

FOIA Request
FOI 2014-00268

ORP Letter Number	Letter Issued Date
13-CPM-0239	09/24/2013
13-ECD-0060	07/29/2013
13-ECD-0074	10/04/2013
13-NSD-0021	07/12/2013
13-NSD-0038	11/05/2013
13-ORP-0281	10/28/2013
13-QAT-0018	07/02/2013
13-QAT-0065	11/18/2013
13-SHD-0056	07/02/2013
13-SHD-0062	06/03/2013
13-SHD-0069	06/28/2013
13-SHD-0074	07/02/2013
13-SHD-0092	09/04/2013
13-SHD-0111	10/01/2013
13-TRS-0029	07/26/2013
13-WSC-0015	08/07/2013
13-WSC-0018	10/22/2013
13-WTP-0091	08/07/2013
13-WTP-0117	07/17/2013
13-WTP-0118	07/22/2013
13-WTP-0130	07/22/2013
13-WTP-0132	07/18/2013
13-WTP-0134	07/12/2013
13-WTP-0153	08/26/2013
13-WTP-0158	08/07/2013
13-WTP-0173	09/11/2013
13-WTP-0176	09/11/2013
13-WTP-0204	10/31/2013

ORP Letter Number	Letter Issued Date
13-WTP-0212	10/10/2013
13-WTP-0252	11/20/2013



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

NOV 18 2013

13-QAT-0065

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – U.S. DEPARTMENT OF ENERGY (DOE),
OFFICE OF RIVER PROTECTION (ORP) SURVEILLANCE REPORT S-13-QAT-RPPWTP-
004, SURVEILLANCE OF REVIEW OF BECHTEL NATIONAL, INC.'S (BNI) INTERIM
SURVEILLANCE IN RESPONSE TO OFFICE OF INSPECTOR GENERAL (OIG) REPORT
DOE/IG-0863, RECOMMENDATION NUMBER 2

- References:
1. BNI Surveillance, 24590-WTP-SV-QA-12-113, "Interim Surveillance Supplier QA to Review BC-HTR Vessel Quality Documentation," dated September 18, 2013.
 2. DOE OIG Audit Report, "The Department of Energy's \$12.2 Billion Waste Treatment and Immobilization Plant – Quality Assurance Issues – Black Cell Vessels," DOE/IG-0863, dated April 2012.

This letter forwards the results of ORP's Surveillance S-13-QAT-RPPWTP-004 conducted from September 1, 2013, through September 30, 2013. ORP evaluated BNI's corrective actions involving black cell and hard to reach vessel areas defined in BNI interim Surveillance Report, 24590-WTP-SV-QA-12-113, "Interim Surveillance Supplier QA to Review BC-HTR Vessel Quality Documentation," Reference 1. ORP's surveillance was in response to Recommendation Number 2 of the DOE OIG Report DOE/IG-0863, Reference 2.

ORP identified the following two opportunities for improvement (OFI):

1. **S-13-QAT-RPPWTP-004-001**: OFI for BNI to improve their quality verification document (QVD) process by performing a comprehensive review of BNI's entire QVD process to determine if the QVD program contained adequate program elements.

Mr. J.M. St. Julian
13-QAT-0065

-2-

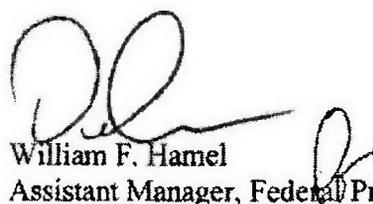
NOV 18 2013

2. **S-13-QAT-RPPWTP-004-O02:** Document 24590-WTP-GPG-PSQ-5002, "Quality Verification Document Second Review," is currently a guidance document. OFI S-13-QAT-RPPWTP-004-O02 addresses reclassification of this document as a procedure versus a guidance document. The document provided written direction to assure supplier equipment documentation was complete and met quality assurance requirements. Although the surveillant found that 24590-WTP-GPG-PSQ-5002 met BNI's document requirements, this type of document was typically a procedure versus guide.

ORP found that BNI's actions were adequate. However, effectiveness of BNI's CAs will be determined once the ORP performs a vertical slice audit upon release of a BC-HTR vessel.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Jeffrey D. May, Supervisor, Quality Assurance Team, (509) 373-7884.


William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

QAT:MAR

Attachment

cc w/attach:
D. E. Kammenzind, BNI
M. McCullough, BNI
BNI Correspondence

**Attachment
13-QAT-0065
(10 Pages)**

**DOE ORP Quality Assurance Team's Review of BNI's Interim
Surveillance, 24590-WTP-SV-QA-12-113, in Response to Office of
Inspector General Report DOE/IG-0863, Recommendation Number 2**

Surveillance Report S-13-QAT-RPPWTP-004

**U.S. Department of Energy
Office of River Protection**

Organization: Quality Assurance Team
Surveillant: Mary A. Ryan
Surveillance Number: S-13-QAT-RPPWTP-004
IAS-ID: 515
Date Completed: September 1 through 30, 2013

Contractor: Washington River Protection Solutions LLC
Facility: Bechtel National, Inc., Waste Treatment and Immobilization Plant
Title: U.S. Department of Energy, Office of River Protection Quality Assurance Team's Review of Bechtel National, Inc.'s Interim Surveillance, 24590-WTP-SV-QA-12-113, in Response to Office of Inspector General Report DOE/IG-0863, Recommendation Number 2

Surveillance Scope:

The U.S. Department of Energy (DOE), Office of River Protection (ORP) Quality Assurance Team (QAT) performed a surveillance to evaluate the Bechtel National, Inc. (BNI) Surveillance Report, 24590-WTP-SV-QA-12-113, *Interim Surveillance Supplier QA to Review BC-HTR Vessel Quality Documentation*. Specifically, the QAT surveillant evaluated BNI's corrective actions (CA) in relation to the DOE Office of Inspector General (OIG) Report DOE/IG-0863, *The Department of Energy's \$12.2 Billion Waste Treatment and Immobilization Plant – Quality Assurance Issues – Black Cell Vessels*, Recommendation Number 2. OIG Recommendation Number 2 involved addressing quality assurance (QA) documentation issues with black cell (BC) and hard to reach (HTR) vessel areas.

Surveillance Summary:

The OIG evaluated BNI's Waste Treatment and Immobilization Plant (WTP) BC-HTR vessel design defined in DOE/IG-0863. The OIG described a number of issues involving BNI's design of the BC-HTR vessel areas. In addition, the OIG acknowledged DOE took a number of actions addressing BNI's BC-HTR deficiencies, but stated in order to prevent unnecessary risk to the operation and mission of WTP additional actions were necessary to verify implementation and

effectiveness of BNI's BC-HTR vessel design areas. The OIG identified five recommendations to address issues defined in their report. This ORP QAT surveillance is an evaluation of BNI's work to date, in resolving OIG Recommendation Number 2. OIG Recommendation Number 2 stated the following:

Review quality assurance documentation associated with black cell and hard-to-reach area vessels and verify all necessary actions have been taken by Bechtel to ensure the receipt of all necessary records required by the project.

Conclusion:

BNI has, and is, making positive changes to ensure BNI engineering and supplier quality (SQ) documentation for BC-HTR vessels will be complete and will meet QA requirements. The ORP QAT found BNI completed Interim Surveillance 24590-WTP-SV-QA-12-113, which identified actions/documents implementing CAs in response to OIG Audit DOE/IG-0863, Recommendation Number 2.

ORP QAT concluded BNI completed an interim surveillance that specifically addressed the OIG's Recommendation Number 2 and that the CAs were adequate. However, the effectiveness of BNI's CAs will be determined once ORP QAT completes a vertical slice audit of a BC-HTR vessel. Current scheduled receipt of a BC-HTR vessel is December of Calendar Year 2014. At that time, the ORP QAT will evaluate whether BC-HTR area vessels meet QA requirements, and the changes BNI implemented were effective. In addition, the ORP QAT will verify whether BC-HTR vessel documentation is complete and meets QA requirements.

The ORP QAT did not identify findings or action follow-up items resulting from this surveillance, but did identify the following two opportunities for improvement (OFI):

1. **S-13-QAT-RPPWTP-004-001:** OFI for BNI to improve their quality verification document (QVD) process by performing a comprehensive review of BNI's entire QVD process to determine if the QVD program contained adequate program elements.
2. **S-13-QAT-RPPWTP-004-002:** Document 24590-WTP-GPG-PSQ-5002, *Quality Verification Document Second Review*, is currently a guidance document. OFI S-13-QAT-RPPWTP-004-002 addresses reclassification of this document as a procedure versus a guidance document. The document provided written direction to assure supplier equipment documentation was complete and met QA requirements. Although the surveillant found that 24590-WTP-GPG-PSQ-5002 met BNI's document requirements, this type of document was typically a procedure versus guide.

The Detailed Surveillance Results section listed below defines ORP QAT's evaluation of BNI's Interim Surveillance 24590-WTP-SV-QA-12-113 along with supporting documentation.

Detailed Surveillance Results:

1. ORP QAT's Evaluation of BNI's Interim Surveillance 24590-WTP-SV-QA-12-113: This BNI report specifically addressed progress made on deficiencies involving supplier quality

documentation and record retrievability. BNI's interim surveillance report listed new and modified documents that were in progress or completed in response to DOE/IG-0863, Recommendation Number 2. BNI evaluated and implemented CAs as needed within these documents to ensure that the receipt of BC-HTR documentation met requirements. ORP QAT surveillant evaluations follows:

- BNI will perform a 100 percent review of the QVD packages received for the BC-HTR vessels (status-open). In addition, BNI will perform a review of QVD packages for HLP-VSL-00027A and HLP-VSL-00027B prior to shipment (status-open).

QVD CAs addressed in BNI's associated surveillance and project issues evaluation reporting (PIER) only involve one QVD process from a programmatic perspective. This programmatic action was the addition of a second QVD review defined in 24590-WTP-GPG-PSQ-5002. The surveillant did not find objective evidence regarding a BNI programmatic review of BNI's entire QVD process to determine whether BNI's process contained adequate program elements. The surveillant identified this as an OFI **S-13-QAT-RPPWTP-004-001**.

ORP Audit/Finding U-12-ESQ-RPPWTP-002-F06 defined BNI's QVD process issues from a programmatic perspective. The ORP QAT will evaluate BNI's response to Audit/Finding U-12-ESQ-RPPWTP-002-F06 from a process and programmatic review once BNI submits a corrective action plan.

- PIER Number 24590-WTP-PIER-MGT-11-0836C, *Vessel 903 Record Retrievability*, was in response to DOE Letter 12-WTP-0202, "Request Schedule for Completing the Corrective Action Plan Items in Response to the DOE OIG Report on QA Issues with Black Cell Vessels," directing BNI to address the OIG issues.

BNI's PIER provided 13 actions, which addressed the OIG BC-HTR vessel area documentation issues as follows:

- 1) Nonconformance report closure will be evidence of completion (status-open).
- 2) BNI incorporated commitments made to strengthen SQ review (SQR) and receipt inspection process for BC-HTR vessels. BNI updated project documents to define requirements for completion of a second review of 100 percent of the QVD packages associated with the BC-HTR vessels (status-closed).
 - BNI Document, 24590-WTP-GPP-MGT-013, *Acceptance of Procured Material*, adequate changes were made.
 - New BNI Document, 24590-WTP-GPG-PSQ-5002, was adequate.
- 3) BNI performed an interim surveillance, 24590-WTP-SV-QA-12-113, of engineering and supplier CAs taken to review BC-HTR vessel quality documentation (status-closed).

- 4) BNI will perform a final surveillance of engineering and supplier quality actions to review BC-HTR vessel quality documentation to determine completeness of Number 1, above (status-open).
- 5) BNI completed the remaining enhanced supplier qualification audits for the two BC-HTR vessel fabricators for which the review has not yet been completed (status-closed).
- 6) BNI QA reviewed the audits conducted on the NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*, BC-HTR vessel suppliers to ensure there was sufficient rigor applied during the qualification of the vessel suppliers' inspection personnel (status-closed).
- 7) BNI evaluated the requirement and need for positive material identification maps for BC-HTR vessels (status-closed).
- 8) BNI evaluated the process for substituting ultrasonic test for radiographic test for BC-HTR vessels (status-closed).
- 9) BNI evaluated weld filler material traceability requirements for BC-HTR vessels (status-closed).
- 10) BNI evaluated the requirement for weld map information for delivered BC-HTR vessels (status-closed).
- 11) BNI evaluated potential impacts to other equipment in which unique requirements could result in overreliance on SQRs to ensure compliance, and determined the need for further extent of condition reviews (status-closed).
- 12) BNI created a specification change notice (SCN) to update 24590-WTP-3PS-G000-T0002, Rev. 8, *Positive Material Identification (PMI) for Shop Fabrication*, with the proposed changes shown in CCN: 254644 "Evaluation on the requirement and need for PMI maps for BC-HTR Vessels" (status-closed).

(Note: CCN: 254644 supersedes CCN: 254639)

 - This SCN strengthened positive material identification documentation for BC-HTR vessels, addressed by Number 9.
- 13) BNI created an SCN to update 24590-WTP-3PS-MVB2-T0001, *Engineering Specification for Welding of Pressure Vessels Heat Exchangers and Boilers*, Rev. 2 with the proposed changes shown in CCN: 254645, "Evaluation on the requirement and need for weld maps for BC-HTR Vessel" (status-closed).

(Note: CCN: 254645 supersedes CCN: 254640)

 - The SCN strengthened requirement for weld map information for BC-HTR vessels, addressed Number 12.

2. 24590-WTP-GPP-MGT-013: This document addressed changes made to respond to ORP and OIG BC-HTR vessel area issues.
- In response to 24590-WTP-PIER-MGT-11-0386, Rev. 17C, BNI made changes to implement an integrated approach applied to receiving equipment. BNI added a new Section (4.3.7.1) to address mandatory special activities associated with BC-HTR pressure vessels.
 - 24590-WTP-PIER-MGT-11-0829, *SSC Installed and Place in Use without Approved Plant Installed Software* and 24590-WTP-PIER-MGT-11-0387, *Procedure Needs to Be Revised to Reflect True Condition*, also addressed changes made to BC-HTR vessel area procurements.
 - In response to 24590-WTP-PIER-MGT-12-0598, Rev. 17D, a new section was added (4.3.7.2) to provide language to support validation of BC-HTR critical characteristics activities.
3. 24590-WTP-GPG-PSQ-5002, *Quality Verification Document Second Review*: This new BNI document was completed on September 13, 2012, and implemented a second quality verification review for equipment including BC-HTR documents. This process described the expanded role of QVD reviews performed by SQ, Engineering, and other BNI organizations as directed by BNI Project Management. Specifically, BNI issued this document to assure BC-HTR QVD's were evaluated, signed as complete, and stored as QA records. This will serve as a second comprehensive documentation review.
- The purpose will be to verify conformance of the QVD package to the purchase order requirements, including G-321-V and specified requirements defined therein.
 - This second QVD review will apply at the WTP site or supplier's facility for equipment located in BC-HTR, and other areas.
 - For WTP equipment after January 1, 2012, this review will be performed prior to material release by the SQR (before the SQR has signed the G-321-V Form).
 - In addition, ORP QAT found 24590-WTP-GPG-PSQ-5002, to be comprehensive and includes typical areas of investigation. One element of verification was the use of a checklist (CL) to assure QA documentation met requirements. The CL included items such as:
 - 1) Assessing general requirements such as legibility, SQR stamping
 - 2) Welding qualification verification documentation
 - 3) Major repair verification reports
 - 4) Heat treat reports
 - 5) Material test reports
 - 6) Ferrite data
 - 7) Material certificate of compliance

- 8) Code compliance
- 9) Ultrasonic examination and verification reports
- 10) Radiographic examination and verification reports
- 11) Liquid penetration examination and verification reports
- 12) Pressure test and verification reports
- 13) Inspection and verification reports
- 14) Mechanical test reports/obstruction test reports
- 15) Supplier deviation dispositions
- 16) Positive material identification results.

BNI Document 24590-WTP-GPG-PSQ-5002 specifically states that these reviews are separate and in addition to normal QVD reviews. The CL is the primary mechanism used during these additional reviews to record WTP suppliers met documentation requirements. The CL may be expanded or narrowed during the review process. However, such tailoring required approval at the same level as the initial approval of the CL. Documents reviewed include equipment test reports, certificates of conformance, commercial grade dedication, fabrication (e.g., cutting, forming, heat treatment), inspection and test plans, equipment and welding traceability, weld maps and logs, visual inspection, nondestructive examination, positive material identification, and special testing (e.g., hydro, pneumatic, leak testing).

The ORP QAT noted that BNI included weld maps and logs as required for BC-HTR vessels, which was one of the concerns identified by the OIG. In addition, although 24590-WTP-GPG-PSQ-5002 was adequate, BNI wrote it as a guide. Typically, written requirements and/or direction are in procedures and not guides. ORP QAT identified this as OFI S-13-QAT-RPPWTP-004-002.

4. ORP QAT Identified Two OFIs:

- **S-13-QAT-RPPWTP-004-001:** OFI for BNI to improve their QVD process by performing a comprehensive review of BNI's entire QVD processes to determine if the QVD program contained adequate program elements.

Discussion: QVD CAs addressed in BNI's 24590-WTP-SV-QA-12-113 surveillance and associated PIERs only involve a QVD process review from a programmatic perspective. This programmatic CA was the addition of a second QVD review defined in 254590-WTP-GPG-PSQ-5002.

- **S-13-QAT-RPPWTP-004-002,** Document 24590-WTP-GPG-PSQ-5002, *Quality Verification Document Second Review*, is currently a guidance document. OFI S-13-QAT-RPPWTP-004-002 addresses reclassification of this document as a procedure versus a guidance document. The document provided written direction to assure supplier equipment documentation was complete and met QA requirements. Although the

surveillant found that 24590-WTP-GPG-PSQ-5002 met BNI's document requirements, this type of document was typically a procedure versus guide.

Discussion: ORP QAT noted during past audits that differences of opinion existed between BNI personnel as to whether guides provided requirements and/or direction. Specifically, if BNI guides were implementing documents similar to BNI procedures.

The QVD second review document, 24590-WTP-GPG-PSQ-5002, reads as a directional document and states the following in Section 1.0, "Objective:"

NOTE: This guide is independent of the instructions and requirements defined in 24590-WTP-GPP-PSQ-045, *Quality Verification Document Review*. This process describes the expanded role of QVD review performed by SQ engineering, and other organizations as directed by BNI Project Management.

Below are examples of BNI documentation defining guides and guidance:

- BNI QA Manual, 24590-WTP-QAM-QA-06-001, Rev. 13, Appendix C, Glossary, stated the following: "NQA-1-2000 the term guidance is a suggested practice that is not mandatory in programs intended to comply with a standard. The word "should" denotes a guideline; the word "shall" denotes a requirement."
- BNI Document, 24590-WTP-GPP-MGT-028, Rev. 4B, WTP Procedures and Guides, Paragraph 4.11, Special Instructions for Guides: "Defined guides as not being used as implementing documents, meaning they do not directly implement requirements. In addition, guides can point to applicable codes and standards that define requirements, and prescribe management direction not included in procedures."

Conclusion:

This surveillance documents the ORP QAT's evaluation as to whether BNI completed an interim surveillance statusing CAs implemented in response to OIG Audit DOE/IG-0863, Recommendation Number 2. The ORP QAT found that BNI completed interim surveillance 24590-WTP-SV-QA-12-113, which identified other actions and documents that implemented CAs in response to OIG Recommendation Number 2.

ORP QAT found that BNI's actions were adequate. The surveillant identified the two OFIs defined in this document. However, effectiveness of BNI's CAs will be determined once the ORP QAT performs a vertical slice audit upon release of a BC-HTR vessel. December 2014 is the expected release date for a BC-HTR vessel.

Management Debriefed

Debriefed with QA supervisor, WTP engineering, and ORP QAT/BNI interface meetings.

Lead Surveillance:


Mary A. Ryan

Date: 10-30-13

Appendix A
Documents Reviewed

- 24590-WTP-3PS-MVB2-T0001, 2005, *Engineering Specification for Welding of Pressure Vessels Heat Exchangers and Boilers*, Rev. 02, Bechtel National, Inc., Richland, Washington, May 12.
- 24590-WTP-3PS-G000-T0002, 2010, *Engineering Specification for Positive Material Identification (PMI)*, Rev. 8, Bechtel National, Inc., Richland, Washington, January 4.
- 24590-WTP-GPG-PSQ-5002, 2012, *Quality Verification Document Second Review*, Bechtel National, Inc., Richland, Washington, September 18.
- 24590-WTP-GPP-MGT-013, 2013, *Acceptance of Procured Material*, Bechtel National, Inc., Richland, Washington, June 18.
- 24590-WTP-GPP-MGT-028, 2013, *WTP Procedures and Guides*, Rev. 4B, Bechtel National, Inc., Richland, Washington, April 1.
- 24590-WTP-PIER-MGT-11-0387-C, 2011, *Procedure Needs to be Revised to Reflect True Condition*, Rev 0, Bechtel National, Inc., Richland, Washington, August 17.
- 24590-WTP-PIER-MGT-11-1027-D, 2011, *PDC Archive Quality Verification Document (QVD) Package Documentation Discrepancies*, Rev 0, Bechtel National, Inc., Richland, Washington, November 15.
- 24590-WTP-PIER-MGT-11-0829, 2011, *SSC Installed and Place in Use without Approved Plant Installed Software*, November 16.
- 24590-WTP-QAM-QA-06-001, 2013, *Quality Assurance Manual*, Rev. 13, Bechtel National, Inc., Richland, Washington, June 26.
- 24590-WTP-SV-QA-12-113, 2012, *Interim Surveillance Supplier QA to Review BC-HTR Vessel Quality Documentation*, Bechtel National, Inc., Richland, Washington, September 10.
- 24590-WTP-PIER-MGT-12-1145-A, 2012, *LAB Vessel Weld Record Deficiencies*, Rev 0, Bechtel National, Inc., Richland, Washington, Entry Date-September 20.
- 24590-WTP-WTP-RCA-PROC-12-002, 2013, *Inaccurate and Missing Purchase Order Documentation Required by G-321-E and G-321-V Forms*, Bechtel National, Inc., Richland, Washington, May 13.
- ASME NQA-1-2008, 2008, *Quality Assurance Requirements for Nuclear Facility Applications*, American Society of Mechanical Engineers, New York, New York.

DOE/IG-0863, 2012, *The Department of Energy's \$12.2 Billion Waste Treatment and Immobilization Plant – Quality Assurance Issues – Black Cell Vessels*, U.S. Department of Energy, Office of Inspector General and Office of Audits and Inspections, Washington, D.C., April 25.

DOE Letter 12-WTP-0202, 2012, "Request Schedule for completing the Corrective Action Plan Items in Response to the U.S. Department of Energy (DOE) Office of Inspector General (OIG) Report on Quality Assurance Issues with Black Cell Vessels (DOE/IG-0863)," (external letter to R.W. Bradford, Bechtel National, Inc., Richland, Washington) from D.L. Noyes, U.S. Department of Energy, Office of River Protection, Richland, Washington, June 12.

Fang, M., 2013, "CCN: 25644 – 24590-WTP-PIER-MGT-11-0836, Action 9" (email to T. Getz, BNI), Richland, Washington, February 27.

Fang, M., 2013, "CCN: 254645 – 24590-WTP-PIER-MGT-11-0836, Action 12" (email to T. Getz, BNI), Richland, Washington, March 14.



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

SEP 24 2013

13-CPM-0239

Ms. L. W. Baker, Business Services Manager
Business Services
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Ms. Baker:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-CPM-RFPWTP-003 – U.S. DEPARTMENT OF ENERGY OFFICE OF RIVER PROTECTION (ORP) PROCUREMENT SYSTEM OVERSIGHT SURVEILLANCE REPORT FOR FISCAL YEAR (FY) 2013 – SECOND AND THIRD QUARTERS (JANUARY 1 THRU JUNE 30, 2013)

The purpose of this letter is to transmit the attached results of ORP's surveillance of Bechtel National, Inc.'s (BNI) procurement system for the second and third quarters of FY 2013. The subject report is required under ORP's BNI Procurement System Oversight Plan and is performed in accordance with Contracts and Property Management Division Procedure CPM-AAM-DI-01, Revision 2, "Subcontract Consent and Contractor Purchasing System Approval and Oversight," dated August 2, 2012.

During this surveillance period, one Priority Level 3 finding was identified. This finding is detailed in the subject surveillance report. No formal written response is required for the finding identified herein. However, the Priority Level 3 finding shall be entered into BNI's corrective action management system and tracked until the identified issue is corrected.

If you have any questions, please contact me at (509) 376-6678.

A handwritten signature in cursive script that reads "George F. Champlain".

George F. Champlain
Contracting Officer

CPM:GFC

Attachment

cc w/attach:
BNI Correspondence

Attachment
to
13-CPM-0239

SURVEILLANCE REPORT S-13-CPM-RPPWTP-003

(Total number of pages, 8)

**U.S. DEPARTMENT OF ENERGY OFFICE OF RIVER PROTECTION (ORP)
CONTRACTS AND PROPERTY MANAGEMENT (CPM)
SURVEILLANCE REPORT (FISCAL YEAR (FY) 2013 – 2nd and 3rd QUARTERS)**

Surveillance Report Number: S-13-CPM-RPPWTP-003

Division Performing the Surveillance: Contracts and Property Management Division

Integrated Assessment Schedule Number: 113

Title of Surveillance: BNI Procurement System Oversight Surveillance for FY 2013 – Second and Third Quarters (January 1 thru June 30, 2013)

Dates of Surveillance: FY 2013, Second and Third Quarters (January 1 thru June 30, 2013)

Surveillance Lead: George F. Champlain, Contracting Officer

APPROVED BY: Marc T. McCusker, Director, CPM

**BNI PROCUREMENT SYSTEM OVERSIGHT SURVEILLANCE REPORT FOR
FY 2013 – SECOND AND THIRD QUARTERS
(JANUARY 1 THRU JUNE 30, 2013)**

I. Introduction:

This semi-annual BNI procurement system oversight surveillance report documents oversight of the BNI purchasing system during the period and is required under the ORP CPM's BNI Procurement System Oversight Plan, as part of the ORP Integrated Assessment Schedule. CPM oversight includes assessing compliance with the Contract, the Federal Acquisition Regulation (FAR), the Department of Energy Acquisition Regulation (DEAR), and BNI's procedures.

During the period of January 1 thru June 30, 2013, ORP CPM conducted a surveillance of BNI's procurement system. During the surveillance period, BNI processed 83 total procurement actions requiring advance notification. ORP CPM reviewed 12 actions this period. Eleven of the 12 actions (92%) reviewed established a sound basis for award and provided documentation that was consistent with contractual requirements. The total value of the actions reviewed this period was \$11,781,133.22.

Summary: Based on the foregoing surveillance of BNI's Purchasing System, there were no significant weaknesses noted which would warrant a change in the status of the purchasing system. This determination is based on the discussions documented in this surveillance report. The summary results included herein are as follows:

- Section II: This section details reviews that were conducted and the findings documented. This section also includes a discussion of noteworthy actions, opportunities for improvement, and a list of files reviewed.
- Section III: This section details reports and advance notices of award pertinent to this surveillance.
- Section IV: This section details discussions that were conducted between BNI and ORP at bi-weekly working meetings that occurred during this period.
- Section V: This section provides an overview of the application of BNI's small business subcontracting goals in relation to awards made during this period.

II. Summary of Finding/Noteworthy Action/Opportunity for Improvement/List of Reviews Conducted:

The following findings were identified during this surveillance:

Finding S-13-CPM-RPPWTP-001-F01 (Priority Level 3, George Champlain): A discrepancy in the award of Purchase Order No. 24590-QL-POA-MKAS-00003, Revision 18, was

identified regarding an inadequate description of how the negotiated value of the revision was calculated.

Requirement:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), requires BNI to develop and implement a QA Program.

BNI's Quality Assurance Manual – 24590-WTP-QA-06-001, Revision 11, Policy Q-05.1, Instructions, Procedures, and Drawings, paragraph 5.1.1.1, states: This policy identifies the requirement to ensure that activities are prescribed by and performed in accordance with instructions, procedures, and drawings (e.g. implementing documents) of the type appropriate to the circumstances.

BNI Procedure 24590-WTP-GPP-GPX-00602, Subcontract and Purchase Order Modifications, Revision 8, Section 6.18, File Documentation, states that the "PR shall thoroughly document and place in the subcontract or purchase order file the basis for justification and details of negotiation of any modification".

Discussion:

This finding pertains to Subcontract No. 24590-QL-POA-MKAS-00003, Revision 18, which was awarded to Premier Technology, Inc. (PTI), as a fixed-price with economic price adjustment purchase order (P.O.). The P.O. is for the procurement of the Offgas Caustic Scrubber for the Low-Activity Waste Melters. The P.O. award documentation was transmitted for review on May 7, 2013. The purpose of this procurement action was to incorporate MR Revision 3 and Technical Change Notice Numbers 24590-QL-MRA-MKAS-00003-T0009 and -T0010. The total value of the award was \$302,233.95.

Contrary to the requirements above, BNI didn't adequately describe how it arrived at the negotiated value of \$302,233.95. The subcontractor (PTI) proposed (b)(4) for Revision 18. Based on the explanation in the Justification and Basis for Revision (JBR) and a review of PTI's proposal, the surveillance concluded that the negotiated amount was \$300,550.11 (reference table below), \$1,683.84 less than the P.O. change amount of \$302,233.95. The JBR didn't include a table summarizing the negotiated amount by cost category, or specifically state the total negotiated amount.

PTI Labor:
Subcontractor:
Other Subcontracts:
Materials (excluding G&A)
G&A on Materials/Subcontracts
Profit
Total Amount Negotiated

(b)(4)
\$300,550.11

Total Amount in Purchase Order	\$302,233.95
Difference	\$1,683.84

BNI negotiated an amount lower than proposed in two areas; Material and Profit. For Material, BNI and PTI agreed to remove the proposed Material costs, except for ODC (consumables) in the amount of \$(b)(4) plus G&A at (b)(4). For Profit, PTI proposed (b)(4) the JBR stated that BNI negotiated a savings of (b)(4) which equals a negotiated profit of (b)(4). Based on the explanation in the JBR, ORP was unable to determine how BNI arrived at a negotiated value of \$302,233.95.

