second phase incorporates the actual emission data from the LAW and HLW Vitrification System with the estimated emission data from the other WTP waste management operations.

Work on the Risk Assessment Work Plan has been proceeding for several years. The draft work plan has been reviewed by Ecology and EPA, comments issued, and resolved. The Permittees did not have sufficient time to incorporate the comments into the work plan before issuance of this permit modification. The Preliminary Risk Assessment Work Plan, comments, and comment resolutions are attached to the Permit in Attachment 51, Appendices 6.1.1 and 6.1.2. Permit Condition III.10.C.11.a. requires the work plan comments be incorporated and the Risk Assessment Work Plan incorporated into the Permit as a permit modification with a public review process.

The Risk Assessment Work Plan details how both phases of the risk assessment will be performed. The Preliminary Risk Assessment Report (phase one) will be used to further refine the constituents of concern (chemicals and radionuclides), exposure pathways, exposure impact locations, and potential receptors (human and ecological) for incorporation into the Final Risk Assessment. The further refinement of the constituents of concerns will also be incorporated into LAW and HLW Vitrification Systems' Demonstration Tests. During the Demonstration Tests during cold (nonradioactive) commissioning, sampling will be conducted to measure the concentrations of chemical constituents in the LAW and HLW Vitrification Systems' emissions under controlled conditions. The purpose of the Demonstration Test is to collect data that will be used in the Final Risk Assessment Report and to demonstrate the ability of the HLW and LAW Vitrification Systems to meet the performance standards specified in Permit Conditions III.10.H.1.b., III.10.I.1.b., III.10.J.1.b.,and III.10.K.1.b. at the outer boundaries of their operating conditions. Additional details on the performance standards can be found in Sections 3.5.6 and 3.5.7 of this Fact Sheet. The Final Risk Assessment Report will be used to assure that Permit limits for operations of the WTP that are protective of human health and the environment.

The basis for the Permit requirements under Permit Section III.10.C.11 for performance of the risk assessment for the WTP is WAC 173-303-812(2)(b)(ii) and WAC 173-303-680(2).

3.5.1.11 Air Emissions

Permit Condition III.10.C.12 requires the Permittees to obtain permit modifications prior to installing or using equipment or waste management processes which would be subject to the organic emissions controls requirements of WAC 173-303-690, -691, or -692.

3.5.1.12 Remote Access

Permit Condition III.10.C.13 requires the Permittees to provide to Ecology onsite, unrestricted twenty-four (24) access to key WTP operating and emission monitoring data. This permit condition provides an Ecology only use computer station for monitoring WTP operations to assure that the thermal treatment systems are operated to be protective of human health and the environment. This permit condition is based on WAC 173-303-815(2)(b)(ii) and WAC 173-303-680(3).

3.5.1.13 Performance Demonstration Test

The Permittees are required by Sections III.10.H and III.10.J to complete performance demonstration tests prior to receiving mixed waste into the WTP Facility. The purpose of the Demonstration Tests is to collect data that will be used in the Final Risk Assessment Report and to demonstrate the ability of the HLW and LAW Vitrification Systems to meet the performance standards specified in Permit Conditions III.10.H.1.b., III.10.I.1.b., III.10.J.1.b., and III.10.K.1.b. at the outer boundaries of their operating conditions. One of the tests required to be performed is a demonstration that the Vitrification systems can achieve an organic Destruction and Removal Efficiency (DRE) of 99.99 %. In order to perform the test, the Permittees will have to spike the waste simulant feed to the melters during cold commissioning with a known amount of selected organic constituents and measure the concentration of the constituent after treatment and before discharge. For details on the testing see Sections 3.5.6 and 3.5.7 of this Fact Sheet.

The Permittees have expressed the concern that injecting high concentrations of organics into the melters will change the chemistry of the melt and cause the metals in the melt to form metal sulfides. The metal sulfides would sink to the bottom of the melter and could short-circuit the melter electrodes. The melter would then become unusable and have to be replaced. Experience with melters has shown that the formation of a metals layer can be a major limiting factor on melter life. There is no data available to quantify the amount of organics that would cause an unacceptable build-up of metals in melters. However, failure of the WTP melters due to organic spikes during demonstration testing is not acceptable to the Permittees or to Ecology.

To address this problem the Permittees have agreed to Permit Condition III.10.C.14 which requires pilot-scale tests be performed on the one third scale prototype melter, located in Maryland. A test plan will be submitted to Ecology for approval by January 31, 2004, and the tests will be completed by November 15, 2004. It is expected that the pilot scale program will determine if the spiking of organics will have an adverse effect on melter life. If the pilot scale testing results in melter failure, no further testing at high concentrations will be required for the WTP melters. The Permittees would have to modify the demonstration test plan to include the pilot-scale results and an alternative method of demonstrating that the DRE requirement has been met.

3.5.2 Containers

Regulations in WAC 173-303-630 address requirements for design and management of container storage areas, and containers within those areas at a dangerous waste TSD facility. Information addressing WAC 173-303-630 requirements is included in Attachment 51, Chapter 4.0, Section 4.2.1 of this permit modification. The information addresses how each container storage area and containers stored within those areas are managed in compliance with the dangerous waste regulations.

WAC 173-303-630(3) requires containers of dangerous waste to be labeled in a manner which adequately identifies the major risk(s) associated with the contents of the containers for employees, emergency response personnel, and the public. This requirement will be modified for the ILAW and IHLW containers. Due to the expected high radioactivity levels of the ILAW and IHLW containers, they will be handled remotely using a combination of cranes and hoists with grappling equipment that could scratch or tear a conventional label, rendering it unreadable. In addition, the expected radioactivity levels of the containers would eventually destroy a conventional label. Finally, employee, emergency response personnel, and public access to areas where ILAW and IHLW containers are to be stored will be limited and controlled administratively, also due to high radioactivity levels. In place of a conventional label, a unique identifier welded onto the shoulder and side wall of each container at the time of container construction will be used, as described in Attachment 51, Chapter 4.0, Section 4.2.1.3 of this permit modification, and as required pursuant to Permit Condition III.10.D.5.a. Each container's unique identifier will be tracked using the plant information network (i.e., plant tracking system), and will include dangerous waste numbers and major risk(s) associated with the dangerous waste in that particular container. In addition, Permit Condition III.10.D.5.c. requires the Permittees to post entrances and access points to all ILAW and IHLW container storage areas, and any other areas where ILAW and IHLW containers are handled, with signs that clearly identify the major risk(s) associated with the containers of ILAW and IHLW. Ecology believes the proposed alternative meets the intent of the regulatory requirement, while continuing to ensure personnel safety.

