



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-WTP-171

Mr. J. P. Henschel, Project Director
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 – U.S. DEPARTMENT OF ENERGY (DOE) NOTICE TO PROCEED WITH ANALYTICAL LABORATORY CONSTRUCTION ACTIVITIES

- References:
1. BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Request for Review and Approval of the Construction Authorization Request for the Hanford Waste Treatment and Immobilization Plant - Analytical Laboratory Facility," CCN: 087896, dated June 2, 2004.
 2. ORP/WTP-2004-02, Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Analytical Laboratory Construction Authorization, Revision 0, dated July 29, 2004.
 3. ORP letter from R. J. Schepens to R. F. Naventi, BNI, "U.S. Department of Energy (DOE) Notice to Proceed with Pretreatment Construction Activities," 03-OSR-0021, dated March 17, 2003.
 4. ORP letter from R. J. Schepens to R. F. Naventi, BNI, "U.S. Department of Energy (DOE) Notice to Proceed with Construction Activities," 02-OSR-0517, dated November 13, 2002.
 5. 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. ORP letter from R. C. Barr to R. F. Naventi, BNI, "River Protection Project – Waste Treatment Plant (RPP-WTP) Limited Construction Authorization Agreement, Revision 1," 01-OSR-0509, dated December 20, 2001.
 7. Inspection Note A04-AMWTP-RPPWTP-003-10, March 1 - June 30, 2004, dated July 20, 2004.

Bechtel National, Inc. (BNI) is authorized to proceed with construction of the analytical laboratory portion of the Hanford Tank Waste Treatment and Immobilization Plant (WTP). Following detailed review of material provided to the DOE Office of River Protection (ORP) in Reference 1, ORP has determined that BNI has the programs and processes in place for successful project execution of these

activities, as summarized in Reference 2. The WTP regulatory process for radiological, nuclear, and
Mr. J. P. Henschel -2-
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process safety requires that construction activity be authorized in the form of an authorization agreement. The authorization agreement describes the specific terms and conditions associated with ensuring the achievement of adequate safety. The specific scope of work associated with this construction has been agreed to by BNI and ORP and is described in the attached Construction Authorization Agreement. The signed agreement has been given the following document number: ORP/OSR-2003-01, *Construction Authorization Agreement between the U.S. Department of Energy Office of River Protection and Bechtel National Inc.*, Revision 2, dated July 29, 2004. Newly authorized construction activity covered by Revision 2 of the Construction Authorization Agreement is:

- Full analytical laboratory construction.

All construction activities previously authorized in References 3 through 6 for the WTP Low Activity Waste, High Level Waste, Pretreatment, and selected portions of the Balance of Facilities structures and systems continue to be authorized.

Construction work shall be performed in accordance with Contract DE-AC27-01RV14136. The authorization basis for the construction phase remains as described in the attached Construction Authorization Agreement, the elements of which may be modified according to the requirements of DOE/REG-97-13, *Office of River Protection Position on Contractor-Initiated Changes to the Authorization Basis*, Revision 11.

BNI completed a management assessment of readiness to proceed with construction of the analytical laboratory which identified six items that had to be completed prior to starting full construction. ORP has verified that all six items have been completed. In addition, ORP observed selected aspects of the Contractor management assessment of readiness to proceed with laboratory construction (Reference 7). The observations included preparatory meetings prior to the management assessment to determine the assessment scope, attendance at meetings during the assessment to understand developing issues, thorough critique of the draft report, and review of the final report. No concerns were identified with the assessment, which had adequate scope to ensure that the Contractor was ready to begin construction of the facility. Based on these observations, the reviewers concluded that the Contractor was ready to begin construction, once a Construction Authorization Agreement was issued.

If you have any questions, please contact me, or your staff may call Lewis F. Miller, Jr., WTP Safety Authorization Basis Team, (509) 376-6817.

Sincerely,

Roy J. Schepens
Manager

WTP:LFM

**CONSTRUCTION AUTHORIZATION
AGREEMENT BETWEEN
THE U.S. DEPARTMENT OF ENERGY,
OFFICE OF RIVER PROTECTION AND
BECHTEL NATIONAL, INC.**



July 29, 2004

U.S. Department of Energy
Office of River Protection
P.O. Box 450, H6-60
Richland, Washington 99352

**CONSTRUCTION AUTHORIZATION
AGREEMENT BETWEEN
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July 29, 2004

U.S. Department of Energy
Office of River Protection
P.O. Box 450, H6-60
Richland, Washington 99352

Approved: _____
Roy J. Schepens

Date: _____

PREFACE

As directed by Congress in Section 3139 of the *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999*, the U.S. Department of Energy (DOE) established the Office of River Protection (ORP) at the Hanford Site to manage the River Protection Project (RPP), formerly known as the Tank Waste Remediation System. ORP is responsible for the safe storage, retrieval, treatment, and disposal of the high level nuclear waste stored in the 177 underground tanks at Hanford.

The initial concept for treatment and disposal of the high level wastes at Hanford was to use private industry to design, construct, and operate a Waste Treatment and Immobilization Plant (WTP) to process the waste. The concept was for DOE to enter into a fixed-price contract for the Contractor to build and operate a facility to treat the waste according to DOE specifications. In 1996, DOE selected two contractors to begin design of a WTP to accomplish this mission. In 1998, one of the contractors was eliminated, and design of the WTP was continued. However, in May 2000, DOE chose to terminate the privatization contract and seek new bidders under a different contract strategy. In December 2000, a team led by Bechtel National, Inc. was selected to continue design of the WTP and to subsequently build and commission the WTP.