The following noteworthy action was identified:

The surveillance identified a noteworthy item pertaining to P.O. No. 24590-QL-POA-MKAS-00003, Revision 18, to PTI discussed above. The technical evaluation was thorough and well documented. Rather than simply stating that hours or costs were "fair and reasonable," the technical evaluation went a step further by including a detailed analysis, documentation of discussions with the subcontractor, and an explanation of the engineer's rationale and technical judgment in accepting or questioning the subcontractor's position.

The following Opportunity for Improvement (OFI) item was identified:

OFI S-13-CPM-RPWTP-003-001 (George Champlain): All required file documentation was not promptly uploaded to BNI's e-room for ORP's review prior to award.

Discussion:

Prior to the award of any procurement/subcontract action requiring advance notification to ORP under the prime contract, BNI is required to upload all pertinent file documentation to its e-Room website for ORP's review. The required documents are listed in e-Room, at file location P&S - CO eRoom/2013 Advance Notification Documentation.

During the surveillance period, ORP identified three procurement/subcontract files, uploaded to the BNI e-Room that did not contain all of the required file documentation prior to award. As a result, ORP was required to follow-up with BNI management. The files lacking all required documentation included:

Purchase Order/Subcontract Number	Action Type	Dollar Value
24590-CM-HC4-HXYG-00201 (Mesa Associates, Inc.)	New Award	\$668,165.40
24590-NP-POA-HX00-00039 (Level 3 Communications, LLC)	New Award	\$305,620.92
24590-QL-FC3-SY00-00001, CO 008 (Kleinfelder West, Inc.)	Change Order	\$1,035,898.69

List of Files Reviewed:

The following is a list of purchase orders and subcontracts reviewed during the surveillance period:

Purchase Order/Subcontract Number	Action Type	Dollar Value
24590-QL-POA-HAHH-00003, Revision 7 (Energy Solutions)	Revision	\$390,360.01
24590-CM-HC4-HXYG-00201 (Mesa Associates, Inc.)	New Award	\$668,165.40
24590-QL-SRA-MDHM-00001, MTA-033 (Intermech)	Revision	\$904,283.18
24590-QL-POA-PV18-00001 (Greenberry Industrial)	New Award	\$410,000.00
24590-CM-FC1-NNPO-00001 (DKB, Inc.)	New Award	\$5,999,960.00
24590-CM-POA-MBT0-00002, Rev. 17 (Ionex)	Revision	\$503,272.95
24590-CM-HC4-WA49-00002 (NuVision Engineering)	New Award	\$246,522.50
24590-QL-FC3-NE00-00003 CO 002 (Northwest Inspection, Inc.)	Change Order	\$240,000.00
24590-QL-POA-MVA0-00018, Rev. 18 (Joseph Oat Corp.):	Revision	\$1,810,714.31
24590-QL-POA-MKAS-00003, Rev. 18 (Premier Technology, Inc.)	Revision	\$302,233.95
24590-NP-POA-HX00-00039 (Level 3 Communications, LLC)	New Award	\$305,620.92
24590-QL-FC3-SY00-00001, CO 008 (Kleinfelder West, Inc.)	Change Order	\$1,035,898.69

III. Reports/Advanced Notices of Award Discussion:

BNI reliably forwarded Daily Activity Reports, Permanent Plant Award Reports, Award Preview Reports, Bucksheet Reports, and Advance Notices of Awards, in electronic format. In addition, BNI provided the following reports electronically on a bi-weekly basis:

Plant Equipment Purchase Order Suspension;

Plant Equipment Undefined;
Plant Equipment – Seller Initiated REA;
Subcontract – Undefined Changes;
Subcontract – Letter Awards
Subcontracts – Subcontracts Initiated REAs; and
Active Time and Material and Labor Hour Subcontracts

CPM utilized these reports as part of its subcontract oversight responsibilities.

IV. BNI/ORP Bi-Weekly Working Meetings:

BNI and ORP conducted bi-weekly meetings to discuss pertinent issues relating to the award and administration of purchase orders and subcontracts. The purpose of these meetings was to provide a forum conducive to the communication, identification, and resolution of issues which may be problematic or have a bearing on the procurement process. The following is a summation of topics discussed during this period:

- Identification of purchase orders and subcontracts requiring consent;
- Actions taken to mitigate and resolve subcontracts and purchase orders with technical and performance-related issues. Issues discussed herein included the status of requests for equitable adjustments and actions taken by BNI to mitigate the impact of a vendor going out of business;
- Leasing of additional warehouse space in Yakima, WA; and
- Status of equipment shipped from BNI vendors.

V. Small Business Subcontracting Goals:

The following table represents the BNI subcontracting plan and inception to date actual percentages:

	Subcontracting Plan		June 2013		Inception To Date	
	Goal		Actual		Actual	
	Dollars (000)	Percent	Dollars (000)	Percent	Dollars (000)	Percent
Small Business	1,920,838	40.4%	1,658	5.3%	1,412,503	41.2%
Large Business	2,833,711	59.6%	28,645	94.7%	2,014,988	58.8%
Total	4,754,549	100.0%	31,304	100.0%	3,427,501	100.0%
Small Disadvantaged Business	166,408	3.5%	39	0.1%	90,401	2.6%
Woman-Owned Small Business	190,182	4.0%	735	2.3%	155,971	4.6%
Small HubZone	76,073	1.6%	66	0.2%	57,479	1.7%
8(a)	-	0.0%	-	0.0%	41,699	1.2%
Native American Business	47,545	1.0%	27	0.1%	38,472	1.1%
Veteran Owned Small Business	237,727	5.0%	505	1.6%	234,660	6.8%
Service Disabled Veteran Owned	7,132	0.15%	-	0.00%	5,074	0.15%
Washington/Oregon Dollars	1,664,092	35.0%	19,214	61.4%	1,516,680	44.3%
Tri Cities Dollars	(% of Total \$)		18,409	58.8%	1,042,713	30.4%
	(% of WA/OR \$)			95.8%		68.7%
Local Counties Dollars	(% of Total \$)		18,467	59.0%	1,064,566	31.1%
	(% of WA/OR \$)			96.1%		70.2%
Footnote: Prior period adjustments are reflected in the ITD (ITD, Dec 2000 - June 2013)						
Footnote: Seven local counties include: Benton, Franklin, Walla Walla, Yakima, Grant, Adams, Klickitat						

For the month of June 2013, BNP's actual performance was below its small business subcontracting goals in all categories. However, on an inception-to-date basis, BNI met or exceeded its goals in the Small, Woman-Owned, HubZone, Native American, Veteran-Owned, and Service Disabled Veteran-Owned small business categories; and was below its goal in the Small Disadvantaged business category.

SURVEILLANCE TEAM APPROVAL:

Prepared by: George F. Champlain Date: 10/5/2013
George F. Champlain, Contracting Officer

Reviewed and Concluded by: Ronnie L. Dawson Date: 9/24/13
Ronnie L. Dawson, Contracting Officer

Approved by: *Marc T. McCusker*
Marc T. McCusker, CPM Director

9/11/13
Date



OFFICE OF RIVER PROTECTION

P O. Box 450, MSIN H6-60
Richland, Washington 99352

JUL 29 2013

13-ECD-0060

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 - SUBMITTAL OF U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION SURVEILLANCE REPORT S-13-ECD-RPPWTP-004, WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP) LABORATORY RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM SECONDARY CONTAINMENT

This letter transmits the WTP surveillance for the Laboratory's Radioactive Liquid Waste Disposal System Secondary Containment. The purpose of the surveillance was to review the fume hood with its cup-sink drain pipeline and verify the current installation and configuration against the Dangerous Waste Permit. The surveillance team identified no findings or observations.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.

A handwritten signature in black ink, appearing to read "William F. Hamel".

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

ECD:GMN

Attachment

cc: See page 2

Mr. J. M. St. Julian
13-ECD-0060

-2-

JUL 29 2013

cc w/attach:
B. G. Erlandson, BNI
S. L. Dahl, Ecology
Administrative Record (H-0-8)
BNI Correspondence
Environmental Portal, LMSI

Attachment
13-ECD-0060
(7 Pages)

Surveillance Report for the WTP Laboratory's Radioactive Liquid
Waste Disposal System Secondary Containment

S-13-ECD-RPPWTP-004

U.S. Department of Energy
Office of River Protection

Surveillance Report Number: S-13-ECD-RPPWTP-004

Division Performing the Surveillance: Environmental Compliance Division

Integrated Assessment Schedule Number: 75

Title of Surveillance: Waste Treatment and Immobilization Plant
Laboratory Radioactive Liquid Waste Disposal
System Secondary Containment

Dates of Surveillance: June 3, 2013

Surveillance Lead: Gae Neath

Team Member(s) (if any): Ko Chen, ORP/NSD; Don Sommer, ECD
Support Services; Tracy Gao, Ecology, LBL
Engineering

Scope:

Evaluate if field conditions of the Analytical Laboratory (LAB) Radioactive Liquid Waste Disposal (RLD) system met applicable Dangerous Waste Permit (DWP) conditions.

Requirements Reviewed:

- Washington Administrative Code (WAC) 173-303-640, "Tank systems," "Washington Administrative Code," as amended.
- Hanford Facility Resource Conservation and Recovery Act Permit, "Dangerous Waste Portion Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste," Part 111, Operating Unit Group 10 [WTP], WA7890008967.

Records/Design/Installation Documents Reviewed (if applicable):

- 24590-LAB-P1-60-P0008, "Analytical Laboratory General Arrangement Drawing," Revision 2, Bechtel National, Inc. (BNI).
- 24590-LAB-M6-RLD-00006002, "P&ID - Lab, Radioactive Liquid Waste Disposal System, C3 RAD Lab Collection," Revision 0, BNI, Richland, Washington, June 22, 2010.
- 24590-LAB-3YD-RLD-00001, "System Description for the LAB RLD System," Revision 4.
- 24590-LAB-3YD-60-00003, "Facility Description for the LAB," Revision A.
- 24590-WTP-PER-PL-02-001, "Piping Material Class Description," Revision 6.
- 24590-WTP-PER-CSA-02-001, "Secondary Containment Design," Revision 10.
- Class 'I Permit Modification 24590-LAB-PCN-ENV-11-001 to replace existing Piping and Instrumentation Diagrams (P&ID) for the LAB RLD system in Appendix 11.2 of the DWP.

- 24590-LAB-APIR-CON-07-0159 Revision NA, "Aboveground Piping Inspection Record LAB-RLD-WU-22054-N11E."
- 24590-LAB-P3-RLD-WU22054001 Revision 000, "LAB Facility Isometric, Line No. LAB-RLD-WU-22054-N11E-1.5."
- 24590-WTP-3PS-PS02-T0003 Revision 009, "Engineering Specification for Field Fabrication and Installation of Piping."
- 24590-WTP-GPP-CON-3503 Revision 06B, "Aboveground Piping Installation."
- 24590-CM-HC1-AY00-00001-30-00002 Revision 00C, "WTP Supplier Document Review, Fume Hood - Cup Sink with Welding at Tailpiece."
- 24590-LAB-RPT-ENV-09-001, "Dangerous Waste Permit Secondary Containment Requirements for LAB," Revision 1.

Discussion of Area(s) or Activities Reviewed:

The RLD C3 subsystem collects effluent from the radiological laboratories including the cup sinks within the fume hoods. It consists of a drain line network, the laboratory area sink drain collection vessel (RLD-VSL-00164), and pump (RLD-PMP-00164). Analytical work involving samples containing radionuclide or hazardous materials is performed in fume hoods that contain a corrosion resistant cup sink and drain system for disposal of liquid wastes to the RLD C3 LAB collection system followed by a line flushing with available water. Each fume hood drain line is provided with a drip pan that provides secondary containment for the DWP regulated cup-sink drains. Liquid effluents are disposed in the fume hood sink drains.

The objective of this surveillance was to select a fume hood with its cup-sink drain pipeline and verify the current installation and configuration using DWP permit conditions and DWP engineering documentation.

Fume hood ARL-HOOD-00042 containing drain pipe line LAB-RLD-WU22054001-B was randomly selected in Radiological Laboratories Room A-0128, RL-10 General Chemistry (Figures 1 through 5) to verify that the requirements, shown in Table 1, were followed regarding the installation of this drain pipeline. This drain pipeline was also verified in the P&ID.

24590-LAB-APIR-CON-07-0159, "Aboveground Piping Inspection Record" was reviewed for documentation of assembly verification (e.g., material, configuration and dimensions, alignment, torque, welding, and nondestructive examination) and material traceability to the material specification and grade.

Summary of Findings, Opportunities for Improvement (OFI), or Assessment Follow-Up (AFI) Items:

There are no findings, OFIs, or AFIs.

Attachments:

Table 1. Surveillance Conformance Summary (2 pages)

Requirement	Conformance Summary
<p>08/2012 WA7890008967, Part III, Operating Unit Group 10 Waste Treatment and Immobilization Plant (WTP)</p>	
<p>Permit Condition III.10.E.9 Compliance Schedule Permit Condition III.10.E.9.b. The permittees will submit to the Washington State Department of Ecology (Ecology), pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the WTP unit tank system (per level, per WTP unit building and outside the WTP unit buildings) as identified in Permit Tables III.10.E.A through D, J, L, N, and P, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.4, 8.5, 8.7, 8.8, 8.9, 8.11, 8.12, 9.4, 9.5, 9.7, 9.8, 9.9, 9.11, 9.12, 10.4, 10.5, 10.7, 10.8, 10.9, 10.11, 11.4, 11.5, 11.7, 11.8, 11.9, and 11.11 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):</p> <p>Permit Condition III.10.E.9.b.ii. Design drawings (General Arrangement Drawings in plan) and specifications for the foundation, secondary containment, including, liner installation details, and leak detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f), WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)].</p>	<p>Design drawings (general arrangement drawings in plan):</p> <ul style="list-style-type: none"> • 24590-LAB-PCN-ENV-12-002, "Analytical Laboratory General Arrangement Drawing, Permit Modification," to replace LAB general arrangement permit drawings with source drawings, approved by Ecology on September 6, 2012. <p>Specifications for the foundation, secondary containment, including, liner installation details, and leak detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f), WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)]:</p> <ul style="list-style-type: none"> • Leak detection will be by daily visual inspection. • DWP ancillary equipment provided with secondary containment required per DWP and WAC 173-303-640(4)(f) as noted in 24590-LAB-RPT-ENV-09-001, "Dangerous Waste Permit Secondary Containment Requirements for LAB."
<p>Permit Condition III.10.E.9 Compliance Schedule Permit Condition III.10.E.9.b.vi. Detailed description of how the secondary containment for each tank system will be installed in compliance with WAC 173-303-640(3)(c) [WAC 173-303-806(4)(c)(vi)].</p>	<p>Detailed description of how the secondary containment for each tank system will be installed in compliance with WAC 173-303-640(3)(c) [WAC 173-303-806(4)(c)(vi)]:</p> <ul style="list-style-type: none"> • 24590-WTP-PCN-ENV-11-008, "Permit Modification," for submittal of document 24590-WTP-PER-CSA-02-001, Revision 10, to update LAB under sink drip

**Attachment
13-ECD-0060**

	pan design information in permit document, approved by Ecology on November 2, 2011.
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DWP = Dangerous Waste Permit.
LAB = Analytical Laboratory.

WAC = Washington Administrative Code.
WTP = Waste Treatment and Immobilization Plant.

Figure 1. Fume Hood 24590-LAB-AE-ARL-HOOD-00042

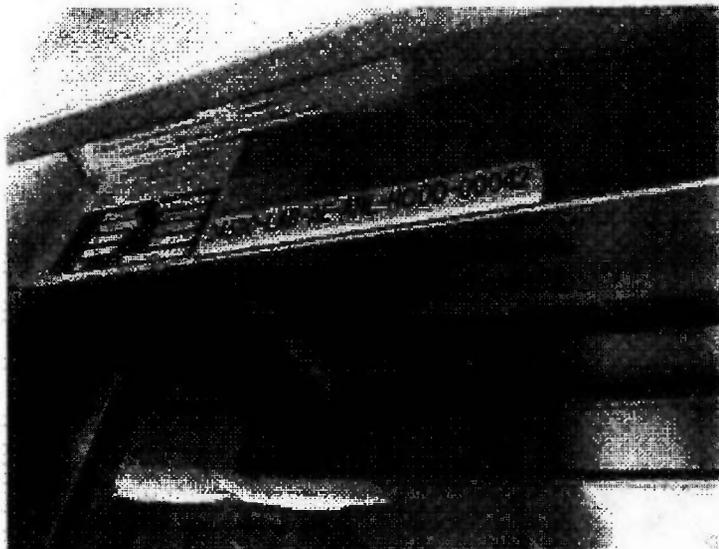


Figure 2. Room A-0128, RL-10 General Chemistry



Fume hood 24590-LAB-AE-ARL-HOOD-00042

Figure 3. Drip Pan under Fume Hood LAB-AE-ARL-HOOD-00042



Figure 4. Cup Sink Drain Line leading to Coaxial Drain Pipe surrounded by Stainless Steel Drip Pan



Figure 5. Down Spout under Drip Pan leading to Drain Pipe



Signatures:

Assessor or Lead Assessor: *J. M. Neave* Date: 07/08/2013

Division Director: *Eric Huff* Date: 7/8/13

Figure 1. Fume Hood 24590-LAB-AE-ARL-HOOD-00042

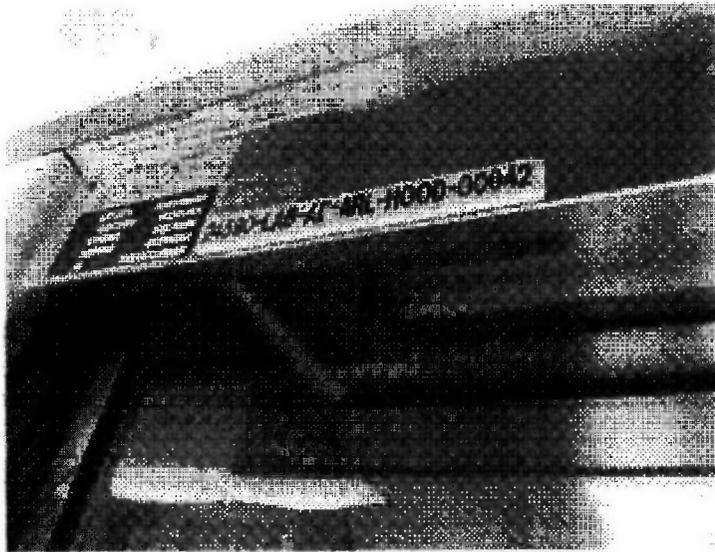


Figure 2. Room A-0128, RL-10 General Chemistry



Fume hood 24590-LAB-AE-ARL-HOOD-00042

Figure 3. Drip Pan under Fume Hood LAB-AE-ARL-HOOD-00042

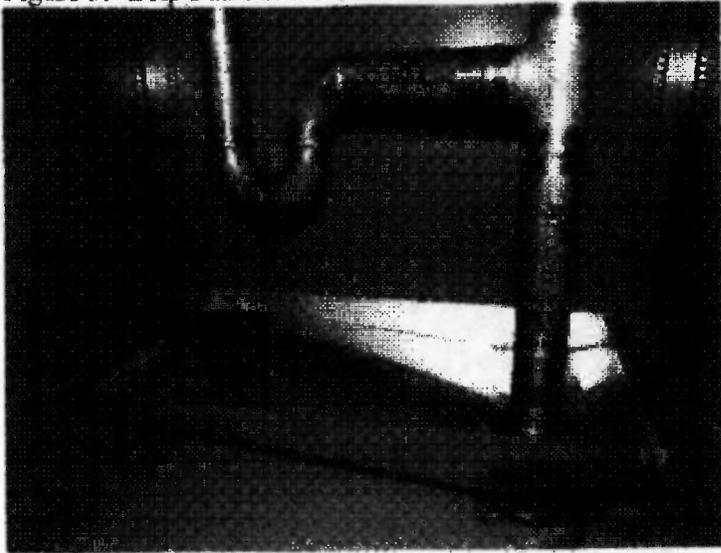


Figure 4. Cup Sink Drain Line leading to Coaxial Drain Pipe surrounded by Stainless Steel Drip Pan

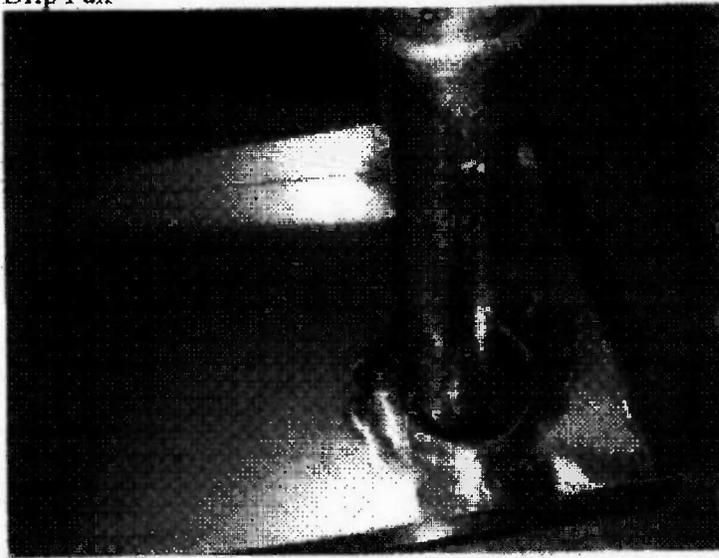
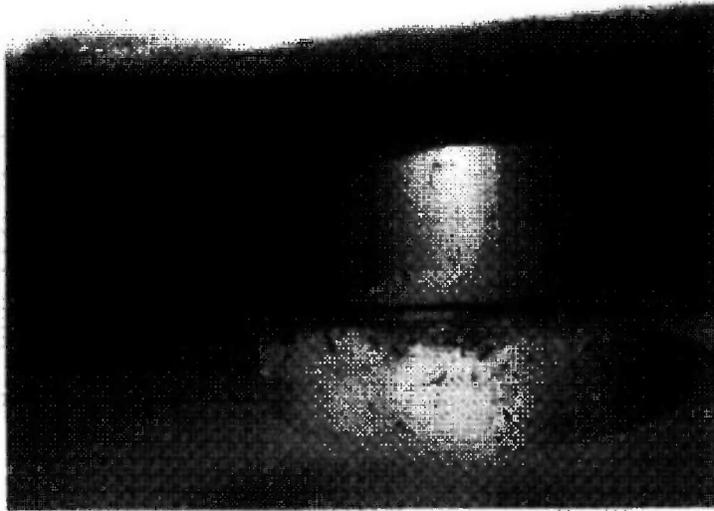


Figure 5. Down Spout under Drip Pan leading to Drain Pipe



Signatures:

Assessor or Lead Assessor: *J. McNamee* Date: 07/08/2013

Division Director: *Paul Huff* Date: 7/9/13



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

OCT - 4 2013

13-ECD-0074

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RVI4136 – SUBMITTAL OF U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION ASSESSMENT REPORT S-13-ECD-RPPWTP-005, WASTE GENERATOR

Reference: ORP letter from J. R. Eschenberg to W. S. Elkins, BNI, "Notification of Dangerous Waste Permit (DWP) Condition/Waste Management Surveillances," 06-ED-019, dated March 6, 2006.

This letter transmits the Waste Treatment and Immobilization Plant assessment for Waste Generation. The purpose of the assessment was to verify compliance with the dangerous waste generator requirements and evaluate the effectiveness of the waste generator process. The assessment team identified no findings or observations.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509)376-5700

A handwritten signature in black ink, appearing to read "W. Hamel".

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

ECD:GMN

Attachment

cc: See page 2

Mr. J.M. St. Julian
13-ECD-0074

-2-

OCT 04 2013

cc w/attach:

B. G. Erlandson, BNI

M. McCullough, BNI

S. L. Dahl, Ecology

Administrative Record (H-0-8)

BNI Correspondence

Environmental Portal, LMSI

Attachment
13-ECD-0074
(16 Pages)

Waste Generator Surveillance

S-13-ECD-RPPWTP-005

**U.S. Department of Energy
Office of River Protection**

Assessment Report Number: S-13-ECD-RPPWTP-005
Division Performing the Assessment: Environmental Compliance Division
Integrated Assessment Schedule Number: 77
Title of Assessment: Waste Generator Surveillance
Dates of Assessment: August 15, 2013
Assessment Lead: Gae Neath
Team Member(s) (if any): Don Sommer, Support Services

Scope:

This Level 2 assessment reviewed the process for handling dangerous waste upon generation and related training and to verify that contract requirements flowed down to procedures that implement construction work activities at the Waste Treatment and Immobilization Plant (WTP).

Requirements Reviewed:

- Washington Administrative Code (WAC) 173-303-070, "Designation of Dangerous Waste," *Washington Administrative Code*, as amended.
- WAC 173-303-170, "Requirements for Generators of Dangerous Waste," *Washington Administrative Code*, as amended.
- WAC 173-303-180, "Manifest," *Washington Administrative Code*, as amended.
- WAC 173-303-200, "Accumulating Dangerous Waste Onsite," *Washington Administrative Code*, as amended.
- WAC 173-303-220, "Generator Reporting," *Washington Administrative Code*, as amended.
- WAC 173-303-230, "Special Conditions," *Washington Administrative Code*, as amended.
- WAC 173-303-9904, "Dangerous Waste Sources List," *Washington Administrative Code*, as amended.
- WTP Contract, Contract No. DE-AC27-01RV14136 Conformed through Modification No. 304, Section C, "Statement of Work," C.6, "Standard," Standard 7: Environment, Safety, Quality, and Health:

"(4) Environmental Protection (Table C.5-1.1, Deliverable 7.3):

(i) The Contractor shall develop and implement an integrated environmental protection program. The Contractor shall design, construct, manage, and

commission the WTP to assure compliance with environmental requirements, permits, licenses, and other regulatory approvals and agreements.

(ii) The Contractor shall develop and implement an integrated program to provide environmental protection and compliance. The Contractor shall integrate all permitting and compliance actions with the future WTP operator.

(iii) The Contractor shall identify all necessary permits, licenses, and other regulatory approvals and authorizations for the design, construction, commissioning, and operation of the WTP, unless otherwise identified in this Contract. The Contractor shall develop the necessary permit applications, license applications, requests for other regulatory authorizations, and supporting materials and documentation in accordance with Clause H.26, Environmental Permits. The Contractor shall provide all technical and regulatory information, documentation, and support to ensure that permits, licenses, and other regulatory authorizations and approvals are obtained in a timely manner to support the design, construction, commissioning, and operation of the WTP and other Hanford Site facilities that support the WTP.

(iv) The Contractor shall implement a program to track and address environmental compliance issues, and to implement and comply with all requirements (including, but not limited to, permitting, environmental reports, enforcement actions, consent decrees, Hanford Federal Facility Agreement and Consent Order milestones/reports/management commitments, NEPA, pollution prevention, and waste minimization)..."

Records/Design/Installation Documents Reviewed (if applicable):

- 24590-WTP-GPP-SENV-005, 2010, *Waste Designation*, Rev. 2, August 9.
- 24590-WTP-GPP-SENV-006, 2010, *Packaging Nonradioactive Dangerous Waste and Material for Recycle*, Rev. 4, October 19.
- 24590-WTP-GPP-SENV-007, 2010, *Dangerous Waste Accumulation and Handling*, Rev. 3, September 27.
- 24590-WTP-GPP-SENV-017, 2010, *90-Day Accumulation Area Training*, Rev. 1, October 21.
- 40 CFR 261, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, as amended.
- Training record references from the WTP construction training coordinator are attached.

Listing of Personnel Interviewed:

- WTP Field Safety Environmental Lead.

Discussion of Area(s) or Activities Reviewed:

This Level 2 assessment reviewed shipping contacts, training, and procedures for waste generation and handling. In addition, the 90-day accumulation area positions (e.g., waste handler, field safety environmental lead, and field safety environmental engineer) and training records were discussed and reviewed with respect to the following implementing procedures:

- **24590-WTP-GPP-SENV-005:** This procedure describes the requirements for designation of solid waste generated at the WTP. The designations are performed in accordance with WAC 173-303. The objective of this procedure is to properly identify waste at the WTP to ensure proper management of dangerous waste in compliance with applicable regulatory requirements in 40 CFR 261, "Standards Applicable to Generators of Hazardous Waste" and WAC 173-303. This procedure is applicable to construction and field safety assurance personnel who prepare containers, package dangerous waste, and are responsible for maintaining container inventory records.

The Field Safety Environmental Lead responded to a request regarding how waste designation is performed. It was stated that Washington River Protection Solutions LLC staff designates the waste; afterwards the waste determination is put into a database with a completed Waste Certification Form. WTP labels the waste for storage at the 90-day satellite accumulation area. The environmental manager is the responsible person who ensures that this procedure meets the relevant regulatory requirements of WAC 173-303 and 40 CFR Part 261; and is also responsible for updating this procedure when the applicable regulatory requirements change or new regulations are promulgated. Also the WTP field safety assurance manager was identified, who has the responsibility for implementation of this procedure in the field, for coordination, and for oversight of waste management activities performed at the WTP Construction Site.

- **24590-WTP-GPP-SENV-006:** This procedure describes requirements for packaging, labeling, and preparation for shipping of nonradioactive dangerous waste and material for recycle at the WTP construction site. The packaging, shipping, and labeling of either recyclable materials or dangerous waste in Washington State are regulated, as applicable, by the U.S. Department of Transportation, U.S. Environmental Protection Agency, and Washington State Department of Ecology, whichever is the more restrictive. This procedure is applicable to personnel who prepare containers, package dangerous waste or materials for recycling, and are responsible for maintaining container inventory and tracking records. The scope of this procedure is limited to activities associated with dangerous waste and material for recycle packaging and labeling containers prior to shipment offsite. This document was examined, but not found to be applicable for the scope of this assessment as it involves packaging waste and material for recycling. However, information in this document provided good information.
- **24590-WTP-GPP-SENV-007:** This procedure describes the federal and state regulatory and permit requirements for accumulating and managing dangerous waste (DW) at the WTP construction site. The scope of this procedure is limited to requirements for accumulating and managing nonradioactive DW at WTP during construction and startup activities prior to receipt of waste from tank farms. Management of radioactive, radioactive mixed wastes, non-DW materials for recycle and sanitary wastes are not

within the scope of this procedure. This document was reviewed, but was found not to be applicable for the scope of this assessment since it details waste handling and accumulation procedures for waste. This document provided good supporting information. Satellite accumulation at the WTP facilities meet the following requirements and best management practices:

- WTP shall not accumulate more than 55 gallons of DW or 1-quart acutely hazardous waste in approved containers (24590-WTP-GPP-SENV-006) at or near any point of generation.
- All satellite accumulation areas (SAA) are inspected on a weekly basis as a best management practice. An SAA shall be at or near the point of generation.