WAC 173-303-630(5)(c) requires a minimum thirty-inch separation between aisles of containers holding dangerous waste(s). The purpose of this requirement is to allow an inspector access to the containers and the container storage area and to ensure access in the event of a release or emergency. This requirement will be modified for the containers of ILAW and IHLW. Direct access to containers of ILAW and IHLW for the purposes of inspection is precluded due to high radioactivity levels. Therefore, general inspections of the ILAW and IHLW containers and container storage areas will be performed remotely with closed circuit television cameras or by cell window, as described in Attachment 51, Chapter 6.0, Section 6.2.4.1 and Appendix 6A, Table 6A-2 of this permit modification. Permit Condition III.10.D.4.b.ii. requires the physical arrangement (i.e., spacing) of immobilized LAW and HLW waste containers to be as described in Attachment 51, Chapter 4.0, Section 4.2.1.2.1 of this permit modification, which specifies a range of four (4) to sixteen (16) inches between containers. The combination of the container spacing and location of the unique identifier on each containers shoulder will allow an inspector to remotely identify and inspect any container stored within these areas. Ecology believes the proposed alternative meets the intent of the regulatory requirement, while continuing to ensure personnel safety.

WAC 173-303-630(6) requires areas where containers are stored, to be inspected weekly, looking for leaking or deteriorating containers, and deterioration of the containment system. The ILAW and IHLW container storage areas do not have containment systems pursuant to WAC 173-303-630(7)(a), as they will not be storing wastes that contain free liquids, exhibit the characteristics of ignitability or reactivity as described in WAC 173-303-090(5) or (7), and will not be designated as F020, F021, F022, F023, F026, or F027 dangerous wastes [WAC 173-303-630(7)(c)]. The ILAW and IHLW container storage areas and container stored within those areas will be generally inspected weekly by remote means with closed circuit television cameras when the container storage areas are in use. A thorough inspection of each ILAW and IHLW container will be performed remotely when they are placed into, or removed from the container storage areas, as described in Attachment 51, Chapter 6.0, Section 6.2.4.1 and Appendix 6A, Table 6A-2 of this permit modification. Remote inspection of the ILAW and IHLW is necessary, as personnel entry is precluded due to high radioactivity levels. In addition, the ILAW and IHLW containers will be cooled, will be will be chemically and physically stable, and lids welded on prior to transferring to the ILAW and IHLW container storage areas. For the reasons above, Ecology believes the proposed alternative inspection is reasonable, and equally protective of human health and the environment.

Because the design of the facility and its container storage areas is not complete, not all the information needed for the container storage areas is currently available. As a result, Ecology has written a compliance schedule in Permit Condition III.10.D.10. that requires compliance with the regulations in WAC 173-303-

630 and WAC 173-303-806(4)(a) and (b), and describes, in as much detail as possible at this time, the information that needs to be submitted to comply with the requirements for container storage areas. The engineering information required in Permit Condition III.10.D.10.b. must be incorporated into the Permit through the permit modification process before construction can begin on those particular areas. The operational information required in Permit Condition III.10.D.10.c. must be incorporated into the Permit through the permit modification process prior to the initial receipt of dangerous or mixed waste in those container storage areas.

3.5.3 Tank Systems

During the development of the DWPA, ORP and BNI made several regulatory interpretations, which are not consistent with the regulations. One interpretation concerns the evaporation or volatilization of mixed waste at the WTP in units such as evaporators and melters. ORP and BNI determined that waste, once vaporized into the air emission control system, is not considered a contained gas and would be a newly generated waste and no longer carry the listed codes acquired from tank farms (F001 through F005).

Ecology has determined this interpretation is incorrect. The preamble discussion in the December 11, 1989, Federal Register clearly identifies condensed gases as being regulated under RCRA (December 11, 1989; 54 FR 50973). Residues from treating, storing, or disposing of a listed dangerous waste continue to be listed dangerous wastes under the derived from rule [WAC 173-303-070(2)(a)]. The only way such a residue ceases to be dangerous is if the generator petitions the Department for a delisting and is granted that delisting. This is consistent with the regulation of process condensate from the 242-A Evaporator, which is a listed waste until exempted after treatment at the 200 ETF. Therefore, gases and/or process condensate resulting from treatment, either in tanks or in the off-gas systems, will continue to be a listed waste until delisted. As a result of this determination, tanks containing process condensate are regulated under WAC 173-303 and need to be included in this Permit. Permit Condition II.10.E.9.e.vi. requires the Permittees to update the list of tanks in Permit Tables III.10.E.A and III.10.E.B, and update Attachment 51, Chapter 4.0 of this permit modification.

Another interpretation made by ORP and BNI assumed that process water could be blended with process condensate and it would not become listed waste. Ecology has determined that if process water includes recycled process condensate derived from a listed waste, the process water used in the facilities will be regulated as a dangerous waste. According to WAC 173-303-082(3), "If a person mixes a solid waste with a waste that would be designated as a dangerous waste source under this section, then the entire mixture is designated as a dangerous waste source. The mixture has the same designation (DW), and the same dangerous waste number as the dangerous waste source which was mixed with the solid waste." As a result, tanks containing process water that has been blended with process condensate are regulated under WAC 173-303 and need to be included in this Permit. Permit Condition II.10.E.9.e.vi. requires the Permittees to update the list of tanks and Chapter 4.0 included in the Permit.

Because the design of the facility and its waste processing systems are not complete, not all the information needed to permit the tank system is currently available. As a result, Ecology has written Permit Condition III.10.E.9 to require compliance with the regulations in WAC 173-303-640 and WAC 173-303-806(4)(a) and (c), and have described, in as much detail as possible at this time, the information that needs to be submitted to comply with the requirements for tank systems. The submission of independent, qualified, registered professional engineer (IQRPE) certifications of tank structural integrity and material compatibility required by WAC 173-303-640(3)(a) must be incorporated into the Permit before the tanks can be installed. For the initial design package only, the IQRPE certification for the secondary containment structures in the below grade portions of the HLW and LAW Buildings will be submitted with the initial tank IQRPE certification submittal.

Permit Condition III.10.E.9.e.vi. requires the Permittees to submit an updated Chapter 4.0, narrative descriptions, and tables and figures to Ecology, for approval, prior to the receipt of any waste. The revised

information will be incorporated into this Permit in accordance with the compliance schedule in Attachment 51, Appendix 1.0.

WAC 173-303-640(5)(d) requires all tank systems holding dangerous waste to be marked with labels or signs to identify the waste contained in the tank. The label, or sign, must be legible at a distance of at least fifty feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s). (Note: If there already is a system in use that performs this function in accordance with local, state, or federal regulations, then such system will be adequate.) Attachment 51, Chapter 4.0, Section 4.2.2.9 describes how the Permittees will mark accessible tanks. Permit Condition III.10.E.5.f. requires the Permittees to mark accessible tank systems in accordance with WAC 173-303-640(5)(d). Many tank systems will be routinely non-accessible to personnel (i.e., personnel are unable to enter these areas while waste is being managed in them) due to expected high radioactivity levels in those areas. Permit Condition III.10.E.5.e. requires the Permittees to mark routinely non-accessible tank system access points in accordance with WAC 173-303-640(5)(d). In addition, Permit Condition III.10.E.9.e.vi. requires the Permittees to update Attachment 51, Chapter 4.0 of this permit modification to include a list of routinely non-accessible tank systems. Ecology believes the proposed alternative meets the intent of the regulatory requirement, while continuing to ensure personnel safety.

