

## **Conditions of Acceptance for Low Activity Waste (LAW) and High Level Waste (HLW) Construction Authorization Request (CAR)**

The following conditions of acceptance were identified by the U.S. Department of Energy (DOE), Office of River Protection (ORP) in its review of the Partial Construction Authorization Request (PCAR) and the subsequent CARs. The conditions were included as Appendix B of the Safety Authorization Report, ORP/OSR-2002-18, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Construction Authorization*, Revision 2, issued November 13, 2002.

### **Conditions of Acceptance**

The conditions of acceptance for the general information evaluation and for the facility specific evaluations are shown below by the section in which they were cited.

#### **Section 3.7 Radiation Protection**

**Conditions of Acceptance** – Bechtel National, Inc. (BNI) must include the following provisions in the Radiological Controls Program. All of these conditions were identified in the Partial Construction Authorization<sup>1</sup> and remain in effect. Except for Item 2 below, these provisions must be provided with the Final Safety Analysis Report:

1. Provide detailed organizational chart that shows the radiation safety organization and its relationship to senior plant personnel and other line managers. Also, provide job descriptions defining specific authorities and responsibilities of radiation safety personnel. (See Section 3.7.2, Item 2.)
2. Specify the review and revision cycle of procedures and provide to DOE before the start of the preoperational testing phase. (See Section 3.7.2, Item 3.)
3. Describe the mechanism for ensuring that RWPs are not used past their termination dates. (See Section 3.7.2, Item 3.)
4. Describe the methods for analyzing airborne concentrations; methods for calibrating air sampling and counting equipment; actions levels and alarm setpoints; the basis used to determine action levels, investigation levels, and derived air concentrations and minimum detectable activities for the radionuclides; the frequency and methods for analyzing airborne concentrations; counting techniques; specific calculations and levels; action levels and investigation levels; locations of continuous air monitors, if used; and locations of annunciators and alarms. (See Section 3.7.2, Item 6.)
5. Identify the types and quantities of contamination monitoring equipment and the methods and types of instruments used in the radiation surveys. (See Section 3.7.2, Item 7.)

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<sup>1</sup> ORP letter from R. J. Schepens to R. F. Naventi, BNI, "U.S. Department of Energy (DOE) Notice to Proceed with Partial Construction Activities," 02-OSR-0289, dated July 9, 2002.

6. Identify the locations of the facility's respiratory equipment. (See Section 3.7.2, Item 11.)
7. Describe the radiation measurement selection criteria for performing radiation and contamination surveys, sampling airborne radioactivity, monitoring area radiation, and performing radioactive analyses. List the types and quantities of instruments that were available, as well as their ranges, counting mode, sensitivity, alarm setpoints, and planned use. Describe the instrument storage, calibration, and maintenance facilities and laboratory facilities used for radiological analyses. (See Section 3.7.2, Item 12.)

## **Section 3.12 Procedures and Training**

### **Procedures**

**Conditions of Acceptance** – BNI must complete the following changes to Preliminary Safety Analysis Report (PSAR) Volume I, Section 12.3, with the first PSAR revision following authorization for full facility construction. All of these conditions were previously identified in the Partial Construction Authorization<sup>2</sup> and remain in effect:

1. Revise Section 12.3.1.1 to state: "The project readiness assessment process determines the procedure set required to support Construction activities. Procedures are developed and issued before the activity governed by the procedure takes place"; in addition, provide a table in Section 12.3.1.1 to indicate which activities are being addressed in management control procedures during design and construction, cold commissioning, and hot commissioning and operations, as committed to in response to Question LAW-PCAR-103. (See Section 3.12.2, Procedures, Item 2.)
2. Revise Section 12.3.2.2 to state: "The procedures covering the following topics are in place as needed for the construction phase of the project. Changes and additions to the procedure set will be identified before cold commissioning and scheduled for completion before the activity taking place: major management control systems, system and facility operations (including control of hazardous processes), major maintenance activities (including safe work practices), hazardous materials control activities, radiological control activities, and emergency response activities (including radiological and hazardous chemical release)," as committed to in response to Question LAW-PCAR-106. (See Section 3.12.2, Procedures, Item 4.)
3. Revise Section 12.3.1.1 as follows to clarify who can approve procedures: "The procedure process is governed by the project procedure on procedures. It requires that management associated with ES&H and QA review new procedures and concur that they are or are not within the authorization basis. ES&H and QA review changes to existing procedures if they affect the authorization basis or QA requirements. At a minimum, management associated with the relevant safety disciplines concurs with new procedures and changes to existing procedures that affect the authorization basis requirements," as committed to in response to Question LAW-PCAR-104. (See Section 3.12.2, Procedures, Item 6.)