Table 1 contains current SAA location, status, waste description, container type/size, and source information as of the date of this assessment.

Table 1. Satellite Accumulation Area Information (3 pages)

PIN Number	Location	Status	Waste Description	Container Type	Container Size	Waste Source
WTP-10-020-02	OE Shop	Active	SAA for Gasoline	UN1A1	55 gal	Equipment Maintenance
WTP-10-362-03	BOF Waste Storage Area	Active	SAA for Bitumastic 300 Coating Waste	UN1A2	55 gal	Pipe Coatings
WTP-11-210-05	OE Shop	Active	SAA for Diesel Absorbed Pads	UN1A2	55 gal	Equipment Maintenance
WTP-12-005-08	BOF Waste Storage Area	Active	SAA for Desiccant	UN1A2	55 gal	Material Handling
WTP-12-005-10	BOF Waste Storage Area	Active	SAA for PVC Cement Waste	UN1A2	16 gal	Piping Installation
WTP-12-012-09	MHF	Active	SAA for Paint Markers	UN1H2	30 gal	Equipment Marking
WTP-12-012-10	BOF Waste Storage Area	Active	SAA for Powder Actuated Rounds	UN1H2	2.5 gal	Powder Actuated Tools
WTP-12-074-12	BOF Waste Storage Area	Active	SAA for Fire Extinguisher Debris	UN1A2	2.5 gal	Spilled/Excess/Expired Product
WTP-12-137-01	MHF	Active	SAA for Desiccant	UN1G2	16 gal	Material Handling
WTP-12-137-02	BOF Waste Storage Area	Active	SAA for Broken Light Tubes	UN1G2	55 gal	Broken Fluorescent Lamps
WTP-12-139-03	LAW #28	Active	SAA for Intumescent Fireproofing Debris	UN1A2	55 gal	Special Coatings

Table 1. Satellite Accumulation Area Information (3 pages)

PIN Number	Location	Status	Waste Description	Container Type	Container Size	Waste Source
WTP-12-177-04	BOF Waste Storage Area	Active	SAA for Ramset A7 Adhesive Waste	UN1H2	5 gal	Piping
WTP-12-177-07	BOF Waste Storage Area	Active	SAA for Bondo Filler Debris	UN1H2	5 gal	Wood Filler
WTP-12-236-01	BOF Waste Storage Area	Active	SAA for TempilStik Waste	UN1H2	2.5 gal	Welding
WTP-12-236-02	FD Thomas	Active	SAA for Spent Colorimetric Tubes	UN1H2	2.5 gal	Air Monitoring
WTP-12-282-06	BOF Waste Storage Area	Active	SAA for Aerosol Residue	UN1A1	55 gal	Spilled/Excess/Expired Products
WTP-12-346-01	MHF South 40	Active	SAA for Fuel Filters	UN1A2	55 gal	Equipment Maintenance
WTP-12-362-03	OE Shop	Active	SAA for Battery Maintenance Debris	UN1H2	5 gal	Equipment Maintenance
WTP-13-057-07	FD Thomas	Active	SAA for Contaminated Gray Water	UN1H2	55 gal	Special Coatings
WTP-13-057-08	BOF Waste Storage Area	Active	SAA for Photo Development Rinse Water	UN1A2	55 gal	MDE Weld Examination
WTP-13-057-09	FD Thomas	Active	SAA for Spent Solvents	UN1A2	55 gal	Special Coatings
WTP-13-093-03	OE Shop SAA	Active	SAA for Fuel Filters	UN1A2	55 gal	OE Shop Maintenance
WTP-13-114-01	BOF Waste Storage Area	Active	SAA for Paint Markers	UN1H2	5 gal	Material Labeling
WTP-13-114-02	BOF Waste Storage Area	Active	SAA for Cadwelding Slag	UN1H2	5 gal	Exothermic Welding
WTP-13-136-03	LAW +28	Active	SAA for Duct Sealant Waste	UN1A2	55 gal	Fireproofing
WTP-13-136-06	FD Thomas	Active	SAA for Epoxy Wastes	UN1A2	55 gal	Special Coatings
WTP-13-175-05	LAW +28	Active	SAA for A/D Firefilm Debris	UN1A2	55 gal	Special Coatings

LAW = low-activity waste.
 BOF = Balance of Facilities.
 SAA = satellite accumulation area.
 OE = Office of Enforcement Oversight.
 MHF = material handling facility.

- 24590-WTP-GPP-SENV-017, Rev. 1, 90-Day Accumulation Area Training, October 21, 2010. This procedure provides the training requirements for personnel managing wastes in the 90-day accumulation area. This procedure, the appendices, and the list of

employees provided via the WTP Learning Management System for the 90-day accumulation area comprise the training procedure, which complies with the requirements of "Personnel Training" in WAC 173-303-330. See Attachment 1 for training records of relevant personnel. This procedure provides the training requirements for personnel managing containers in the 90-day accumulation areas. Personnel managing wastes in the accumulation area must successfully complete the identified training within six months after the initial assignment to a 90-day accumulation area job position. From the interviews of the Field Safety Environmental Lead and WTP Construction Training Coordinator, in addition to the review of this procedure, it was found that the training requirements of WAC 173-303-330 "Personnel Training" were satisfied as follows:

- The job title, description, and the name of the employee filling each position related to hazardous waste management at a 90-day accumulation area; the job description that includes the requisite skills and education, as well as any other qualifications and duties for each position;
- A written description of the type and amount of both introductory and continuing training for each position;
- Training records for all personnel who have completed the training required by this procedure; and
- Training programs directed by a person knowledgeable in dangerous waste management procedures, including training relevant to the accumulation area job positions and job functions for which accumulation area personnel are employed.

The following Conformance Table was used during the interview with the Field Environmental Lead to discuss various waste management responsibilities and practices.

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
24590-WTP-GPP-SENV-005, Revision 2, Waste Designation, August 9, 2010; (applicable to Construction and Field Safety Assurance personnel who prepare containers, package dangerous waste, and are responsible for maintaining container inventory records)		
4.0 Responsibilities		
4.1 Environmental Manager The Environmental Manager is responsible for ensuring that this procedure meets the regulatory requirements of WAC 173-303 and 40 CFR Part 261. The Environmental Manager is also responsible for updating this procedure when the applicable regulatory requirements change or new regulations are promulgated.	Y	BNI has an Environmental Manager
4.2 Field Safety Assurance Manager/Site Manager The WTP Field Safety Assurance Manager has the responsibility for implementation of this procedure in the field, for coordination, and for oversight of waste management activities performed at the	Y	BNI has a WTP Field Safety Manager

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
WTP Construction Site.		
<p>4.3 Field Environmental Lead</p> <p>The Field Environmental Lead is responsible for identification and designation of waste generated during the construction of the WTP. The Field Environmental Lead may choose to perform this function or choose to use WTP Field Environmental or subcontractor personnel. The Field Environmental Lead reviews and authenticates the waste designation record prepared by the WTP Field Representative/Waste Supervisor by signing the record.</p>	Y	BNI has a Field Environmental Lead
<p>4.4 Field Environmental Representative/Waste Supervisor</p> <p>The Field Representative/Waste Supervisor has the primary responsibility to ensure that dangerous waste and material for recycle are properly designated or otherwise identified, packaged, marked, labeled, stored, and shipped. The Environmental Field Representative/Waste Supervisor is also responsible for the generation and maintenance of waste designation files, including the preparation of the waste designation record recording the waste designation and for providing waste designation and container inventory data to the Environmental Manager for preparation of the WTP input to the annual dangerous waste generator reports (reference procedure 24590-WTP-GPP-SENV-013, WTP Routine Environmental Regulatory Reporting).</p>	Y	BNI has as assigned Field Environmental Representative / Waste Supervisor and has a designated WRPS contact.
<p>5.0 Procedure</p> <p>5.1 Dangerous Waste Management Requirements for WTP Generated Waste. The WTP generated waste must be managed as in accordance with the Washington State Dangerous Waste Regulations. The steps for properly managing WTP generated waste are the following:</p> <ol style="list-style-type: none"> 1. Gather acceptable knowledge of the waste sufficient to determine whether the Dangerous Waste Regulations apply. 2. Designate the waste in accordance with WAC 173-303-070. 3. Determine whether the waste is defined as a solid waste. 4. Determine whether the waste qualifies for a conditional exclusion as a Special Waste. 5. Determine whether the waste is considered a Universal Waste. 	Y	
<p>5.1.1 Acceptable Knowledge for Waste Designation</p> <p>Gather acceptable knowledge of the waste sufficient to designate the waste. Acceptable knowledge may be obtained from the following sources:</p> <ul style="list-style-type: none"> • Mass balance from a controlled process that has a specified output for a specified input • Material safety data sheets (MSDS) on unused chemical products • Analytical data on the waste or a waste from a similar process • Test data from a surrogate sample 	Y	

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
<p>5.1.2 Designation of Dangerous Waste WTP shall designate waste generated by construction activities prior to transfer to an off-site treatment, storage, or disposal facility. Determinations made during the designation process are recorded on the Waste Designation Form (Appendix C). WTP must perform the waste designation (see Section 4.0 for responsibilities) to determine whether the waste is classified as a dangerous waste by checking the waste against dangerous waste designation standards in the following order (see Appendix A):</p> <ol style="list-style-type: none"> 1. WTP shall determine whether the waste is a listed discarded chemical product 2. WTP shall determine whether the waste is from a listed dangerous waste source 3. WTP shall determine whether the waste exhibits any dangerous waste characteristics 4. WTP shall determine whether the waste meets any dangerous waste criteria 	Y	<p>Example of designated waste :</p> <ul style="list-style-type: none"> Aerosols Spent Solvents Sealants Fire Proofing Adhesives Epoxy Paints PVC Primers Paint Markers
<p>5.2 Waste Designated as Dangerous Waste Waste designated as Dangerous Waste in Section 5.1.2 may not necessarily require management in accordance with all the regulations governing Dangerous Waste. If waste designates as Dangerous Waste but is not considered solid waste, it is excluded from management as Dangerous Waste. If waste Designates as a Dangerous Waste and is a solid waste, it may be excluded from regulation by the Dangerous Waste Regulations. Waste considered to be Special Waste is conditionally excluded from management as a Dangerous Waste. Waste considered to be Universal Waste is not fully regulated and not subject to all the Dangerous Waste management requirements. The following subsections describe the processes for determining whether any of these exclusions or management requirement relaxations apply.</p>	Y	<p>Close to 600 designations</p> <p>Go into buckets, starts 90-day accumulation clock.</p> <p>Labeled with: PIN # Hazardous Waste Sticker</p>
<p>5.2.1 Solid Waste Determination Dangerous Wastes that are not Solid Waste are not subject to the requirements of the Washington State Dangerous Waste Regulations. WTP shall determine whether any waste designated as Dangerous Waste is excluded from regulation by the following steps:</p> <ol style="list-style-type: none"> 1. Determine whether the solid waste is excluded from regulation because it is listed in an excluded category of waste. 2. Determine whether the solid waste qualifies for an exclusion from the Dangerous Waste Regulations because it is recycled. 3. Determine whether the solid waste has been granted a variance. 4. Determine whether the waste is a discarded material because it is: <ol style="list-style-type: none"> a. Abandoned b. Recycled c. Considered inherently waste-like 	Y	<p>Silicone Sealants Latex Paints</p>

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
24590-WTP-GPP-SENV-006, Rev 4 Packaging Nonradioactive Dangerous Waste and Material for Recycle (applicable to Construction and Field Safety Assurance personnel who prepare containers, package dangerous waste, and are responsible for maintaining container inventory records)		
4.0 Responsibilities		
<p>4.1 Environmental Manager</p> <p>The Environmental Manager is responsible for ensuring that this procedure meets the regulatory requirements of WAC 173-303 and 40 CFR Part 262. The Environmental Manager is responsible for updating this procedure when the applicable regulatory requirements change or new regulations are promulgated.</p> <p>The Environmental Manager is also responsible for submitting the required annual dangerous waste generator reports.</p>	Y	
<p>4.2 Safety Assurance</p> <p>The WTP Field Safety Assurance Manager has the responsibility for implementation of this procedure in the field, coordination, and oversight of waste management activities performed at the WTP Construction Site. The Field Safety Environmental Lead has the primary responsibility to ensure that dangerous waste and material for recycle are properly identified, packaged, marked, labeled, stored and shipped. The Field Safety Environmental Lead is also responsible for the generation and maintenance of container inventory files and for providing data to the Environmental Manager for preparation of the annual dangerous waste generator reports.</p>	Y	
<p>4.4 Craft Personnel</p> <p>The appropriate laborer/craft personnel (waste handler qualification 5258) are responsible for packaging dangerous waste and material for recycle according to this procedure. The container requester is responsible for initiating the packaging of dangerous waste and material for recycle by completing Part 1 of the Waste Stream Instruction Form when required. The Key Custodian is responsible for ensuring that containers managed in waste accumulation areas are locked at all times other than for filling, sampling, or inspection.</p>	Y	Construction-Waste handler has 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training.
<p>5.0 Prerequisites</p> <p>5.1 Personnel Training</p> <p>Personnel involved with packaging, labeling, and transfer of dangerous waste or material for recycle must have successfully completed the required solid waste handling course(s) and hazard communication training or work under the direct supervision of a trained waste handler or the Field Safety Environmental Engineer or the Field Safety Environmental Lead until completion of the required training.</p> <p>Training requirements for personnel involved with managing dangerous waste in the accumulation areas are described in 24590-</p>	Y	See attached training record.

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
WTP-GPP-SENV-017, 90-Day Accumulation and Training Procedure.		
24590-WTP-GPP-SENV-007, Dangerous Waste Accumulation and Handling (Requirements for handling and accumulation of dangerous waste during the WTP construction)		
The scope of this procedure is limited to requirements for accumulating and managing nonradioactive DW at the WTP during construction and startup activities prior to receipt of waste from Tank Farms. Management of radioactive, radioactive mixed wastes, non-DW materials for recycle and sanitary wastes are not within the scope of this procedure.		
5.7 Training Training required in compliance with WAC 173-303-330 is satisfied by procedure 24590-WTP-GPP-SENV-017, 90-Day Accumulation Area Training.	Y	
24590-WTP-GPP-SENV-017, Rev 1 90-Day Accumulation Area Training (provides the training requirements for personnel managing wastes in the 90-day accumulation area)		
In accordance with the requirements in WAC 173-303-330, this procedure implements the following elements: <ul style="list-style-type: none"> • The job title, description, and the name of the employee filling each position related to hazardous waste management at a 90-day accumulation area; the job description includes the requisite skills and education, as well as any other qualifications and duties for each position. • A written description of the type and amount of both introductory and continuing training for each position. • Training records for all personnel who have completed the training required by this procedure. • Training programs directed by a person knowledgeable in dangerous waste management procedures, and including training relevant to the accumulation area job positions and job functions for which accumulation area personnel are employed. 	Y	
5.1 Personnel Training 5.1.1 Initial Training Minimum initial training required for hazardous waste management personnel supporting the operation of the accumulation area is provided below. Two job descriptions have been identified for the 90-day accumulation area. These job descriptions include Waste Handler and Waste Supervisor/Engineer job positions. Details of the responsibilities, education, and job function of each of these job descriptions are provided in Section 4 and Section 5.3 of this document. Initial training includes classroom training, computer-based training, supervised field experience training, and required reading.	Y	

2013-08-15 WTP Waste Generation Surveillance Conformance Table

Requirement	Compliance (Y/N)	Notes
Course numbers refer to standard courses available through the WTP and construction training departments. The course list was developed based on criteria in WAC 173-303-330, the Hanford Facility RCRA Permit, and correspondence between the U.S. Department of Energy and the Department of Ecology on dangerous waste training.		
The Waste Handler, Field Safety Environmental Lead, and Field Safety Environmental Engineer are required by 29 CFR 1910.120 (e)(3)(i) and CFR 1910.120 (e)(4) to have 40 hours of off-site instructional training and 3 days actual field experience under the direct supervision of a trained and experienced supervisor.	Y	
5.3.1 Waste Handler (Laborer - Qualification 5258) Responsibilities of position: The Waste Handler performs container and facility inspections, as well as handling, marking, labeling, sampling, packaging, and moving dangerous waste onsite. The Waste Handler also completes and maintains required training, provides emergency response support, and escorts trainees or visitors. Entry-level education and skill: The Waste Handler possesses basic training and communication skills, and has the ability to complete training and job functions, along with the requisite skills and knowledge acquired through training.	Y	

Waste Removal of Contaminated Mud Swallow Nests

In July, Bechtel National, Inc. (BNI) teamed with Mission Support Alliance (MSA) to safely remove 356 mud swallow nests from the WTP construction site that contained radioactive contamination. MSA provided radiological control technicians (RCT) to survey and remove the nests from three WTP facilities. A single nest was removed from Building T-1, three nests were removed from the Low-Activity Waste Facility and 352 nests were removed from the High-Level Waste Facility by MSA's biological control team. The project required two phases. Phase one involved RCTs surveying the nests to assess levels of contamination in the nesting material. Direct surveys identified low levels of contamination in nearly 70 percent of the nests and no contamination in the other 30 percent. The nests were removed during phase two. In preparation for removal, nests were sprayed with a water/disinfectant solution to mitigate risk of dust and biological hazards. Each nest was enclosed in a plastic bag. Bagged nests were labeled and disposed of.

The following Table lists the less than 90 day storage log book information for the swallows nesting material.

Rad <90-Day Storage Area Log Book. see Figure 3 in Attachment 2.

PIN	Waste Description	Accumulation Start Date	Ship Date
WTP-13-164-02	Bird Nests	7-8-13	
WTP-13-164-03	Contaminated PPE	7-15-13	
WTP-13-164-04	Contaminated PPE	7-16-13	

WTP-13-164-05	Bird Nesting Debris	7-16-13	
WTP-13-164-06	Contaminated PPE	7-30-13	

Summary of Findings, Opportunities for Improvement, or Assessment Follow-Up Items:

From the interview and review of the documentation described above, the team identified no findings or observations for the waste designation process used at WTP.

Requirements: The requirements listed in this assessment were satisfied by the interview responses of the Field Safety Environmental Lead, and by the inspection of the training records examined (refer to Attachment 1).

Discussion: The documents reviewed showed that the requirements reflected the intent of the WAC regulations and that the responsible personnel who conduct waste designations were properly trained and were current on their training.

Conclusion: The assessment team found that the contractor was compliant with the WAC regulations and relevant BNI procedures, as listed in this report.

Attachments: See Attachment 1, "Training Records" and Attachment 2, "Waste Removal of Contaminated Mud Swallow Nests Photographs."

Assessor or Lead Assessor:  Date: 09/16/2013

Division Director:  Date: 9/20/2013

Attachment 1, Training Records

User Management > Users > Curricula > Details

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Curricula

> Curricula > View Details

Curriculum ID: 5258
 Title: Construction-Waste Handler
 Status: Complete

View the items for the Curricula

Status	Title	Item
<input checked="" type="checkbox"/>	24550-WTP-TMCC-G-03-000379, Container Waste Management	CRT 586 (Rev 01 - 8/12/2011 10:00 AM Pacific Time) Assignment Date: 8/13/2011 Completion Status: CRTCMP Completion Date: 1/8/2013 07:52 AM Pacific Time Failure Date: Effective Date: 8/13/2011 Required Date: 1/8/2014 Expiration Date: 1/8/2014 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24550-WTP-CRM-TRA-000040, Construction Site Orientation - Non-Manual, Manual and Subcontractors	CRM 2913 (Rev 1 - 11/9/2010 07:00 AM Pacific Time) Assignment Date: 11/9/2010 Completion Status: CRMCC Completion Date: 12/5/2006 11:14 AM Pacific Time Failure Date: Effective Date: 11/9/2010 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24550-WTP-CRTC-G-05-000061, 80 Hr HDHr Hazardous Waste Worker Cert Card	CRT 6797 (Rev 0 - 10/22/2006 11:15 AM Pacific Time) Assignment Date: 2/2/2010 Completion Status: CRTCMP Completion Date: 2/2/2008 12:00 AM Pacific Time Failure Date: Effective Date: 2/2/2008 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24550-WTP-CRTC-G-08-000002, 8 Hr Hazardous Waste Worker Refresher Training Proof	CRT 6016 (Rev 0 - 2/27/2006 05:27 AM Pacific Time) Assignment Date: 8/5/2010 Completion Status: CRTCMP Completion Date: 2/28/2013 04:00 PM Pacific Time Failure Date: Effective Date: 2/27/2006 Required Date: 2/28/2014 Expiration Date: 2/28/2014 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24550-WTP-CRM-TRA-000023, Construction HOET Initial	GET 2574 (Rev 0 - 10/26/2002 01:13 PM Pacific Time) Assignment Date: 8/5/2010 Completion Status: GETCC Completion Date: 12/5/2008 05:31 PM Pacific Time Failure Date: Effective Date: 8/5/2010 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24550-WTP-CRP-SENV-003, Spill and Release Reporting	RR 3242 (Rev 3 - 10/5/2010 08:47 AM Pacific Time) Assignment Date: 10/5/2010 Completion Status: RRCMP Completion Date: 12/20/2012 10:08 AM Pacific Time Failure Date: Effective Date: 10/5/2010 Required Date: 12/20/2013 Expiration Date: 12/20/2013 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24550-WTP-CRP-SENV-005, Packaging Nonradioactive Dangerous Waste and Material for Recycle	RR 3244 (Rev 054 - 10/20/2010 07:37 AM Pacific Time) Assignment Date: 10/20/2010 Failure Date: Effective Date: 10/20/2010

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Attachment 1, Training Records (continued)

User Management > Users > Curricula > Details

Page 1 of 2

Curricula

> Curricula > View Details

Curriculum ID: 5258
 Title: Construction-Waste Handler
 Status: Complete

View incidents for the Curriculum

Status	Title	Item
<input checked="" type="checkbox"/>	24590-WTP-TMSS-G-02-000379, Container Waste Management	C&T 586 (Rev 01 - 01/13/2011 10:00 AM Pacific Time) Assignment Date: 07/23/2011 Completion Status: C&T CMP Completion Date: 07/24/2011 02:01 PM Pacific Time Failure Date: Effective Date: 07/23/2011 Required Date: 07/27/2011 Expiration Date: 07/23/2011 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24590-WTP-CRM-TRA-002040, Construction Site Orientation - Non-Manual, Manual and Subcontractors	CRM 2913 (Rev 1 - 11/01/2010 07:00 AM Pacific Time) Assignment Date: 11/09/2010 Completion Status: CRMCC Completion Date: 2/28/2007 12:00 AM Pacific Time Failure Date: Effective Date: 11/09/2010 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24590-WTP-CRTC-G-08-000001, 80-Hr/40-Hr Hazardous Waste Worker Cert Course	CRT 6797 (Rev 0 - 2/28/2008 11:16 AM Pacific Time) Assignment Date: 5/14/2008 Completion Status: CRTCMP Completion Date: 3/5/2008 10:00 AM Pacific Time Failure Date: Effective Date: 2/28/2008 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24590-WTP-CRTC-G-08-000002, 8-Hr Hazardous Waste Worker Refresher Training Proof	CRT 6816 (Rev 0 - 2/27/2008 08:37 AM Pacific Time) Assignment Date: 5/14/2008 Completion Status: CRTCMP Completion Date: 11/11/2012 10:00 PM Pacific Time Failure Date: Effective Date: 2/28/2008 Required Date: 11/11/2013 Expiration Date: 11/11/2013 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24590-WTP-CRA-TSA-000993, Construction HCET Initial	CET 2871 (Rev 0 - 10/26/2008 01:10 PM Pacific Time) Assignment Date: 8/2/2010 Completion Status: CETCMP Completion Date: 2/28/2008 12:00 AM Pacific Time Failure Date: Effective Date: 8/2/2010 Required Date: Expiration Date: Retraining Assignments: N/A
<input checked="" type="checkbox"/>	24590-WTP-GFP-SENV-003, Spill and Release Reporting	RP 3242 (Rev 3 - 10/5/2010 08:47 AM Pacific Time) Assignment Date: 10/5/2010 Completion Status: RRCMP Completion Date: 9/5/2012 07:48 AM Pacific Time Failure Date: Effective Date: 10/5/2010 Required Date: 9/5/2013 Expiration Date: 9/5/2013 Retraining Assignments: 365 Days - Event
<input checked="" type="checkbox"/>	24590-WTP-GFP-SENV-006, Packaging Hazardous/Dangerous Waste and Material for Recycle	RR 3244 (Rev 004 - 10/20/2010 07:57 AM Pacific Time) Assignment Date: 10/20/2010 Failure Date: Effective Date: 10/20/2010

http://lms/plateau/admin/student/body_student_qualifications_components_view.jsp?status... 8/15/2013

Attachment 2, Waste Removal of Contaminated Mud Swallow Nests Photographs

Figure 1. Five 55-Gallon Drums on Pallets in Hazardous Waste 90 Day Accumulation Area.

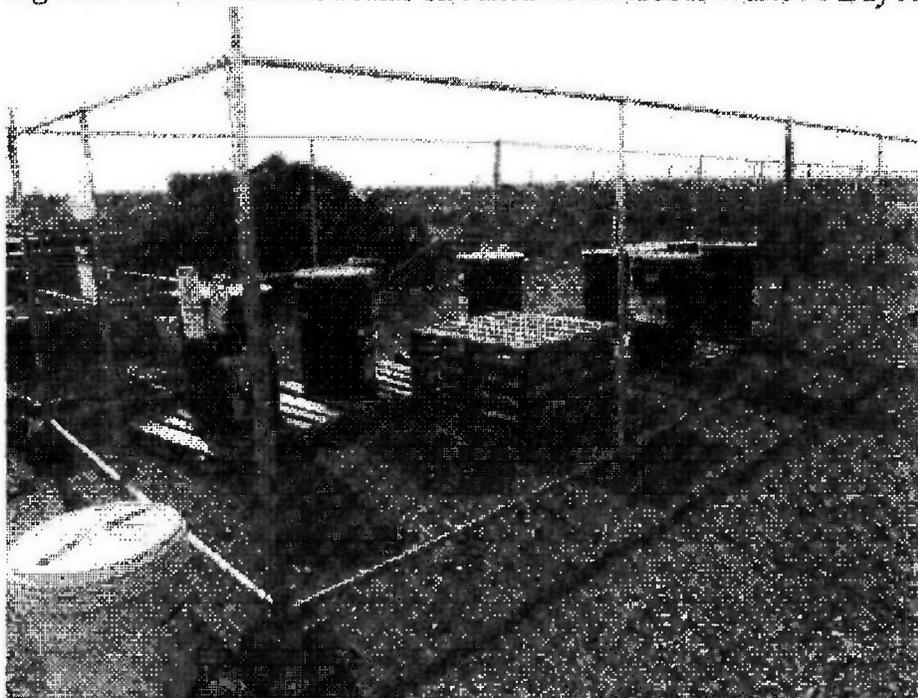


Figure 2. Hazardous Waste 90 Day Accumulation Area Postings.



Figure 3. Log Book Inventory of Swallow Nesting Material Waste.

BECHTEL

90-Day Accumulation Area Inventory

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PIN	Waste Description	Accumulation Start Date	Ship Date
WTP-13-164-02	Bird Nests	7-8-13	
WTP-13-164-03	Contaminated PPE	7-8-13	
WTP-13-164-04	Contaminated PPE	7-8-13	
WTP-13-164-05	Bird Nesting Material	7-8-13	
WTP-13-164-06	Contaminated PPE	7-8-13	

Figure 4. Packaged Contaminated Swallow Nesting Material.





OFFICE OF RIVER PROTECTION

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JUL 12 2013

13-NSD-0021

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Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-NSD-RPPWTP-002, SURVEILLANCE OF BECHTEL NATIONAL, INC.'S (BNI) HAZARDS ANALYSIS (HA) PROCESS

This letter transmits the attached U.S. Department of Energy, Office of River Protection (ORP) Nuclear Safety Division Surveillance Report S-13-NSD-RPPWTP-002. This surveillance reviewed the HA Process. Two Opportunities for Improvement (OFI) were identified.

The surveillance team concluded that BNI has made great strides in the last year towards establishing a well-defined HA process. Two supporting OFIs are provided in this surveillance report for BNI's consideration. Additionally, the performance of this surveillance independently observed the same areas of concern identified by the Safety Basis Review Team as documented in ORP Letter 13-SBRT-0001, Items A and B. However, no findings or observations were specified in this surveillance in effort to avoid duplication.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

JUL 12 2013

Mr. J. M. St. Julian
13-NSD-0021

-2-

If you have any questions, please contact me, or your staff may contact Victor L. Callahan, Director, Nuclear Safety Division, (509) 373-9880.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

NSD:GLJ

Attachment

cc w/attach:
D. M. Gutowski, DNFSB
R. G. Quirk, DNFSB
BNI Correspondence

Attachment
to
13-NSD-0021

U.S. Department of Energy, Office of River Protection
Nuclear Safety Surveillance S-13-NSD-RPPWTP-002
Surveillance of Bechtel National, Inc.'s
Hazards Analysis (HA) Process

(total number of pages, 7, excluding this page)

**U.S. Department of Energy
Office of River Protection**

Surveillance Report Number: S-13-NSD-RPPWTP-002

Division Performing the Surveillance: Nuclear Safety Division

Integrated Assessment Schedule Number: IAS ID 65

Title of Surveillance: Surveillance of Bechtel National, Inc.'s Hazards Analysis Process

Dates of Surveillance: April 29 to May 3, 2013

Surveillance Lead: Gregory L. Jones, Surveillance Team Leader
Nuclear Safety Division, DOE ORP

Team Member(s): Cheryl L. Arm, Nuclear Safety Specialist,
Nuclear Safety Division, DOE ORP
Robert D. Carrell, Nuclear Safety Contractor
Technical and Regulatory Support, DOE ORP

Purpose:

The U.S. Department of Energy (DOE), Office of River Protection (ORP) mission is to retrieve and treat Hanford Site tank waste and close the tank farms to protect the Columbia River. In order to complete one major component of this mission, ORP has awarded Bechtel National, Inc. (BNI), a contract for the design, construction, and commissioning of the Waste Treatment and Immobilization Plant (WTP) at the Hanford Site in Richland, Washington. In order to meet the WTP Contract, DE-AC27-01RV14136, BNI is required to develop and implement an Integrated Safety Management Program to ensure radiological, nuclear, and process safety requirements are defined, implemented, and maintained. Related to this requirement but not part of this review, BNI is committed to ensuring the designated safety Structures, Systems, and Components are adequately designed to reliably perform their intended safety functions through the WTP Authorization Basis (AB).