WAC 173-303-640(6)(b)(i) requires aboveground portions of the tank system, if any, to be inspected at least once each operating day to detect corrosion or releases of dangerous waste. While most of the tank systems will be located aboveground (i.e., above grade), many of them will be routinely non-accessible to personnel due to expected high radioactivity levels in those areas, as discussed above. With the exception of the two outside tanks at the pretreatment plant, the tanks will be located indoors within process cells, process rooms, or caves with controlled access. Many of these areas will not have direct or remote visual inspection capabilities on a daily basis. For tank system areas where direct or remote daily visual inspection is not feasible, continuous, leak detection systems for those areas is required pursuant to Permit Condition III.10.E.9.b.ii. Normally, continuous leak detection systems are only required for double-walled tanks where an inspection of the tank system to detect corrosion or releases of dangerous waste is not possible. Ecology believes providing these non-accessible areas with continuous leak detection systems, in lieu of a daily, direct or remote visual inspection, meets the intent of the regulatory requirement, while continuing to ensure personnel safety, and protection of human health and the environment.

WAC 173-303-640(7) requires tank systems or secondary containment systems from which there has been a leak or spill, or which is unfit for use, to be removed from service immediately. The tank system is to remain out of service until the owner/operator fulfills a set of requirements including identifying the source of the leak or spill, cleaning up the leak or spill, and repairing the damaged tank system. Permit Condition III.10.E.5.i.i. requires the Permittees (upon detection of a leak or spill of dangerous and/or mixed waste), to immediately and safely stop the flow of dangerous and/or mixed waste into the tank system or secondary containment system. Permit Condition III.10.E.5.i.i. was written to ensure the sequence of actions taken by the Permittees are consistent with the WTP Facility safety basis, and are most protective of personnel safety, human health, and the environment.

3.5.4 Containment Buildings

Regulations for containment buildings are found in WAC 173-303-695, which incorporates by reference federal requirements for containment buildings found in 40 CFR Part 264 Subpart DD. The containment building designation was developed to provide a method for storing and managing dry, bulk (uncontainerized) dangerous waste. The regulations are primarily designed to prevent the migration of waste and dust from the containment building holding the dangerous waste.

The Permittees have requested containment building designations for 12 areas within the WTP. The containment building designation gives the facility more operational flexibility by allowing the treatment and

storage of uncontained equipment in the designated areas of the WTP. During operations routine maintenance activities, including replacing pumps, valves, melter components, etc. will occur. Some equipment will need to be repaired in maintenance rooms in each of the three process buildings. Before equipment can be removed from the facility, it may need to be size reduced, decontaminated (to reduce radiation levels), and containerized for disposal. These activities are considered treatment as defined in WAC 173-303-040. The Permittees have requested that these areas be classified as "containment buildings" because treatment is allowed in containment buildings. Container storage areas as defined in WAC 173-303-630 are for storage of closed containerized waste, not waste treatment. Containment buildings will provide the Permittees the flexibility to repair, store, or containerize solid dangerous and mixed wastes as needed in the designated areas.

For treatment or storage of dangerous and mixed waste with free liquids (e.g., routine decontamination in designated areas) 40 CFR 264.1101 has additional requirements, including the requirement for primary and secondary containment barriers with leak detection. The secondary containment requirements are detailed in 40CFR 264.1101(b) (Design and Operating Standards). Decontamination or other treatment with free liquids must be contained within the primary barrier. The 40CFR 264.1101(b) containment requirements are similar to the tank containment requirements in WAC 173-303-640.

Any closed containers stored in the containment buildings that are not removed from the containment building areas within 90 days of generation are required to be identified per Permit Condition III.10.F.5.e. There are no additional container requirements in 40 CFR 264.1101. Therefore, closed containers storing dangerous or mixed waste within a containment building must be stored in container storage areas and comply with the container requirements in WAC 173-303-630. These container storage areas will be identified in Permit Section III.10.D (container conditions).

Regulations in 40 CFR 264.1101(c)(2) require the certification of a qualified registered professional engineer that the containment building unit's design meets applicable requirements. These requirements include certification of the structural integrity of the containment building floor, walls and ceiling, the ability of the structure to contain the waste, and the type of liner the containment building is utilizing.

The Permittees have indicated in the permit application that some of the containment building units will be certified to treat with free liquids and other areas will not. Permit Condition III.10.F.5.e. requires the Permittees to identify areas that will treat with free liquids and will prohibit treatment with free liquids in areas not certified to meet the regulatory requirements. This condition also requires the Permittees to identify container storage areas within the containment buildings units.

3.5.5 Pretreatment Plant Miscellaneous Unit Systems

WAC 173-303-680 addresses requirements for "miscellaneous units." Under WAC 173-303-040, a "miscellaneous unit" means a dangerous waste management unit where dangerous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR Part 146, containment building, corrective action management unit, temporary unit, staging pile, or unit eligible for a research, development, and demonstration permit under WAC 173-303-809.

The pretreatment waste feed evaporator separator vessels, LAW evaporator separator vessel, cesium evaporator, and technetium eluant recovery evaporator are thermal treatment units as defined in WAC 173-303-040, and are designed to separate the incoming liquid waste stream into a vapor stream and a concentrated liquid stream. Thermal treatment as defined in WAC 173-303-040 means, the treatment of dangerous waste in a device which uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the dangerous waste.

Attachment 51, Chapter 4.0, Sections 4.1.2.2, 4.1.2.6, 4.1.2.9, and 4.1.2.11 of this permit modification describes each evaporator's process in more detail. Treatment that is typical of tanks includes pH adjustment, minor chemical addition, blending, mixing etc. The thermal treatment that will be occurring in the evaporators is more complex than typical tank treatment, and as such, the Waste Feed Evaporation System, Cesium Nitric Acid Recovery System, Technetium Eluant Recovery Process System, and the Treated LAW Evaporation system are properly classified as "miscellaneous unit systems" under WAC 173-303-680.