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<sup>2</sup> Ibid 1.

4. Add the following to Sections 12.3.3.1 and 12.3.3.2.1: "The project procedure complies with the WTP QAM and addresses permanent procedure revisions and expedited procedure changes," as committed to in response to Question LAW-PCAR-107. (See Section 3.12.2, Procedures, Item 7.)
5. Add the following to Section 12.3.1.1: "For construction activities, the basic work planning process is based on the concept that for standard construction tasks, step-by-step work instructions are not required. A combination of technical specifications, field procedures, and drawings are used to perform the work. Individuals involved in the work are trained to the requirements. The work is planned using a construction administrative procedure addressing construction work packages. When unique or complex tasks are performed, work planning is addressed in a construction administrative procedure addressing special instruction work packages. This procedure provides for using a work package with additional controls, including, where appropriate, step-by-step instructions," as committed to in response to Question LAW-PCAR-105. (See Section 3.12.2, Procedures, Item 8.)

## **Training**

**Conditions of Acceptance** – BNI must complete the following changes to Section 12.4 of Volume I of the PSAR with the first PSAR revision following authorization for full facility construction:

1. Define the periodic basis for comparing training materials with the list of tasks selected for training. (See Section 3.12.2, Training, Item 4.)
2. Clearly state in the learning objectives the knowledge, skills, and abilities the trainee must demonstrate; that learning objectives are sequenced based on their relationship to one another; the conditions under which required actions will take place; and the standards of performance the trainee should achieve when completing the training. (See Section 3.12.2, Training, Item 5.)
3. Define review and approval requirements for lesson plans, training guides, and other training materials before they are issued and used. (See Section 3.12.2, Training, Item 6.)
4. Demonstrate that when an actual task cannot be performed and is walked-through, the conditions of task performance, references, tools, and equipment reflect the actual task to the extent possible. (See Section 3.12.2, Training, Item 8.)
5. Define the periodic basis for conducting training program evaluations. (See Section 3.12.2, Training, Item 4.)

## **Section 3.13 Human Factors**

**Condition of Acceptance** – BNI must complete the following action with the first PSAR revision following authorization for full facility construction:

1. As committed in the response to Question LAW-PSAR-210, implement a Human Factors Implementation Plan following Safety Requirements Document (SRD) Safety Criterion 4.3-6, SRD Appendix B (Section 2.6), which require IEEE 1023-1988, Section 6, "Implementation in the Design, Operations, Testing, and Maintenance Process." (See Section 3.13.2, Item 5.)

### **Section 3.15 Emergency Preparedness**

**Condition of Acceptance** – BNI must complete the following action with the first PSAR revision following authorization for full facility construction:

1. Revise PSAR Section 15.3 to reflect that DOE/RL-94-02, *Hanford Emergency Management Plan*, Section 14.0, "Program Administration," and its requirements will be contained as part of the Emergency Response Plan, as committed to in response to Question LAW-PSAR-012. (See Section 3.15.2, Item 12.)
2. Revise PSAR Section 15 to reflect that, for WTP Emergency Response Plan program administration, BNI will provide WTP input to the Hanford Emergency Readiness Assurance Plan, develop an internal assessment of the emergency preparedness activities program and implement it before cold commissioning, and develop a vital records program to ensure documents essential to the continued functioning of WTP are available during and after an emergency. This was committed to in response to Question LAW-PSAR-129. (See Section 3.15.2, Item 12.)
3. Revise PSAR Section 15.4.6 to clarify that training and drills will be conducted using DOE G-151.1; *Emergency Management Guide*, Volume V, Section 4.0, "Training and Drills," as a guide. Clarify that the emergency manager will periodically assess the drill and training program, and the results will be used to improve the program. Clarify that all identified deficiencies from drills will be compiled in a database and tracked until adequate corrective actions are implemented. Clarify that management will attend emergency response training to determine where enhancements can be made to ensure that proper training is provided. This was committed to in response to Question LAW-PSAR-129. (See Section 3.15.2, Item 13.)
4. Revise PSAR Section 15.4.6.2 to reflect that exercises will be conducted in accordance with DOE/RL-94-02, *Hanford Emergency Management Plan*, and DOE/RL emergency procedures RLEP 3.10, "Developing Exercise Packages" (DOE-0223, *Emergency Plan Implementing Procedures*), as committed to in response to Question LAW-PSAR-129. (See Section 3.15.2, Item 14.)

### **Section 3.16 Deactivation and Decommissioning**

**Conditions of Acceptance** – BNI must complete the following changes to Chapter 16 of Volume I of the PSAR with the first PSAR revision following authorization for full facility

construction. All of these conditions were previously identified in the Partial Construction Authorization<sup>3</sup> and remain in effect.