The WTP AB is the composite of information provided by BNI in response to radiological, nuclear, and process safety requirements and is the basis that ORP grants permission to perform regulated activities. The AB includes information requested by BNI for inclusion in the AB and subsequently accepted by ORP. The current AB for WTP consists of the Preliminary Documented Safety Analysis (PDSA) for the WTP Facilities and the Preliminary Criticality Safety Evaluation Report. The Low-Activity Waste (LAW) Facility, Analytical Laboratory (LAB), and Balance of Facilities have started the process of transitioning from a PDSA to a Documented Safety Analysis (DSA). The DSAs will document the design basis accidents, accident analyses, and control strategy for protecting the public, the worker, and the environment in order to safely operate WTP Facilities. A critical foundation for the DSA development is the Hazards Analysis (HA) process. BNI and the ORP assessments have previously identified

weaknesses in the HA process, which provide the foundation to integrated accident analysis and control selections. Therefore, BNI undertook a major effort to verify, and in some instances reconstitute the HA process to ensure that hazards are complete and traceable to the design by use of current revision of Piping and Installation Drawings.

Previous to this surveillance, BNI was transitioning its regulatory construct in accordance with the 24590-WTP-PL-ENS-11-0001, "Safety Basis Development Project Execution Plan (PEP) for the Analytical Laboratory, Low-Activity Waste, and Balance of Facilities (LBL)" and the 24590-WTP-PL-ENS-12-0001, "Implementation Plan (IP) for Modification 257 to WTP Contract DE-AC27-01RV-14136 Section C, Standard 9, Related to the Regulatory Construct," during the assessment performed in June 2012, (12-NSD-0041, A-12-NSD-RPPWTP-002, "Assessment of BNI Hazards Analysis Process"). At that time, rather than identify findings and/or observations against a process that would be superseded, the 2012 assessment identified four Assessment Follow-up Items (AFI). The 2012 ORP HA Assessment (12-NSD-0041) specified that a HA process review be performed by the ORP, after a sufficient implementation period was allowed, to revisit the four AFIs identified.

The surveillance team evaluated the four AFIs identified in the ORP HA 2012 Assessment (12-NSD-0041) and satisfied the compliance and performance based review. This surveillance was also performed to verify that BNI's HA program and process were properly executed, maintained, and implemented.

Scope:

This surveillance reviewed the approved procedures and guidance documents, to ensure the HA process is consistent with DOE-STD-3009-94, "Preparation Guide for U.S. Department of Energy Nonreactor Facility Documented Safety Analyses," Change Notice 3. Consistent with the HA process is the appropriate application of hazard evaluation techniques described in the American Institute of Chemical Engineers textbook, "Guidelines for Hazard Evaluation Procedures" (1992). This surveillance team also evaluated the HA program and process to verify compliance. Part of the evaluation process included physical observations of LAW HA sessions. A direct result of these HA sessions is to develop Hazard Analysis Reports (HAR), first by systems and then by facility documenting a list of hazardous events (i.e., an event identified by Material at Risk, cause, and qualitative frequency/consequence assigned) in the Insight database in order to identify the bounding representative or unique hazardous events.

It should be noted that this surveillance is not directly associated with the ongoing ORP Safety Basis Review Team (SBRT) HA evaluation of the LAW and LAB HAs meetings, rather this surveillance is a follow-up to the ORP HA 2012 Assessment (12-NSD-0041). As such, some of the summary observations from this surveillance include information previously provided to BNI through the SBRT (13-SBRT-0001).

Requirements Reviewed:

The contractual and regulatory requirements reviewed and evaluated for compliance during the development of this surveillance report are found in the following documents.

- American Institute of Chemical Engineers, 1992, "Guidelines for Hazard Evaluation Procedures," Second Edition.
- 24590-WTP-GPP-GAB-411, Revision 5, "Organization," dated June 9, 2011.
- 24590-WTP-GPP-MGT-028, Revision 4A, "WTP Procedures and Guides," dated April 1, 2013.
- 24590-WTP-GPP-RANS-NS-0004, Revision 0, "Safety Basis Development," dated March 28, 2013.
- 24590-WTP-GPP-RANS-NS-0005, Revision 0, "Hazards Analysis Procedure," dated July 24, 2012.
- 24590-WTP-GPP-RANS-NS-0006, Revision 0, "Accident Analysis Process," dated January 11, 2013.
- 24590-WTP-GPP-RANS-NS-0007, Revision 0, "Control Selection Process," dated January 11, 2013.
- 24590-WTP-GPP-SRAD-065, Revision 3, "Preparing a Fire Hazards Analysis," dated March 5, 2012.
- 24590-WTP-ISMSD-ESH-01-001, Revision 11, "WTP Project Integrated Safety Management System Description," dated January 9, 2013.
- 24590-WTP-QAM-QA-06-001, Revision 12, "Quality Assurance Manual," dated February 7, 2013.
- DOE M 450.4-1, "Integrated Safety Management System Manual," dated November 1, 2006.
- DOE O 414.1C, "Quality Assurance," dated June 17, 2005.
- DOE-STD-3009-94, Change Notice No. 3 (dated March 2006), "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses."
- ORP letter from R. L. Dawson to S. L. Sawyer, BNI, "Transmittal of Contract Modification No. 257," 12-WTP-0132, dated April 30, 2012.

- Title 10, Code of Federal Regulations, Part 830, "Nuclear Safety management."
- TRS-OA-IP-01 Revision 6, "Integrated Assessment Process," dated February 6, 2013.
Supporting Documents Reviewed:

The following documents were reviewed during the performance of this surveillance.

- ORP letter from D. L. Noyes to R. W. Bradford, BNI, "Transmittal of Assessment Report A-12-NSD-RPPWTP-002 – Review of Bechtel National, Inc. (BNI) Authorization Basis Hazards Analysis (HA) Process," 12-NSD-0041, dated June 26, 2012.
- 24590-WTP-GPG-RANS-NS-0002, Revision 0, "Hazards Analysis Handbook," dated July 24, 2012.
- 24590-WTP-PL-ENS-11-0001, Revision 0, "Safety Basis Development Project Execution Plan (PEP) for the Analytical Laboratory, Low-Activity Waste, and Balance of Facilities (LBL)," dated January 2, 2012.
- 24590-WTP-PL-ENS-12-0001, Revision 0, "Implementation Plan for Modification 257 to WTP Contract DE-AC27-01RV14136, Section C, Standard 9 Related to the Regulatory Construct," dated April 18, 2012.
- 24590-WTP-SV-QA-07-271, Revision 0, "BNI/WTP QA Surveillance Report," dated September 26, 2007.
- BNI letter from J. M. St. Julian to W. F. Hamel, DOE-WTP, "For Information: Fire Hazards Analysis and Preliminary Fire Hazards Analysis Calendar Year 2012 Updates for the Hanford Tank Waste Treatment and Immobilization Plant," CCN: 255294, dated February 28, 2013.
- BNI letter from S. L. Sawyer to R. L. Dawson, ORP, "Status of Changes to the Waste Treatment and Immobilization Plant (WTP) Regulatory Construct (Contract Standard 9)," CCN: 245510, dated April 20, 2012.
- BNI Meeting Minutes, "HSS Outbrief – LBL Hazard Analysis Observation Meeting Minutes," CCN: 249548, dated October 18, 2012.
- BNI Meeting Minutes, "LAB Facility Return to Hazards Analysis Meeting Minutes," CCN: 254224, dated December 18, 2012.
- BNI Meeting Minutes, "WTP Hazards Analysis Report Development Meeting," CCN: 249541, dated October 8, 2012.
- BNI memorandum from C. Morgan to G. W. Ryan, BNI, "WTP Hazards Analysis Roles and Responsibilities Matrix," CCN: 252911, dated December 12, 2012.

- BNI memorandum from D. M. Carson to C. Morgan, "Release of Revision 1 to 24590-ENS-DI-RANS-NS-0001, WTP Hazards Analysis Interim Expectations and Guidance Desk Instruction," CCN: 254916, dated April 8, 2013.
- BNI memorandum from D. M. Ferrara to S. Omberg Carro and C. E. Morgan, "WTP Hazards Analysis Pause Action-Plan Briefing," CCN: 252909, dated December 11, 2012.
- BNI memorandum from K. M. Wendi to S. Omberg Carro and C. E. Morgan, "WTP Hazards Analysis Pause Extent-of-Condition Metric," CCN: 252910, dated December 11, 2012.
- ORP letter from W. F. Hamel to J. M. St. Julian, BNI, "Evaluation by the U.S. Department of Energy, Office of River Protection's (ORP) Safety Basis Review Team (SBRT) of the Adequacy of the Waste Treatment and Immobilization Plant (WTP) Low-Activity Waste (LAW) and Analytical Laboratory (LAB) Hazards Analysis (HA) Meetings," 13-SBRT-0001, dated March 26, 2013.

Discussion of Area(s) or Activities Reviewed:

As part of this review process, the surveillance team evaluated the BNI HA program and process using the lines of inquiry presented below.

Lines of Inquiry:

1. Do BNI procedures communicate clearly the regulatory construct for conducting the overall integrated process of HA consistent with the requirements of DOE-STD-3009-94, Change Notice No. 3?
 - Do the BNI processes and procedures clearly define the process roles and responsibilities consistent with DOE-STD-3009-94, Change Notice No. 3?
 - Do BNI processes and procedures clearly define hazards identification consistent with DOE-STD-3009-94, Change Notice No. 3?
 - Does the integrated HA process adequately addresses scope, schedule, and overall planning that is developed, documented, and communicated to ensure a thorough and complete HA of the facilities consistent with DOE-STD-3009-94, Change Notice No. 3?
2. Are the Integrated Safety Management System Core Functions (DOE M 450.4-1) implemented in procedural references that are part of the WTP HA process in accordance with the BNI Integrated Safety Management System Description, 24590-WTP-ISMSD-ESH-01-001?

3. Do BNI personnel follow their HA program (i.e., procedures/guides/handbook/desk instruction), and is the process appropriate to the task?
 - Are HA teams and responsible persons performing their function in accordance with requirements specified in the WTP HA Procedure, 24590-WTP-GPP-RANS-NS-0005?
 - Are there any inconsistencies between the BNI governing procedures with respect to their HA process and implementing procedures?

Summary of Findings and Opportunities for Improvement (OFI):

The performance of this surveillance observed and identified several areas that were also documented in a letter to BNI by the SBRT in 13-SBRT-0001, "Evaluation by the U.S. Department of Energy, Office of River Protection's (ORP) Safety Basis Review Team (SBRT) of the Adequacy of the Waste Treatment and Immobilization Plant (WTP) Low-Activity Waste (LAW) and Analytical Laboratory (LAB) Hazards Analysis (HA) Meetings." As sufficient time has not elapsed to allow BNI to correct the areas of concern identified by the SBRT, no findings were identified by this surveillance. However, two OFIs are provided as they were determined to be uniquely identified by this surveillance. Areas of concern identified during the performance of this surveillance were also previously identified by the SBRT and provided with a cross reference to the SBRT "areas of concern." The resolution of those areas of concern observed by this surveillance and documented in the SBRT letter will be addressed by BNI in their response to the SBRT letter (13-SBRT-0001).

Duplicate areas of concern observed during this surveillance and documented by the SBRT are as follows:

1. Contrary to BNI contract requirements to flow down nuclear safety requirements into implementing procedures has been inadequately accomplished and personnel are using "draft" (i.e., unapproved) procedures for quality affecting work (SBRT Item B, HA Methodology).
2. The BNI Desk Instruction Guidance, 24590-ENS-DI-RANS-NS-0001, "WTP Hazards Analysis Interim Expectations and Guidance Desk Instruction," related to completion of Insight database records are inconsistently documented/filled out and full compliance was not demonstrated (SBRT Item A, HA Session Process Related Observations).

The surveillance team identifies two OFIs that warrant attention but are not in direct noncompliance with a requirement.

OFI 5-13-NSD-RPPWTP-002-001; Guidance Documents 24590-WTP-GPG-RANS-NS-0002 and 24590-WTP-GPG-RANS-NS-0007, provide inconsistent direction for risk binning methodology.

Discussion: The risk binning methodology identified in the "Hazards Analysis Handbook" (24590-WTP-GPG-RANS-NS-0002) was reviewed for consistency with similar process

requirements in the DSA development process documentation. The Risk Bin Table in the "Hazards Analysis Handbook" was inconsistent with the Risk Bin Table in the "Control Selection Handbook" (24590-WTP-GPG-RANS-NS-0007). The two issued and implemented handbooks are inconsistent for the risk bin designation for the anticipated/low risk bin. The "Hazards Analysis Handbook" established this risk bin value as "II," while the "Control Selection Handbook" establishes this risk bin value as "III." The draft Revision 1 of the "Hazards Analysis Handbook" out for review has revised the "II" to "III," which would then be consistent.

OFI S-13-NSD-RPPWTP-002-002: Documentation of team discussions to ensure and demonstrate systematic approach needs clarification.

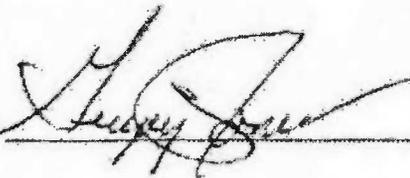
Discussion: Team discussions that are part of the systematic approach of the Hazard and Operability Study (HAZOP) process need to be captured and documented in the HAR in order to validate that a systematic and complete process has been accomplished. There are times when HA discussions go into extensive detail with Subject Matter Experts and engineering to understand how and why events can or cannot occur. It is not clear how this information is being captured to be presented in the HAR; especially to document the events that were determined could not occur, often based on the present design. This information needs to be documented in a fashion to defend that the effort was thorough, sufficient, and complete. Again, extensive discussion occurred during 'brainstorming' activities while developing Insight event records, but it is unclear how much information is being documented by scribes, or how the pictures of the whiteboard drawings and notes might be incorporated to document the process in the HAR.

Conclusion:

BNI has made great strides in the last year towards establishing a well-defined HA process. Two supporting OFIs are provided in this surveillance for BNI's consideration. Additionally, the performance of this surveillance independently observed the same areas of concern identified by the SBRT as documented in 13-SBRT-0001, Items A and B. However, no findings or observations were identified in this surveillance in effort to avoid duplication.

Signatures:

Surveillance Team Lead:



Date: 6/20/13

Division Director:



Date: 6/20/13



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

OCT 28 2013

13-ORP-0281

Mrs. Margaret McCullough, Project Director
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mrs. McCullough:

CONTRACT NO. DE-AC27-01RV14136 – BECHTEL NATIONAL, INC. QUALITY ASSURANCE PROGRAM REQUIREMENTS 3, 4, 7, 8, 15, AND 16, AND DIRECTION TO PERFORM MANAGED IMPROVEMENT PLAN

Reference: Audit Report U-13-QAT-RPPWTP-001 – Bechtel National, Inc. Quality Assurance Program Requirements 3, 4, 7, 8, 15, and 16.

This letter transmits the results of the U.S. Department of Energy (DOE), Office of River Protection (ORP) audit regarding implementation of Bechtel National, Inc. (BNI) quality assurance program (QAP) Requirements 3, 4, 7, 8, 15, and 16 (attached). The audit team evaluated the adequacy, implementation, and effectiveness of BNI's QAP related to the requirements listed above. The audit team, as discussed in the attached audit report, noted two Priority Level 1 findings with numerous examples cited, five audit follow-up items, and six opportunities for improvement. A summary of the two proposed Level 1 findings is as follows:

- U-13-QAT-RPPWTP-001-F01: Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work," BNI's overall QAP has not been implemented in accordance with requirements and is not fully effective; and
- U-13-QAT-RPPWTP-001-F02: Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work," BNI's overall Corrective Action Program has not been implemented in accordance with requirements and is not fully effective.

The audit team concluded that BNI's QAP itself was generally adequate, but the program was not fully implemented in accordance with contract requirements, and therefore was not fully effective. BNI is to develop corrective action plans (CAP) for each of the findings, as discussed below.

BNI is directed to develop, in addition to these specific CAPs, an integrated, comprehensive Managed Improvement Plan (MIP). To support the future startup of the Waste Treatment and Immobilization Plant, BNI is to address the range of causal factors in sufficient breadth and depth to fully identify and resolve the contributors to the current programmatic integration and quality implementation issues, in order to become fully compliant with DOE directives. ORP will oversee the development and implementation of this plan to ensure that it addresses the needed improvements both to the BNI QAP and in its implementation.

OCT 28 2013

The MIP is to address all systemic QA program and implementation issues. There have been a number of recent reviews that have identified weaknesses in BNI's QA program and in its implementation. Examples of those include the Inspector General report DOE/IG-0894 of September 2013 on design control (to be transmitted to BNI under separate letter), the Office of Enforcement letter of August 2013 regarding vessel weld deficiencies, the Government Accountability Office report GAO-13-38 of December 2012 regarding technical and management challenges, and the joint ORP/headquarters QA audit transmitted by this letter. The MIP may credit existing causal analyses and planned corrective actions, but must also review those with sufficient rigor to ensure that the root causes for the systemic issues are identified and resolved. Key among those would be the integration of the design process, with each affected organization understanding the process and where and when they and others perform their roles. An additional key area for resolution is the process whereby material is procured, reviewed at vendor shops, inspected and accepted, and issued for installation, with particular focus on inspection of sufficient rigor to identify unacceptable material prior to release to the field.

The MIP is to be developed and executed such that the improvements to the QAP are completed and all organizations are effectively implementing it within two years of the date of this letter.

Within 30 days of the date of this letter, BNI senior management is to meet with the ORP Manager to provide the plan for development of the MIP. This discussion must include BNI's plans for causal analyses, for determination of changes needed to the QAP, and for improvements in implementation by all affected organizations.

Relative to this QA audit and its findings, BNI senior management is to meet with the ORP Manager within 15 days of the date of this letter to discuss BNI's investigative actions, the compensatory measures being implemented, and the justification (if necessary) for continuing the activity.

Within 30 days of the date of this letter, BNI is to respond to all Priority Level 1 findings contained in the attached report. For each Priority Level 1 finding, BNI is to provide a corrective action plan (CAP) that includes:

- Immediate and remedial actions to correct the specific deficiencies identified in each finding;
- The extent of condition;
- The root cause(s);
- Corrective actions to correct the cause(s) to prevent further findings; and
- The date when all corrective actions will be completed, verified, and compliance to applicable requirements achieved.

Mrs. Margaret McCullough
13-ORP-0281

-3-

OCT 28 2013

The submittal requested above is assumed to be approved by ORP unless a rejection letter from ORP is received within 90 days of BNI submitting the CAP.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Should you have any questions regarding the QA audit, please contact Jeffrey May, ORP Supervisor, Quality Assurance Team, at 509-373-7884 or Jeffrey_D_May@orp.doe.gov. Should you have any questions regarding the MIP, please contact Paul Harrington, ORP Assistant Manager for Technical and Regulatory Support, at 509-376-5700.



Kevin W. Smith, Manager
Office of River Protection

Attachment

cc w/attach:
BNI Correspondence

**Attachment
13-ORP-0281
(78 Pages)**

**Bechtel National, Inc. Quality Assurance Program
Requirements 3, 4, 7, 8, 15, and 16**

Audit Report U-13-QAT-RPPWTP-001

U.S. DEPARTMENT OF ENERGY

Office of River Protection

AUDIT: Bechtel National, Inc. Quality Assurance Program Requirements 3, 4, 7, 8, 15, and 16

REPORT: U-13-QAT-RPPWTP-001

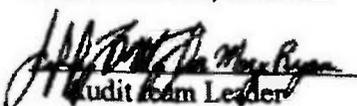
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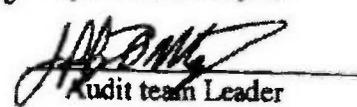
FACILITY: Waste Treatment and Immobilization Plant; Bechtel National, Inc. Project Office

LOCATION: Richland, Washington

DATES: May 06 through May 29, 2013

AUDITORS: Mary Ryan, Audit team Leader
Jeff May, Co-Audit team Leader
Sam Vega, Auditor
Jeff Reiten, Auditor
Elaine Diaz, Auditor, Limited Certification
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Ron Schrotke, Auditor, Limited Certification
Colette Broussard, Auditor, Limited Certification
Earl Bradford, Auditor, Limited Certification
Pamela Bailey, Auditor- in-Training
Ted Wyka, Observer
John Mocknick, Observer

APPROVED BY:  10/7/2013
Audit team Leader Date

APPROVED BY:  10/7/2013
Audit team Leader Date

LIST OF ACRONYMS

AFI	Audit Follow-up Item
ASME	American Society of Mechanical Engineers
ATL	Audit Team Lead
ATS	Action Tracking System
BBR	Broad Based Review
BNI	Bechtel National, Inc.
BOF	Balance of Facilities
BPS	Bechtel Procurement System
BSII	Bechtel Systems & Infrastructure Inc.
CA	Corrective Action
CAP	Corrective Action Plan
CDR	Construction Deficiency Report
CGD	Commercial Grade Dedication
CHG	Change
CNS	Chief of Nuclear Safety
CTQ	Critical to Quality
DCD	Design Criteria Database
DNFSB	Defense Nuclear Facility Safety Board
DOE	U.S. Department of Energy
DV	Design Verification
DVR	Design Verification Report
E&NS	Environmental & Nuclear Safety
EM	Office of Environmental Management
EPCC	Environmental Procurement, Construction, and Commissioning
ESL	Evaluated Supplier's List
FMM	Field Material Management
GRCN	Global Requisition Change Notice
HLW	High-Level Waste
HSS	Health, Safety, and Security
ICN	Integrated Control Network
IESNA	Illuminating Engineering Society of North America
IG	Inspector General
IHLW	Immobilized High-Level Waste
ILAW	Immobilized Low-Activity Waste
ISI	Invensys Systems, Inc.
ISL	Inventory Specialist Lead
LAW	Low-Activity Waste
LSIT	Large Scale Integration Testing
LVP	LAW Secondary offgas/vessel vent process
MAP	Material Acceptance Plan
MHF	Material Handling Facility
MR	Material Requisitions
MRR	Materials Receiving Reports
MS	Material Specialist
MWR	Material Withdrawal Request

NCR	Nonconformance Report
OCRWM	Office of Civilian Radioactive Waste Management
OE	Office of Enforcement
OFI	Opportunities for Improvement
OIG	Office of Inspector General
ORD	Operations Requirements Document
ORP	Office of River Protection
PDSA	Preliminary Documented Safety Analysis
PIER	Project Issue Evaluation Report
PIP	Process Improvement Process
PJM	Pulse Jet Mixer
PO	Purchase Order
PSRA	Project Software Risk Assessment
PT	Pretreatment
QA	Quality Assurance
QAM	Quality Assurance Manual
QAP	Quality Assurance Program
QARD	Quality Assurance Requirements and Description
QC	Quality Control
QVD	Quality Verification Document
RI&T	Receiving Inspection & Test
RIR	Receiving Inspection Report
RM	Responsible Manager
RTS	Return to Stock
RVP	Reliability Validation Process
S&IS	Shipping and Inventory Specialist
S/CI	Suspect/Counterfeit Items
SASSI	System for Analysis of Soil Structure Interaction
SDDR	Supplier Deviation Disposition Request
SQR	Supplier Quality Representatives
SRD	Safety Requirements Document
SRS	Software Requirements Specifications
SSC	Systems, Structures, and Components
WES	Wholesale Electric Supply Co.
WOS	Warehouse Operations Supervisor
WTP	Waste Treatment and Immobilization Plant

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted an audit of the Bechtel National, Inc. (BNI) quality assurance program (QAP) Requirements 3, 4, 7, 8, 15, and 16 in Richland, Washington, from May 6 through May 29, 2013. The audit team evaluated the adequacy, and implementation of procedures, as well as BNI's effectiveness in meeting requirements contained in DOE O 414.1C, 10 CFR 830, and quality assurance requirements in the American Society of Mechanical Engineers (ASME) NQA-1-2000, "Quality Assurance Requirements for Nuclear Facility Applications," as delineated in 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual" (QAM) for Requirements listed above.

Below is a short synopsis of the review areas and the results that were audited by the audit team. Section 2.0 of this report lists a detailed description of these areas.

The audit team conducted interviews with BNI personnel, reviewed documented objective evidence, and evaluated BNI's procedures during the course of this audit. Because of the results of this audit discussed in each review area audited, the audit team leaders reviewed the results of these activities to determine the overall effectiveness of the BNI QAP and to determine if there were any weaknesses within the BNI QAP that would account for the issues that were previously and currently found and documented. The previous issues were discussed within oversight reports prepared as a result of ORP assessments and audits, DOE Office of Health, Safety, and Security (HSS) oversight activities, DOE Office of Inspector General (OIG) investigations, Office of Enforcement (OE) investigations, and Defense Nuclear Facilities Safety Board (DNFSB) activities as well as the areas evaluated during this audit.

The audit team focused their review in three areas: the success of BNI's QAP in self-identifying issues, the effectiveness of BNI's corrective actions related to issues identified by oversight activities performed by ORP, HSS, OIG, OE, and DNFSB, and the ability of BNI's QAP to prevent the recurrence of previous identified and documented issues and conditions adverse to quality.

As a result of this audit, the audit team was able to understand the BNI QAP at the implementation level. The audit team identified weaknesses in six areas: 1) Design Control; 2) Software Quality Assurance; 3) Procurement Document Control; 4) Control of Purchased Items and Services; 5) Identification and Control of Items; and 6) Corrective Action. As a result of the audit results being reported by the audit team members, and to ensure that a comprehensive assessment of the BNI QAP was accomplished, the audit scope was broadened to include an additional evaluation regarding the overall effectiveness of BNI's QAP. The audit team leaders performed an evaluation of these audit results relative to the overall effectiveness of BNI's QAP. In addition, as required by NQA-1, an evaluation was also conducted by the audit team leaders on the effectiveness of BNI's corrective actions associated with issues identified by oversight activities performed by ORP, HSS, OIG, OE, and DNFSB, and the ability of BNI's QAP to prevent the recurrence of previously-identified and documented issues and conditions adverse to quality.

The conclusions drawn from the results of this evaluation led to a determination that the overall BNI QAP, as well as BNI's corrective action program, were not implemented in accordance with requirements, and therefore were not fully effective. As a result, Finding U-13-QAT-RPPWTP-001-F01 and Finding U-13-QAT-RPPWTP-001-F02 are being issued. A full discussion of these findings is contained in the Section 3.0 of this report, and objective evidence reviewed in relation to these findings is listed in Appendix B of this report.

The following review areas were evaluated by the audit team, and represent a representative cross-section of BNI's QAP that provides some of the most important quality processes performed by BNI. The issues identified by the audit team in these areas represent a lack of effectiveness of BNI's QAP and therefore are considered examples of the issues which the overall Finding U-13-QAT-RPPWTP-001-F01, is being based.

The review areas evaluated by the audit team are as follows:

Review Area – 1:

- Requirement – 3, Design Control: BNI had adequate procedures. However, in the electrical area, this program was not fully implemented, and therefore was not effective.
- Requirement – 3, Software Quality Assurance: BNI did not have adequate detail in the relevant procedures to support their use by non-expert employees, but due to expert staff who could work with limited detail, the software program was adequately implemented and was effective.

Review Area – 2:

- Requirement – 4, 7, and 8, Procurement Document Control, Control of Purchased Items and Services, and Identification and Control of Items: BNI had adequate procedures, which were adequately implemented, but the program was not effective overall because the process released noncompliant components for shipment from fabricators.

Review Area – 3:

- Requirement – 15, Control of Non-Conforming Items, and Control of suspect/counterfeit items (S/CI): BNI had adequate procedures, which were adequately implemented, and the overall program was therefore considered to be effective.
- Requirement – 16, corrective action (CA): BNI had procedures for CA program in place, but BNI's CA program was not adequate, was not fully implemented, and therefore was not effective.

Review Area – 4:

- The plan for this audit addressed Review Area 4, which was a gap analysis relative to the updated quality assurance requirements contained in DOE O 414.1D and Rev. 1 of the Office of Environmental Management (EM) QAP. That activity was performed to inform a decision on approving a request for exemption from those updated requirements. Because that is a substantially different issue than this audit of compliance to existing

quality assurance requirements, it will not be addressed further in this audit report, but will be addressed in separate correspondence.

With respect to Office of Civilian Radioactive Waste Management (OCRWM)-related activities, which would need to be compliant with DOE/RW-0333P, R20, quality assurance requirements and description (QARD), the team interviewed BNI management personnel and found BNI has not been performing OCRWM-related activities.

1.2 Conclusions

During the audit the audit team identified and documented examples of issues in each of the areas that were determined to have weaknesses. These six areas are as follows:

- 1) Design Control;
- 2) Software Quality Assurance;
- 3) Procurement Document Control;
- 4) Control of Purchased Items and Services;
- 5) Identification and Control of Items; and
- 6) Corrective Action.

The identified issues in these six program areas substantiate the failure in implementation and effectiveness of BNI's QAP. Overall, the audit team found that BNI had programs in place to implement requirements but, these six programs were not fully implemented and/or were not effective. The identified issues are documented under the discussions pertaining to each specific area of this audit. Taken together along with issues identified by other evaluations, assessments, audits, and surveillances, these identified issues provide justification for determining that BNI's QAP is not fully implemented and is not fully effective in meeting requirements stipulated in BNI's Contract DE-AC27-01RV14136, Section C, "Statement of Work," regarding implementation of a nuclear QAP.

The audit team recommends that in lieu of a stop work, BNI should develop an integrated, comprehensive "Managed Improvement Plan." ORP would oversee the development and implementation of this plan to ensure that it is of sufficient breadth and depth to accomplish the needed improvements to the BNI QAP and its implementation.

Section 3.0 of this report discusses the following findings, audit follow-up items (AFI), and opportunities for improvement (OFI) that resulted from this audit. The findings represent conditions adverse to quality that have been identified as a result of this audit. The AFIs represent areas that currently do not represent conditions adverse to quality, or areas where BNI is currently working on specific process improvements, and which warrant further evaluation at a later date. The OFI are also not conditions adverse to quality, but are suggestions for areas where the program may be strengthened.