On January 10, 2001, the U.S. Department of Energy published the revised Nuclear Safety Management rule, 10 CFR 830. This rule, in Subpart B, "Safety Basis Requirements," established specific requirements for the establishment and maintenance of the safety basis of DOE nuclear facilities, including the WTP project.

A key element of the WTP is DOE regulation of safety. The mission of removal and immobilization

of the existing large quantities of tank waste by the WTP Contractor must be accomplished safely, effectively, and efficiently.

The DOE principles of integrated safety management were built into the regulatory program for design, construction, operation, and deactivation of the facility. The regulatory program for nuclear safety permits waste treatment services to occur on a timely, predictable, and stable basis, with attention to safety.

A key feature of this regulatory process is its definition of how the standards-based integrated safety management principles are implemented to develop a necessary and sufficient set of standards and requirements for the design, construction, operation, and deactivation of the WTP facility. This process meets the expectations of the DOE necessary and sufficient closure process (subsequently renamed Work Smart Standards process) in DOE Policy 450.3, *Authorizing Use of the Necessary and Sufficient Process for Standards-based Environment, Safety and Health Management*, and is intended to be a DOE approved process under DOE Acquisition Regulations, DEAR 970.5204-2, *Laws, Regulations and DOE Directives*, Section (c). DOE approval of the contractor-derived standards is assigned to the Manager, ORP.

The WTP Contractor has direct responsibility for WTP safety. DOE requires the Contractor to integrate safety into work planning and execution. This integrated safety management process emphasizes that the Contractor's direct responsibility for ensuring that safety is an integral part of mission accomplishment. DOE, through its safety regulation and management program, verifies that the Contractor achieves adequate safety by complying with approved safety requirements.

This documents issued is available to the public through the DOE Public Reading Room at the Consolidated Information Center, Washington State University, Room 101L, Richland, Washington.
Copies may be purchased for a duplication fee.

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**CONSTRUCTION AUTHORIZATION AGREEMENT
BETWEEN
THE U.S. DEPARTMENT OF ENERGY (DOE),
OFFICE OF RIVER PROTECTION (ORP) AND
BECHTEL NATIONAL, INC.**

1.0 PURPOSE

This Construction Authorization Agreement (hereafter referred to as the "Agreement") identifies the scope of the construction work authorized by the ORP and the terms and conditions associated with ensuring the achievement of adequate nuclear, radiological, and process safety.

2.0 SCOPE OF THE AUTHORIZATION AGREEMENT

This Agreement applies to the performance of specified construction activities associated with the River Protection Project Waste Treatment and Immobilization Plant (WTP) performed by BNI and its subcontractors. The WTP is a large radiochemical processing facility located in the 200 East Area of the Hanford Site that will treat and immobilize Hanford tank wastes. The specific construction activities authorized under this Agreement are:

- Full facility construction of the Low Activity Waste (LAW) facility.
- Full facility construction of the High Level Waste (HLW) facility.
- Full facility construction of the Pretreatment (PT) facility
- Construction of the following selected portions of the Balance of Facility (BOF) systems and structures:
 - Electrical utility distribution systems
 - Switchgear building
 - BOF switchgear building
 - ITS switchgear building
 - Administration building
 - Chiller/compressor building
 - Water treatment building and storage tanks
 - Cooling tower facility
 - Fire water pump house and fire water storage tanks
 - Non-dangerous, non-radioactive (NDNR) liquid effluent facility
 - Access control facility
 - Simulator facility, located off site
 - Warehouse
 - Steam plant

- Wet chemical storage facility (WCSF)
 - Diesel generator facility (includes both standby and emergency diesel generators)
 - Fuel oil facility
 - Melter assembly building
 - Glass former storage facility.
- Full facility construction of the Analytical Laboratory

In addition, the activities currently authorized by Revision 1 of the Construction Authorization Agreement (March 17, 2003) and Revision 0 of the Partial Construction Authorization Agreement (July 9, 2002) continue to be authorized by the Agreement.

The following activities currently authorized by the Limited Construction Authorization Agreement (Revision 1, dated December 19, 2001) also continue to be authorized:

- Construction activities detailed in the Limited Construction Authorization Request (LCAR), Table 1, "WTP Project Limited Construction Activities."
- The radiological surveys, potential radiological contamination control and remediation activities, and the use of industrial radioactive sources as described in the LCAR, Section 4.0, "Radiological Safety."

3.0 DOE BASIS FOR APPROVAL

The ORP has performed safety reviews and conducted oversight of the WTP Contractor in the areas of radiological, nuclear, and process safety. These safety reviews and oversight activities have been conducted in accordance with the specific regulatory actions established in the WTP contract. Based on these reviews and oversight activities, the ORP has concluded that construction activities, if properly performed, will achieve adequate safety. The following specific regulatory actions, safety reviews associated with amendments to these documents, and oversight activities have led to this conclusion:

- a. The Standards Approval regulatory action, which included the following reviews and approvals:
 - Review and approval of the Safety Requirements Document (SRD) as documented in RL/REG-98-01, *DOE Regulatory Unit Evaluation Report of BNFL Inc. Safety Requirements Document*, in RL/REG-98-20, *DOE Regulatory Unit Evaluation of BNFL Inc. Safety Requirements Document, Rev. 1A.*, and in the Safety Evaluation Reports for the various Authorization Basis Change Notices (ABCNs) and Authorization Basis Amendment Requests (ABARs) that have been approved. The details of the SRD reviews can be found on the ORP website (<http://www.hanford.gov/osr/index.cfm>).
 - Review and approval of the Integrated Safety Management Plan (ISMP) as documented in RL/REG-98-19, *DOE Regulatory Unit Evaluation of BNFL Inc.*

Integrated Safety Management Plan, Revision 3A. The details of the ISMP reviews can be found on the ORP website (<http://www.hanford.gov/osr/index.cfm>).