1. In Chapter 16 of the PSAR, clarify its commitment to reduce radiation exposure to workers and the public during and following deactivation and decommissioning, as committed to in response to Question LAW-PCAR-028. (See Section 3.16.2, Item 1.)
2. Add the following statement to Section 16.3.5: "While the proposed decommissioning method has not been specified, the facility is being designed to limit contamination, facilitate decontamination, and minimize the dose and generation of waste in the event re-use or demolition of the facility is the ultimate decommissioning method," as committed to in response to Question LAW-PSAR-197. (See Section 3.16.2, Item 1.)
3. Change the R1, R2, and R3 contamination classifications listed in Section 16.3.1 consistent with current practices, i.e., C1, C2, C3, and C5 classifications, as committed to in response to Question LAW-PCAR-030. (See Section 3.16.2, Item 3.)

### **Section 3.17 Management, Organization, and Institutional Safety Provisions**

**Conditions of Acceptance** – BNI must complete the following actions. Except for Item 4, the actions should be completed with the first PSAR revision following authorization for full facility construction:

1. Describe organizational responsibilities and staffing interfaces for the Configuration Management program in PSAR Volume I, Section 17.4, as committed to in response to Question LAW-PCAR-005. (See Section 3.17.2, Configuration Management, Item 1[c].)
2. Revise the first paragraph in PSAR Volume I, Section 17.4.6, to read, "The USQ process will be established during implementation of the approved FSAR, which will precede start of the hot commissioning portion of the operations phase. The USQ process will allow project management to make changes to the facility, the procedures, and the Authorization Basis documents; ..." In addition, establish a "USQ-like" process before the start of cold commissioning, and describe this process in a PSAR supplement on a schedule providing for adequate review by DOE, as committed to in response to Question LAW-PSAR-161. (See Section 3.17.2, Configuration Management, Item 5[a].)
3. Revise the last sentence of paragraph two in PSAR Volume I, Section 17.4.6, to read, "However, a USQ evaluation is required for a nonconforming or degraded condition if the resolution of the condition is to 'use as is' or 'repair.' A USQ evaluation would also be required for an interim compensatory action that is proposed to deal with the degraded or nonconforming condition as part of the disposition process," as committed to in response to Question LAW-PSAR-160. (See Section 3.17.2, Configuration Management, Item 5[b].)

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<sup>3</sup> Ibid 1.

4. Revise procedure 24590-WTP-GPP-SIND-001-0, *Reporting Occurrences in Accordance with DOE Order 232.1A*, to address hazards and activities for the cold commissioning phase before the start of the preoperational testing phase, as committed to in response to Question LAW-PCAR-037. (See Section 3.17.2, Incident Reporting and Investigation, Item 2).

### **Section 3.18 Fire Protection**

**Conditions of Acceptance** – BNI must complete the following by the date or milestone indicated:

1. Have procedures in place as part of the March 1, 2003, implementation plan for the WTP fire protection program for performing periodic safety inspections; inspecting and tracking fire barrier penetration seals, doors, dampers, and related devices, as committed to in response to Question LAW-PSAR-218. (See Section 3.18.2, Item 1[b].)
2. Have procedures in place as part of the March 1, 2003, implementation plan for the WTP fire protection program for performing periodic evaluations of the overall WTP fire protection performance and for identifying and tracking fire safety issues, as committed to in response to Question LAW-PSAR-218. (See Section 3.18.2, Item 3[a].)
3. Fully implement the fire prevention program as part of the March 1, 2003, implementation plan for the WTP fire protection program; and revise the Non-Radiological Worker Health and Safety Plan to include the relevant fire protection requirements from Subparts F and J of 29 CFR 1926, "Safety and Health Regulations for Construction," to ensure that an adequate set of fire safety requirements are specified for work at the WTP construction site, as committed to in response to Question LAW-PSAR-215. (See Section 3.18.2, Item 3[c].)
4. Include in Chapter 2 of the HLW PFHA, with the first PSAR revision following authorization for full facility construction, the information on the ability to achieve and maintain a safe state after the loss of the melter offgas system components, as committed to in response to Question HLW-PFHA-037. (See Section 3.18.2, Item 5[c].)

### **Section 4.1.1 LAW Facility Description**

#### **Facility Description**

**Conditions of Acceptance** – BNI must include the following provisions in the PSAR. Except for Item 6 below, these provisions should be provided with the first PSAR revision following authorization for full facility construction:

1. Include the evaluation of the aircraft impact on the LAW building and associated justification, as committed to in response to Question LAW-PSAR-153. (See Section 4.1.1.2, Facility Description, Item 3[f].)