These miscellaneous unit systems include support systems such as tanks and share an air emission treatment train. The air emission treatment train, which is referred to as the Pretreatment Vessel Vent Process System, is also shared by the other mixed waste management operations (containers storage, tanks systems, and containment building units) in the Pretreatment Building. The Pretreatment Vessel Vent Process System is primarily comprised of scrubbers, filters, absorbers, and a catalytic oxidizer to treat/remove constituents in the air emissions from the mixed waste management operations in the Pretreatment Building prior to release to the atmosphere from the Pretreatment Building Stack. Please note, Permit Table III.10.G.A includes some tanks that are regulated in Permit Section III.10.E, "Tank Systems." These tanks have been marked with an asterisk, and the table footnote explains they have been included in Permit Table III.10.G.A for system description completeness only, and are regulated under Permit Section III.10.E, "Tank Systems."

The requirements that Ecology has determined to be appropriate and included in this Permit for these miscellaneous unit systems include the following:

- General and Miscellaneous Unit System Specific Waste Management Requirements under Permit Conditions III.10.A, B, and C, and III.10.G.1, G.5, and G.7-9., including, but not limited to, waste analysis, inspections, recordkeeping, procedures to prevent hazards, contingency planning, training, and closure. Additional details on these requirements are provided in Section 3.5.1 of this Fact Sheet. The basis for these conditions is WAC 173-303-680(2) and (3).

- Permit Conditions III.10.G.1, G.2, G.3, G.4, and G.10 address requirements for the miscellaneous unit systems including installation and certifications, secondary containment, and integrity assessments as appropriate requirements from WAC 173-303-640 for tanks based on WAC 173-303-680(2) and (3). Additional details on these requirements are provided under Section 3.5.2 of this Fact Sheet.

- Permit Conditions III.10.G.5 and G.6 addresses requirements for operation of the miscellaneous unit systems including, but not limited to, maintaining impermeable coating on concrete containment systems, procedures for responding to leaks and preventing release of toxic emissions into the air as appropriate requirements from WAC 173-303-640 and WAC 173-303-806(4)(a) and (c) based on WAC 173-303-680(2) and (3).

- Permit Conditions III.10.G.5.l. and III.10.G.6 also includes requirements that assure the operation of the miscellaneous unit systems (treatment effectiveness, feedrates, and operating limits) in the Pretreatment Buildings combined with the other mixed waste management operations in the Pretreatment Building are consistent with the assumptions and basis reflected for the Pretreatment Building in the Risk Assessment described in Section 3.5.1.10 of this Fact Sheet. The emission limits at Permit Table III.10.G.D., which are currently reserved, will initially be established based on the Preliminary Risk Assessment and then updated based on the Final Risk Assessment. The Permittee's compliance with these operating requirements for miscellaneous unit systems and other mixed waste management operations in the Pretreatment Building is an essential element in Ecology's determination that the WTP Facility operated in accordance with this Permit will be protective of human health and the environment. The basis for these operating requirements are WAC 173-303-815(2)(b)(ii) and WAC 173-303-680(2) and (3).

Because the design of the facility and its waste processing systems are not complete, not all the information needed to permit the miscellaneous unit systems is currently available. As a result, Ecology has written Permit Condition III.10.G.10, similar to Permit Condition III.10.E.9, to require compliance with the appropriate requirements in WAC 173-303-640 and WAC 173-303-806(4)(a) and (c) based on WAC 173-303-680 and the appropriate requirements in WAC 173-303-806(4)(i), and have described, in as much detail as possible at this time, the information that needs to be submitted to comply with the requirements for miscellaneous unit systems. The submission of independent, qualified, registered professional engineer (IQRPE) certifications of miscellaneous unit structural integrity and material compatibility must be incorporated into the Permit before the miscellaneous units can be installed. For the initial design package only, the IQRPE certification for the secondary containment structures in the below grade portions of the Pretreatment Buildings will be submitted with the initial miscellaneous unit IQRPE certification submittal.

3.5.6 Low Activity (LAW) and High Level Waste (HLW) Vitrification Systems Short Term Operations

Permit Sections III.10.H and III.10.J set forth conditions and includes testing for treatment in the LAW and HLW Vitrification Systems. The LAW and HLW Vitrification Systems include the melter feed system (piping and pumps to convey wastes from tanks to the melter), the melters and the downstream air pollution control systems (e.g., scrubbers, filters, coolers, oxidation units, reduction units, etc.). The LAW and HLW Vitrification Systems have been determined to not the fit the definition of container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, or underground injection well. Therefore, the LAW and HLW Vitrification systems are categorized as miscellaneous treatment units under WAC 173-303-680.

In accordance with WAC 173-303-680, the requirements that are appropriate for the miscellaneous units being permitted are included in these sections. In determining what appropriate requirements apply to the LAW and HLW Vitrification systems, the wastes that will be treated, and what occurs to the constituents contained in the waste, are major factors. These requirements include limitations for waste management, secondary containment, integrity assessments, and certifications as required under Permit Section III.10.E for tanks. Also like an incinerator, the LAW and HLW Vitrification Systems will: (1) volatilize organics; (2) breakdown organics (i.e., destroy); (3) promote formation of products incomplete destruction; (4) remove organics and metals and transfer to liquid, solid and./or gas media; and (5) collect and remove acid gases and particulate matter.

The requirements that Ecology has determined to be appropriate and included in this Permit for the LAW and HLW Vitrification Systems include the following:

- General and LAW and HLW Vitrification Systems Specific Waste Management Requirements under Permit Conditions III.10.A, B, and C, III.10.H.1.d., f., and g., III.H.2.c., III.H.3.c., III.H.4.c., III.10.J.1.d., f., g., III.J.2.c., III.J.3.c., and III.J.4.c. addressing, but not limited to, waste analysis, inspections, recordkeeping, procedures to prevent hazards, contingency planning, training, and closure. Additional details on these requirements are provided in Section 3.5.1 of this Fact Sheet. The basis for these conditions is WAC 173-303-680(2) and (3).

- Permit Conditions III.10.H.1.a. and III.10.J.1.a. address requirements for the LAW and HLW Vitrification Systems including installation and certifications, secondary containment, and integrity assessments as appropriate requirements from WAC 173-303-640 for tanks based on WAC 173-303-680(2) and (3). Additional details on these requirements are provided under Section 3.5.2 of this Fact Sheet.

- Permit Conditions III.10.H.1.a. and III.10.J.1.a. also addresss requirements for operation of the LAW and HLW Vitrification Systems including, but not limited to, maintaining impermeable coating on concrete containment systems, procedures for responding to leaks and preventing release of toxic

emissions into the air as appropriate requirements from WAC 173-303-640 and WAC 173-303-806(4)(a) and (c) based on WAC 173-303-680(2) and (3).