- b. The portion of the Construction Authorization regulatory action related to the activities described in Item 2 above, which included the following reviews and approvals:
- Review and approval of three Construction Authorization Requests (CAR)^{1,2,3} as documented in ORP/OSR-2002-18, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Construction Authorization, Revision 3*, dated March 17, 2003. The approval of the CARs was subject to the conditions described in Appendix B of ORP/OSR-2002-18.
 - Review and approval of updates to Volumes I through V of the *Preliminary Safety Analysis Reports to Support Construction Authorization*, as documented in ORP/OSR-2003-22, *Safety Evaluation Report for Waste Treatment Plant (WTP) Preliminary Safety Analysis Report (PSAR) Update, Revision 0*, dated January 29, 2004. The approval of the PSAR update was subject to the conditions described in Appendix B of ORP/OSR-2003-22.
 - Review and approval of 24590-WTP-PSAR-ESH-01-002-06, *Preliminary Safety Analysis Report to Support Construction Authorization: Lab Facility Specific Information, Revision C*, as documented in ORP/WTP-2004-02, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Analytical Laboratory Construction Authorization, Revision 0*, dated July 29, 2004. The approval of the analytical laboratory construction authorization was subject to the conditions described in Appendix B of ORP/WTP-2004-02.
- c. The Oversight Process regulatory action, which included ORP inspections of WTP contractor activities during the WTP design phase. These inspection activities are established in RL/REG-98-05, *Inspection Program Description for the Regulatory Oversight of the RPP-WTP Contractor*. Safety issues raised in these inspections are resolved in accordance with the Corrective Action Program established in RL/REG-98-06, *Corrective Action Program Description*.

Before issuing the Construction Authorization Agreements for the LAW, HLW, PT, and selected portions of the BOF, ORP conducted the following readiness inspections of the Contractor:

¹ CCN: 02762, BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Request for Review and Approval of the Construction Authorization Request for the Hanford Tank Waste Treatment and Immobilization Plant," dated January 31, 2002.

² CCN: 027638, BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Request for Review and Approval of the Construction Authorization Request for the Hanford Tank Waste Treatment and Immobilization Plant," dated February 19, 2002.

³ CCN: 030609, BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Request for Review and Approval of the Construction Authorization Request for the Hanford Tank Waste Treatment and Immobilization Plant," dated May 1, 2002.

- Construction Authorization Request Readiness Inspection (A-03-OSR-RPPWTP-002) performed November 4-7, 2002. This readiness review covered LAW and HLW full facility construction, PT facility pits, tunnels, and basemat, and selected portions of the BOF.
- Pretreatment Facility Construction Authorization Readiness Inspection Report (A-01-OSR-RPPWTP-011) performed March 3-13, 2003. This readiness review covered PT full construction.

Both readiness inspections assessed completion of corrective actions that had been identified during earlier ORP inspections and concluded that implementation of the corrective actions was adequate to support construction authorization for these portions of the WTP.

The following construction authorization request readiness inspection was also conducted prior to issuing this Construction Authorization Agreement for construction of the analytical laboratory to verify readiness for construction:

- Inspection Notes (A04AMWTP-RPPWTP-003-10) performed March 1 - June 30, 2004. This inspection covered the BNI Management Assessment of Lab Construction Readiness.

The reviewers observed selected aspects of the BNI management assessment of readiness to commence laboratory construction. The observations included preparatory meetings prior to the management assessment to determine the assessment scope, attendance at meetings during the assessment to understand developing issues, thorough critique of the draft report, and review of the final report. No concerns were identified with the assessment, which had adequate scope to ensure that BNI was ready to commence construction of the facility. Based on these observations, the reviewers concluded that BNI was ready to commence analytical laboratory construction, once a construction authorization was issued.

4.0 AUTHORIZATION BASIS

The WTP authorization basis is the composite of information provided by the WTP contractor in response to radiological, nuclear, and process safety requirements. The implementation of these requirements forms the basis upon which the DOE grants permission to perform regulated activities. The following specific documents (including material incorporated by reference) provided by BNI are the basis for DOE's decision to authorize full construction activities:

- a. Safety Requirements Document (SRD), Volume II, 24590-WTP-SRD-ESH-01-001-02, as modified through July 29, 2004 using the authorization basis amendment process.
- b. Integrated Safety Management Plan (ISMP), 24590-WTP-ISMP-ESH-01-001, Rev. 3, as modified through June 13, 2003 using the authorization basis amendment process.
- c. Quality Assurance Manual (QAM), 24590-WTP-QAM-QA-01-001, Rev. 4b, dated November 11, 2003.