2. Include the commitment to design anchorage using cracked concrete assumptions unless the structure is evaluated and determined to be uncracked, as committed to in response to Question LAW-PSAR-211. (See Section 4.1.1.2, Facility Description, Item 5[c].)
3. Include the methodology to be used for qualifying SDC equipment in the LAW facility, as committed to in response to Question LAW-PSAR-202. (See Section 4.1.1.2, Facility Description, Item 5[g].)
4. Design ITS piping in the LAW building to ASME B31.3, "Process Piping," occasional load criteria, and include this commitment in the PSAR, as committed to in response to Question LAW-PSAR-201. (See Section 4.1.1.2, Facility Description, Item 5[h].)
5. Designate two cranes in the vicinity of the offgas system as SDS SC-III for their seismic safety function to prevent crane components or the bridge from falling on the SDC offgas SSCs. To protect against damage from the third crane (RWH-CRN-00008), provide either a protective cage surrounding the offgas duct in the process area or, if a protective cage cannot be provided, designate the third crane also as SDS SC-III for its seismic safety function to protect the SDC offgas duct from falling crane components or the bridge, as committed to in response to Question LAW-PSAR-200. (See Section 4.1.1.2, Facility Description, Item 5[i].)
6. Provide, as committed to in response to Question LAW-PSAR-207, initial information (from ISM Cycle III) in the first PSAR revision and full information when the FSAR is submitted, for the following (see Section 4.1.1.2, Facility Description, Item 8):
  - (a) A detailed analysis of control room habitability for the facility (including the LAW building) to demonstrate that there is adequate time to evaluate accident conditions, to perform mitigating actions required at the LAW facility to place the facility in a safe state, and to evacuate the LAW facility safely.
  - (b) A systematic evaluation of ITS SSCs and non-ITS equipment that may impact ITS SSCs and an analysis of the LAW design to identify LAW ITS controls and indications that must be provided in the PT control room design to ensure that the LAW can be placed and maintained in a safe state following any DBEs.
7. Include the following commitment, as stated in response to Question LAW-PSAR-207: LAW SDC and SDS controls and indications provided in the PT control room that are required to place/maintain the LAW facility in a safe state following any DBEs will be independent of the integrated control network controls and indications and will be designed according to the standards in SRD Safety Criterion 4.3-4. (See Section 4.1.1.2, Facility Description, Item 8.)

### **Process Description**

**Conditions of Acceptance** – BNI must include the following provisions in the first PSAR revision following authorization for full facility construction:

1. Include the radiological shielding function of the wet process cell walls as an ITS function in the event of a mis-feed of HLW to the LAW facility, as committed to in response to Question LAW-PCAR-098. (See Section 4.1.1.2, Process Description, Item 1.)

### **Section 4.1.2 LAW Facility Hazard and Accident Analysis**

Two conditions of acceptance originally identified in Section 4.1.2, "LAW Facility Hazard and Accident Analysis," in Revision 1 of the SER, were completed:

1. Revise the design calculation report 24590-LAW-DBC-S13T-00005, *Thermal Analysis for Basemat and Pour Cave Walls*, to incorporate the results of the computational fluid dynamics analysis of the pour cave. The analysis must confirm that the concrete temperatures of the melter and pour caves could be maintained within design limits during the postulated glass spill and loss of cooling accident scenario. All structural calculations affected by the computational fluid dynamics analysis must be revised, as appropriate. These should be completed before authorization for full LAW facility construction. (COMPLETE) (See Section 4.1.2.2, Item 1.)
2. Complete hazard and accident analysis of internal flooding, including identification of control strategies required to protect the safety functions of the facility structure, assuming PSAR reference structural design, before the start of full LAW facility construction. (COMPLETE; superseded by Conditions [3] and [5] below) (See Section 4.1.2.2, Item 2.)

**Conditions of Acceptance** – BNI must complete the following actions, except for Item 5 below, with the first PSAR revision following authorization for full facility construction:

1. Correct the discrepancies related to the CSD records identification system used in SIPD and as referenced in the LAW and HLW PSAR texts and tables, as committed to in responses to Questions LAW-PSAR-069 and -169, and as agreed in authorization for construction for walls to grade. (See Section 4.1.2.2, Item 1.)
2. Include the analysis related to the mis-feed hazardous situation, identifying control strategies that include the provision of gamma monitor activated automatic valve closure as SDC SSCs in the PT facility to prevent the mis-feed to the LAW facility and to designate certain LAW process cell shield walls as SDS SSCs to mitigate the event, as committed to in responses to Questions LAW-PCAR-098 and LAW-PSAR-056. (See Section 4.1.2.2, Item 1.)
3. Include interim information on internal flooding events, as committed to in response to Question LAW-PSAR-036. (See Section 4.1.2.2, Item 2.)
4. Include the design features for mitigating potential for steam explosion in the LAW melter, and the results of the evaluation of the potential for water injection via wash water or feed nozzle cooling water, as committed to in response Question LAW-PSAR-064. (See Section 4.1.2.2, Item 2.)