Findings:

- **U-13-QAT-RPPWTP-001-F01, (Priority Level 1):** Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work" BNI's overall QAP has not been implemented in accordance with requirements and is not fully effective.
- **U-13-QAT-RPPWTP-001-F02, (Priority Level 1):** Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work" BNI's overall Corrective Action Program has not been implemented in accordance with requirements and is not fully effective.

Audit Follow-up Items:

- **U-13-QAT-RPPWTP-001-A01:** Review the adequacy of BNI's 24590-WTP-RPT-OP-01-001, Operations Requirement Document, in relation to meeting requirements of system design, and design verification activities, including the Integrated Control Network.
- **U-13-QAT-RPPWTP-001-A02:** Conduct a surveillance to gather facts on software grading early in the audit process and then for BNI, ORP, and if possible, Chief of Nuclear Safety (CNS) employees to participate in an assist visit associated with this topic.
- **U-13-QAT-RPPWTP-001-A03:** Evaluate software used to perform administrative functions that manages, modifies, or retains quality affecting data to ensure compliance with quality requirements.
- **U-13-QAT-RPPWTP-001-A04:** Evaluate BNI's incorporation of the full NQA-1-2000 (all 18 requirements) on BNI's Q-Datasheet, R14, and within BNI purchase orders (PO).
- **U-13-QAT-RPPWTP-001-A05:** Evaluate BNI's review whether QARD audits were applicable to EnergySolutions' QAP and amended BNI's evaluated supplier's list (ESL) accordingly.

Opportunities for Improvement:

- **U-13-QAT-RPPWTP-001-O01:** OFI for improving the process of how documents are reviewed or re-reviewed by BNI organizations.
- **U-13-QAT-RPPWTP-001-O02:** OFI involving analyses of integrated control network (ICN) hardware and/or software to assure compliance with DOE O 205.1B Chg. 1. Additionally R0010 could be reviewed for potential modification.
- **U-13-QAT-RPPWTP-001-O03:** OFI for BNI to improve software procedures and document clarity.

- **U-13-QAT-RPPWTP-001-O04:** OFI regarding the practice of utilizing supplier procedures (in lieu of the supplier's QAM) to determine compliance to NQA-1-2000 requirements. This practice may lead to the supplier's QAP being out-of-compliance from the approved BNI review of the suppliers QAM.
- **U-13-QAT-RPPWTP-001-O05:** OFI for BNI to improve their Q Data sheet and Specification 24590-WTP-3PS-G000-T0019 by showing commercial grade dedication (CGD) activities comply with NQA-1 2004 in lieu of NQA-1 2000.
- **U-13-QAT-RPPWTP-001-O06:** OFI to improve identification of personnel signing the Material Receiving Report documents.

2.0 Report Details

The audit team evaluated the adequacy, implementation, and effectiveness of the BNI procedures and the organizations in meeting requirements contained in DOE O 414.1C, 10 CFR 830 Subpart A, and quality assurance requirements in the ASME NQA-1-2000, "Quality Assurance Requirements for Nuclear Facility Applications," as delineated in 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual" for Requirements 3, 4, 7, 8, 15, and 16.

The audit team conducted interviews with BNI personnel, witnessed work activities, reviewed documents, and evaluated BNI's procedures within the following review areas:

- Review Area 1 – NQA-1 Requirement 3 (Design Control and Software Quality);
- Review Area 2 – NQA-1 Requirement 4, 7, and 8 (Procurement Document Control, Control of Purchased Items and Services, and Identification and Control of Items);
- Review Area 3 – NQA-1 Requirement 15, and 16 (Control of Nonconforming Items, Corrective Action, and Control of S/CIs); and
- Review Area 4 – (Appendix A) EM-43 QAP Safety Gaps Analysis Surveillance. The plan for this audit addressed Review Area 4, which was a gap analysis relative to the updated quality assurance requirements contained in DOE O 414.1D and Rev. 1 of the EM QAP. That activity was performed to inform a decision on approving a request for exemption from those updated requirements. Because that is a substantially different issue than this audit of compliance to existing quality assurance requirements, it will not be addressed further in this audit report, but will be addressed in separate correspondence.

2.1 Review Area 1 – NQA-1 Requirement 3 (Design Control and Software Quality)

Review Area 1a – Requirement 3 (Design Control):

The audit team reviewed BNI's design process for adequacy of design control, design change and design verification. In addition, the audit team reviewed the design control procedures

responsible for controlling alignment between BNI Engineering (Design) and other affected organizations, such as environmental and nuclear safety (E&NS).

Design Control:

The audit team reviewed procedures and interviewed BNI personnel to assess the control of design, the flowdown of design criteria, and the effectiveness of organizational interfaces during the design process. BNI's governing design control procedures are, 24590-WTP-3DP-G03B-00001, *Design Process*, and 24590-WTP-3DP-G04B-00001, *Design Criteria*, which were adequate to ensure design control and proper requirements flowdown.

BNI's design criteria database (DCD) is an important system for maintaining design control and ensuring appropriate flowdown of design criteria. The audit team examined the process of updating requirements in the DCD and reviewed several DCD change notices, their distribution and subsequent use. A BNI engineer demonstrated the process of searching and extracting design requirements from the database. The DCD is capable of controlling design input although its effectiveness depends on knowledgeable users to properly extract complete design criteria. The audit team found the information in the DCD was comprehensive, but interviews with BNI's engineering employees revealed that it contains some conflicting information. This stemmed largely from the safety basis versus design basis misalignment. The misalignment of the safety and design bases was also confirmed in numerous interviews during this review. The misalignment does represent a non-compliance with BNI QAM Section 3.1.2.1.2, which states, "Design inputs shall be specified on a timely basis and translated into design documents." However, as existing project issue evaluation report (PIER) and corrective actions are in place for addressing the misalignment, a duplicative finding will not be generated as part of this audit.

The audit team found BNI's procedures governing interfaces between the Engineering, and E&NS organizations adequate. Procedure 24590-WTP-RPT-ENG-07-013, *RPT-WTP Engineering Documents Review and Approval Matrix*, dictates which documents require review by E&NS. This document is in agreement with the matrix in 24590-WTP-GPP-SREG-002, *E&NS Screening and Authorization Basis Maintenance*, which indicates the types of documents E&NS reviews. In an effort to improve the interface between nuclear safety, engineering, and procurement, BNI Document SREG-002 will be replaced by a new procedure for unreviewed safety question to evaluate changes.

The audit team reviewed BNI's procedures governing interfaces between BNI Engineering and E&NS. Specifically, 24590-WTP-3DP-G04T-00913, *Review of Engineering Documents*, states in Section 3.3.1 that if a reviewing BNI organization does not need to review subsequent document revisions, they can inform the originator and will not be sent future revisions. If a subsequent modification to this document started to impact the BNI organization that previously declined review, there would be no automatic review sent since they previously declined subsequent document revisions. In contrast, 24590-WTP-GPP-MGT-066, *Review of Project Documents*, states in Section 5.3.2, "If substantive changes are made to a document, and those changes impact, or potentially impact, an organization that previously indicated further review was not required, then the preparer includes that organization in the review of the changes." The *Review of Engineering Documents* procedure would benefit from including similar language, thereby

reducing the potential for missing an important document review. The audit team documented this as an OFI, U-13-QAT-RPPWTP-001-001.

The team reviewed BNI engineering Document 24590-WTP-RPT-OP-01-001, operations requirements document (ORD), and discovered the system level design requirements needed a detailed follow-on review to determine if the ORD incorporated facility design requirements within system designs and design verification activities, including the ICN. The team identified AFI U-13-QAT-RPPWTP-001-A01 to review the adequacy of BNI's 24590-WTP-RPT-OP-01-001 document in relation to meeting requirements of system design, and design verification activities, including the ICN.

Design Change:

BNI's self-assessment, reliability validation process (RVP), had identified ten "Significant Critical to Quality (CTQ) Gaps" related to the design change process. Most of these CTQ gaps were targeting the upper levels of the design change process. Closure of these gaps should drive substantial improvement in the program. Based on the RVP process' scope and results, the bulk of this design change audit focused on implementation in the field. Generally speaking, most field employees expressed that the design change process was understood, although the volume of changes at times made the process "cumbersome." BNI's Waste Treatment and Immobilization Plant (WTP) field engineering support was adequate in the high-level waste (HLW) Facility, and their presence was a key factor in assisting craft employees' with an understanding of complex changes or defining numerous changes written on one document.

The team evaluated working interfaces at the low-activity waste (LAW) Facility. Craft employees at the LAW Facility stated that, too many changes were written on a conduit installation document, causing confusion in understanding how to implement the field design changes. Upon further investigation, the team determined that the LAW conduit installation document had 28 outstanding changes written on the document versus 10 outstanding changes allowed by BNI Procedure 24590-WTP-3DP-G04T-00901. This issue is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

Design Verification (DV):

The review of design verification focused on flowdown of requirements from NQA-1-2000 to the QAM and from the QAM to the implementing procedures, as well as the effectiveness of those procedures in ensuring a consistent quality product. Review of DV Procedure, 24590-WTP-3DP-G04B-00027, indicated BNI adequately integrated requirements from BNI's QAM and NQA-1-2000, Requirement 3 into this procedure, but there was little guidance on how to perform DVs. The audit team reviewed a sampling of design verification reports (DVR) determining that consistency in DVR preparation was lacking, and that the depth of reporting the verifications ranged greatly from one DVR to the next. The most complete DVR was 24590-PTF-DVR-M-03-008, dated December 20, 2011, and detailed which systems, structures, and components (SSC) to verify. This DVR provided: 1) Disclosure of Incomplete Verification including resolutions of closed items; and 2) a list of safety and functional requirements the design was verified against, and included referenced documents containing the requirement. Design verification investigation reports that contained this type of information allowed the team to determine DV adequacy.

Other reports reviewed contained much less information leaving the audit team unable to determine the quality of the verification performed. One example was 24590-HLW-DVR-E-04-0001, which addressed low voltage emergency power distribution. This DVR lists documents reviewed, but provided extremely brief answers to the twenty-one elements BNI's Procedure, 24590-WTP-3DP-G04B-00027, *Design Verification*, recommends include, such as:

- "Design inputs were correctly selected and incorporated into the design of the emergency 480V Safety distribution system; maintenance features and requirements have been adequately specified; adequate accessibility has been provided to perform in-service inspections of equipment during plant life; and the specified SSCs are suitable, as confirmed by calculations, for the intended application."

BNI's brief answers did not provide the audit team adequate information to assess verification completeness, nor provide information as to which requirements were verified.

Another example was 24590-PTF-DVR-E-04-0002 Rev. 3, dated June 3, 2010, which addressed an uninterruptable power supply distribution system, and utilized a checklist with Yes, No, or N/A boxes for the twenty-one elements listed in the *Design Verification* procedure. Again, this approach does not provide enough information to determine the quality of the verification process used.

DV is the final step taken by BNI's designer to ensure the design meets all the requirements and functions required. The examples above does not reflect an appropriate level of detail that is compliant with NQA-1 Requirement 5, which requires the activity be described to a level of detail to assure consistent and acceptable results. This issue is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

The team found no other procedures or guides that identified additional assistance in performing design verification. The variety of actions taken by various engineers in performing the design verifications was evidence that additional guidance and level of detail was required in the procedures and/or additional training required to assure consistent and acceptable results. The audit team also noted BNI design verification issues were previously documented and addressed in the 2004-2005 time-frames but BNI continues to have design verification issues. In 2004-2005 BNI tried to address this issue as documented in CCN: 127756 and CCN: 114079.

- CCN: 127756 documents an independent design verification assessment completed in 2004.
- CCN: 114079 is titled Submittal of DV Path Forward. This document lists 20 recommendations provided by Management Assessment and planned actions which included development of a "How to" guide. Current issued documentation does not include such a guide nor is the information included in the current procedure.

Part of BNI's RVP included a Six-Sigma process improvement project (PIP) on DV. There were four PIP recommendations identified regarding design control and design verification. The PIP recommendations are identified in quality assurance/quality control (QC) Surveillance Report

24590-WTP-SV-QA-13-005, and include: Preparing a DV program description that will identify management expectations for DVs; Prepare a DV guide to provide more detailed guidance on the DV process; and revise the DV Procedure, 24590-WTP-3DP-G04B-00027, to strengthen and clarify requirements, process and expectations.

As stated above, the audit team found that BNI's design control program had repeated design control, verification and interface issues. BNI's design control issues will need to be adequately addressed, before BNI's design control program is considered effective.

Review Area 1b – Requirement 3 (Software Quality):

The audit team performed interviews with BNI Engineering, Quality Assurance & Performance Assurance and Information Systems and Technology employees responsible for implementation or supporting the development of utility calculations, the development of software for the ICN, and for large scale integration testing (LSIT) for the WTP. The audit team also reviewed pertinent documents and procedures associated with the areas audited which included plant installed software and engineering, procurement, construction & commissioning (EPCC) software.

Developed Software:

The audit team evaluated ICN software and control software for the pulse jet mixer (PJM) that was part of the LSIT. The majority of the ICN development for LAW, balance of facility (BOF) and Analytical Laboratory, referred to as LBL, was complete. Software requirements were identified and the software, including a large portion of the subsystem components, was successfully designed and implemented in accordance with the developed software objects, BNI had also conducted developer level testing on completed code elements.

The audit team noted that several of the ICN software requirements captured in 24590-WTP-PISW-J-08-0001-02, *Software Requirements Specifications (SRS) for the Integrated Control Network (ICN)*, did not have adequate detail in describing software requirement attributes (i.e., clear, correct, testable, and traceable) required by the BNI implementing Procedure (24590-WTP-GPP-SQP-202, *Development and Management of Levels A, B, C, and D Software For Plant*). This resulted in software requirements that did not provide sufficient detail for developing the software and implementing these requirements into actual software code. This lack of detail would also impact developing adequate test plans and test cases making troubleshooting future problems difficult and implementing future software changes. This issue will become acute when BNI's current employees are no longer available to support future activities. This lack of detail made it difficult to trace the requirements throughout the software development phases assuring all requirements were being captured during design and properly tested. Due to the lack of procedural detail, the audit team would not have been able to establish requirement traceability without assistance from BNI's ICN software development employees. This is not compliant with NQA-1 Requirement 3 Paragraph 400, which requires that design analyses be sufficiently detailed such that it can be reviewed by a technically competent person without recourse to the originator. Instead of using adequately detailed procedures, BNI employed software development experts enabling BNI to determine missing design details and have these details implemented during development of the ICN software. However, as BNI's

ICN employees found missing design details that were incorporated during ICN software development, these added details were not consistently added to the software requirements specification.

Not providing sufficient detail to adequately develop software is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**. The ICN software requirements Specification, 24590-WTP-PISW-J-08-0001-02, stated that the ICN software performance requirements were identified in *System Response Times* (3P-JD01-T0001 Rev. 2, Section 3.1.2.1. These requirements were only identified by the document section and textual list number (e.g., 3.1.2.1(a), 3.1.2.1 (b)). They were not captured in the software requirements specification (SRS) to ensure traceability.

The Audit team determined that 24590-WTP-PISW-J-08-0001-01, *Software Project Plan for the Integrated Control Network* did not appropriately identify when configuration items were to be placed on the development baseline. Specifically, Table 1, *Software Configuration Item Identification and Naming*, of the software project plan identified the life cycle documentation and when each document was baselined; "prior to completion of the downstream lifecycle activity." The direction in the table was inconsistent with the other portions of the project plan (such as Table 4). The audit team noted during discussions with BNI ICN employees they were following the criteria in Section 5 of Procedure 24590-WTP-GPP-SQP-202. When the audit team reviewed this procedure, the team found the procedure was unclear due to the use of several different terms interchangeably. In some cases, the direction in the procedure did not comply with BNI's QAM requirements, which required documents to be baselined at the end of each life cycle activity. BNI's ICN employees place the software life cycle documents into project administrative document control when they were completed and the computer code was placed into the ABB code control system upon completion of the developer testing. This issue of conflicting requirements in BNI's procedures is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

The audit team selected two ICN software requirements, R0003 and R0005, to trace requirements through software design, implementation and testing. Due to lack of procedural detail, the audit team could not trace requirements for R0003 and R0005 without ICN project employees. Traceability was initiated from the software design phase back to the J3 requirements drawings using a tag number and then forward from the design document to the software acceptance test plan and report using the design document identifier. The tag number was also used to trace to the specific test procedure within the software acceptance test plan. No additional issues were identified.

The audit team evaluated the following ICN implementation code modules to review: 1) BOF Building 82 - Chiller/Compressor Plant; and 2) HLW domestic water System. The BOF Building 82 - Chiller/Compressor Plant was implemented using functional diagrams. No issues were identified with the ICN implementation of these two code modules. In addition, the audit team reviewed the training records for one ICN responsible manager to ensure the manager was qualified to sign as an alternate to the primary responsible manager. No issues were found.

At the time of the audit, BNI was in the process of incorporating DOE O 205.1B Chg1, *Department of Energy Cyber Security Program*, for all networks and systems within the WTP

Operational Plan (i.e., permanent plant). The SRS for ICN, 24590-WTP-PISW-J-08-0001-02, identified a single ICN software requirement, R0010, addressing access control through a username and password. DOE O 205.1B Chg. 1 requirements were not being addressed at the time of this audit. DOE O 205.1B Chg. 1 required "where mission appropriate, or where required in the (Senior DOE Management) (Risk Management Approach) Implementation Plan, the contractor to consider and incorporate Federal initiatives such as HSPD-12 (or compatible) logical access capabilities and the use of internet protocol (IP) v6 and Domain Name System Security Extensions (DNSSEC) as part of their system development life cycle plans." Additionally, DOE O 205.1B Chg. 1 required that "the contractor must ensure all information systems operate within the processes defined and approved by the Federal Authorized Official, and that all systems maintain an acceptable level of risk pursuant to: 1) the agreed upon risk profile defined by Site and Federal management; and 2) approved oversight and assurance systems." BNI should perform an analysis to determine what, if any, additional requirements on the hardware or software for the ICN would need to be implemented to comply with DOE O 205.1B Chg. 1. BNI should also review requirement R0010 for potential modification. The early evaluation of implementation approaches will avoid procurement issues of inadequate hardware or rework of software applications. This observation resulted in the identification of OFI U-13-QAT-RPPWTP-001-002.

The audit team discussed with BNI the current functionality of the control software for the PJMs that was being used in the LSIT. At the time of this audit, the functionality of this software was minimal. As LSIT testing activities progresses through testing phases, BNI expects to expand the functionality of the PJM software. Currently, all input to the software was manual; entered by the operator. All output from the software was displayed and visually verified by the operator. The current software was throwaway code and would not be used in the WTP. In the WTP, there will be both safety and non-safety PJMs that will be controlled by software. The software functionality will be expanded to include flushing, a synchronized mixing and short cycle flutter capabilities. BNI stated that software will be developed at the proper software grade level. The audit team did not identify issues with current LSIT software.

The audit team evaluated change control for LSIT changes, and noted the change control procedure did not address changes to the software that were not initiated through a change of a J3 diagram change (i.e., a requirement change). Changes that did not affect a requirement typically included software design changes, such as operator screen changes, implementation changes to improve maintenance, or add error handling to improve the robustness of the computer code. These types of changes are typical and will require a controlled process to effectively maintain configuration control of LSIT changes. In addition, the team noted during interviews with BNI that the ICN change control process used during software development was specified and managed as stated in the ICN software project plan. The team determined that the change control process described in this plan was not adequate and was incomplete. The plan did not adequately describe all required activities to maintain effective configuration control of ICN software changes. This lack of adequate LIST and ICN change control is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

The audit team reviewed previous audit reports and identified examples of software databases used in the facility design processes that had questionable software grade levels determined in the project software risk assessment (PSRA). The audit team reviewed these PSRAs and found two

reasons for these conditions. The first was the description in the PSRA did not accurately reflect the software function and impact and thus software was improperly designated based on that description. The second was that the process in the PSRA for determining software grade levels was not sufficient to properly identify all software that should be designated as quality affecting. The process resulted in an inappropriate designation of the software. For example, BNI's grading designation for the requirements management software was Level E. However, the audit team's evaluation showed the software should have been designated a higher grade level because it supported quality affecting or safety activities. This is paramount because the software level assigned and the software type determined the rigor applied to the software life cycle activities. In addition to the requirements management software, the audit team identified the following additional examples:

- DOE QARD Audit, 12-DOE-AU-005, conducted October 2012, generated a finding (CAR 12-WTP-AU-005-CAQ-028), that Info-Works was inappropriately classified in the PSRA as Level E for software that is immobilized high-level waste (IHLW) impacting. PIER, 24590-WTP-PIER-MGT-12-1350-C was issued for this finding.
- DOE ORP conducted a surveillance in October 2012, S-12-QAT-RPPWTP-002, that determined that Insight was improperly classified as Level E. In the case of Insight, the PSRA description was insufficient to adequately designate the software grading level. However, after interviewing software users (the interviews of software users were performed during ORP surveillance S-12-QAT-RPPWTP-002) and reviewing the Insight software life-cycle documentation the audit team determined that per the existing BNI software grading process Insight should have been designated as safety software. This categorization is the subject of continuing evaluation.

The audit team determined the software grade level designation in the PSRA for software databases used as: 1) input to the facility design and to support the PDSA; and 2) used during plant operations needed to be further evaluated. Additionally, BNI requested a discussion on this topic of software grading early in the audit process. Unfortunately, the audit schedule did not allow the audit team to conduct the requested discussion with BNI. It was recommended that one or more surveillances be conducted to gather facts and then for BNI, ORP, and if possible, CNS employees to conduct an assist visit associated with this topic. This resulted in the identification of an AFI U-13-QAT-RPPWTP-001-A02.

The audit team evaluating Review Area 2 noted a possible software problem with BNI's non-conforming item report (NCR) database. The database displayed a different closure date for the same database record when the record was displayed on different computer screens. In addition, the audit team attending a Performance Improvement Review Board meeting, May 14, 2013, was notified of a recent computer crash which resulted in the loss of records retained in BNI's PIER system. BNI initiated recovery of the lost records. These two examples prompted the audit team to determine software used to perform administrative functions that manages, modifies, or retains quality affecting data needed to be evaluated to ensure compliance with quality requirements. This was identified as AFI U-13-QAT-RPPWTP-001-A03.

Utility Calculation Software:

The audit team reviewed the life cycle documentation for developed software packages; HLW Wall Reinforcement Design Template, Vertical Cuts, and pretreatment (PT) Wall Reinforcement Design Template, and Horizontal Cuts. The HLW and PT packages contained utility calculations. In accordance with BNI's program, a utility calculation is a spreadsheet used in the design or analysis of an SSC that was pre-verified as an individual software package. The audit team also reviewed process procedures and interviewed BNI employees. Procedures reviewed were related to developing safety (Levels A, B, & C) and quality affecting (Level D) utility calculations as they applied to the software packages reviewed.

BNI Procedure, *Development and Management of Utility Calculation Software Levels A, B, C, D*, 24590-WTP-GPP-SQP-106, Rev. 2), Section 5.0 states, "...For utility calculation software, this procedure serves as the Project Plan..." In addition, The Project Software Risk Assessment, the User Information Form for EPCC, and the related Shear Wall Design – quality affecting software Routine were reviewed. The audit team evaluated this documentation because it provided the software life-cycle application processes of the utility calculation.

Software Procedures and Documents:

The audit team found BNI's software employees to be knowledgeable in the area of software/software development while conducting interviews. However, when the audit team reviewed BNI's software procedures, the team found the procedures to be hard to understand and follow due to how information was presented and/or lack of sufficient detail. BNI's procedures were written as "expert based" procedures. Meaning, employees with a high degree of software development knowledge would easily understand and follow information within the procedures. However, if BNI's current software employees changed, these procedures would lack the detail required to avoid software development errors. During the audit, the team noticed several instances of implementation errors that could be contributed to "expert" interpretation of procedures or inconsistent implementation of software project or life cycle processes. Below are some of the documents the audit team found confusing or unclear procedures that were discussed with BNI.

- WTP-GPP-MGT-028, *WTP-Procedures and Guides, Section 4.1, 4.2 and 4.3*
- 24590-WTP-GPG-J-025, *Configuration Management Guide for the Integrated Control Network (ICN)*
- 24590-WTP-GPP-SQP-202 *Development and Management of Levels A, B, C, and D Software for Plant*
- 24590-WTP-GPG-SQP-0004, *Procedure: Guide to Software Life Cycle Work Activities, Section 5.0, 6.0 and 6.2*
- 24590-WTP-GPP-SQP-102, *Development and Management of Levels, A, B, C, and D Software for EPCC, Appendix C*

The audit team identified OFI, U-13-QAT-RPPWTP-001-O03, Opportunity to improve software procedures and document clarity. This OFI was issued regarding BNI's procedures being hard to understand and follow due to how procedural information was presented and/or lack of sufficient detail.

Software Requirements Flowdown

The audit team determined that BNI's flowdown of requirements was ineffective. Software quality assurance requirements flowed down from BNI's QAM to implementing procedures, guides, desk instructions and down to the software project plans. Procedure 24590-WTP-GPP-SQP-202, *Development and Management of Levels A, B, C, and D Software for Plant*, required the project program sponsor to establish configuration management and baseline processes to be applied during software development. These processes were required to be explained in the software project plan. Thus, the software project plans become part of the requirement flowdown and served as bridges, providing more specific direction and detail that would apply to the specifics of each software project. As such, software project plans served as procedures and were an essential part of establishing software project processes to meet requirements. The WTP-GPP-SQP-202 procedure provided requirements but did not provide implementing processes for configuration management during software development. Those processes were expected to be in the software project plans. The change management processes provided in Section 5.5 of the procedure applied after tested software was placed in the "Plant Installed Software Baseline," which would be after software development and successful completion of the software testing. Findings related to specific deficiencies in the software project plan attributed to inadequate implementation of procedures, but the end result was software project documents that failed to adequately flowdown requirements.

The BNI engineering procedures and the software quality assurance procedures in many cases provided generic processes that lacked the detail to assure consistent and adequate implementation of required activities. Even at the level of the software project plans and software project procedures and guides, sufficient detail was missing that would have demonstrated compliance with requirements and assured consistent and adequate implementation.

The audit team determined the implementation of software requirements, except where noted were adequate. However, BNI's success with implementing DOE software requirements was dependent upon employees that were software experts and knowledgeable in the software engineering discipline. The procedures and guides as currently written were not able to sustain a significant loss of employees and still retain a compliant software quality assurance program. Software lifecycle documentation to support continued implementation and maintenance activities do not contain the required detail should existing employees be replaced. This would also apply to the software life cycle documentation. Traceability and adequacy of requirement could not be accomplished or understood without the aid of the project experts. Therefore, the procedures, guides, and some of the software life cycle documentation were determined to be not effective when they applied to specifying software requirements and establishing software baseline and configuration management processes applied during the software life cycle activities. Not effectively flowing down software quality assurance requirements is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

2.1.1 Results

Design Control: The audit team determined the design control procedures were adequate, but the program was not effectively implemented in the electrical/design change section as well as design verification section listed above, and therefore was not effective.

Software Quality: The audit team determined that BNI's software procedures did not have adequate detail to support their use by non-expert employees, and therefore were not compliant. However, due to the current expert BNI employees, the software program was adequately implemented, and is effective.

2.2 Review Area 2 – NQA-1 Requirement 4, 7, and 8 (Procurement Document Control, Control of Purchased Items and Services, and Identification and Control of Items)

Procurement Document Control

The audit team evaluated BNI's Procurement Document Control program. The team evaluated BNI's requisition process found in Procedure 24590-WTP-3DP-G06B-00001, *Material Requisitions*, and interviewed BNI management personnel from Procurement and Subcontracts, Nuclear Material Services, Quality and Performance, and Engineering Technology organizations. The audit team found all BNI personnel to be knowledgeable of requirements and capable of performing assigned work activities. Before BNI awarded a contract, BNI evaluated the capability of supplier's to provide items or services according to procurement documents. BNI's purchasing organization was responsible for placing orders only with suppliers found acceptable in accordance with established procedures and processes.

For purchases and subsequent changes, the audit team reviewed statements of work, technical requirements, identification of tests and inspections, quality assurance requirements, establishment of hold points, right to access statements, submittal documentation, reporting of nonconformance, and spare and replacement part requirements from twelve purchase orders and material requisitions. The audit team evaluated BNI's process for identifying and incorporating applicable requirements, and flowdown of requirements to assure supplier documents for items and/or services would meet requirements.

The audit team found the purchase orders and material requisitions the team evaluated were adequate with respect to BNI's procedures. However, the audit team found that BNI's implementation and effectiveness in controlling procurement process was not fully effective in preventing noncompliant equipment from being release for shipment from the fabricator, which is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**. The audit team determined this due to conditions adverse to quality identified in this audit report and similar issues discovered during other evaluations, assessments and audits conducted by the following:

- DOE/IG-0863, DOE's Inspector General (IG) DOE's \$12.2 Billion WTP – Quality Assurance Issues – Black Cell Vessels, supplier deviation disposition request (SDDR) and Oversight Issues, dated April 2012
- DNFSB, Staff Issue Report, Design and preliminary documented safety analysis (PDSA) Issues, dated June 1, 2012

- S-12-QAT-RPPWTP-001, CNS-2012-001, system for analysis of soil structure interaction (SASSI) Software, configuration control issues, dated September 4, 2012
- S-13-QAT-RPPWTP-001, 13-QAT-0015, CGD Technical evaluations noncompliant with requirements, dated April 25, 2013
- U-12-ESQ-RPPWTP-002, 12-QAT-0019, Procurement noncompliance's, December 12, 2012
- A-12-WED-RPPWTP-004, Individual vendor noncompliance's, dated July 16, 2012

Control of Purchased Items and Services

The audit team evaluated BNI's process for Control of Purchased Items and Services. Although no significant issues were found during the teams review, the audit team determined that consideration of results from previous oversight activities were warranted due to continuous issues being found regarding BNI's received equipment. The audit team determined BNI's processes for controlling purchased items and services consisted of three main sub-processes that controlled acceptance of items delivered to the WTP. These processes include, source verifications, review of quality documents, and receiving material in the Material Handling Facility. These sub-processes are performed primarily in the contractor's facility and at the WTP Material Handling Facility.