- d. Radiation Protection Program for Design and Construction (RPP), 24590-WTP-RPP-ESH-01-001, Rev. 0, dated December 11, 2001.
- e. Construction Authorization Requests (CARs), which consist of the following BNI submittals:
 - 24590-WTP-PSAR-ESH-01-002-01, *Preliminary Safety Analysis Report to Support Construction Authorization; General Information*, Rev. 1, dated September 30, 2003. (Volume I)
 - 24590-WTP-PSAR-ESH-01-002-02, *Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information*, Rev. 1, dated September 30, 2003. (Volume II)
 - 24590-WTP-PSAR-ESH-01-002-03, *Preliminary Safety Analysis Report to Support Construction Authorization; LAW Facility Specific Information*, Rev. 1, dated September 30, 2003. (Volume III)
 - 24590-WTP-PSAR-ESH-01-002-04, *Preliminary Safety Analysis Report to Support Construction Authorization; HLW Facility Specific Information*, Rev. 1, dated September 30, 2003. (Volume IV)
 - 24590-WTP-PSAR-ESH-01-002-05, *Preliminary Safety Analysis Report to Support Construction Authorization; Balance of Facility Specific Information*, Rev. 1, dated September 30, 2003. (Volume V)
 - 24590-WTP-PSAR-ESH-01-002-06, *Preliminary Safety Analysis Report to Support Construction Authorization; Lab Facility Specific Information*, Rev. C, dated June 2, 2004. (Volume VI)

5.0 TERMS AND CONDITIONS

The following terms and conditions apply to full facility construction authorization:

- a. Construction activities shall be performed in accordance with the WTP authorization basis.
- b. BNI shall maintain the authorization basis current with respect to changes made to the facility design and administrative controls, and in light of significant new safety information. BNI-initiated changes to the authorization basis shall be performed in accordance with RL/REG-97-13, *Office of Safety Regulation Position on Contractor-Initiated Changes to the Authorization Basis*, as amended.
- c. BNI shall incorporate and implement new or revised radiological, nuclear, and process safety requirements as directed by the ORP in accordance with RL/REG-98-14, *Office of Safety Regulation Position on New Safety Information and Back-fits*.

- d. BNI shall identify and correct conditions that do not conform to the WTP authorization basis in accordance with PSAR Volume I, Section 17.5.3.1, "External Interfaces," which describes BNI's implementation of RL/REG-98-06, *Corrective Action Program Description*.
- e. BNI shall report occurrences that involve nuclear, radiological, or process safety to the ORP in accordance with the 24590-WTP-PL-CN-01-002, *Construction Occurrence Reporting Plan*.
- f. BNI shall complete the conditions of acceptance identified in the Appendix to this Agreement on the schedule therein.
- g. In the event that BNI requests modification to the conditions of acceptance, BNI shall notify DOE no later than five business days before the due date of any affected conditions, propose an alternative condition, and provide the justification for the modification, including an assessment of its safety significance, if any. DOE shall promptly review the request, and provided that DOE concludes the request has been adequately justified, the agreement may be modified accordingly.

6.0 CONTRACTOR QUALIFICATION

Construction activities will be performed under DOE Contract DE-AC27-01RV14136. Evaluation of contractor qualifications was a key factor in the solicitation process associated with awarding the Contract. During the solicitation process, the DOE Source Evaluation Board determined that BNI was qualified to perform the work specified in the Contract. In addition, during the CAR review described in Section 3.b above, the ORP reviewed information provided in the CAR specifically related to BNI's qualifications to perform important-to-safety activities and determined that the information adequately demonstrated BNI's qualifications to safely perform the activities authorized in this Agreement. On this basis, the ORP has determined that BNI is qualified to perform important-to-safety WTP construction activities.

Appendix – Conditions of Acceptance

The U.S. Department of Energy, Office of River Protection (ORP) identified conditions of acceptance (COAs) in its PSAR reviews. Some of the following COAs were identified during review of the PSAR update as shown in Appendix B of the Safety Authorization Report, ORP/OSR-2003-22, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Preliminary Safety Analysis Report (PSAR) Update*, issued January 29, 2004. The status on closure of the COAs is shown with the individual COA. In addition, 13 new COAs were identified during review of the analytical laboratory PSAR. All of the open COAs are part of the Construction Authorization Agreement and must be completed by the Contractor as part of the construction authorization process.

PSAR Update Review COAs (from Appendix B of ORP/OSR-2003-22, Revision 0)

3.3 Hazard and Accident Analyses

New COA

1. By March 31, 2004, the Contractor must (a) identify any control strategies and SSCs in PSAR Revision 0 that were deleted or were significantly modified as a result of deletion of worker DBEs and (b) re-identify the DBEs affecting the facility worker and include them in the PSAR along with a description of the events each DBE bounds and the selected control strategies. The identifications must be submitted as an ABAR for ORP review and approval. [COMPLETE]

3.6 Criticality Safety Program

New COA

1. The Contractor must remove the interface safety limits from the CSER and delete references to the interface safety limits in PT PSAR, Section 5.5.20.8, "Administrative Controls – Criticality Safety." This must be completed by the next PSAR update.

3.7 Radiation Protection

BNI must include the following provisions in the radiological control program. These provisions were not required for the PSAR update, but must be provided with the FSAR, except for item #2:

1. The Contractor must provide a detailed organizational chart that shows the radiation safety organization and its relationship to senior plant personnel and other line managers; also, the Contractor must provide job descriptions defining specific authorities and responsibilities of radiation safety personnel (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B).