5. Submit the internal flooding event hazard evaluation (for the preliminary design) to ORP for approval, and receive DOE approval, before start of construction of the nonstructural aspects of the LAW design expected to be credited as SDC or SDS SSCs for the internal flooding event, on a schedule mutually agreed to by ORP and BNI. (See Section 4.1.2.2, Item 2.)
6. Include the results of the offgas system evaluation for ammonium nitrate deposition potential, including what control strategies, if any, will be implemented to address concerns identified through this evaluation, as committed to in response to Question LAW-PSAR-113. (See Section 4.1.2.2, Item 2.)
7. Include that approximately 30 minutes after being on UPS system power, the plant would be evacuated, therefore eliminating the need for exhausters fans to protect the facility workers from NO<sub>x</sub> release in the LAW facility, as committed to in response to Question LAW-PSAR-029. (See Section 4.1.2.2, Item 5.)
8. Correct the omission of additional safety functions for the basemat based on the seismic DBE event being SL-2 for the facility and co-located worker, the mis-feed event being SL-1 for the facility worker, and the liquid spill/overflow from the LAW concentrate receipt vessel being SL-2 for the facility worker as agreed in authorization agreement for walls to grade construction. (See Section 4.1.2.2, Item 8.)

### **Section 4.1.3 LAW Facility Important-to-Safety SSCs**

**Condition of Acceptance** – BNI must complete the following with the first PSAR revision following authorization for full facility construction:

1. Include a complete list of RRC SSCs, with associated safety functions, as committed in its response to question LAW-PSAR-066. (See Section 4.1.3.2, Item 1.)

### **Section 4.2.1 HLW Facility Description**

#### **Facility Description**

Two conditions of acceptance originally identified in the HLW PCAR SER, and in effect in the authorization basis, were completed:

1. Perform transient computational fluid dynamics analysis of the DBE 2700-L molten glass spill before authorization for full HLW facility construction. (COMPLETE) (See Section 4.2.1.2, Facility Description, Item 3[f][i].)
2. Provide the seventeen structural calculations that demonstrate structural design adequacy of HLW walls to grade as described in Section 4.2.1.2, Facility Description, Item 3(b) of this SER. (COMPLETE)

**Conditions of Acceptance** – BNI must complete the following by the date or milestone indicated:

1. Include an evaluation of the aircraft impact on the HLW building and associated justification, as committed to in response to Question LAW-PSAR-153, with the first PSAR revision following authorization for full facility construction. (See Section 4.2.1.2, Facility Description, Item 3[f][iii].)
2. Include the commitment to design anchorage using cracked concrete properties, as committed to in response to Question HLW-PSAR-256, with the first PSAR revision following authorization for full facility construction (See Section 4.2.1.2, Facility Description, Item 4.)
3. Include information on the analysis of the potential effects on ventilation and air-cleaning SSCs of common-cause external events, including volcanic ashfall, in the first PSAR revision following completion of the analysis and in the FSAR, as committed to in response to Question PT-PSAR-257. (See Section 4.2.1.2, Facility Description, Item 7.)
4. Provide, as committed to in the response to Question HLW-PSAR-224, initial information (from ISM Cycle III) in the first PSAR revision and full information when the FSAR is submitted, the following (see Section 4.2.1.2, Facility Description, Item 8):
  - (a) A detailed analysis of control room habitability for the facility (including the HLW building) to demonstrate that there is adequate time to evaluate accident conditions, to perform mitigating actions required at the HLW facility to place the facility in a safe state, and to evacuate the HLW facility safely.
  - (b) A systematic evaluation of ITS SSCs and non-ITS equipment that may impact ITS SSCs and an analysis of the HLW design to identify HLW ITS controls and indications that must be provided in the PT control room design to ensure that the HLW can be placed and maintained in a safe state following any DBEs.
5. Include the following commitment in the first PSAR revision following authorization for full facility construction, as stated in the response to Question HLW-PSAR-224: HLW SDC and SDS controls and indications provided in the PT control room that are required to place/maintain the HLW facility in a safe state following any DBEs will be independent of the integrated control network controls and indications and will be designed according to the standards in SRD Safety Criterion 4.3-4. (See Section 4.2.1.2, Facility Description, Item 8.)