The audit team reviewed previous oversight activities and took note of the number and types of issues that were found with received WTP equipment. These issues were also examined during ORP Audit U-12-ESQ-RPPWTP-002, BNI Procurement Process Vertical Slice Audit (Blackcell and hard to reach piping both quality and commercial). This audit concluded that BNI's "implementation of the source verification method for acceptance of items and or services from a supplier were not fully effective in assuring the products met procurement requirements. Also that BNI's process did not adequately implement a level and rigor involving internal interface control to assure a cohesive review and acceptance of supplier submittals."

Based upon the results of this audit and consideration of previous oversight activities, the audit team determined that the three main sub-processes that make up the BNI overall process for acceptance of items to be delivered to the WTP are not fully effective due to the following:

- Source verifications - In-process source verification was performed by BNI's supplier quality representatives (SQR) in accordance with the direction provided in applicable approved material acceptance plans (MAP). Per procedure, the final source verification assures: 1) Supplier performed inspections, examinations, and/or tests were completed and the material had been determined by the Supplier to be acceptable; 2) quality verification documents (QVD) were assembled, reviewed, approved by the supplier, and presented in a complete package; 3) Applicable engineering document submittals were received, reviewed, and given a status code; 4) Acceptable status codes were required before fabrication, first operation, first article/item, or other in-process source verification activities were completed; and 5) verify that all previous hold and/or witness points were satisfied. However, from a performance-based standpoint, the BNI source verification process is not fully effective because it released noncompliant equipment for shipment.

- **Review of quality documents** - Each supplier was responsible for the preparation, review, and submittal of quality verification documents in accordance with purchase order requirements. The initial determination of document package acceptability on behalf of BNI was assigned to the BNI SQR. The final review and evaluation of each document package was performed upon receipt of the procured material or equipment as required by the G-321-V, QVD requirements. The audit team, while performing this audit, found, in some instances, similar conditions had been previously documented in other assessments referenced within this report. As a result, the audit team recognized and took into account these pre-existing and open conditions and did not duplicate the identified issues. However, from a performance-based standpoint, the BNI document review process is not fully effective because it accepted documentation packages that did not include required records.
- **Receiving material in the Material Handling Facility** - The receiving inspection & test (RI&T) organization was required to perform and document receiving inspection activities to ensure permanent plant materials met established Purchase Order requirements to the extent required by an approved MAP. The receiving inspection process typically begins with a "Kick and Count" review of the Material Items List provided in the material receiving report (MRR) and a review of the QVD received by RI&T.

The audit team, while performing this audit, found, in some instances, similar conditions that had been previously documented in other assessments referenced within this report. As a result, the audit team recognized and took into account these pre-existing and open conditions and did not duplicate the identified issues. These issues indicate BNI's receiving inspection process in relation to BNI's final acceptance of items in accordance with MAPs, the Receiving Inspection Reports, and QVD Requirements was not always effective. The U-13-QAT-RRPWTP-001 audit team found that BNI does not rigorously inspect items upon receipt. BNI relies on their MAP and inspection processes at the vendor shops. However, as stated in past oversight reports, as well as, this report, the audit team found reoccurring issues with only relying on the vendor shop inspections. However, from a performance-based standpoint, the BNI receiving inspection process is not fully effective because it released noncompliant equipment for installation.

BNI Supplier Evaluation and Selection, and Supplier Quality Program Reviews

The audit team reviewed the implementation of the BNI Supplier Evaluation and Selection process identified in Procedures 24590-WTP-3DP-G06B-00010, *Specifying Supplier Quality Assurance Program Requirements*, 24590-WTP-GPP-QA-021, *Q Supplier Quality Assurance Program Review*, 24590-WTP-GPP-QA-020, *Q Supplier Qualification*, 24590-WTP-GPP-MGT-051, *Supplier/Subcontractor QA Audits*, and 24590-WTP-GPP-QA-024, *Supplier Annual Evaluations*.

The audit team performed reviews to verify that, prior to award, BNI evaluated supplier performance capabilities and documented the results. BNI evaluated supplier's technical and quality capabilities through direct evaluation of supplier facilities, personnel, and implementation of supplier's QAP. The audit team evaluated a sampling of BNI's supplier quality program review documents and BNI Supplier Audits.

While reviewing BNI's supplier quality audits, the team noted BNI's audit checklists had been enhanced to incorporate all paragraphs of each of the 18 requirements of NQA-1-2000, versus using only the basic 100 paragraph of each of the 18 requirements. This change was required by BNI PIER 24590-WTP-PIER-MGT-12-0442 and was also listed on BNI's Q-Datasheet, R14. However, during interviews with BNI supplier quality personnel, the audit team identified that although BNI evaluations were being performed using full NQA-1-2000 requirements, procurement documents were not updated to reflect this change. BNI engineering and procurement were in the process of identifying POs that needed the quality assurance datasheet revised. BNI determined that suspended POs would have the Q-Datasheet revised upon release of suspension. The global requisition change notice (GRCN) revising current, active material requisitions (MR) to incorporate the new quality assurance datasheet is currently forecasted to be issued by the end of June 2013. Once the GRCN is received by Procurement, Procurement will track the required changes in the post-award action tracking system until full implementation in POs. The audit team identified AFL U-13-QAT-RPPWTP-001-A04, to follow up on BNI's incorporation of the full NQA-1-2000 (all 18 requirements) on BNI's Q-Datasheet, R14, and within BNI POs.

When the audit team reviewed BNI's ESL and supplier quality program, the team noticed that EnergySolutions' QAP was reviewed for compliance to DOE/RW-0333P QARD requirements. The team also noted BNI added EnergySolutions to their ESL as a "Quality Assurance Requirements and Description (QARD) Supplier." However, the audit team could not find objective evidence that BNI performed a QARD audit of EnergySolutions, and interviews with BNI's supplier qualification personnel could not substantiate why compliance to QARD requirements was applicable for this supplier. The audit team issued, AFI U-13-QAT-RPPWTP-001-A05, to evaluate BNI's review whether QARD audits were applicable to EnergySolutions' QAP and amended BNI's ESL accordingly.

During review of supplier quality programs, the audit team identified the Invensys Systems, Inc. (ISI) program did not have pertinent NQA-1-2000 requirements addressed. In lieu of revising this program to incorporate missing requirements, BNI conducted a surveillance to determine if ISI procedures were adequate thus determining the areas which were not contained in ISI QAM. However, the audit team determined, utilizing supplier procedures (in lieu of the supplier's QAM) to determine compliance to NQA-1-2000 requirements may lead to the supplier's QAP being out-of-compliance from the approved BNI review of the suppliers QAM. To address the above the audit team identified OFI, U-13-QAT-RPPWTP-001-004.

During the teams review of ISI's quality assurance requirements for the programmable protection system MR 24590-QL-MRA-JD03-00001 the following conditions were identified:

- The Quality Data sheet shows compliance to NQA-1 2000 for CGD activities. In addition, Section 2.4.2, "Commercial Grade Dedication" of the MR requires compliance to Specification 24590-WTP-3PS-G000-T0019, titled, Engineering Specification for Acquisition of Commercial Items and Services for Use in Safety Applications at WTP. This engineering specification also shows compliance to NQA-1 2000 for CGD activities. However, NQA-1 2004 (Sections 701-705) were tailored for CGD activities and adopted by BNI within their design basis. Currently, BNI complies with NQA-1 2000 except for

CGD activities. BNI complies with NQA-1 2004 for CGD activities. These two documents, BNI's Quality Data Sheet and 24590-WTP-3PS-G000-T0019, should reflect BNI's current design basis regarding the use of NQA-1 2004 versus NQA-1 2000 for CGD activities.

- Section 2.4.10, "Safety Software Application Development" of the MR required compliance to NQA-1 2000 Subpart 2.7. This standard is already referenced in the Quality Data sheet "Notes" section as a requirement to be met.

The audit team noted an opportunity to update the Quality Data sheet and engineering specification 24590-WTP-3PS-G000-T0019 to reflect NQA-1 2004 (Sections 701-705) for CGD activities. The team identified this as an OFI, U-13-QAT-RPPWTP-001-O05. OFI for BNI to improve their Quality Data sheet and Specification 24590-WTP-3PS-G000-T0019 by showing CGD activities comply with NQA-1 2004 in lieu of NQA-1-2000.

Review of Material Acceptance Plan

The audit team reviewed BNI's MAP process found in Procedure 24590-WTP-GPP-MGT-013, *Acceptance of Procured Material*. MAPs were developed through an evaluation of approved technical requirements from applicable specifications, drawings, codes, and standards. MAPs were utilized as integrated planning documents in which quality acceptance attributes and/or activities were documented by BNI for verification and ultimate acceptance of procured material, and from which BNI designated functional organization performed assigned responsibilities. MAPs were further utilized for quality acceptance verification of procured material during the material receiving process.

The audit team evaluated the development of MAPs by reviewing the implementation of the technical requirements. This was done by comparing the issued versions of two MAPs against the requirements in the related technical specifications and purchase order technical notes. The flow down of applicable codes and standards and upper level project requirements (Safety Requirements Document and Basis of Design), used in developing the requirement specifications, were also reviewed. Samples of completed MAPs were evaluated to ensure conformance to specified requirements. The MAPs were reviewed for initial concurrence and approval through implementation of assigned oversight by the various responsible functional organizations, and the verification, and/or acceptance activities.

BNI recently developed a "Readiness for Shipment" and "Material Acceptance Plan" checklist for use for all new supplier POs. The use of this checklist focuses on engineering MRs and requirements (Reference CCN: 254186 dated March 21, 2013, and CCN: 25481 dated February 13, 2013). These checklists are approved by the Engineering and Procurement management and include such activities as: 1) review for POs to ensure requirements were adequately specified; 2) review of MAPs for adequacy using the MAP readiness checklist; 3) review and status of supplier submittals; and 4) review for impact of any SDDR's pending engineering disposition.

BNI Source Verifications and Quality Documents

The audit team reviewed BNI's process for performing source verifications of fabrication activities. Applicable BNI source verifications procedures were 24590-WTP-GPP-PSQ-043, *Source Verification Reporting*, 24590-WTP-GPP-PSQ-042, *In-Process Source Verification*, and 24590-WTP-GPP-PSQ-044, *Final Source Verification*. In process source verification was performed by BNI's SQR in accordance with the direction provided in applicable approved MAPs. These BNI verifications were performed on a sampling basis and results were documented on Source Verification Reports. In accordance with BNI procedures, prior to shipment, a final source verification is performed by BNI SQR's to assure the following: 1) Supplier performed inspections, examinations, and/or tests were completed and the material had been determined by the Supplier to be acceptable; 2) QVD were assembled, reviewed, approved by the supplier, and presented in a complete package; 3) Applicable engineering document submittals were received, reviewed, and given a status code; 4) Acceptable status codes were required before fabrication, first operation, first article/item, or other in-process source verification activities were completed; and 5) verify that all previous hold and/or witness points were satisfied. Results of final source verification were documented on a source verification report. Upon completion of all prerequisites, the SQR released the procured material/equipment for shipment in accordance with BNI Procedure 24590-WTP-GPP-PSQ-046, *Release for Shipment*.

The audit team evaluated a sampling of BNI's source verification reports to ensure verifications were being performed in accordance with approved MAPs, procurement documents, and procedures. During discussion with BNI's supplier quality manager the team noted that SQRs do perform verification that all SDDR's are closed within the BNI system and that all affiliated NCR's are closed within the supplier's system prior to the release for shipment. However, the audit team noted that currently there is no objective evidence documenting this verification and there is not a procedural step to complete this verification. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

This audit team found similar issues were addressed in ORP's previous Vertical Slice Audit, U-12-ESQ-RPPWTP-002, which stated that implementation of the source verification method for acceptance of items and or services from a supplier were not fully effective in assuring the products met procurement requirements. Also that BNI's process did not adequately implement a level and rigor involving internal interface control to assure a cohesive review and acceptance of supplier submittals. The reviews performed during this current audit are in line with the conclusions made during the vertical slice audit.

The audit team reviewed the BNI process for submittal and review of Supplier Submittal documents and QVDs in accordance with BNI Procedures 24590-WTP-3DP-G04B-00058, *Supplier Engineering and Quality Verification Documents*, and 24590-WTP-GPP-PSQ-045, *Quality Verification Document Review*. The audit team verified the G-321-E forms were attached to the MRs. These documents summarized engineering documentation requirements for supplier submittals. The BNI project archives the completed supplier submittals (either in hard copy or electronically) when received from the supplier into the electronic document management system database. The audit team interviewed BNI responsible engineers who was responsible for coordinating reviews, and acceptance of supplier submittals.

BNI's process for submittal and review of QVDs was evaluated by the audit team. Each supplier was responsible for the preparation, review, and submittal of quality verification documents in accordance with purchase order requirements. The initial determination of document package acceptability on behalf of BNI was assigned to the BNI SQR. The final review and evaluation of each document package was performed upon receipt of the procured material or equipment as required by the G-321-V, QVD requirements.

The audit team evaluated a sampling of QVDs to ensure completed documentation packages provided objective evidence that the specified material quality requirements had been reviewed by the SQR and appropriate approval entries had been provided as required by the G-231-V documentation. The audit team found, in some instances, similar conditions that had been previously documented in other assessments referenced within this report. As a result, the audit team recognized and took into account these pre-existing and open conditions and did not duplicate the identified issues. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

BNI Material Handling Facility

The audit team reviewed BNI's process for receiving material in the material handling facility (MHF) in accordance with BNI Procedure 24590-WTP-GPP-GCB-00100, *Field Material Management*. The audit team also reviewed the BNI process for receipt inspection. BNI Procedure 24590-WTP-GPP-PSQ-050, *Receiving Inspections*, governed receipt inspection. The RI&T organization was required to perform and document receiving inspection activities to ensure permanent plant materials met established PO requirements; to the extent required by an approved MAP. The receiving inspection process typically begins with a "Kick and Count" review of the Material Items List provided in the MRR and a review of the QVD received by RI&T. After inspection a signed Receiving Inspection Report (RIR) is completed.

The audit team evaluated the sampling of Material RIR to ensure conformance with specified requirements specified in the approved MAP. The audit team also interviewed BNI's Supplier Quality Manager to discuss the specific activities performed by RI&T personnel during the final acceptance of material. The RI&T personnel approved the RIR. The final acceptance signature by RI&T on the RIR validated steps performed by others and indicating all MAP steps were completed, except as otherwise documented on the RIR by references to deficiency documents. This identified completion of MAP steps, performed in the vendor's shop, which was verified by the SQRs, and Materials Management signatures on the G-321-V form.

During the review of MRRs, it was identified that some of the signatures were illegible (i.e., checker's signature on the Kick & Count form and SQR signature on Block 17 of Quality Verification G-321-V form). No printed name accompanied the signature to ensure the authenticator could be properly identified. As a result, the audit team had to contact supervision to identify individuals. Examples: MRRs 0028104, 0027845, 0028063, and 0027842. BNI Procedure 24590-WTP-GPP-PADC-002, R13A, Project Records Management, Section 5.2 "Authentication of Records" states in part that it is a best business practice to include a printed name of the signatory on all documents ensuring that the authenticator can be properly identified.

The audit team identified this as an OFI U-13-QAT-RPPWTP-001-006 which addresses improving identification of personnel signing the MRR documents.

These issues indicate BNI's receiving inspection process in relation to BNI's final acceptance of items in accordance with MAPs, the RIRs, and QVD Requirements was not always effective. The U-13-QAT-RPPWTP-001 audit team found that BNI does not rigorously inspect items upon receipt at BNI's MHF. BNI relies on their MAP and inspection processes at the vendor shops. However, as stated in past oversight reports, as well as this report, the audit team found reoccurring issues with solely relying on the vendor shop inspections. BNI's existing quality assurance processes for overseeing vendor items have not been effective.

The audit team also evaluated BNI's SDDR process was performed. The review included BNI documents: 24590-WTP-QAM-QA-06-001, *Quality Assurance Manual* specifically, Policy Q-04.1, *Procurement Document Control*; 24590-WTP-3DP-G04B-00063, *Supplier Deviation Disposition Request*; and 24590-WTP-GPP-SREG-002, *E&NS Screening and Authorization Basis Maintenance*. The SDDR procedure addresses one method for implementing Policy Q-04.1 with respect to controlling changes to procurement documents. The SDDR procedure includes requirements for changes to be reviewed by affected organizations and for tracking the approved changes (via "InfoWorks") to ensure they are incorporated into affected design media. The audit team reviewed a sampling of SDDRs for compliance with BNI Procedure 2590-WTP-3DP-G04B-00063. Two SDDRs the team reviewed (SDDR-MH-12-00122 and SDDR-MH-10-00129) were not reviewed by BNI E&NS organization as required by 24590-WTP-GPP-SREG-002. A previous DOE's IG evaluation (DOE/IG-0863) found similar issues with BNI's SDDR documents and processes. BNI's continued quality assurance issues with SDDR's not meeting requirements are example of and supports Finding U-13-QAT-RPPWTP-001-F01.

Review of Commercial Grade Dedication Process

The audit team reviewed the implementation of the CGD process found in Procedures 24590-WTP-GPP-MATL-010, *Evaluation and Acceptance of Commercial Grade Items and Services*; 24590-WTP-GPP-MATL-014, *Commercial Grade Surveillances and Source Verifications*; 24590-WTP-GPP-MATL-009, *Performance of Commercial Grade Surveys and Annual Supplier Evaluations*; and 24590-WTP-GPP-MATL-005, *Commercial Dedication Material Requisition*. The team evaluated a sampling of CGD plans, survey reports and checklists for activities such as technical evaluations to determine that the item or service performed a safety function, identified critical characteristics, included acceptance criteria, selection, performance, and documented dedication method (s) for determining compliance with acceptance criteria. All reports the audit team evaluated were determined to be in accordance with the approved checklist or plan. The team also reviewed a sampling of commercial dedicated non-complex items POs and MRs and found no issues.

Civilian Radioactive Waste Management Procurements

With respect to OCRWM procurement-related activities the team interviewed BNI management personnel and found BNI does not have OCRWM procurement-related activities currently being performed for compliance with DOE/RW-0333P, R20, QARD requirements. As a result

compliance of the QAM Appendix "A" IHLW Policies Q-04.1, Procurement Document Control and Q-07.1, Control of Purchased Items and Services were not reviewed.

BNI's WTP Facility Lighting Design

A review of facility lighting design was conducted to understand procurement requirements and determine what standards were used to establish adequate levels of light for various work areas. BNI established an onsite service provider to stock and release bulk electrical items (lights, conduit, etc.) using an *Engineering Specification For Electrical Bulk Materials*, 2590-WTP-3PS-E000-T0001, and a material requisition 2590-CM-MRA-E000-00003, with seven supplements. These documents are labeled commercial grade (non-nuclear safety related). A separate requisition will include cables and other electrical components for nuclear safety related applications.

BNI selected Wholesale Electric Supply Co. (WES) to operate the bulk electrical supply service at the construction site. A BNI procedure covers *Administration of Bulk Electrical Materials*, 24590-WTP-GPP-MGT-019, Rev. 3. This procedure includes responsibilities for BNI and WES in the areas of maintaining an adequate supply, receipt of supplies, and material withdraw. WES then bills BNI for the actual items withdrawn.

Design of lighting is controlled using standard BNI engineering procedures and an industry standard, Illuminating Engineering Society of North America (IESNA), as stated in BNI's Basis of Design Section 8.1.1.6 and 8.6. The specific portions of IESNA standards are: RP-1 (office), RP-7 (general), and RP-8 (roadway). The IESNA standard and a software package AGI-32 provides guidance on lighting levels for various work areas such as, hazardous area controls, layout, and fixture types. The audit team did not find deficiencies in BNI's WTP facility lighting design, and the audit team found overall compliance to BNI Procedure 24590-WTP-GPP-MGT-019.

Identification and Control of Items

The audit team reviewed BNI's programs, related to identification and control of items located at the MHF. The team evaluated objective evidence consisting of implementing procedures, computer tracking systems, information obtained during BNI interviews, and observations recorded during field walk downs. Applicable BNI procedures reviewed controlling items are 24590-WTP-3DP-G06B-00001, *Control of Government Property*, 24590-WTP-GPP-CMNT-006, *Export Controlled Items*, 24590-WTP-GPP-GCB-00100 *Field Material Management*, 24590-WTP-GPP-GPA-025, *Plant Equipment Labeling Procedure*, 24590-WTP-GPP-MATL-002, *Area Operations Material Control*, 24590-WTP-GPP-MATL-002, *Inventory Control*, 24590-WTP-GPP-SS-009, *Receiving Inspection*, 24590-WTP-P-PSQ-050, *Material Requisitions*, 24950-WTP-GPP-CON-7109, *Acceptance of Procured Material*, 24950-WTP-GPP-CON-7109, *Material Control*, and 24950-WTP-GPP-MGT-044, *Nonconformance Reporting and Control*.

MHF Evaluations and Field Material Management (FMM)

The audit team interviewed MHF employees and found them to be knowledgeable of requirements and BNI procedures. Bechtel procurement system (BPS) is the computer tracking

system BNI uses for purchases. Specifically, BPS is used for executing field requisitions, POs, receipt, inventory, control, and issuance of material, equipment, and services. The interface between BPS and management of items was defined in BNI Procedure 24590-WTP-GPP-GCB-00100 *Field Material Management*. This procedure was not clear in describing activities and not detailed enough to assure consistent and acceptable results. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**. Some examples are as follows:

- FMM-Section 2.2.6 "Material Specialist:" The responsibilities of BNI's material specialist (MS) were identified, but some pertinent activities the audit team observed was not defined. In particular the team observed the MS taking photos of damaged items upon receipt and making entries into the BPS system. The FMM procedure stated pictures were to be taken but didn't define who and how the pictures would be entered into the system and disseminated.
- FMM-Section 3.2 "Receiving:" Bullet 1 requires FMM to initiate a visual inspection before the delivered material is removed from the delivery vehicle when applicable. However, who performs this function and how information is disseminated is not defined. Bullet 18 requires material to remain in MHF receiving area a minimum of 48 hours after completion of the MRR or site receiving report. This would allow area operation personnel time to evaluate prior to placing material in inventory. MS personnel stated that the term "material" did not mean all material. It only applied to unique material. The audit team could not find, in the procedure, what was considered unique material that would apply to the 48 hours.

24950-WTP-GPP-MGT-044, *Nonconformance Reporting and Control*: Numerous sections of this procedure, Sections 4.0, 5.4.4, 5.4.7, 5.5, refer to organizations and individuals such as engineering, assigned engineer, or engineering groups. The team found this procedure to be unclear as to whom these individuals/organizations were within BNI. Document Sections 5.4.1.5 and 5.4.2.2 both state that Material Management may utilize "an electronic BPS hold" in lieu of segregation and tagging of a non-conforming item. This could result in the situation that BPS may not always contain this information. The language in the procedure could be revised to state that "the Hold Status contained in BPS can be flagged, if needed, as the control method for non-conforming items if tagging is impractical or not achievable." This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

24950-WTP-GPP-CON-7109, Revision 7A, *Material Control*: This document defines how material is controlled. The audit team witnessed MHF personnel using white and black labeling to mark items. The procedure governing material control does not discuss using white and black labeling to control items. There is only marking control, i.e., paint for the steel and nickel items. The objective of this procedure is to define the material control process necessary to ensure correct and accepted materials are used and installed. The audit team noted that the white and black labeling system should be evaluated and proceduralized. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

24590-WTP-GPP-MATL-002, Rev. 0, *Inventory Control*: The audit team noted that Section 4.4 of this document defined Inventory Control Supervisor responsibilities. According to personnel interviewed, this position has not been in existence for over a year. The team also noted that this

procedure has not been updated since 2009. The MHF personnel are currently in the process of updating several procedures. This procedure should be updated to reflect current responsibility assignments for such areas as overseeing the physical material and equipment inventories, material storage and condition assessments, inventory reconciliations, issued-material storage oversight, and excess and/or surplus coordination and management. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

During a tour of the MHF, the audit team observed four levels of storage areas and found these areas to be compliant with requirements. Each of these storage areas had specific material handling equipment capabilities and assigned numeric designators. Both the MHF storage and surrounding lay-down yard numeric designators contain global positioning coordinates and a grid system to establish storage locators. The lay-down yard is subdivided into twenty-two separate storage areas. The lay-down area was locked and secured during non-working hours and monitored by WTP project security personnel.

All WTP procured items are delivered to the MHF, the WTP site warehouse, or other location, as directed in the purchase order or subcontract. As items or material are received field personnel immediately inspect the shipment and complete initial paperwork identified as a "Kick and Count" sheet. These sheets are then used to develop the MRR. The MRRs are documents used to record the receipt of all project items. MRRs also listed unique material identification including markings, serial numbers, or tag numbers added to the material upon receipt. In addition, items cannot be withdrawn unless a material withdrawal request (MWR) is completed.

BNT's Field Material Manager maintains a list of personnel authorized to approve MWRs. This list is updated as site personnel change and is approved by the Field Material Manager. The approved list is distributed or placed on a shared drive for viewing by Construction, and Commissioning & Testing maintenance personnel. Material issuing personnel verify the material withdrawal request for appropriate approvals, completeness, and accuracy. Each requested withdrawal is posted to the BPS inventory system showing where items are delivered. All items are required by procedures to be controlled by identifying materials through use of batch, heat, lot, part, and/or serial numbers, or by specified inspection, test, or other records.

MHF Interviews and Evaluations

The audit team witnessed work activities in the MHF. The audit team noticed personnel attaching color coded labels to piping. MHF personnel stated that this color coded system assisted them in finding items after MRRs were completed and MWRs were issued. The different colors correspond to the type of building the piping was to be used in, e.g., HLW, LAW or BOF. In addition, solid colored ribbons were being tied to various items. According to MHF personnel, the solid colored ribbons alerted personnel to where certain items would be moved to. The audit team did not find these two types of item control process documented in a procedure. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

- The team found an item tagged as "hold for inspection" in the MHF storage area E04. Specifically, piping spool (HLW-HOP-WSO-1646001-A) had a yellow "hold for

inspection" tape tied on the spool signifying an inspection was needed. However, when BNI searched the BPS, the status identified this spool had already been inspected and passed inspection. This is another example of color coded tagging, and this process not being defined in a procedure.

- The use of an issued desktop instruction guide was discussed during the team's interview with BNI's FMM. This guide references placing "hold for inspection" tape on items or materials that's staged in the warehouse or in BNI's laydown yards. However, the guide did not define the process involved, and there wasn't a procedure documenting this process.

The audit team found traceability and material management issues between an NCR (24590-WTP-NCR-CON-08-0090) and construction deficiency report (CDR) (24590-WTP-CDR-CON-10-0070) that was written on the same item. The item was a Weld Station Table/Bench 24590-HLW-MZ-HPH-BENCH-00004. NCR 08-0090 was issued on several items including the bench, which were procured on a commercial PO. However, the bench needed to meet quality requirements for QARD. The team looked in the conex where the bench was stored, and found numerous hold tags on the handle of the conex, including a hold tag for the bench. These hold tags only referenced CDR 10-0070. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

- 24590-WTP-CDR-CON-10-0070: The CDR was issued two years after NCR 08-0090 due to storage issues. Specifically, the requirement for storage included the need for desiccants to indicate moisture levels in the storage area. This and other storage issues were identified in BNI Surveillance Report 24590-WTP-SV-PSQ-10-005. All issues identified in the surveillance resulted in CDR 10-0070. When looking at CDR 10-0070, there was no reference to NCR Number 24590-WTP-NCR-08-0090, only that an NCR existed.
- Further investigation showed that the CDR had been closed in 2011, but the hold tags for the CDR were not removed until the day the audit team went to the conex (May 14, 2013). Within the conex the team could not see an open hold tag for NCR 08-0090. The team did note that the bench was stored deep in the conex and could not be easily seen. According to Procedure, 24590-WTP-GPP-MGT-044, Section 5.4.1.2, if a hold tag cannot be placed on an item, the NCR or CDR needs to explain why not and how the item will be controlled.

The inventory specialist lead (ISL) in the MHF showed the audit team an electronic inventory list of shelf life items. There were 23 acrylic adhesive cartridges that had expired July 26, 2011. When the audit team inspected these items on the shelf, the team noted the items were not controlled, and were available for use. At one point, a hold number was created for the expired material. However, there was a mix-up in deciding whether a hold status or MWR would be used which resulted in the adhesive not being control. During this audit the ISL began the necessary actions to place a hold pending on these items. BNI contacted the adhesive company and the response was the acrylic adhesive products would not be granted an extended shelf life. This is an example of and supports **Finding U-13-QAT-RPPWTP-001-F01**.

When the audit team was reviewing the Non-Conformance Database a particular NCR printed out inaccurate/in-error dates when using a certain view format of the NCR report. Specifically, NCR 24590-WTP-NCR-CON-13-0003 had "assigned dates" that were three months after the "completed dates" (e.g., Assigned April 10, 2013, and Completed January 15, 2013). This is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

The audit team discussed the return to stock (RTS) process with the shipping and inventory specialist (S&IS) who was processing a RTS for two valves received from an external vendor. While processing the RTS, the S&IS stated all paperwork was processed to return the valves to stock, and therefore, he was going to approve the RTS (because it was an external return). The audit team stated that the FMM procedure requires the warehouse operations supervisor (WOS) to approve all RTS. When the S&IS and ISL realized that BNI's procedure required a higher level approval for both external and internal returns, the BNI personnel immediately sent a request to WOS for approval of the RTS in question. This is an example of and supports Finding U-13-QAT-RPPWTP-001-F01.

2.2.1 Results

The audit team determined that Review Area 2 (Procurement Document Control, Control of Purchased Items and Services, and Identification and Control of Items) were adequate, which were adequately implemented, but because the process released noncompliant components for shipment, the program was not effective overall.

2.3 Review Area 3 – NQA-1 Requirement 15, and 16 (Control of Nonconforming Items, Corrective Action, and Control of S/CI)

Control of Nonconforming Items

The audit team reviewed the adequacy, implementation and effectiveness of BNI's control of nonconforming items. The team reviewed S/CI in relation to how BNI implemented their control of nonconforming items program. The audit team evaluated BNI's program documents and interviewed BNI personnel responsible for controlling nonconforming items and activities.

The team reviewed the governing Procedure, 24590-WTP-GPP-MGT-044, and determined that this document adequately addressed upper-tier requirements as specified in BNI's QAM Policy, QP-15.1. This procedure includes the quality and commercial SSC for the WTP. The WTP Prime Contractor also uses an electronic tracking system to track the disposition of nonconforming items.