2. The Contractor must specify the review and revision cycle of procedures and provide that information to ORP before the start of the preoperational testing phase (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B).
3. The Contractor must describe the mechanism for ensuring that RWPs are not used past their termination dates (was COA #3 in ORP/OSR-2002-18, Rev. 3, Appendix B).
4. The Contractor must describe the methods for analyzing airborne concentrations; methods for calibrating air sampling and counting equipment; action 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 (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B).
5. The Contractor must identify the types and quantities of contamination monitoring equipment and the methods and types of instruments used in the radiation surveys (was COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B).
6. The Contractor must identify the locations of the facility's respiratory equipment (was COA #6 in ORP/OSR-2002-18, Rev. 3, Appendix B).
7. The Contractor must describe the radiation measurement selection criteria for performing radiation and contamination surveys, sampling airborne radioactivity, monitoring area radiation, and performing radioactive analyses. The Contractor also must list the types and quantities of instruments that were available, as well as their ranges, counting mode, sensitivity, alarm setpoints, and planned use. In addition, the Contractor must describe the instrument storage, calibration, and maintenance facilities and laboratory facilities used for radiological analyses (was COA #7 in ORP/OSR-2002-18, Rev. 3, Appendix B).

3.12 Procedures and Training

1. In the next PSAR update, the Contractor must add the following information to Section 12.4.3.1, "Design and Construction Phases Training": "Periodic systematic program evaluations will be conducted every three years to measure the training systems' effectiveness in producing qualified employees. Training program evaluations should identify program strengths and weaknesses, determine if worker performance has improved, assess if program content matches current job needs or task lists, and determine if corrective actions are needed to improve program effectiveness." (This was training COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B.)
2. In the next PSAR update, the Contractor must add the following information to Sections 12.4.3.2, "Maintenance of Operational Phase Training": "Periodic systematic program evaluations will be conducted every three years to measure the training systems' effectiveness in producing qualified employees. Training program evaluations should identify program strengths and weaknesses, determine if worker performance has

improved, assess if program content matches current job needs or task lists, and determine if corrective actions are needed to improve program effectiveness." (This was training COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B.)

3.17 Management, Organization, and Institutional Safety Provisions

1. The Contractor must 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 ORP (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B).
2. The Contractor must revise the occurrence reporting procedure for cold commissioning before the start of the preoperational testing phase (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B).

3.18 Fire Protection

1. The Contractor must provide objective evidence of the plan for periodic evaluations of the WTP Fire Protection Program by December 31, 2003 (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B). [COMPLETE]

4.1 PT Facility Description

Facility Description

1. By April 13, 2004, the Contractor must perform an evaluation of PT internal flooding as part of the common-cause/common-mode failure analysis during ISM Cycle III; identify control strategies for internal flooding events, as necessary, to prevent unacceptable impacts to the safety function of the structure located above the basemat. Before floors are constructed above the basemat, the Contractor must demonstrate, in the flooding assessment, the vulnerability to flooding from internal sources. Where vulnerabilities are detected, the Contractor must provide appropriate mitigation. The Contractor must provide the results from this analysis to ORP for approval and document them in the first PSAR revision following completion of the hazard analysis. (This was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B.) [SUBMITTAL UNDER EVALUATION BY ORP]

Process Description

1. By March 31, 2004, the Contractor must assess tank waste characterization data and internal WTP process streams and re-assess requirements selected for erosion/corrosion based on this assessment (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 1, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
2. By the next PSAR update, the Contractor must complete additional laboratory tests to establish a safe upper limit for nitric acid concentration with new and degraded resin (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B).

New COAs

1. The Contractor must update the control room habitability calculation (24590-WTP-HAC-C1V-00001, *Technical Basis Calculations for WTP Control Room Habitability*) using the new version of the source term calculation (24590-PTF-M4C-V11T-00008, *Pretreatment, HLW, and LAW Vitrification Predicted Maximum Radionuclides*) as an assumed input. The update must be completed by June 30, 2004, and the resulting PSAR changes provided as an ABAR to ORP for review and approval. The ABAR will also identify all ITS SSCs necessary to ensure the PT main control room remains habitable throughout any DBE. [SUBMITTAL UNDER EVALUATION BY ORP]
2. In the next PSAR update, the Contractor must incorporate the addition of water ejectors into Section 2.4.13.1, "Hot Cell, Remote Decontamination/Maintenance Cave (RDMC), and RDMC Operating Area."
3. In the next PSAR update, the Contractor must add the following statement to Section 2.5.3, "Waste Feed Receipt Process System" (from 24590-WTP-ABCN-ENS-03-025, *Additional Gamma Monitor Function and Deletion of Emptying Ejector in System TCP*): "The concentrate undergoes on-line gamma monitoring during transfers back to the treated LAW concentrate vessel."

4.2 PT Facility Hazard and Accident Analyses

1. The Contractor must perform a hazard analysis for water hammer and consider water hammer loads in the design of piping supports in the ISM Cycle III hazard topography process and incorporate the results in the next PSAR update (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B).
2. The Contractor must complete the analysis of the release rate and ammonia concentration by March 31, 2004 (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
3. Prior to cold commissioning, the Contractor must develop and include a basis for the frequency and locations of periodic flushing (if needed) of vent lines to prevent ammonium nitrate buildup and determine the need for inspection ports (was COA #3 in ORP/OSR-2002-18, Rev. 3, Appendix B).
4. The Contractor must test degraded resin with 3 molar nitric acid to determine whether degraded resin is more reactive than fresh resin. If this test demonstrates that the degraded resin is more reactive, then the viability of testing with sodium permanganate must be evaluated. This laboratory work is scheduled to be completed by December 31, 2003. Results of the testing will be documented in a report and incorporated in the next PSAR update. (This was COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B.)
5. By the dates shown below, the Contractor must revise hydrogen generation rates and severity level analysis and complete the following (was COA #8 in ORP/OSR-2002-18, Rev. 3, Appendix B):