### **Process Description**

**Conditions of Acceptance** – One condition of acceptance originally identified in the HLW PCAR SER and in effect in the authorization basis, was completed:

1. Revise the design drawings that were used to support the hazard and accidental analysis of the embedded C5 ventilation ductwork to reflect the configuration used in the accident analysis with the first PSAR revision following authorization for full facility construction. (COMPLETE) (See Section 4.2.1.2, Process Description, Item 5)

**Conditions of Acceptance** – BNI must complete the following in the first PSAR revision following authorization for full facility construction:

1. Include information on monitoring vessel vent and overflow lines to ensure their functionality, as committed to in response to Question HLW-PSAR-010. (See Section 4.2.1.2, Process Description, Item 4.)
2. Revise HLW PSAR Tables 3-3, 3-4, and 3-5 to eliminate shortcomings in the chemical compatibility assessments identified by the reviewers, as committed to in the response to Question HLW-PSAR-017. (See Section 4.2.1.2, Process Description, Item 9.)

### **Section 4.2.2 HLW Facility Hazard and Accident Analysis**

Two conditions of acceptance originally identified in the SER for the walls to grade were completed and one remains open:<sup>4</sup>

1. Correct the discrepancies between the CSD records in Appendix A and the HLW PCAR and PSAR text and tables, as committed to in responses to Questions LAW-PSAR-069 and -169 and as agreed to in authorization for construction of HLW walls to grade. (See Section 4.2.2.2, Item 1.) (OPEN – must be closed as part of the first PSAR revision following authorization for full facility construction.)
2. Provide the DBE analysis of the 2700-L molten glass spill accident. (COMPLETE)
3. Complete hazard and accident analysis of internal flooding, including identification of control strategies required to protect the safety functions of the facility structure, assuming PCAR and PSAR reference structural design, before the start of full HLW facility construction. (COMPLETE; superseded by conditions 4 and 5 below)

**Conditions of Acceptance** – BNI must complete the following with the first PSAR revision following the authorization for full facility construction (except as noted in Items 5 and 13 below):

1. Analyze the potential for ammonia in the HLW feed to be released from the liquid phase into the gaseous phase, reaching a flammable concentration and igniting, as committed to in response to Question HLW-PSAR-240. (See Section 4.2.2.2, Item 1.)
2. Include the results of the offgas system evaluation for ammonium nitrate deposition potential, including the control strategies, if any, that will be implemented to address concerns identified through this evaluation, as committed to in response to Question HLW-PSAR-024. (See Section 4.2.2.2, Item 1.)

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<sup>4</sup> The HLW walls to grade SER condition of acceptance (condition [2]) – submit an evaluation of the combined effects of seismically induced radiological releases from the PT, LAW, and HLW buildings on the workers, co-located workers, and the public through a seismic probabilistic risk analysis study – is addressed in Section 4.6 of this SER.

3. Include information on overflow events involving submerged bed scrubber condensate vessels, including control strategies, as committed to in response to Question HLW-PSAR-127. (See Section 4.2.2.2, Item 1.)
4. Include interim information on internal flooding events, as committed to in response to Question HLW-PSAR-003. (See Section 4.2.2.2, Item 2[a].)
5. Submit the internal flooding event hazard evaluation (for the preliminary design) to ORP for approval, and receive DOE approval, before start of construction of the nonstructural aspects of the HLW design expected to be credited as SDC or SDS SSCs for the internal flooding event, on a schedule mutually agreed to by ORP and BNI. (See Section 4.2.2.2, Item 2[a].)
6. Revise Section 4.4.4 to explicitly address all incoming feeds as sources to the concentrate receipt tank that may result in vessel overflow events, as committed to in response to Question HLW-PSAR-188. (See Section 4.2.2.2, Item 2[a].)
7. Perform a sensitivity study to compare respirable releases from a crack to an orifice and revise the calculations and PSAR, as necessary, as committed to in response to Question HLW-PSAR-128. (See Section 4.2.2.2, Item 3.)
8. Reanalyze the hydrogen generation deflagration DBE and the PSAR based on reevaluation of the hydrogen correlation used in the event analysis, as committed to in response to Question HLW-PSAR-235. (See Section 4.2.2.2, Item 3[a].)
9. Revise the PSAR to show that the HLW melter shell will be qualified to SC-II, as committed to in response to Question HLW-PSAR-150. (See Section 4.2.2.2, Item 3[b].)
10. Remove the 6600-L molten glass spill as a DBE from PSAR Section 3.4.1.4, as committed to in response to Question HLW-PSAR-253. (See Section 4.2.2.2, Item 3[b].)
11. Include a description of the 2700-L molten glass spill event and associated control strategies, as committed to in responses to Questions HLW-PCAR-012 and HLW-PSAR-191. (See Section 4.2.2.2, Item 3[b].)
12. Revise 24590-HLW-Z0C-W14T-00013, *Revised Severity Level Calculations for the HLW Facility*, and 24590-HLW-Z0C-H01T-00001, *Design Basis Event – HLW Process Vessel Hydrogen Deflagrations*, to more conservatively account for the radiolytic affects (i.e., the concentrations of the nitrate/nitrite ions by using Equation 2-3 from RPT-W375-SA00002, *Topical Report on the Management of Risks Posed by Explosive Hazards Present at the RPP-WTP*, rather than Equation 2-2) and the thermolytic affects (i.e., by establishing design air purge flow rates through vessel head spaces using an activation energy,  $E_a$ , of 100 kJ/mole [vs. 91 kJ/mole and assuming the vessels are at 220°F). This was committed to in response to Questions HLW-PSAR-235 and PT-PSAR-336. (See Section 4.2.2.2, Item 4[b].)