– Permit Conditions III.10.H.1.b. and III.10.I.1.b require compliance with appropriate performance standards as specified in WAC 173-303-670 and 40 CFR Part 63 Subpart EEE for incinerators based on WAC 173-303-680(2) and (3), including:

  - 99.99% destruction and removal efficiency (DRE) for organics;
  - carbon monoxide (C0) at or less than 100 parts per million by volume on an hourly rolling average basis;
  - hydrocarbon (HC) at or less than 20 parts per million by volume on an hourly rolling average basis;
  - particulate matter (PM) at or less than .015 grains per dry standards cubic foot;
  - hydrochloric acid and chlorine gas emission shall not exceed 21 parts per million on a volume basis;
  - mercury emission at or less than 45 micrograms (µg) per dry standard cubic meter (dscm);
  - lead and cadmium emissions at or less than 120 µg/dscm;
  - arsencic, beryllim, and chromium emissions at or less than 97 µg/dscm; and
  - dioxin and furan emissions at or less than .2 nanograms (ng)/dscm.

  Air is used in the LAW and HLW Vitrification Systems to operate components, provide negative pressure control, and ventilate process vessels. Compared to an incinerator, the consumption of oxygen in the melters is not significant as the melters use electrical heating instead of fossil fuel to process the waste. The lack of significant consumption of oxygen in the melters combined with the large inputs of air into the LAW and HLW Vitrification Systems to operate components, provide negative pressure control, and ventilate process vessels, results in high oxygen levels in the LAW and HLW Vitrification Systems' exhaust. The standard correction of emission standards to 7% oxygen for incinerators is not being applied to the LAW and HLW Vitrification Systems, as it is technically inappropriate.

– Permit Conditions III.10.H.1.b., III.10.J.1.b., III.10.H.1.c., III.10.J.1.c., III.10.H.1.e., and III.10.J.1.e. also include requirements that assure the operation of the HLW and LAW Vitrification Systems (treatment effectiveness, feedrates, and operating limits) in the LAW and HLW Buildings combined with the other mixed waste management operations in the HLW and LAW Buildings are consistent with the assumptions and basis reflected for the LAW and HLW Buildings in the Risk Assessment described in Section 3.5.1.10 of this Fact Sheet. The emission limits at Permit Tables III.10.H.E and III.10.J.E, which are currently reserved, will be established for short term operations of the LAW and HLW Vitrifications Systems based on the Preliminary Risk Assessment. The Permittee's compliance with these operating requirements for LAW and HLW Vitrifications Systems and other mixed waste management operations in the LAW and HLW Buildings is an essential element in Ecology's determination that the WTP Facility operated in accordance with this Permit will be protective of human health and the environment. The basis for these operating requirements are WAC 173-303-81592)(b)(ii) and WAC 173-303-680(2) and (3).

– Permit Conditions III.10.H.1.c. and III.10.J.1.d. include requirements for reporting, operation, and maintenance of automatic waste feed cut-off systems when LAW and HLW Vitrification Systems

operating conditions deviate from those operating limits to be specified in Permit Tables III.10.H.C, III.10.H.F, III.10.J.C, and III.10.J.F. These Permit Tables are currently reserved and will be established for short term operations of the LAW and HLW Vitrification Systems based on completed design information to be submitted to Ecology under Permit Conditions III.10.H.5 and III.10.J.5 (Compliance Schedules). The basis for these requirements are WAC 173-303-680(2) and (3).

- Permit Conditions III.10.H.2, 3, and 4, and III.10.J.2, 3, and 4 include requirements for the start-up, demonstration testing and post demonstration test operations of the LAW and HLW Vitrification Systems until such time as Ecology approves the Demonstration Test Report(s) and Final Risk Assessment Report and finalizes the operating conditions based on these Reports. These permit conditions also include requirements for ceasing dangerous and mixed waste feed to the LAW and HLW Vitrification Systems under operating conditions where performance standards are not met. The basis for these requirements are WAC 173-303-680(2) and (3).

Because the design of the facility and its waste processing systems are not complete, not all the information needed to permit the LAW and HLW Vitrifications Systems is currently available. As a result, Ecology has written Permit Conditions III.10.H.5 and III.10.J.5, similar to Permit Condition III.10.G.10, to require compliance with the appropriate requirements in WAC 173-303-640, WAC 173-303-670, 40 CFR Part 63 Subpart EEE, and WAC 173-303-806(4)(a), (c), and (f) based on WAC 173-303-680 and the appropriate requirements in WAC 173-303-806(4)(i), and have described, in as much detail as possible at this time, the information that needs to be submitted to comply with the requirements for these systems. The submission of independent, qualified, registered professional engineer (IQRPE) certifications of LAW and HLW Vitrification Systems structural integrity and material compatibility must be incorporated into the Permit before the LAW and Vitrification Systems can be installed. For the initial design package only, the IQRPE certification for the secondary containment structures in the below grade portions of the LAW and HLW Buildings will be submitted with the initial IQRPE certification submittal.

3.5.7 LAW and HLW Vitrification Systems Long Term Operation

Permit Sections III.10.I and III.10.K set forth conditions for normal operation of the LAW and HLW Vitrifications Systems following successful operation and demonstration testing of these systems under Permit Sections III.10.H and III.10.J.

- General and LAW and HLW Vitrification Systems Specific Waste Management Requirements under Permit Conditions III.10.A, B, and C, III.10.I.1.d., f., and g., III.I.2.c., III.I.3.c., III.I.4.c., III.10.K.1.d., f., and g., III.10.K.2.c., III.10.K.3.c., and III.10.K.4.d. addressing, but not limited to, waste analysis, inspections, recordkeeping, procedures to prevent hazards, contingency planning, training, and closure. Additional details on these requirements are provided in Section 3.5.1 of this Fact Sheet. The basis for these conditions is WAC 173-303-680(2) and (3).

- Permit Conditions III.10.I.1.a. and III.10.K.1.a. address requirements for the LAW and HLW Vitrification Systems including maintaining design and construction, certifications, secondary containment, and integrity assessments, as appropriate requirements from WAC 173-303-640 for tanks based on WAC 173-303-680(2) and (3). Additional details on these requirements are provided under Section 3.5.2 of this Fact Sheet.

- Permit Conditions III.10.I.1.a. and III.10.K.1.a. also addresses requirements for operation of the LAW and HLW Vitrification Systems including, but not limited to, maintaining impermeable coating on concrete containment systems, procedures for responding to leaks and preventing release of toxic emissions into the air as appropriate requirements from WAC 173-303-640 and WAC 173-303-806(4)(a) and (c) based on WAC 173-303-680(2) and (3).