During a tour of the MHF, the audit team observed that nonconforming items were identified, tagged, and segregated sufficiently to prevent their inadvertent usage. In addition, the audit team toured the construction areas at the WTP site with construction and QC personnel. The team verified that nonconforming items at the construction site were appropriately identified and tagged, although some of these items were already installed. The items that were installed but were identified as nonconforming became nonconforming after installation due to an installation error or during a post-installation inspection.

Upon evaluating control of nonconforming items the audit team determined that BNI met applicable requirements.

Corrective Action

The audit team interviewed BNI personnel, reviewed numerous PIER reports, corrective action plans, and other related documents to evaluate the adequacy, implementation, and effectiveness of BNI's corrective action management procedures (specifically, Procedures 24590-WTP-QAM-QA-06-001, Rev. 12, *Quality Assurance Manual*, Section QP-16.1, and 24590-WTP-GPP-MGT-043, Rev. 4, *Corrective Action Management*) to determine if requirements were flowed down and applied effectively. The audit team focused on the contractor's ability to identify and classify adverse conditions, plan corrective actions that fix identified conditions, and to conduct efficient closure verifications.

During the audit, the team noted several examples of failure to identify conditions adverse to quality, inadequate issue classification, inadequate corrective action planning, and inadequate verification and closure of PIERs.

Interviews with BNI personnel involved with the corrective action process recognized there were problems with the current state of BNI's corrective action program, and that BNI's corrective action management procedure was under revision. However, BNI's recognition of the problem through self-identified PIERs did not rise to the level of management attention to address the ineffective corrective action management program. Specifically, the team assessed BNI's overall response to the problem to-date via review of self-identified PIERs (24590-WTP-PIER-MGT-13-0393-B and 24590-WTP-PIER-MGT-13-509-B), and other externally identified findings (24590-WTP-PIER-MGT-12-0158-B and 24590-MGT-PIER-MGT-12-0973-B), and found it did not rise to the level of management attention necessary to address the systemic problem and determine the root cause.

Based on repeated CA non-compliances identified in this report, the team determined this was indicative of an ineffective CA program, which calls into question the adequacy of BNI's overall QAP. This led the audit team to identify **Finding U-13-QAT-RPPWTP-001-F02**, Contrary to the BNI Contract DE-AC27-01RV14136, Section C "Statement of Work" BNI's overall Corrective Action Program has not been implemented in accordance with requirements and is not fully effective.

The following information is a summary of sixteen examples identifying issues for **Finding U-13-QAT-RPPWTP-001-F02** identified by the audit team; refer to Section 2.3.1 of this report, for a detailed description:

1. The verification for PIER #24590-WTP-CRPT-QA-08-651-B was inadequate.
2. The verification for closure of PIER #24590-PIER-MGT-11-1235-C did not adequately document objective evidence of actions taken.
3. Planning for PIER #24590-WTP-PIER-MGT-12-0973-B was inadequate, as well as the closure verification.

4. Planning for PIER #24590-WTP-PIER-09-1607-C was inadequate, as well as the closure verification.
5. Planning for PIER #24590-WTP-PIER-MGT-09-1609 was inadequate, as well as the closure verification.
6. PIER #24590-WTP-PIER-MGT-10-0840-C was inadequately described at issuance and the planning and closure verification was inadequate.
7. PIER #24590-WTP-PIER-10-0267-D was inadequately classified and subsequently planned inadequately. Closure verification for this PIER was also inadequate.
8. An issue identified through Trend Notice (TN-24590-06-05590) stating that the current piping configuration for the transfer "is not ideal for siphon initiation and there is a significant risk that the siphon will not start," was not identified as a condition adverse to quality affecting the operability of a system important to operations.
9. PIER #24590-WTP-PIER-MGT-09-0662-D was inadequately classified.
10. PIER #24590-WTP-MGT-09-0655-D was inadequately classified.
11. PIER #24590-WTP-PIER-MGT-09-1609-D was inadequately classified.
12. 24590-WTP-PIER-MGT-11-1071-B was inadequately classified.
13. Self/Sponsored Assessment Report, 24590-LAW-SAR-OP-09-0001, Rev. 0, dated April 9, 2013, documents eight "findings," three of which are referred to as "major." These issues were inadequately classified as minor Level D PIERS (24590-WTP-PIER-MGT-09-0655-D, 24590-WTP-PIER-MGT-09-0655-D, 24590-WTP-PIER-MGT-09-0658-D, 24590-WTP-PIER-MGT-09-0660D, 24590-WTP-PIER-MGT-08-2420-D, 24590-WTP-PIER-MGT-09-0660-D, 24590-WTP-PIER-MGT-09-0662-D, 24590-WTP-PIER-MGT-09-0663-D).
14. 24590-WTP-PIER-MGT-10-0606-D was inadequately classified.
15. Inadequate verification and closure identified for PIER#24950-WTP-PIER-MGT-10-1252-B.
16. DOE Priority Level 1 findings identified through S-12-QAT-RPPWTP-001 inadequately classified in PIER system (24590-WTP-PIER-MGT-12-1102-C, 24590-WTP-PIER-MGT-12-1103-C, 24590-WTP-PIER-MGT-12-1104-C, 24590-WTP-PIER-MGT-12-1105-C, 24590-WTP-PIER-MGT-12-1106-C, 24590-WTP-PIER-MGT-12-1107-C, 24590-WTP-PIER-MGT-12-1108-C, 24590-WTP-PIER-MGT-12-1109-C, 24590-WTP-PIER-MGT-12-1110-D, 24590-WTP-PIER-MGT-12-1111-C, 24590-WTP-PIER-MGT-12-1112-C).

2.3.1 Detailed Discussion of Examples that Support Finding U-13-QAT-RPPWTP-001-F02.

The following provides further discussion of the conditions identified by the audit team:

1. PIER #24590-WTP-CRPT-QA-08-651-B, Rev. 0, documented issue #122 from the broad based review (BBR) activity that was conducted in 2008. This issue documented several conditions that were related to the aggregate system leakage rate for the LAW secondary offgas/vessel vent process (LVP) system, which has not been sufficiently analyzed and defined. The PIER further states, "the BBR team has expressed a concern that the sum of the individual leakage rates may provide for an aggregate system leakage rate that would result in unacceptably high concentrations of chemical hazards in areas that could be occupied by operational personnel."

Action 1 contained the following verification statement: "The calculation points out that orifice sizing may be so small as to result in operational problem and references ATS 09-0349 to evaluate alternatives to ensure safe egress times are achieved and maintained and ATS 09-0350 to include statements in the LVP and AMR system description for periodic leak testing and for restricting access to high-risk rooms." Action tracking system (ATS) 09-0349 was closed May 2009, possibly to another ATS, which was opened in April 2009. This other ATS was to create an Engineering Trend Notice to add enclosures that were recommended in the aforementioned calculation, but was subsequently rejected. The safety issues related to this action are still unresolved as evident in recently initiated PIER #24590-PIER-MGT-13-0509-B. The audit team concludes that the verification for this action was inadequate because the issue of orifice sizing is still unresolved. **(Inadequate Verification and Closure)**

Action 3 was to perform a WTP Safety Assurance assessment of the LAW Melter Offgas System per CCN: 198450, Finding A-09-WED-RPPWPT-004-F01. The verification for this action stated that the assessment identified weaknesses in the documentation of controls and selection methodology and this was documented PIER #24590-PIER-MGT-09-664-D. This PIER was then closed to Action 10 of 24590-PIER-MGT-08-651. **(Inadequate Verification and Closure)**

Action 4 was to perform another assessment of the LAW Melter Offgas system but this time by an independent offsite consultant. This consultant was to write a report, "That addresses Industrial Safety and Health." The assessment report, CCN: 167458, contained recommended actions to address Industrial Safety and Health. However, the verification for this action did not verify that these recommendations were adequately resolved. Therefore, Industrial Safety and Health was not addressed as planned and the verification is inadequate. **(Inadequate Verification and Closure)**

Action 5 was to prepare a punch list of the open issues for the LAW Melter Offgas Systems to address ORP Finding A-09-WED-RPPWTP-004-F01. The verification of this action stated that the punch list was created and that it identified 14 independently tracked items and an additional listing of 14 more items currently tracked under this PIER or ATS.

It is inadequate to track open items related to corrective action outside the corrective action program. **(Inadequate Identification)**

2. PIER 24590-WTP-PIER-MGT-11-1235-C, Rev. 0, identified that the HLW PDSA does not identify the full set of design basis accidents and design basis events necessary to identify the SSCs relied upon to control potential hydrogen detonations in piping, and to establish the bounding performance requirements for those safety SSCs. The PIER originator, Engineering Support (Eng.), recommended that this specific issue should not be consolidated with any of those other PIERs so that appropriate remedial actions can be identified in a timely manner and tracked to closure separately in this PIER. Action 1 of this PIER was to validate the issue and determine the necessary changes to the HLW PDSA. This action was complete and attached as 24590-WTP-PIER-MGT-11-1235-C Action Validation and Recommendations. However, the verification statement (October 3, 2012) by the Responsible Manager for E&NS & Plant Engineering stated, "HLW has issued a project execution plan to update and upgrade the HLW PDSA. The audit team reviewed and concurred with both documents. This action is verified complete."

Subsequent verification statements for Actions 2 and 3 similarly close the actions based on a plan to address the issue. In addition, the closure statement of this PIER states, "As an HPAV event will be considered as an initiating event for a spill or a spray event in the planned hazards analyses, the control strategies developed will be consistent with a detect and mitigate approach for spill/sprays. As noted above, the plans noted outline the actions necessary to reconstitute the hazards and accident analysis, including those associated with HPAV." This is contrary to the requirements to correct conditions and for the responsible manager (RM) to verify and close the completed PIER ensuring that verification of individual action(s) taken to address the PIER are complete and are supported by objective evidence. In addition, there is an open ATS referencing this PIER to "identify and track the remedial actions necessary to update the HLW PDSA to include hazard and accident analysis for HPAV events and resolve the problem identified in PIER 11-1235-C per DOE-STD-3009 requirements. The ATS is not a recognized system for corrective actions related to nuclear safety.

In addition, the identified causal codes (A6 – Training deficiency" and "B2 – Training Methods") related to training deficiencies were not addressed in the corrective actions. The verification for closure did not adequately document whether the training was completed for the disciplines affected by this PIER. **(Inadequate Identification, Inadequate Verification and Closure)**

3. PIER 24590-WTP-PIER-MGT-12-0973-B, Rev. 0, which was an ORP Level 2 finding, documented that PIERs were incorrectly classified as Level C. The verification for Actions 1 and 2 did not state that the completed actions align with the cause analysis. After reviewing the actions taken, it appears that Action 1 corresponds to apparent Cause 2 and Action 2 corresponds to contributing Cause 1. However, the verification states, "I verify that this action is complete." Based on the Corrective Action Procedure, the verification requires that the actions taken be verified to address the cause. **(Inadequate Planning, Inadequate Verification and Closure)**

4. PIER 24590-WTP-PIER-09-1607-C, Rev. 0, is from an externally identified issue from ORP Observation, A-09-WED-RPPWTP-005-006, discovered during the DOE HLW Offgas Assessment. The ORP observation documented the concern that the design calculations for the range of HEPA filter inlet temperatures (161°F to 228°F) are inconsistent with the design of the solid urethane used to seal the filter media, which has a maximum design temperature of 250°F.

Action 5 assumes a vacuum pump can be connected to a commercially available photometer to boost pressure. Commercially available photometers are not designed to withstand the approximate operating pressure (7 psi) of these systems. The verification for this action did not ensure that the intention of the action in relation to the condition would adequately address the issue. **(Inadequate Planning, Inadequate Verification and Closure)**

Action 7 proposes to verify methodology for in-place HEPA testing for systems that have injection and sample lines greater than 100-feet. The action taken states that an additional test will be conducted on already installed and leak tested HEPA equipment, which must be modified to support this additional test. This modification compromises the already verified leak-proofed HEPA equipment. Action 7 is in conflict with the proposed methodology of a vendor test that was submitted in CCN: 205008 and approved by ORP in CCN: 219414. **(Inadequate Planning; Inadequate Verification and Closure)**

The risk to the accomplishment of the mission is at higher risk with Action 7 because the question of whether the radial HEPA filters can be in-place leak tested could not be answered until start-up and commissioning. The in-place leak test, which has already been effectively performed, was required per the PDSA, which references the ASME AG-1 code. Given the risk, Action 7 should have been reviewed by ORP as a change in testing methodology as submitted and approved by CCN: 205008 and CCN: 219414, respectively. Therefore, the verification for this action is inadequate. **(Inadequate Verification and Closure)**

5. PIER 24590-WTP-PIER-MGT-09-1609, Rev. 0, which identifies that the C2V ventilation design was completed without specific features to remove toxic hazards from room H-A123. There are two actions to resolve this PIER. Action 1 was verified adequately. However, Action 2 states, "on receipt of approved fugitive NOx and ammonia calculation from Mechanical systems associated with Action 1, 24590-WTP-PIER-09-[sic]109-D (should be 1609-D), HVAC to assess the required dilution air flow rate, and if required the affected HVAC calculations and HVAC V&ID's will be updated accordingly and issued." The calculation to address Action 1 is HLW-M6C-HOP-00003. The action taken for Action 2 and Action 3 states in part that "there is no recommendation as far as changes to the dilution flow rate and ductwork is concerned." The verification for closure statement states, "Actions 1, 2, and 3 have been closed in a logical stepped fashion to address subject PIER." However, on Page 21 of HLW-M6C-HOP-00003 there is a recommendation for ventilated enclosure of the system in question (i.e., "Preferred alternative is to place these end-point instruments in a ventilated enclosure."). Therefore, the verification for closure of this PIER was inadequate as it missed the conflicting action statements with the

above-mentioned recommendation within the calculation. **(Inadequate Planning; Inadequate Verification and Closure)**

6. PIER 24590-WTP-PIER-MGT-10-0840-C, Rev. 0, was initiated to capture the adverse condition documented in ORP Finding A-10-ESQ-RPPP-WTP-003-F01. This ORP finding documents the adverse condition that the Software Project Plan for the ICN, 24590-WTP-PISW-J-8-00001-01, did not describe the requirements to baseline each lifecycle document at the end of each lifecycle. The closure of this PIER did not verify that the only corrective action, Action 1, addressed the adverse condition because the actual corrective action that was implemented on the Software Project Plan for the ICN was to document baseline each lifecycle document "prior to the completion of downstream lifecycle activity." This corrective action does not address the original adverse condition identified in the ORP Finding, A-10-ESQ-RPPP-WTP-003-F01. This ineffective corrective action was later recognized after closure (November 16, 2010) of 24590-WTP-PIER-MGT-10-0840-C as evident of by ATS 24590-WTP-ATS-MGT-11-0040 initiated on January 13, 2011. This ATS documents the planned action to revise the Software Project Plan for the ICN to clearly state, "that the related lifecycle activity deliverable is baseline at its completion. This action addresses the original ORP finding. **(Inadequate Identification; Inadequate Planning; Inadequate Verification and Closure)**

7. PIER 24590-WTP-PIER-10-0267-D, which states that the "HLW ammonia skid design has not incorporated provisions to isolate potential leakage from the worker." This PIER also states that the Engineering calculation, 24590-HLW-M6C-HOP-00003, Rev. A, Room Concentrations of Nitrogen Oxides and Ammonia Due to Leakage, concluded that a leakage rate as little as 0.038 cfm (0.013" diam. hole), will result in an immediately dangerous to life or health exposure level in the room. In addition, this PIER states that "the current design philosophy is to design the ammonia skid to be leak free. Small weeping leaks (fugitive emissions) will occur even when preventative maintenance is properly performed. Identification of a leak, whether by human or electronic device, will require idling the associated melter, perhaps both melters. The time required to [sic] to develop and execute troubleshooting plan and repair work package, utilizing appropriate safety measures and controls, will affect availability." This PIER documents an adverse condition that affects both personnel safety and plant operability. The condition affecting personnel safety is in noncompliance with the requirement cited in the PIER, 24590-WTP-RPT-OP-01, Rev. 2, Operations Requirements Document. **(Inadequate Classification)**

The single action planned to address PIER #24590-WTP-PIER-10-0267-D was to review the existing design of the HLW melter offgas treatment process system and LAW LVP to determine adequacy of existing hazard control strategies. The planned action also states, "Based on the results of the review, additional actions may be added to this PIER." No additional actions were added to this PIER. The action taken indicates that the "Qualitative Exposure Assessments for WTP Process Chemicals for the HLW facility (24590-WTP-BEAP-SA-09-101) has been updated to the bring the assessments, including one for anhydrous ammonia, in line with additional knowledge of proposed WTP chemical use, operations procedures and engineered controls. This action taken does not match the planned action of a review of existing design to determine adequacy and

appears to be an additional action taken. The verification for closure statement confirms the action taken: "accurately states the existing hazard control strategies as designed are adequate in meeting the acceptable personnel exposure risks; no serious worker chemical exposure risk is present in the proposed operations." The verification for closure statement did not confirm whether the plant operability concerns documented in the PIER were addressed. **(Inadequate Planning, Inadequate Verification and Closure)**

8. For the transfer lines between submerged bed scrubbers to the radioactive liquid waste disposal system vessel, drawing, piping and instrumentation diagram 24590-HLW-MG-HOP-20001, Rev. 000, was issued for construction in 2002 based on committed calculation 24590-HLW-M6C-HOP-00002, Rev. A. Rev. B of calculation 24590-HLW-M6C-HOP-00002, in 2011, identified the need for more air injectors to be installed in locations where the line drops vertically for more than one foot to remove trapped air and ensure siphon start. An Engineering Trend Notice (TN-24590-06-05590) was submitted to request funding from management reserve for a re-design to accommodate the air injectors. The basis given for this Engineering Trend Notice was that the current piping configuration for the transfer "is not ideal for siphon initiation and there is a significant risk that the siphon will not start." This Engineering Trend Notice was cancelled because it will be included in the "FY 12 Re-Baseline." This Re-Baseline effort was initiated in Fiscal Year 2012, but is still currently ongoing. RVP has been given this condition where it will be further binned and analyzed and may eventually be entered into the PIER system. Therefore, the current design has an adverse condition that represents a significant risk to the operability of the facility, yet no such adverse condition was entered into the PIER system as required per 24590-WTP-GPP-MGT-043. Per that procedure, this condition affects the reliability, availability, or maintainability of equipment or a facility. Per the 16.1.1.1 of the QAM, 24590-WTP-QAM-QA-06-001, Rev. 12, this is an adverse condition regarding the operability of a system important to operations. **(Inadequate Identification)**
9. PIER 24590-WTP-PIER-MGT-09-0662-D, Rev. 0, documents that the LAW ammonia supply isolation valve is located in LCO306, which placed an ammonia leak point into an uncontrolled and routinely occupied space and poses an unmanaged leakage exposure risk to facility personnel. This condition is in noncompliance with the following documents: CCN: 188131, Operations Requirements for Design to Control Hazardous Gasses, which states that atmospheric monitoring for gaseous hazards must be provided for rooms or areas where there is a potential for the gas concentration to exceed the permissible exposure limit due to a single component failure or miss-operation.

24590-WTP-RPT-OP-01-001, Rev. 2, Operations Requirements Document, Section 8.1.1 which states in part: "...plant safety requirements shall include: - minimizing safety concerns in operating areas - providing monitoring equipment to areas with potential air quality problems..."

24590-LAW-M6-LVP-00005, Rev. 1, P&ID Law Melter Secondary Offgas Vessel Vent Process System, [this drawing] shows AMR-V-11153 with a note indicating that the valve is to be located outside of the NOx room and this puts a potentially dangerous ammonia

leak source into an uncontrolled and routinely occupied area. The leak point must be controlled, but must be accessible to isolate without putting a people in the hazard area.

This PIER was classified a Level D, which is contrary to the established levels in 24590-WTP-GPP-MGT-043 as this PIER documents a safety concern, given the safety implications of these requirements not being incorporated into the current design. **(Inadequate Classification)**

10. PIER 24590-WTP-MGT-09-0655-D, Rev. 0, documents that the current design places atmospheric monitoring relied upon for personnel protection from hazardous gasses in the affected room. This requires operators to enter the hazardous room to perform calibration or to respond to monitor alarms. This design does not prevent unnecessary personnel exposure to hazardous gases and is not consistent with acceptable industrial hygiene practices. This condition is noncompliant with 24590-WTP-RPT-OP-01-001, Rev. 2, Operations Requirements Document. This requirements document description states that in addition to those safety requirements in the Authorization Basis documents and those required by Occupational Safety and Health Administration, plant safety requirements shall minimize industrial safety concerns in plant operating areas. This PIER was classified a Level D, which is contrary to the established levels in 24590-WTP-GPP-MGT-043 as this PIER documents a safety concern, given the safety implications of these requirements not being incorporated into the current design. **(Inadequate Classification)**
11. PIER 24590-WTP-PIER-MGT-09-1609-D, Rev. 0, documents the C2V ventilation design was completed without specific features to remove toxic hazards from Room H-A123. The C2V ventilation design was completed without the knowledge that toxic hazards were in the room, which led to the condition that the design did not provide for distribution or return ducting. While this PIER does not cite a specific requirements document, the fact that it documents a condition with the design not incorporating features to remove known toxic hazards would make this PIER classified higher than Level D. (see QAM Section 3.1.2.2.2, "The design input shall be specified to the level of detail necessary to permit the design activities to be carried out in a correct manner and to provide a consistent basis for making design decisions, accomplishing design verification measures, and evaluating design changes.") **(Inadequate Classification)**
12. Self/Sponsored Assessment Report, 24590-LAW-SAR-OP-09-0001, Rev. 0, dated April 9, 2013, documents eight "findings," three of which are referred to as "major." These findings document various conditions in the design of the LAW Offgas System that affect worker safety. These findings were classified in the PIER system as Level D OFIs. The PIERs are as follows:
 - a. 24590-WTP-PIER-MGT-09-0655-D, which states: "Relocate atmospheric gas monitors outside of monitored rooms."
 - b. 24590-WTP-PIER-MGT-09-0656-D, which states: "Relocate operator controls for fan coils to outside of LAW NOx hazard rooms."
 - c. 24590-WTP-PIER-MGT-09-0658-D, which states: "Limit leak flow rate from NOx and ammonia affected instruments in LAW."

- d. 24590-WTP-PIER-MGT-09-0660-D, which states: "Provide walls for LAW NOx hazard rooms L-0322 and L-0308."
- e. 24590-WTP-PIER-MGT-08-2420-D, which states: "Provide atmospheric gas monitors for LAW NOx hazard rooms L-0308 and L-0317."
- f. 24590-WTP-PIER-MGT-09-0660-D (listed twice to deal with 2 issues), which states: "Provide designed air flow for LAW NOx hazard room L-0304G."
- g. 24590-WTP-PIER-09-0662-D, which states: "Relocate LAW potential ammonia leak points into controlled rooms."
- h. 24590-WTP-PIER-09-0663-D, which states: "Update LAW facility RAM data to reflect NOx and ammonia hazard controls."

The above PIERs are written as recommended actions in the system versus the adverse conditions as described in the self-assessment report. **(Inadequate Classification)**

- 13. S-12-WED-RPPWTP-012-F01, Review of WTP Design and Safety Margin Management and Request for Action to Address Accumulative Management Performance were issued on March 20, 2012 (12-WTP-0111). This finding was characterized by DOE ORP as a Priority Level 1 because Multiple examples of less-than-required design and safety margin were identified, indicating the finding may have broad WTP ramifications. The WTP contractor documented and characterized this finding in 24590-WTP-PIER-MGT-11-1071-B, Material Corrosion Performance Management Margin Not Documented and has documented Apparent Cause Analysis in the Cause Analysis Type section of the PIER. 24590-WTP-GPP-MGT-043, Rev 4A, Corrective Action Management, Appendix H condition describes Level B conditions as adverse to quality that involve a lesser significance and effect on safety, health, and quality. The CAM does not require a Root Cause Analysis for Level B. The WTP contractor has submitted several iterations of a corrective action plan (CAP) that have yet to be approved by DOE ORP (See CCN: 236405 dated August 3, 2012, CCN: 246745 dated April 26, 2012, and others). Within those CAPs the WTP contractor documents Root Cause Analysis, Extent of Condition, Remedial Action, Criteria for Effectiveness and Actions to Preclude Recurrence indicating agreement with a significant condition (Level A). **(Inadequate Classification)**
- 14. PIER 24590-WTP-PIER-MGT-10-0606-D, Rev. 0, documents that there were three safety significant components that did not receive the appropriate safety classification. The PIER states that the Defense in Depth requirements have not been flowed down adequately in engineering procedures and guides. This PIER documents an adverse condition with safety significant impacts, but it was classified as a Level D opportunity for improvement. **(Inadequate Classification)**
- 15. PIER 24950-WTP-PIER-MGT-10-1252-B, Rev. 0, documents that "required subscriptions were not established by the responsible DP EMs/managers for referenced Calculations in violation of 24590-WTP-3DP-G04B-00037, Engineering Calculations, Rev.7..." Per the violated procedure, the discipline production engineering managers or designee identifies the calculations issued by another discipline or organization that could affect their issued design, and subscribes to those identified calculations. The planned action to preclude recurrence was to develop a draft impact review process to be piloted prior to revising

Engineering Calculations. The remaining actions taken, Action 8 to Action 23, involve applying the "Calculation Impact Review/Exemptions Pilot Program" to the various Engineering functional groups that implement the procedure, Engineering Calculations. These remaining actions, Action 8 to Action 23, document the results of the pilot program. However, the closure statement of this PIER does not state that the procedure has been revised to incorporate the pilot program. Furthermore, there are statements in the other actions that state that the results will be evaluated to determine if there are any required changes based on experience with the pilot program to be incorporated into the final process for the revised procedure. There is no discussion of these results and any operating experience that may have required the impact review process to be adjusted in the proposed revision to the procedure. **(Inadequate Verification and Closure)**

16. S-12-QAT-RPPWTP-001 generated 11 Priority Level 2 Findings (F01 through F11) that documented adverse conditions in the software quality assurance practices used for software acquisition, configuration control, and the acceptance for use. These adverse conditions created risks for the WTP by relying upon the results of soil-structure interaction analyses from software not validated and not approved for use.

Despite the adverse conditions and the risks to the accomplishment of the WTP mission explained in the Priority Level 2 findings, the prime contractor issued these findings in the PIER system as 10 Level C PIERs and one Level D PIER:

- a. 24590-WTP-PIER-MGT-12-1102-C
- b. 24590-WTP-PIER-MGT-12-1103-C
- c. 24590-WTP-PIER-MGT-12-1104-C
- d. 24590-WTP-PIER-MGT-12-1105-C
- e. 24590-WTP-PIER-MGT-12-1106-C
- f. 24590-WTP-PIER-MGT-12-1107-C
- g. 24590-WTP-PIER-MGT-12-1108-C
- h. 24590-WTP-PIER-MGT-12-1109-C
- i. 24590-WTP-PIER-MGT-12-1110-D
- j. 24590-WTP-PIER-MGT-12-1111-C
- k. 24590-WTP-PIER-MGT-12-1112-C

Despite the PIERs being classified as Level C and Level D, the planned actions include corrective actions necessary to preclude recurrence. Corrective Actions to Prevent/Preclude Recurrence were identified for all of the SASSI PIERs with exception to 12-1111-C, 12-1107-C, and 12-1103-C, in the PIER system.

The initial response from the prime contractor was rejected by ORP because the causal analysis and corrective actions for the findings should be aligned the expectation established Level B PIERs. **(Inadequate Classification)**

2.3.1 Results

Control of Nonconforming Items: The audit team did not identify any issues associate with BNI's control of nonconforming items. The audit team concluded that overall control of nonconforming

items was achieved using adequate procedures, which were properly implemented, and therefore the program was effective.

Requirement 16 Corrective Action: Overall, the audit team determined that Review Area 3 (Corrective Action) did not have adequate procedural controls, was not fully implemented, and therefore was not effective.

3.0 Finding, Action Follow-up Items, and Observations

FINDINGS:

U-13-QAT-RPPWTP-001-F01, (Priority Level 1): Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work" BNI's overall QAP has not been implemented in accordance with requirements and is not fully effective.

Requirements:

1. 10 CFR Part 830, Subpart A, quality assurance Requirements, Paragraph 830.121 QAP, states "Contractors conducting activities, including providing items or services that affect, or may affect, the nuclear safety of DOE nuclear facilities must conduct work in accordance with the Quality Assurance criteria in paragraph 830.122. QA Criteria." 830.122 states that, "The QAP must address ...management, performance, and assessment criteria." This section lists the 10 elements to be addressed in the contractor's QAP.
2. Contract No. DE-AC27-01 RV 14136, Section C, Standard 7 (e) (3), Quality Assurance (Table C.5-1.1, Deliverable 7.2), requires BNI to develop and implement a QAP.

Section C, Standard 7 (e) (3) (ii) (B) states "The Contractor shall implement the *National Consensus Standard ASME NQA-1-2000, Part I and Part II, Subpart 2.7* for elements of the Contractor's scope that may affect product quality of the Immobilized Low-Activity Waste (ILAW) product, entrained solids, and sludge washing, including, but not limited to, waste form development, qualification, characterization, production process control, certification of ILAW product, entrained solids, and sludge washing. Furthermore, all research and technology activities (other than IHLW - see (A)) shall be conducted in accordance with NQA-1. (M066)."

Section C.4 Environment, Safety, Quality, and Health (c)(3) "... The Contractor shall develop and implement an integrated WTP-specific QA Program, supported by documentation that describes overall implementation of QA requirements."

Standard 7, "Environment, Safety, Quality, and Health, Paragraph (3) "Quality Assurance (Table C.5-1.1, Deliverable 7.2) "The Contractor shall develop a QA Program, documented in a QA program manual(s), and supported by documentation that describes overall implementation of QA requirements. Supporting documentation shall include procedures, instructions, plans, and manuals used to implement the Contractors QA program within the Contractors scope of work. Specific requirements for process development, waste form qualification and testing are described in Standards 2, and 6.