13. Re-evaluate transportation events as part of the control room habitability evaluations and include initial results of this HLW evaluation in the first PSAR revision following authorization for full facility construction and include final results in the FSAR. This was committed to in response to Question PT-PSAR-204. (See Section 4.2.2.2, Item 6[c][vi].)

### **Section 4.2.3 HLW Facility Important-to-Safety SSCs**

**Conditions of Acceptance** – BNI must complete the following with the first PSAR revision following the authorization for full facility construction:

1. Include a complete list of RRC SSCs, with associated safety functions, as committed to in responses to Questions HLW-PSAR-039, -170, -213, -250, -251, and -252. (See Sections 4.2.3.2, Item 1.)
2. Correct the information in the PSAR on the safety functions of the high-high level interlocks, quality of instrument air, design of the Hydrogen Mitigation System to meet the single failure criteria of SRD, Appendix A, the design of the C5 ventilation system for wind effects, and the seismic qualification (SC-I) of the smoke/fire dampers. This was committed to in responses to Questions HLW-PSAR-051, -098, -120, -184, -189, -190, -228, and -229. (See Section 4.2.3.2, Item 2.)
3. Correct the information in the PSAR on the functional requirements for the canister handling crane and grapple, immobilized HLW cask, impact absorbers, and HEPA filter preheaters, as committed to in responses to Questions HLW-PSAR-023, -058, -059, and -099. (See Section 4.2.3.2, Item 4.)

### **Section 4.3.1 PT Facility Description**

#### **Facility Description**

**Conditions of Acceptance** – BNI must complete the following actions and obtain DOE acceptance of the information provided as conditions of acceptance before DOE authorization of PT subsurface pits, tunnels, and basemat structural concrete placement:

1. Develop a structural design evaluation summary table, as committed to in response to Question PT-PSAR-227. (See Section 4.3.1.2, Item 3[b].)
2. From the preliminary SSI analysis results, for each wall and horizontal seismic motion, tabulate (a) the in-plane shear force in the direction of the length of the wall, (b) the maximum in-plane shear stress in the direction of the length of the wall, and (c) maximum out-of-plane bending moments, one about the horizontal axis and one about the vertical axis.  
Compare the out-of-plane bending moments in the subsurface walls from the preliminary SSI analysis for the horizontal seismic motions with those from the GTSTRUDL analysis of the PT building. The applied dynamic soil pressure is based on ASCE 4-98. These

were committed to in responses to Questions PT-PSAR-227. (See Section 4.3.1.2, Item 3[d].)

3. Modify the design moments and shear forces in calculation report 24590-PTF-DGC-S13T-00002, *Design of Pits, Foundations and Below Grade Walls for PT Building*, using a method similar to that used in the HLW facility design. Include this effect on demand-to-capacity ratios in the structural design evaluation summary. These commitments were provided in the responses to Questions PT-PSAR-227 and -231. (See Section 4.3.1.2, Item 3[d].)
4. Include both through-thickness thermal loads and thermal growth loads in design calculations and provide justification for not considering all load combinations, as committed to in responses to Questions PT-PSAR-225, -226, and -227. (See Section 4.3.1.2, Item 3[g].)
5. Provide a code requirement interpretation for shear wall design limits that would provide a basis for concluding that the shear forces were acceptable using ACI 349-01, as committed to in response to Question PT-PSAR-227. (See Section 4.3.1.2, Item 4.)

BNI must complete the following commitment before full PT facility construction authorization:

1. Perform a revised seismic SSI analysis based on the revised building layout in which lateral dynamic soil pressure will be calculated directly for a few critical below grade walls using soil pressure elements in the SASSI model. If soil pressure is not obtained directly from the revised SSI analyses, the SASSI-generated moment results will be used to estimate the lateral dynamic soil pressure. This was committed to in responses to Questions PT-PSAR-224 and -227. (See Section 4.3.1.2, Item 3[d].)