– Permit Conditions III.10.I.1.b. and III.10.K.1.b require compliance with appropriate performance standards as specified in WAC 173-303-670 and 40 CFR Part 63 Subpart EEE for incinerators based on WAC 173-303-680(2) and (3), including:

  - 99.99% destruction and removal efficiency (DRE) for organics;
  - carbon monoxide (C0) at or less than 100 parts per million by volume on an hourly rolling average basis;
  - hydrocarbon (HC) at or less than 20 parts per million by volume on an hourly rolling average basis;
  - particulate matter (PM) at or less than .015 grains per dry standards cubic foot;
  - hydrochloric acid and chlorine gas emission shall not exceed 21 parts per million on a volume basis;
  - mercury emission at or less than 45 micrograms (µg) per dry standard cubic meter (dscm);
  - lead and cadmium emissions at or less than 120 µg/dscm;
  - arsencic, beryllim, and chromium emissions at or less than 97 µg/dscm; and
  - dioxin and furan emissions at or less than .2 nanograms (ng)/dscm.

  Air is used in the LAW and HLW Vitrification Systems to operate components, provide negative pressure control, and ventilate process vessels. Compared to an incinerator the consumption of oxygen in the melters is not significant as the melters use electrical heating instead of fossil fuel to process the waste. The lack of significant consumption of oxygen in the melters combined with the large inputs of air into the LAW and HLW Vitrification Systems to operate components, provide negative pressure control, and ventilate process vessels, results in high oxygen levels in the LAW and HLW Vitrification Systems' exhaust. The standard correction of emission standards to 7% oxygen for incinerators is not being applied to the LAW and HLW Vitrification Systems, as it is technically inappropriate.

– Permit Conditions III.10.I.1.b., III.10.K.1.b., III.10.I.1.c., III.10.K.1.c., III.10.I.1.e., and III.10.K.1.e. also include requirements that assure the operation of the HLW and LAW Vitrification Systems (treatment effectiveness, feedrates, and operating limits) in the LAW and HLW Buildings combined with the other mixed waste management operations in the HLW and LAW Buildings are consistent with the assumptions and basis reflected for the LAW and HLW Buildings in the Risk Assessment described in Section 3.5.1.10 of this Fact Sheet. The emission limits at Permit Tables III.10.I.E and III.10.K.E, which are currently reserved, will be based on the Final Risk Assessment. The Permittee's compliance with these operating requirements for LAW and HLW Vitrifications Systems and other mixed waste management operations in the LAW and HLW Buildings is an essential element in Ecology's determination that the WTP Facility operated in accordance with this Permit will be protective of human health and the environment. The basis for these operating requirements are WAC 173-303-815(2)(b)(ii) and WAC 173-303-680(2) and (3).

– Permit Conditions III.10.I.1.c. and III.10.K.1.c. include requirements for reporting, operation, and maintenance of automatic waste feed cut-off systems when LAW and HLW Vitrification Systems operating conditions deviate from those operating limits to be specified in Permit Tables III.10.I.C and F, and III.10.K.C and F. These Permit Tables are currently reserved and will be based on the Demonstration Test and Final Risk Assessment Reports. Permit Conditions III.10.I.c.viii. and III.10.K.c.viii. require that the Permittees obtain Ecology approval to restart waste feed to the LAW and

HLW Vitrification Systems if the number of waste feed cut-offs due to deviations from Permit Tables III.10.I.F and III.10.K.F exceed thirty (30) in thirty calendar days. As this Permit includes a complex technology, the LAW and HLW Vitrification Systems, minimizing operations outside the specified operating limits is critical to assuring Ecology that operation of the WTP Facility continues to be protective of human health and the environment. The basis for these requirements are WAC 173-303-680(2) and (3).

– Permit Conditions III.10.I.h. and III.10.K.h. include requirements for performance of additional emission testing of the LAW and HLW Vitrification Systems during the duration of this Permit to confirm continuing conformance with performance standards. As this Permit includes a complex technology, it is essential that its continued conformance with the performance standards be periodically reconfirmed. The re-occurrence frequency for this emission testing was established based on emission retesting freguency for hazardous waste incinerators specified in Hazardous Waste Combustion Maximum Achievable Control Technology (MACT) requirements under 40 CFR Part 63 Subpart EEE. The permit conditions require this additional emission testing be performed under normal operating conditions and feeds in contrast to the initial Demonstration Testing under Permit Sections III.10.H and III.10.J which is required to be performed at worst case operating conditions and feeds. These permit conditions also include requirements for ceasing dangerous and mixed waste feed to the LAW and HLW Vitrification Systems under operating conditions where performance standards are not met. These permit conditions are based on WAC 173-303-680(2) and (3).

3.6 Changes to Permit Application Text

During review of the WTP Dangerous Waste Permit Application a number of errors and instances of unclear wording were found in the text and figures. Ecology modified the text where necessary. The changes are summarized in Table 1 below. Where the changes are substantial, Ecology is requiring that the text be clarified by the Permittees through permit condition requirements.

Table 1: Text Changes in Attached Permit Application Chapters

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
Page 3-3, Line 41 Page 3-4, Line 10 Section 2.1 in WAP (Appendix 3A)		Remove "other" from the sentence, now reads: "strontium and transuranic elements (TRU) …"
P3-21, L32 Sec. 5.2 in WAP (Appendix 3A)		Added "of ignitability (D001) and reactivity (D003)" to the last bullet, now reads: "Characteristic of ignitability (D001) and reactivity (D003) waste numbers can be removed after testing or the application of process knowledge, as appropriate."
		Permit Application Section 4.2 changed to Section 4.1 in the Attachment 51, Chapter 4. Permit Application Section 4.3 changed to Section 4.2 in the Attachment 51, Chapter 4. Permit Application Section 4.4 changed to Section 4.3 in the Attachment 51, Chapter 4.
		Permit Application Appendix 4B "Tank System Design Assessment" changed to Permit Attachment 51, Appendices 8.10, 9.10, 10.10, and 11.10.