- (a) By February 28, 2004, the Contractor must revise calculation 24590-PTF-Z0C-W14T-00002, *Revised Severity Level Calculations for the Pretreatment Facility*, to more conservatively account for the concentration 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*, following revision of the Hu 2000 hydrogen generation correlation for applicability to the WTP. [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
 - (b) By February 28, 2004, the Contractor must perform all hydrogen generation rate calculations for tanks that could self-boil within 300 hours using a maximum temperature of 220°F and increased activation energy (100 kJ/mole), following revision of the Hu 2000 hydrogen generation correlation for applicability to the WTP. [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
 - (c) [CLOSED IN THE PSAR UPDATE REVIEW]
 - (d) By December 31, 2005, the Contractor must evaluate the potential for piping systems and ancillary equipment to accumulate hydrogen and the potential control strategies. The potential for piping systems and ancillary equipment to accumulate hydrogen must be incorporated into the DBE calculations and the PSAR as applicable.
 - (e) By December 31, 2005, the Contractor must finalize calculations to verify that the instrument air supply rate and noncondensed steam conditions are sufficient to keep the evaporators below 25% of the lower flammability limit in the offgas systems. The results must be incorporated into the DBE calculations and the PSAR as applicable.
- 6. The Contractor must develop administrative controls during ISM Cycle III to prevent hydrogen buildup in vessels containing low liquid levels when pulse jet mixers are automatically stopped and document the results in the FSAR (was COA #9 in ORP/OSR-2002-18, Rev. 3, Appendix B).
 - 7. The Contractor must evaluate the flooding hazard for ITS equipment (both electrical and mechanical) as part of the hazard topography evaluation scheduled during ISM Cycle III and document the results in the next PSAR update (was COA #13 in ORP/OSR-2002-18, Rev. 3, Appendix B).
 - 8. By the next PSAR update, the Contractor must develop a separate tank bump DBE analysis (was COA #15 in ORP/OSR-2002-18, Rev. 3, Appendix B).

New COA

1. In the next PSAR update, the Contractor must change the severity level for the public consequence from a worst-case spray leak of waste material from SL-2 to SL-1 in Section 3.4.1.4.3.8, "Conclusions."

4.3 PT Facility Important-to-Safety SSCs

1. By March 31, 2004, the Contractor must confirm in a DBE calculation that water-saturated air caused by a break in the evaporator steam line will be mixed with enough dry air from other C5 cells before it reaches the primary C5 ventilation system filters to preclude exceeding moisture limitations or propose alternate controls (was COA #3 in ORP/OSR-2002-18, Rev. 3, Appendix B). [SUBMITTAL UNDER EVALUATION BY ORP]
2. By the next PSAR update, the Contractor must evaluate use and proper sizing of the bulge vent line to supplement drain capacity as part of the PSAR control strategy to provide bulge drains before bulge procurements are complete (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B).

5.1 LAW Facility Description

Facility Description

1. In the next PSAR update, the Contractor must include the methodology to be used for qualifying SDC equipment as committed to in response to Question LAW-PSAR-202 (was COA #3 in ORP/OSR-2002-18, Rev. 3, Appendix B.)
2. By the next PSAR update, the Contractor must submit a document that supports the justification for accepting higher allowances permitted by ASME-III for design of the SC-III and -IV piping and pipe supports carrying nonchemical fluids (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B).
3. By March 31, 2004, the Contractor must revise the hazard analysis and designate the cranes as SDS SC-III for their safety function to prevent crane components from falling on the SDC offgas SSCs. The cranes must also be included in Table 4A-2, "Safety Design Significant System, Structure, and Components Summary for LAW." (This was COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B.) [COMPLETE]
4. The Contractor must provide initial information (from ISM Cycle III) in the next updated PSAR and full information when the FSAR is submitted for the following (was COA #6 in ORP/OSR-2002-18, Rev. 3, Appendix B):
 - (a) [CLOSED IN THE PSAR UPDATE REVIEW]
 - (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 facility can be placed and maintained in a safe state following any DBEs.

5.2 LAW Facility Hazard and Accident Analyses

1. By March 31, 2004, the Contractor must 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 (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B). [COMPLETE]
2. By March 31, 2004, the Contractor must include design features for mitigating the 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 (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
3. The Contractor must submit the hazard evaluation of the internal flooding event (for preliminary design) sequentially for each floor, beginning with the bottom floor, to ORP for approval and receive approval before the 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 the Contractor (was COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B).
4. By March 31, 2004, the Contractor must include the results of the offgas system evaluation for ammonium nitrate deposition potential, including any control strategies that will be implemented to address concerns identified through this evaluation (was COA #6 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]

6.1 HLW Facility Description

Facility Description

1. The Contractor must provide initial information (from ISM Cycle III) in the next PSAR update and full information when the FSAR is submitted, for the following (was COA #4 in ORP/OSR-2002-18, Rev. 3, Appendix B):
 - (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 facility can be placed and maintained in a safe state following any DBEs.

Process Description

1. In the next PSAR update, the Contractor must include information on monitoring vessel vent and overflow lines to ensure their functionality and to establish the required frequencies of monitoring prior to cold commissioning (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B).