### **Section 4.3.2 PT Facility Hazard and Accident Analysis**

**Conditions of Acceptance** – BNI must complete the following activity during the ISM Cycle III process:

1. Perform hazard analysis for water hammer, as committed to in response to Question PT-PSAR-276 (see Section 4.3.2.2, item 1), and consider water hammer loads in the design of piping supports.

BNI must also include the following revisions in the first PSAR revision following authorization for full facility construction:

1. Update PSAR Volume II Appendix B, C, and D. Tables B-1, C-1, and D-1, to correctly identify early authorization bounding hazardous conditions and safety case requirements, as committed to in response to Question PT-PSAR-335. (See Section 4.3.2.2, item 3.)
2. Correct inconsistencies in safety case requirements and CSD combinations between 24590-PTF-ESH-02-002, *Design Basis Event Selection for PTF PSAR*, and the PSAR, as committed to in response to Question PT-PSAR-327. (See Section 4.3.2.2, Item 6.)

### Section 4.4.1 BOF Facility Description

#### Facility Description

**Conditions of Acceptance** – BNI must complete the following actions in the first PSAR revision following authorization for full facility construction:

1. As discussed in Section 4.4.1.2, Facility Description, Item 6:
  - (a) Provide the electrical design basis for the ITS electrical ductbank, as committed to in response to Question BOF-PSAR-007.
  - (b) Clarify the design basis for ITS monitoring and control circuits in the ITS electrical ductbank, as committed to in response to Question BOF-PSAR-006.
  - (c) Provide a description of the system for starting EDGs, as committed to in response to Question BOF-PSAR-008.

#### Process Description

**Conditions of Acceptance** – BNI must complete the following actions in the first PSAR revision following authorization for full facility construction:

1. Describe application of the single failure criterion to the nitric acid monitor as committed to in response to Question BOF-PSAR-005. (See Section 4.4.1.2, Process Description, Item 6.)
2. Delete the ITS sodium permanganate monitor as committed to in response to Question BOF-PSAR-005. (See Section 4.4.1.2, Process Description, Item 7.)

### Section 4.4.2 BOF Hazard and Accident Analysis

**Conditions of acceptance** – BNI must complete the following actions in the first PSAR revision following authorization for full facility construction:

1. Correct CSD and safety case requirement identification numbers in the PSAR and referenced documents, as committed to in response to Question BOF-PSAR-010. (See Section 4.4.2.2, Item 1.)
2. Analyze the potential effects of a design basis ashfall event and provide controls, as committed to in response to Question PT-PSAR-204. (See Section 4.4.2.2, Item 1.)

### Section 4.4.3 BOF Important-to-Safety SSCs

**Conditions of Acceptance** – BNI must complete the following action in the first PSAR revision following authorization for full facility construction:

1. Correct RRC SSC identification errors between Volume II, IV, and V of the PSAR, as committed to in response to Question BOF-PSAR-016. (See Section 4.4.3.2, Item 1.)

#### **Section 4.6 Safety Basis/Conformance with Facility Risk Goals**

**Conditions of Acceptance** – BNI must complete the following actions as conditions of acceptance of the LAW and HLW PSARs, by the date or milestone indicated:

1. Complete the seismic probabilistic risk analysis, demonstrating compliance to the radiation exposure standards of SRD Safety Criterion 2.0-1 (excluding the Analytical Laboratory). This must be completed before authorization for full facility construction as committed to in the Authorization Agreement for HLW and LAW walls to grade construction authorization. (See Section 4.6.2, Item 1.)
2. Include in the first PSAR revision following authorization for full facility construction, a table of risk dominant events for the LAW facility, as committed to in response to Question LAW-PSAR-168. (See Section 4.6.2, Item 2.)
3. Submit an update of the operations risk assessment, using the latest available SIPD entries consistent with the LAW, HLW, PT, and BOF facility designs, to document a fully integrated facility-wide analysis that will include LAW, HLW, PT, and BOF facilities before full facility construction authorization, as committed to in response to Question HLW-PSAR-206. (See Section 4.6.2, Item 1.)

#### **Section 6.3.2 SRD and ISMP Acceptability and Compliance**

**Conditions of Acceptance** – BNI must complete the following by the date or milestone indicated:

1. BNI will implement the corrective actions specified in Attachment 2, “Assessment of the Effect of Design Process Implementation Issues on Construction Authorization Readiness,” to the BNI letter dated October 30, 2002.<sup>5</sup> These corrective actions must be completed by the dates provided in the letter.

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<sup>5</sup> BNI letter from R. F. Naventi to R. J. Schepens, ORP, “Hanford Tank Waste Treatment and Immobilization Plant – Construction Authorization Readiness in Consideration of Recent Assessments and Inspections of Engineering Activities,” CCN: 042775, dated October 30, 2002.