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
		Permit Application Appendix 4C "Tank System Installation Inspection" changed to Permit Attachment 51, Appendices 8.11, 9.11, 10.11, and 11.11. Permit Application Appendix 4D "Treatment Effectiveness Report for Miscellaneous Units" changed to Permit Attachment 51, Appendices 9.16, and 10.16.
P4-5, L31 Sec. 4.1.2	DWPA-04-090	Deleted "and neutralize," now reads: "Concentrate the separated radionuclides"
P4-7, L30-40 Sec. 4.1.2.2	DWPA-04-092	Deleted "recirculation" from "recirculation pump" in the paragraphs, now reads: "A pump maintains a high flow rate around the evaporation system. The pump transfers the waste through the reboiler and back into the waste feed evaporator separator vessel. The recirculating waste stream is prevented from boiling in the reboiler tubes by maintaining sufficient hydrostatic head to increase the boiling point above the temperature of the liquor in the reboiler. As the liquid travels through the reboiler, the hydrostatic head diminishes and flash evaporation occurs as the flow enters the waste feed evaporator separator vessel. The liquid continues to flash and the vapor and liquid streams are separated. The liquid stream circulates in this closed loop and becomes more concentrated, while the vapor stream passes to the evaporator overheads system. The concentrate off-take comes from a pump and is discharged to evaporator concentrate buffer vessels (V12010A and V12010B) in the UFP."
P4-8, L1 Sec. 4.1.2.2		"If radiologically contaminated" change to "if the condensate does not meet the LERF/ETF waste acceptance criteria"
P4-8, L4 Sec. 4.1.2.2	DWPA-04-095	"CRP" changed to "FEP" in the following sentence: "Instrumentation, alarms, controls, and interlocks will be provided for the FEP to indicate or prevent the follows conditions:"
P4-8, L19 Sec. 4.1.2.3	DWPA-04-096	"LAW" changed to "LAW feed" in the following sentence: "The Ultrafiltration Process System (UFP) separates the concentrated waste feed from the evaporator system into a high solids stream, referred to as the HLW stream and a solids free stream, the LAW feed stream."
P4-8, L16 to P4-9, L24 Sec. 4.1.2.3	DWPA-04-097 DWPA-04-098 DWPA-04-101	Section 4.2.2.3 "Ultrafiltration Process System (UFP)" revised as follows: "4.2.2.3 Ultrafiltration Process System (UFP) The Ultrafiltration Process System (UFP) separates the concentrated waste feed from the evaporator system into a high solids stream, referred to as the HLW feed stream and a solids free stream, the LAW feed stream. The separated solids may undergo additional treatment (washing and/or leaching operation). These operations will be performed in the UFP system. In addition, the LAW feed stream may require Sr/TRU removal. This operation will also be performed in the UFP system prior to solids separation. The main components of the UFP system are:

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
		• Two evaporator concentrate buffer vessels (V12010A and V12010B) each equipped with pulse jet mixers and cooling jackets • Two concentrate transfer pumps • Two ultrafiltration feed vessels (V12011A and V12011B) each equipped with pulse jet mixers and cooling jackets • Two ultrafilter feed pumps • Two ultrafilter trains, each containing three individual ultrafilter units [(G12002A, G12003A, G12004A) and (G12002B, G12003B, G12004B)] • Associated ultrafilter backpulsing equipment • Three LAW permeate hold vessels (V12015A, V12015B, V12015C) each equipped with pulse jet mixers Ultrafiltration is a filtration process in which the waste stream is processed axially through the ultrafilters, which are long bundles of permeable tubes. Solids free liquids pass radially through the permeable ultrafilter tubes surface while the concentration of the solids in the recirculating stream continuously increases. The resulting solids slurry may need treatment such as caustic leaching and/or water washing to reduce interstitial liquid buildup to minimize the quantity of glass produced. Waste is received from the FEP into the evaporator concentrate buffer vessels (V12010A and V12010B) of the UFP system. The waste may be sampled here to determine the Ultrafiltration parameters. For Envelope C feeds, chemicals are added to the evaporator concentrate buffer vessel to precipitate strontium and TRU elements contained in the incoming waste stream prior to solids concentration by ultrafiltration. Heat (if required) and agitation are applied to ensure that the precipitation process is completed. The solids free stream generated by Ultrafiltration is designated as the LAW feed stream, which is then routed to one of the three LAW permeate hold vessels (V12015A, V12015B, or V12015C). Here, the permeate is sampled for solids prior to further processing, which includes cesium and technetium removal and additional evaporation prior to LAW vitrification. The concentrated slurry may then be washed with process water or caustic leached to remove interstitial liquid, soluble salts, and/or HLW glass limiting compounds and further processed through the ultrafilter. The concentrated solids stream, or HLW feed stream, is transferred to the lag storage vessels (V12001D and V12001E) of the HLW Lag Storage and Feed Blending System (HLP) and then on to the HLW vitrification process. The treated solids may also be returned to the DST system via the Waste Feed Receipt Process System (FRP). During waste processing, the permeability of the ultrafilters is reduced over time. Re-establishing the ultrafilters' permeability can be accomplished using one of two different methods which include backpulsing with filter permeate

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
		or cleaning utilizing nitric acid or caustic. Backpulsing may be utilized while the filter is in operation, but cleaning requires the filters to be out of operation. Filter performance will be monitored to determine when cleaning is required. Instrumentation, alarms, controls, and interlocks will be provided for the UFP system as follows: " ● Vessels have level instrumentation with high alarms and trip functions to minimize the chances of overflowing • Vessels have a designated overflow route designed to handle the largest possible flow rate into the vessels • Level instrumentation and overflow piping with alarm set points will be used to prevent the overfilling of the vessels and subsequent liquid discharge into the vessel vent system • In case of an in-cell equipment failure, the waste will remain within the secondary containment (C5 cell) which will have an engineered route back into the process • Leaks will be detected via sump instrumentation."
P4-10, L34 Sec. 4.1.2.5	DWPA-04-102	Deleted "standby" between "supply" and "reagents", now reads: "In addition, the cesium reagent vessel is used to supply demineralized water and caustic solutions, as well as to supply reagents (nitric acid, demineralized water, and caustic solution) for elution."
P4-11, L42 Sec. 4.1.2.5	DWPA-04-104	"low-level" changed to "high level" in the following sentence: "Loss of containment: Vessels are protected against containment loss by liquid level indication, high-level interlocks to shut off feed sources, and PCS control and alarm functions, as required."
P4-12, L33 Sec. 4.1.2.6		Added "routed through the waste feed evaporator, and" right after the world "after-condenser" to tie to Figure 4A-10
P4-13, L18 Sec. 4.1.2.6	DWPA-04-110	Deleted "and/or neutralization" after "cesium decay," now reads: "Due to the heat generated in the eluate contingency storage vessel from cesium decay, two cooling coils (one operating and one spare) with a cooling water supply are provided for temperature control."
P4-14, L11 Sec. 4.1.2.7	DWPA-04-078	The sentence rewritten to clarify the process, now reads: "… for cesium removal. The cesium ion exchange resin is conditioned in the ion exchange column to utilize the acidic and caustic conditioning solutions through plant processes."
P4-18, L30 Sec. 4.1.2.11	DWPA-04-080	Text rewritten to further explain the function of the third vessel, now reads: "The treated LAW buffer vessels (V43110A/B/C) will be configured in such a way that one will be filling, one will be feeding the LAW evaporator separator vessel, and one will be full, empty, or out-of-service."
P4-21, L36 Sec. 4.1.2.13	DWPA-04-082	Text rewritten to further explain the function of the resin dewatering moisture separation vessel:

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		"…a moisture separator vessel. Circulation of a warm, dry air stream through the spent resin picks up moisture. The moist air stream is cooled and circulated to the moisture separation vessel where the moisture (water droplets) is separated. The blower sucks the dry air from the separation vessel and circulate the air to the resin again. When the water content in the resin is reduced to an acceptable level, the resin is dewatered."
P4-24, L32 Sec. 4.2.2.15	DWPA-04-084	Vessel names on page 4-24 have been revised as follows: "● Alkaline effluent vessels (V15013 and V15018) ● Plant wash vessel (V15009A) ● Primary and secondary acidic/alkaline effluent vessels (V45013 and V45018) ● C3 drain collection vessel (V15319) ● HLW effluent transfer vessel (V12002) ● Ultimate overflow vessel (V15009B)"
P4-30, L10 Sec. 4.2.2.17	DWPA-04-089	Text added in Section 4.2.2.17 to give more information on the vessel vent scrubber purge line listed on Figure 4A-19, after the phrase "… or during maintenance activities." "The vessel vent caustic scrubber generates the liquid purge stream based on the absorption and cooling of the incoming vent exhausts from various vessels in the Pretreatment plant. The vessel vent scrubber recirculation pump transfers, by batch, the scrubbing liquid purge stream once a day to the Plant Wash and Disposal System (PWD). The scrubbing liquid purge stream transfers the accumulated condensate, radiolytic particulates and salts from the recirculating scrubbing liquid stream in the vessel vent scrubber."
P4-38, L11-12 Sec. 4.1.3.2	DWPA-04-040	Text rewritten in the following bullets: " ● Decrease or loss of melter plenum vacuum ● Plenum pressurization "
P4-39, L1 Sec. 4.1.3.3		Text changed to "ten times nominal flow" from "seven times steam flow and three times non-condensable flow"
P4-39, L41 Sec. 4.1.3.3	DWPA-04-013	Text changed to "ten times nominal flow" from "seven times steam flow and three times non-condensables"
P4-40, L32 Sec. 4.1.3.3 (SBS)	DWPA-04-017	Text added in the sentence, now reads: "…simultaneously. Submerged bed scrubber condensate from the submerged bed scrubber condensate collection vessel ultimately flows to the Plant Wash and Disposal System (PWD). Venting …"
P4-41, L14 Sec. 4.1.3.3 (WESP)	DWPA-04-051	Based on Figure 4A-22 and Figure 4A-25, text in the sentence change to : "The tube drain and wash solution are routed to the C3/C5 effluent collection vessel (V25002)."
P4-41, L25 Sec. 4.1.3.3		Based on the information provided in Page 4-39, Line 10-14, this sentence change to: "The standby line consists of an offgas duct from the melter to the submerged bed scrubber, a film cooler, and an isolation valve."
P4-42, L7	DWPA-04-051	"HLW" changed to "LAW" in the following sentence:

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
Sec. 4.1.3.3	/S	"It does this by maintaining the various LAW process vessels under a slight vacuum relative to the cell."
P4-45, L27 Sec. 4.1.3.4		Added "Condensate that forms in the header." Text revised to read: "The vessel (LAW C3/C5 Effluent Collection Vessel) is vented into a common vessel ventilation header. Condensate that forms in the header, drains into the LAW C3/C5 Effluent Collection Vessel."
P4-45, L31-33 Sec. 4.1.3.4		"When" replaced by 'until' in the following sentence: "Effluent generated from other sources will be pumped to the plant wash vessel until it reaches a predetermined level to maintain adequate capacity for fire protection water."
P4-46, L16-23 Sec. 4.1.3.5	DWPA-04-023	Deleted "process vessels," replaced "vessel" with "melter," and changed "central waste storage area" to "LAW out-of-service melter storage area." Text now reads: "The primary functions of this system will be to provide methods and packaging for the change-out of LAW melter and other miscellaneous mixed wastes. In the event of a failure, the out-of-service melter will be prepared for export by rinsing, disconnection of the process lines, and decontamination. The melter will be lifted out of the process cell and covered, to prevent a spread of contamination. The melter will be placed in an approved overpack container staged for receipt. Once closed and secured, the overpack, containing the melter, will be delivered to the LAW out-of-service melter storage area. A similar process in reverse will be used for the introduction and installation of new LAW melter."
P4-50, L23 Sec. 4.1.3.6	DWPA-04-029	Text rewritten as follows: "…an out-of-specification container. Otherwise, the dose rate is measured and is recorded with the container's records. Out-of-specification ILAW containers are routed back through the decontamination and fixative stations until the radiological contamination levels are within specification. The container is then …"
P4-59, L36-38 Sec. 4.1.4.3		Add two bullets to address dangerous waste constituents of concern, now reads: " • Nitrogen oxides (NOx) from decomposition of metal nitrates in the melter feed. • Chloride, fluoride, and sulfur as oxides, acid gases and salts • Dangerous waste metals • Dangerous waste organics • Radionuclide particulates and aerosols"
P4-105, L20 Sec. 4.3.2.6.1	DWPA-04-113	After "… under WAC 173-303-640(4)(e)(i)(B).", deleted "Table 4-11 presents the calculated minimum liner height. Calculations for the liner size necessary in the berms are available upon request."
P4-113, L30		"(Appendix to Chapter 3)" changed to "(Appendix 3A)".

Page Number in the Permit Application	WTP Tracking Number	Changes Made to the Permit Application Text by Ecology
Sec. 4.3.3.7		
P4-118, L29 Sec. 4.3.4.2	DWPA-04-072	Text "south" changed to "east" in the following sentence: "The pretreatment maintenance containment building comprises the majority of the east end of the building."
P4-139, L19 Sec. 4.3.4.10		Changed "northwest" to "northeast"
P4-147, L39 Sec. 4.4.7		"Waste minimization information is presented in Chapter 10." changed to "Waste minimization information is presented in Chapter 10 of the permit application."
Table 4-3	DWPA-04-084	No. 61 - Description revised to read: "Primary Acidic/Alkaline Effluent Vessel" No. 62 - Description revised to read: "Secondary Acidic/Alkaline Effluent Vessel" No. 63 - Description revised to read: "Alkaline Effluent Vessel" No. 66 - Description revised to read: "Alkaline Effluent Vessel"
Table 4-11		Add a "Northeast Process Bulge" column
Table 4-11	DWPA-04-113	In "LAW Buffer Vessel Cell", changed "V41011B" to "V45009B"
Table 4-12	DWPA-04-074	"HLW Vitrification Plant C3 Workshop Containment Building" dimension changed to "(30x27x19)+(33x15x19)" from "27x66x19"
Figure 4A-78	DWPA-04-071	Figure 4A-78 is revised: removed the boundary line on the south end of the Pretreatment Plant
Figure 4A-79	DWPA-04-075	Figure 4A-79 is revised: adjusted the cross hatching shown on the northeastern end of the plant
Figure 4A-87	DWPA-04-076	Figure 4A-87 is revised: included cross hatching over vessel V31102
Figure 4A-89	DWPA-04-077	Figure 4A-89 is revised: label "HLW Vitrification Plant Workshop Containment Building" changed to "HLW Vitrification Plant C3 Workshop Containment Building"