New COAs

1. In the next PSAR update, the Contractor must include the following information from 24590-WTP-ABCN-02-028, *Design Changes Associated with High Level Waste Vitrification System HSF – Mechanical Handling Diagram – Melter Cave Support Handling – Melter Cave 1*:
 - Addition of posting box and decontamination pit information and functions to Sections 2.4.12.1, "Melter Caves and Airlocks, H-0117, H-0116B, H-0116A, H-0106, H-0105B, H-0105A," and 2.4.14.1, "Melter Cave Crane Decontamination Areas – H-0310 and H-0304," respectively
 - Addition of the decontamination pit in the list of systems served by C5 in Section 2.4.14.1, "Melter Cave Crane Decontamination Areas – H-0310 and H-0304."
 - Addition of the cable misreeving detection in Section 2.4.20, "Cranes and Hoists."
2. With issuance of this SER, for SC-I and SC-II primary building structural components (which are modeled in SASSI), the Contractor commits to using a time-history or a response spectrum analysis method to calculate the design basis seismic loads for the steel structural components, anchors of steel structural components, and concrete structural components to ensure that the multi-mode response effects are accounted for. Before any other method is used, the Contractor must perform and document a safety evaluation justifying the method. Although this new COA was identified during the review of the HLW PSAR, the issue also applies to the design of the PT facility, and therefore the COA also applies to PT. [COMPLETE]

6.2 HLW Facility Hazard and Accident Analyses

1. By March 31, 2004, the Contractor must 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 (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
2. By the next PSAR update, the Contractor must include the results of the offgas system evaluation for ammonium nitrate deposition potential, including any control strategies

that will be implemented to address concerns identified through this evaluation (was COA #2 in ORP/OSR-2002-18, Rev. 3, Appendix B).

3. The Contractor must submit the internal flooding event hazard evaluation (for the preliminary design) to ORP for approval, and receive DOE approval, before the 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 (was COA #5 in ORP/OSR-2002-18, Rev. 3, Appendix B).
4. By the next PSAR update, the Contractor must perform a sensitivity study to compare respirable releases from a crack with an orifice and revise the calculations and PSAR, as necessary (was COA #7 in ORP/OSR-2002-18, Rev. 3, Appendix B).
5. By March 31, 2004, the Contractor must re-analyze the hydrogen generation deflagration DBE and the PSAR based on re-evaluation of the hydrogen correlation used in the event analysis (was COA #8 in ORP/OSR-2002-18, Rev. 3, Appendix B). [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]
6. In the next PSAR update, the Contractor must describe the 2700-L molten glass spill event and associated control strategies (was COA #11 in ORP/OSR-2002-18, Rev. 3, Appendix B).
7. By March 31, 2004, following completion of the revised Hu 2000 correlation and hydrogen generation rate calculations, the Contractor must revise calculations 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 effects. (This was COA #12 in ORP/OSR-2002-18, Rev. 3, Appendix B.) [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]

New COA

1. By March 31, 2004, the Contractor must provide a DBE calculation and PSAR DBE section for HLW vessel overblow hazards. [EXTENDED TO JUNE 30, 2004; SUBMITTAL UNDER EVALUATION BY ORP]

6.3 HLW Facility Important-to-Safety SSCs

1. In the next PSAR update, the Contractor must correct the information on the safety functions of the high-high level interlocks (was COA #9 in ORP/OSR-2002-18, Rev. 3, Appendix B).

7.1 BOF Facility Description

Facility Description

1. By the dates shown below, the Contractor must complete the following (was COA #1 in ORP/OSR-2002-18, Rev. 3, Appendix B):
 - (a) [CLOSED IN THE PSAR UPDATE REVIEW]
 - (b) In the next PSAR update, the Contractor must identify controls based on IEEE 497-2002, *IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations*, for monitoring accidents resulting from DBEs in the WTP facility.
 - (c) By April 30, 2004, the Contractor must describe the system for starting EDGs. [COMPLETE]

7.2 BOF Facility Hazard and Accident Analyses

New COA

1. On completion of design and prior to fabrication and construction for the tanks and berms for the nitric acid spill and nitric acid-sodium nitrite mistransfer accidents at the wet chemical storage facility, the Contractor must provide DBE calculations that demonstrate adequate safety margin from SRD Safety Criterion 2.0-2 limits.

8.2 SRD and ISMP Acceptability and Compliance

1. In the next PSAR update, the Contractor must revise Volume I, Table 2-6, "Categorization of Piping"; Section 2.4.9, "Piping Design"; and Section 2.4.10, "Pipe Support Design," to be consistent with the SRD implementing standards for SC-III and -IV piping and pipe supports carrying nonchemical fluid (was COA #3 in ORP/OSR-2002-18, Rev. 3, Appendix B).

Analytical Laboratory COAs (from Appendix B of ORP/WTP-2004-02, Revision 0)

3.1 Facility Description

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

1. Include the requirement to perform periodic leak testing on the C3 decontamination booth isolation damper C5V-YD-6229 to an acceptable leakage level and include the requirement as a TSR in the next PSAR update. (See Section 3.1.2, Item 7.)
2. Include the following definition of passive confinement in the next PSAR update: "The analytical laboratory passive confinement feature is defined as containment of hazardous material achieved by the confinement structure, the C5 exhaust boundary, and the isolation dampers without forced air flow. Leakage from the passive confinement

structure is unfiltered and accounted for in the DBE calculation. The term passive confinement, where used in the analytical laboratory PSAR, or associated SIPD, design basis calculations, or associated safety analyses, includes an active element, the C5V-YD-6229 damper, which must fail closed for the confinement boundary assumed in the safety analysis to be accurate. The single failure criterion for this active component was considered and rejected because of the high reliability of the damper. The damper is periodically tested to assure operability, as discussed in Section 5.5.1, "LCO - C3 Decontamination Booth Isolation Damper and Interlock Operability." (See Section 3.1.1, Item 7.)

3. Revise the fire DBE calculation (24590-LAB-Z0C-W14T-00006, *Design Basis Event: Fire in the Laboratory Facility*) and the *Analytical Laboratory Hotcell Fire Hazard Analysis* (24590-LAB-U1C-FPW-00001) to have consistent input (e.g., fire loading) assumptions and fire scenarios. Combustible load limits used in these calculations will be protected by operating limits defined in the WTP combustible control program and TSRs, as necessary. The amended calculations will (a) itemize and sum combustibles (fixed and transient) used in each hotcell analysis to confirm the assumptions used in the calculations and (b) show the degree of conservatism in the hotcell FHA analysis by calculating the hypothetical fire load necessary for flashover conditions. This will be done on a schedule mutually agreed to by the Contractor and ORP. (See Section 3.1.2, Item 9.)

3.2 Facility Hazard and Accident Analyses

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

1. Include evaluation of interfacility sample transfer events, including transfers from all facilities using the appropriate facility-specific waste streams, with the next update of the PT facility-specific PSAR. (See Section 3.2.2, Item 2.)
2. Revise bullet 5 in PSAR Section 5.5.4.3, "Administrative Controls - Radiation Protection," to include "radioactive material export" to ensure the specific safety functions relative to CSD-UAHL/N0022 and CSD-UAHL/N0064, and the associated SCR-UADM/N0009 are developed into a TSR. This must be accomplished in the next PSAR update. (See Section 3.2.2, Item 8.)
3. Revise the PSARs as follows (see Section 3.2.2, Item 9.):
 - (a) For the general information PSAR, revise Chapter 7, "Radiation Protection," to provide sufficient detail on administrative radiological controls to clearly demonstrate that the controls are adequate to limit potential worker exposure as credited. This will be done with the FSAR, consistent with completion of the seven existing radiation protection COAs from the Volume I PSAR review (ORP/OSR-2002-18).

- (b) For the analytical laboratory PSAR, remove references to the Radiation Protection Program as the basis for administrative radiological controls and describe the specific administrative controls required. This will be done in the next PSAR update.
 - (c) For the HLW, LAW, and PT PSARs, remove references to the Radiation Protection Program as the basis for operational administrative radiological controls that do not explicitly appear in the Radiation Protection Program; this will be done in the next PSAR update. Also, in the FSAR remove all other Radiation Protection Program references that do not reference a specific control.
4. Incorporate the results of the hotcell fire duration calculation 24590-LAB-U1C-FPW-00001, *Analytical Laboratory Hotcell Fire Hazard Analysis*, and the hotcell construction description contained in the fire integrity evaluation into the next update of the analytical laboratory PFHA. (See Section 3.2.2, Item 9.)

3.3 Facility ITS SSCs

Conditions of Acceptance – BNI must complete the following in the next PSAR update except for milestone 3 which must be completed prior to commissioning:

1. Classify the bottles in which samples are stored in the hotcells as APC. (See Section 3.3.2, Item 1.)
2. Add the following APC items to Table 3A-6 in the next PSAR update: (1) accident monitoring instrumentation; (2) electrical power distribution SSCs, including UPS, that serve APC loads [C5 ventilation fans, Area Radiation Monitors (ARMs), Continuous Air Monitors (CAMs), and accident monitoring instrumentation]; (3) automatic fire suppression system, including fire water system and controls for monitoring and supplying water to the sprinklers; (4) C5 exhaust duct between decon hotcell and C5V-YD-6229 damper; (5) piping to hotcell drain collection vessel (RLD-VSL-00165); (6) automatic transfer system instrumentation to detect sample holdup in ASX; (7) permanent CAMs; (8) permanent ARMs; (9) gamma monitor inside hotcell transfer port; (10) gamma monitor in hotcell transfer drawer; and (11) leak detection equipment in C5 tank cell sump. (See Section 3.3.2, Item 1.)
3. Implement the fire protection system impairment procedure prior to commissioning of the analytical laboratory. (See Section 3.3.2, Item 4.)
4. Describe the accident monitoring instrumentation, its safety classification, and associated variable types, pursuant to the tailored version of IEEE 497-2002, *IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations*, and governed by the ISM process. (See Section 3.3.2, Item 5.)
5. Either specify and procure the C3 decontamination booth isolation damper C5V-YD-6229 to remain functional at the elevated temperature (150°C) or evaluate the maximum

temperature at the damper location and protect the damper against the elevated temperature. (See Section 3.3.2, Item 5.)

4.3 Conformance with Facility Risk Goals

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

1. Revise the analytical laboratory ORA as follows (see Section 4.3.2):
 - (a) Develop a written process within 60 days of the laboratory PSAR approval to periodically assess the performance of barriers, engineered safety features and administrative controls as discussed in ORP letter 03-AMWTP-025.
 - (b) As a result of the known and anticipated changes in the WTP that have occurred or will occur prior to the next PSAR update, requantify the ORA and submit the results of the requantification prior to the next revision of the laboratory PSAR in December, 2005. If, after development of the process in Item 1, an assessment determines that requantification is not likely to conclude that the risk goals for the WTP may be exceeded, BNI may request a delay in the requantification.
 - (c) Provide a schedule for requantification that commits to requantify the lab risk as the first phase of the overall requantification effort. The schedule will be provided to ORP within 60 days of ORP approval of the laboratory PSAR.