- a) The Contractor shall implement the Office of Civilian Radioactive Waste Management's, *Quality Assurance Requirements and Description Document (QARD)*, DOE/RW-0333P, Revision 20, for elements of the Contractor's scope that may affect the immobilized high-activity waste (IHLW) product quality, including but not limited to, waste form development, qualification, characterization, production process control, and certification of the IHLW products.
- b) The Contractor shall implement the *National Consensus Standard ASME NQA-1-2000*, Part I and Part II, Subpart 2.7 for elements of the Contractor's scope that may affect product quality of the immobilized low-activity waste (ILAW) product, entrained solids, and sludge washing, including, but not limited to, waste form development, qualification, characterization, production process control, certification of ILAW product, entrained solids, and sludge washing. Furthermore, all research and technology activities (other than IHLW – see (A)) shall be conducted in accordance with NQA-1. (M066)."

Standard 7, Environment, Safety, Quality, and Health, Paragraph (b), "The Contractor shall integrate safety and environmental awareness into all activities, including those of subcontractors at all levels. Work shall be accomplished in a manner that achieves high levels of quality; protects the environment, as well as the safety and health of workers and the public; and complies with all requirements. The Contractor shall identify hazards; manage risks; identify and implement good management practices; and make continued improvements in environment, safety, quality, and health performance."

Standard 9, Nuclear Safety (Table C.5-1.1, Deliverable 9.1), "Paragraph 10. The Contractor shall maintain the safety requirements document (SRD) consistent with the design of WTP facilities. Changes to the SRD will be processed consistent with Standard 9, Item 5, above. Changes that do not impact the safety basis documents will be implemented into the design criteria basis."

3. DOE O 414.1C Attachment 2, Contractor Requirements Document – DOE O 414.1C, Quality Assurance, requires the contractor to submit an "...integrate multiple QA program (QAP) drivers imposed by QA regulations [see Title 10 Code of Federal Regulations (CFR) 830].
4. DOE O 414.1C Attachment 2, Paragraph 3, Quality Assurance Criteria, states, "the QAP must address the following management, performance, and assessment criteria" within their QAP document. The criteria is the 10 quality assurance elements identified in 10 CFR 830.122.
5. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), QAM Policy Q-01.1, Project Organization, Section 1.1.2.1.3.1 states: "Senior management has established the overall expectations for effective implementation of the quality assurance program and is responsible for obtaining the desired end result."

6. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-01.1, Project Organization, Section 1.1.3.2.1.21 states: "Participating in the performance of management assessment processes to evaluate the adequacy and effectiveness of their management control systems for improving processes and eliminating barriers to achieving project goals and objectives."
7. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-01.1, Project Organization, Section 1.1.3.3.2 states: "The Manager of Quality and Performance Assurance is responsible for the development, implementation, assessment, and improvement of this manual and to ensure that a Quality Assurance program that complies with regulatory and management requirements is established and effectively implemented consistent with the schedule for accomplishing the activities."
8. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-01.1 Project Organization, Section 1.1.3.3.7 states: "The Manager of Quality and Performance Assurance is responsible for verifying the adequacy and implementation (i.e., compliance and effectiveness) of the Quality Assurance program and report the results to senior management."
9. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-02.2 Management and Self Assessment, Section 2.2.2.1.1 "Management assessments shall regularly assess the adequacy and effective implementation of their management processes."
10. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-02.2 Management and Self-Assessment, Section 2.2.2.2.4, "Self-assessments shall be used to evaluate performance at all levels periodically and to determine the effectiveness of policies, requirements, and standards and the implementation status."
11. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-02.3 Quality Assurance Surveillance, Section 2.3.1.1 "This policy identifies the requirements for performing quality assurance surveillances, both internal and external. Surveillances are a management tool used to help evaluate the Quality Assurance program adequacy, effectiveness, compliance, implementation and maintenance. In addition, surveillances can also be used to identify continuous improvement opportunities."
12. 24590-WTP-QAM-QA-06-001, "Quality Assurance Manual," (Quality Assurance Program Description), Policy Q-18.1 Audit (Independent Assessment), Section 18.1.1.1 states: "This policy identifies the requirements for performing audits (independent assessment), both internal and external. Audits are used to verify compliance with and to determine the effectiveness of the quality assurance program implementation and maintenance, and to identify continuous improvement opportunities."

Discussion:

Based upon audit results, the audit team leaders reviewed the results of all areas of the audit to determine the overall effectiveness of the BNI QAP and to determine if there were any weaknesses within the BNI QAP that would account for the issues that were previously and currently found and documented during this audit. The audit team lead (ATL) reviewed and evaluated the results of completed ORP assessments and audits, DOE HSS oversight activities, DOE OIG investigations, OE investigations, and DNFSB activities.

The focus of the ATLs in conducting this evaluation was to focus their review in three areas: the success of BNI's QAP in self-identifying issues, the effectiveness of BNI's corrective actions related to issues identified by oversight activities performed by ORP, HSS, OIG, OE, and DNFSB, and the ability of BNI's QAP to prevent the recurrence of previous identified and documented issues and conditions adverse to quality.

As a result of this audit, the audit team was able to have a better insight into the BNI QAP at the implementation level. This provided them with a viewpoint that allowed an overall analysis of the areas with weaknesses. The audit team leaders performed an evaluation of these audit results relative to the overall effectiveness of BNI's QAP.

The review areas audited by the audit team and evaluated by the ATLs represent a critical cross-section of BNI's QAP that provides some of the most important processes performed by BNI.

The issues identified by the audit team in these areas represent a lack of effectiveness of BNI's QAP. This is considered to be representative of a QAP that is not fully implemented in an effective manner and is not fully effective.

U-13-QAT-RPPWTP-001-F02, (Priority Level 1): Contrary to the BNI Contract DE-AC27-01RV14136, Section C, "Statement of Work" BNI's overall Corrective Action Program has not been implemented in accordance with requirements and is not fully effective.

Requirements:

1. 10 CFR Part 830, Subpart A, quality assurance Requirements, Paragraph 830.121 QAP, states "Contractors conducting activities, including providing items or services that affect, or may affect, the nuclear safety of DOE nuclear facilities must conduct work in accordance with the Quality Assurance criteria in paragraph 830.122. QA Criteria." 830.122 states that, "The QAP must address ...management, performance, and assessment criteria." This section lists the 10 elements to be addressed in the contractor's overall QAP.
2. Contract No. DE-AC27-01 RV 14136, Section C, Standard 7 (e) (3), Quality Assurance (Table C.5-1.1, Deliverable 7.2), requires BNI to develop and implement a QAP.

Section C, Standard 7 (e) (3) (ii) (B) states "The Contractor shall implement the *National Consensus Standard ASME NQA-1-2000*, Part I and Part II, Subpart 2.7 for elements of

the Contractor's scope that may affect product quality of the immobilized low-activity waste (ILAW) product, entrained solids, and sludge washing, including, but not limited to, waste form development, qualification, characterization, production process control, certification of ILAW product, entrained solids, and sludge washing. Furthermore, all research and technology activities (other than IHLW – see (A)) shall be conducted in accordance with NQA-1. (M066).”

3. BNI Contract No. DE-AC27-01 RV 14136, Section C, Standard 7 (3)(iv), “QA for facilities, projects, and secondary wastes not subject to the above requirements shall be done in accordance with DOE Order 414.1C. The Contractor has the option to not incorporate the elements of ANSI/ASQ Q 9001-2000, *Quality Management System*, requirements (for non-nuclear activities), which is referenced in the Contractor Requirements Document of DOE Order 414.1C. (M066) (A143) (M152).”
4. DOE O 414.1C Attachment 2, Paragraph 1 Objectives, (b) (3) to achieve quality assurance for all work based upon the following principles.
 - (1) That quality is assured and maintained through a single, integrated, effective QAP (i.e., management system).
 - (2) That management support for planning, organization, resources, direction, and control is essential to quality assurance.
 - (3) That performance and quality improvement require thorough rigorous assessment and corrective action.
 - (4) That workers are responsible for achieving and maintaining quality.
 - (5) That environmental, safety, and health risks and impacts associated with work processes are minimized while maximizing reliability and performance of work products.
5. 24590-WTP-QAM-QA-06-001, QAM, Policy Q-16.1 Corrective Action, 16.1.1 Purpose and Applicability, Paragraph 16. 1.1.1 “This policy identifies the requirements for ensuring that conditions adverse to safety, health, quality, security, safeguards, cyber security, emergency management and the environment are promptly identified, controlled, documented, evaluated, corrected, and trended.”
6. 24590-WTP-QAM-QA-06-001, QAM, Policy Q-16.1 Corrective Action, Section 16.1.2 Requirements, Paragraph 16.1.2.1.1 “Processes for communication of adverse conditions up the management chain to and including, senior management shall be established using a graded approach as described in Policy Q-02. 1, *Quality Program*. These communication processes shall provide: (DOE O 226.11A, Attachment 1, Appendix A, 5d)”
 - Section 2.1.2.1.4 states: “The WTP shall establish and implement processes to detect and correct quality problems.”
 - Section 16.1.1.1, states: “This policy identifies the requirements for ensuring that conditions adverse to safety, health, quality, security, safeguards, cyber security, emergency management and the environment are promptly identified, controlled, documented, evaluated, corrected, and trended.”

- Section 16.1.1.3 states: "...provides the requirements for causal analysis, identification of corrective action and recurrence controls, corrective action tracking and monitoring closure of corrective actions and verification of effectiveness, and trend analysis."
- Section 16.1.2.2.2 states: "Adverse conditions and significant adverse conditions shall be classified as such, and corrective actions shall be taken accordingly. The scope and extent of a condition is evaluated to determine the risk, significance, and priority of the deficiency."

7. 24590-WTP-GPP-MGT-043, Revision 4A, Corrective Action Management.

- Section 5.3.1 states: "Objective evidence, including the following, is provided in the PIER documentation to support action closures."
- Section 5.3.1 states: "The RM shall verify and close the completed PIER ensuring that verification of individual action(s) taken to address the PIER are complete and are supported by objective evidence."
- Section 5.3.3 requires the RM or designee to "verify completed action(s) per Appendix J, ensuring that the action(s) aligns with cause code(s), confirming that process code(s) is appropriate, and considering the extent of condition associated with the cause analysis."
- Appendix H, *Significance Level Determination*, defines significance of PIER Levels A, B, C, and D.
- Appendix H, *Significance Level Determination*, defines Level B PIERs as a condition adverse to quality "that involves a lesser significance and effect on safety, health, quality, security, safeguards, cyber security, emergency management, or the environment. Resolution of Level B PIERs necessitates an understanding of why the condition occurred (ACE, at a minimum) and the extent of condition and cause. Remedial and corrective actions are required, as is an EFR, as determined in Section 5.8."
- Appendix H, *Significance Level Determination*, defines Level C PIERs as a "deficient condition that has a minimal effect on safety, health, quality, security, safeguards, cyber security, emergency management, or the environment. Level C PIERs are deficient conditions often referred to as 'find and fix' issues. These include issues where corrective actions may have already occurred. Level C PIERs may include an extent of condition to identify similar or related conditions and may include corrective or process improvement actions, as determined to be appropriate. However, if the corrective actions are determined to be necessary to preclude recurrence, then the PIER likely needs to be elevated to significance level B."
- Appendix J, *Verification and Review and Approval Expectations*, The purpose of verifying the completed actions and accepting, approving, or concurring with (i.e., reviewing) the collective set of corrective actions is to provide assurance that the actions collectively resolve the identified issue, per the following (This Appendix lists extensive actions to complete in the verification, review and approval process).

Discussion:

Based upon the results of Section 2.3 above, Corrective Action, the audit team found that issues within BNI's corrective action process were significant and warranted a finding separate from the overall QAP Finding, U-13-QAT-RPPWTP-001-F01.

The audit team reviewed the WTP corrective action management process. Open and closed PIERs were reviewed from the past three years including the 2008 Broad Based Review by the prime contractor, which is similar to the current ongoing Reliability Validation Process.

Implementation of 24590-WTP-QAM-QA-06-001, Rev. 12, *Quality Assurance Manual*, Section QP-16.1 and 24590-WTP-GPP-MGT-043, Rev. 4, *Corrective Action Management* has not resulted in ensuring corrective actions are promptly identified and effectively corrected to resolve deficient conditions. Although BNI has conducted reviews of their CA issues, BNI continues to have recurring issues that have been identified in this audit report. The audit team identified this as a weakness in BNI's ability to implement an adequate and effective CAP. The team identified significant breakdowns in several important areas of the corrective action process that could result in quality and safety issues if not properly addressed.

Based on the audit results, the following areas of the corrective action program were determined to be inadequate:

- Identification of Adverse Conditions – PIERs are: 1) being identified and tracked outside of the corrective action process and; 2) inadequately closed/transferred to other PIERs without getting properly resolved.
- Planning of Corrective Actions – PIERs are either planned inappropriately or the plans were not revised to reflect the actions performed.
- Verification and Closure of Corrective Actions - PIERs with inadequate verifications of corrective actions and with the actions not correcting the conditions cited are being closed out inappropriately.
- Classification – PIERs are not being appropriately classified to the proper level of significance. The level of issue classification impacts the rigor of analysis that determines what actions will be needed to correct the issues and mitigate repeated occurrence.
- Procedure (24590-WTP-GPP-MGT-043) inadequacies have been identified in 24590 WTP-PIER-MGT-13-0393-B and 24590-WTP-PIER-MGT-12-0158-B.
- Ineffective implementation resulting in safety concerns not being adequately brought to closure (see 24590-WTP-PIER-MGT-13-509-B).
- The Trend Program is considered to be ineffective as it did not result in the identification of a quality trend action to address the corrective action program. These issues identified by the audit team should have been captured internally by the prime contractor's trending process.
- The performance improvement review board should have been involved in these areas of the corrective action process.

Interviews with BNI personnel involved with the corrective action process acknowledged there were problems within the corrective action program. However, BNI's self-identified PIERs (24590-WTP-PIER-MGT-13-0393-B and 24590-WTP-PIER-MGT-13-509-B), and the externally identified findings (24590-WTP-PIER-MGT-12-0158-B and 24590-MGT-PIER-MGT-12-0973-B) had not risen to the level of management attention necessary to address the ineffective corrective action management process involving BNI's PIER system.

Taken in the aggregate, the adverse conditions defined in this report identified overall symptoms of an ineffective corrective action program. The condition of this ineffective corrective action program represents a systemic breakdown in the quality, and effectiveness of BNI's CAP.

AUDIT FOLLOW-UP ITEMS:

- **U-13-QAT-RPPWTP-001-A01:** Review the adequacy of BNI's 24590-WTP-RPT-OP-01-001, Operations Requirement Document, in relation to meeting requirements of system design, and design verification activities, including the ICN.
- **U-13-QAT-RPPWTP-001-A02:** Conduct a surveillance to gather facts on software grading early in the audit process and then for BNI, ORP, and if possible, CNS employees to participate in an assist visit associated with this topic.
- **U-13-QAT-RPPWTP-001-A03:** Evaluate software used to perform administrative functions that manages, modifies, or retains quality affecting data to ensure compliance with quality requirements.
- **U-13-QAT-RPPWTP-001-A04:** Evaluate BNI's incorporation of the full NQA-1-2000 (all 18 requirements) on BNI's Q-Datasheet, R14, and within BNI POs.
- **U-13-QAT-RPPWTP-001-A05:** Evaluate BNI's review whether QARD audits were applicable to EnergySolutions' QAP and amended BNI's ESL accordingly.

OBSERVATIONS:

- **U-13-QAT-RPPWTP-001-O01:** OFI for improving the process of how documents are reviewed or re-reviewed by BNI organizations.

Discussion: BNI's procedures governing interfaces between BNI Engineering and E&NS. Specifically, 24590-WTP-3DP-G04T-00913, *Review of Engineering Documents*, states in Section 3.3.1 that if a reviewing BNI organization does not need to review subsequent document revisions, they can inform the originator and will not be sent future revisions. If a subsequent modification to this document started to impact the BNI organization that previously declined review, there would be no automatic review sent since they previously declined subsequent document revisions. In contrast, 24590-WTP-GPP-MGT-066, *Review of Project Documents*, states in Section 5.3.2, "If substantive changes are made to a document, and those changes impact, or potentially impact, an organization that

previously indicated further review was not required, then the preparer includes that organization in the review of the changes." This documents and OFI regarding that procedure *Review of Engineering Documents* would benefit from including similar language, thereby reducing the potential for missing an important document review.

- U-13-QAT-RPPWTP-001-002: OFI involving analyses of ICN hardware and/or software to assure compliance with DOE O 205.1B Chg. 1. Additionally R0010 could be reviewed for potential modification.

Discussion: BNI was in the process of incorporating DOE O 205.1B Chg1, *Department of Energy Cyber Security Program*, for all networks and systems within the WTP Operational Plan (i.e., permanent plant). The SRS for ICN, 24590-WTP-PISW-J-08-0001-02, identified a single ICN software requirement, R0010, addressing access control through a username and password. DOE O 205.1B Change (Chg.) 1 requirements were not being addressed at the time of this audit. DOE O 205.1B Chg. 1 required that "the contractor must ensure all information systems operate within the processes defined and approved by the Federal Authorized Official, and that all systems maintain an acceptable level of risk pursuant to (1) the agreed upon risk profile defined by Site and Federal management, and (2) approved oversight and assurance systems." BNI should perform an analysis to determine what, if any, additional requirements on the hardware or software for the ICN would need to be implemented to comply with DOE O 205.1B Chg. 1. BNI should also review requirement R0010 for potential modification. The early evaluation of implementation approaches will avoid procurement issues of inadequate hardware or rework of software applications.

- U-13-QAT-RPPWTP-001-003: OFI for BNI to improve software procedures and document clarity.

Discussion: the team found BNI's software procedures hard to understand and follow due to how information was detailed and presented. BNI's procedures were written as "expert based" procedures. BNI employees that developed these procedures have a high degree of software development knowledge, and can easily understand and follow these software procedures. However, if BNI's current software employees change, these procedures may not be easily understood. This documents an OFI for improving content of BNI's software procedures.

- U-13-QAT-RPPWTP-001-004: OFI regarding the practice of utilizing supplier procedures (in lieu of the supplier's QAM) to determine compliance to NQA-1-2000 requirements. This practice may lead to the supplier's QAP being out-of-compliance from the approved BNI review of the suppliers QAM.

Discussion: During review of supplier quality programs, the audit team identified the ISI program did not have pertinent NQA-1-2000 requirements addressed. In lieu of revising this program to incorporate missing requirements, BNI conducted a surveillance to determine if ISI procedures were adequate thus determining the areas which were not contained in ISI QAM. However, the audit team determined, utilizing supplier procedures (in lieu of the supplier's QAM) to determine compliance to NQA-1-2000 requirements may lead to the supplier's QAP being out-of-compliance from the approved BNI review of the suppliers

QAM. This documents an OFI using the supplier's QAM's to determine compliance to NQA-1-2000 versus only using supplier procedures.

- **U-13-QAT-RPPWTP-001-005:** OFI for BNI to improve their Q Data sheet and Specification 24590-WTP-3PS-G000-T0019 by showing CGD activities comply with NQA-1 2004 in lieu of NQA-1-2000.

Discussion: The Q Data sheet shows compliance to NQA-1-2000 for CGD activities. Section 2.4.2, "Commercial Grade Dedication" of the MR requires compliance to engineering Specification 24590-WTP-3PS-G000-T0019. This engineering specification also shows compliance to NQA-1-2000 for CGD activities. However, NQA-1-2004 (Sections 701-705) identified requirements for CGD activities which BNI adopted within their design basis. Currently, BNI complies with NQA-1-2000 except for CGD activities. For CGD activities BNI complies with NQA-1-2004. This OFI documents an opportunity for these two documents, BNI's Q Data Sheet and 24590-WTP-3PS-G000-T0019, to reflect BNI's current design basis regarding the use of NQA-1-2004 versus NQA-1-2000 for CGD activities.

- **U-13-QAT-RPPWTP-001-006:** OFI to improve identification of personnel signing the Material Receiving Report documents.

Discussion: While Material Receiving Reports the audit team identified that some of the signatures were illegible (i.e., checker's signature on the Kick & Count form and SQR signature on Block 17 of Quality Verification G-321-V form) No printed name accompanied the signature to ensure the authenticator could be properly identified. As a result, the audit team had to contact supervision to identify individuals for the following MRRs that were reviewed: MRRs 0028104, 0027845, 0028063, 0027842. BNI Procedure 24590-WTP-GPP-PADC-002, R13A, Project Records Management, Section 5.2 "Authentication of Records" states in part that it is a best business practice to include a printed name of the signatory on all documents ensuring that the authenticator can be properly identified. The team identified this as an OFI.

4.0 Conclusion

Although BNI has made some improvements with changes to their quality assurance and CA programs, these changes have addressed individual issues but have not represented a comprehensive review and upgrade of the quality assurance and CA programs. Currently BNI is in an implementation phase of BNI's RVP process, which has identified a large number of issues that need to be addressed and resolved by BNI. With the results of this audit, and issuance of Findings U-13-QAT-RPPWTP-001-F01 and U-13-QAT-RPPWTP-001-F02, ORP has identified programmatic breakdowns within BNI's quality assurance and CA programs. In addition to BNI's RVP efforts, and the corrective actions developed and implemented for the findings identified in this report as well as other reports, BNI's CAs should address the overall programmatic identified findings and therefore provide complete corrective actions which will enable BNI to bring their quality assurance and CA programs up to an effective level.

The audit team determined on an overall basis, taking into account the results of this audit as discussed above, that BNI's QAP was adequate, but that it was not fully implemented in accordance with requirements, and therefore was not fully effective.

APPENDIX A

PERSONNEL CONTACTED DURING THE AUDIT

Review Area, 1, Design 1a

- Bechtel National, Inc. (BNI) Area Field Specialist
- BNI Pipefitter Foreman
- BNI Pipefitter Journeyman
- BNI Electrician Foreman
- BNI Electrician Journeyman
- BNI Millwright
- BNI Ironworker Foreman
- BNI Ironworker Journeyman
- BNI Resident Engineer
- BNI Senior Electrical Engineer
- BNI Engineering Support Lead
- BNI Systems Engineering Lead
- BNI Mechanical Engineering Group Supervisor
- BNI Mechanical Systems Engineer
- BNI Field Engineers
- BNI Process Assurance Lead – Engineering Requirements Management
- BNI Engineering Requirements Manager
- BNI Construction Field Engineering Manager
- BNI U.S. Department of Energy (DOE), Office of River Protection (ORP) Nuclear Safety Engineer
- BNI Deputy Manager for Environmental and Nuclear Safety
- BNI Manager for Environmental and Nuclear Safety
- BNI Engineering Training Coordinator
- BNI Civil, Structural, and Architectural Engineering Group Supervisor
- BNI Mechanical Systems Engineering Group Supervisor
- BNI Engineering Process Manger
- Reliability Validation Process (RVP) Design Verification Foundational Process Team Lead
- RVP Design Verification Foundational Process Team Member and Implementation Lead
- DOE ORP Site Inspectors
- DOE ORP Facility Representative – Waste Treatment and Immobilization Plant (WTP)
- DOE EM-41 Site Representative for Hanford

Review Area 1, Design 1b

- BNI Responsible Manager for Integrated Control Network, Controls & Instrumentation
- BNI Project Program Sponsor for Integrated Control Network, Controls & Instrumentation
- BNI Senior Quality Engineer, Quality and Performance Assurance
- BNI Information Systems & Technology Engineering Manager

- BNI Information Systems & Technology Engineering Manager
- BNI Plant Software Change Manager
- BNI Software Quality Program Lead, Information Systems & Technology
- BNI WTP Engineering Software Quality Lead
- BNI Bechtel Systems & Infrastructure Inc. (BSII), BSII Engineering Automation Lead
- BNI Project Program Sponsor for pulse jet mixer (PJM), Software Developer for PJM, Controls & Instrumentation
- BNI BSII, BSII Engineering Automation Lead, Functional Employees
- BNI Project Program Sponsor for pretreatment (PT) Wall and high-level waste (HLW) Wall

Review Area 02

BNI Inventory Specialist Lead
BNI Field Materials Manager/Acting Warehouse Operations Supervisor
BNI Procurement Engineering Manager
BNI Field Engineering Manager
BNI Engineering Requirements Manager
BNI Project Document Control Manager
BNI receiving inspection and test (RI&T) Supervisor
BNI Engineering and Nuclear Safety
BNI Supplier Qualification Sr. Quality Assurance Engineer
BNI Shipping and Inventory Specialist
BNI Field Property Administrator
BNI Supplier Quality Manager (Acting)
BNI Supplier Qualification Manager
BNI Bulk Material Supervisor
BNI Field Materials Management Sr. Material Specialist
BNI Field Engineer
BNI Responsible Engineer, Engineering Controls and Instrumentation
BNI Deputy Manager of Procurement and Subcontracts
BNI Engineering
BNI Material Handling
BNI Procurement Manager

Review Area 3

BNI Quality and Performance Assurance Manager
BNI Corrective Action Plan Manager
BNI Systems Engineering Manager
BNI Deputy Project Manager
BNI Requirements Manager, Corrective Action Manager
BNI Sr. Quality Control Engineer
BNI Sr. Quality Control Engineer
BNI Special Assignment
BNI Field Quality Control Manager
BNI Sr. Systems Engineering Specialist
BNI Process Assurance Technician

BNI Assistant Project Engineer
BNI Engineering Support, HLW
BNI Engineering Support
BNI Environmental Safety and Health Manager
BNI Process Assurance Lead
BNI Engineering Automation Lead
BNI Engineering Support, PT
BNI Engineering Support, Low-Activity Waste Balance of Facilities Laboratory
DOE ORP Facility Representative, Waste Treatment and Immobilization Plant Construction
Division.

Appendix B

DOCUMENTS REVIEWED DURING THE AUDIT (FOR ALL REVIEW AREAS)

- DE-AC27-01RV14136, Waste Treatment and Immobilization Plant (WTP) Contract
- 24590-WTP-RPT-OP-01-001, Operations Requirements Document, dated July 12, 2012
- 24590-WTP-QAM-QA-06-001, *Quality Assurance Manual*, Rev. 12, dated March 22, 2013
- 24590-WTP-3DP-G04T-00901, *Design Change Control*, Rev. 21, April 23, 2013
- 24590-WTP-RPT-ENG-07-013, *RPP-WTP Engineering Documents Review and Approval Matrix*, Rev. 18, February 28, 2013
- 24590-WTP-3DP-G04B-00062, *Disposition of Field change Request/Field Change Notice*, Rev. 20, April 23, 2013
- 24590-WTP-3DP-G04B-00063, *Supplier Deviation Disposition Request*, Rev. 21, April 23, 2013
- 24590-WTP-3DP-G04B-00001, *Design Criteria*, Rev. 18, February 25, 2013
- 24590-WTP-3DP-G03B-00001, *Design Process*, Rev. 12, February 25, 2013
- 24590-WTP-PD-MGT-0001, *WTP Graded Approach*, Rev. 6, June 29, 2012
- 24590-WTP-GPG-ENG-0108, *Design Criteria Database Maintenance*, Rev.5, November 21, 2011
- 24590-WTP-3DP-G04B-00049, *Engineering Specifications*, Rev. 20, November 27, 2012
- 24590-WTP-3DP-G04B-00025, *Engineering Interface Control*, Rev. 8, February 25, 2013
- 24590-WTP-3DP-G04T-00913, *Review of Engineering Documents*, Rev. 12, February 25, 2013
- 24590-WTP-GPP-MGT-066, *Review of Project Documents*, Rev. 1, April 1, 2013
- 24590-WTP-GPP-SREG-002, *E&NS Screening and Authorization Basis Maintenance*, Rev. 25D, April 30, 2013
- 24590-WTP-3DP-G04B-00047, *RPP-WTP Engineering Deliverables To Construction, Startup, and Plant Operations*, Rev. 7, February 25, 2013
- 24590-PTF-PL-ENS-11-0007, *Plan and Schedule to Systematically Evaluate the Hazards of Known Technical Issues, M3 Vessel Assessment Summary Reports, LOAM Benchmark Data and LSIT – Response to DNFSB Recommendation 2010-02 Implementation Plan Commitment 5.7.3.1*, Rev. 0, January 30, 2012
- 24590-LAW-SAA-ENS-11-0001, *Management Assessment of Low Activity Waste Facility – Control Strategy and Related Technical Information*, Rev. 0, June 3, 2011
- 24590-WTP-SAA-ENS-12-0001, *Management Assessment of High-Level Waste, Analytical Laboratory, and Balance of Facilities Preliminary Documented Safety Analyses*, Rev. 0, April 20, 2012
- 24590-WTP-PL-ENS-11-0001, *Safety Basis Development Project Execution Plan for the Analytical Laboratory, Low-Activity Waste, and Balance of Facilities*, Rev. 0, January 2, 2012

- 24590-WTP-PL-ENS-12-0001, *Safety Basis Development Project Execution Plan for the High-Level Waste Facility*, Rev. 0, August 15, 2012
- 24590-WTP-PIER-MGT-10-0999-B, *Inconsistency in PT PDSA Fire Barrier Design Feature Requirements – 24590-WTP-MSOW-MGT-11-0007*, October 1, 2010
- 24590-WTP-PIER-MGT-11-0473-B, *Finding A – Management Assessment of Low Activity Waste Facility Control Strategy and Related Technical Information*, June 8, 2011
- CCN: 251466, *Transmittal of Revised Corrective Actions for Priority Level 1 Findings on Erosion/Corrosion, Lack of a Margin Management Program, and the Systemic Integrated Management Performance Concern*, December 18, 2012
- CCN: 257476, *Design Criteria Database Change*, April 9, 2013
- CCN: 257477, *Design Criteria Database Change*, April 9, 2013
- Construction Work Packages (associated drawings in sub-tiered bullets)
 - HP10018, *Install Pipe Spools and Supports* and associated drawings and documents
 - HP10039, *Install Pipe Spools and Supports* and associated drawings and documents
 - LER2200-00, *Installation of Scheduled Conduit +3 Elevation of the LAW Columns 3W-12&CC-G* and associated drawings and documents
- 24590-LAW-E2-E53T-00106, *LAW Vitrification Building Electrical Power Conduit Layout Plan at EL 3'*, Rev. 3, dated May 18, 2013
 - LII9033-00, *LAW Instrumentation C2V*
- 24590-LAW-M8-C2V-00001002, *LAW Vitrification Building Plant Room V&ID C2 Supply System EL 48-0*, Rev. 6, dated September 6, 2011
- 24590-LAW-J8020-04002, *Controls & Instrumentation Installation Details...* Rev. 1 and two related changes:
- 24590-WTP-FC-IN-12-0067, *LAW +48 C3V-PDT-2201 Detail Markup*, dated August 2012
- 24590-WTP-J8N-J11T-00002, *Removed not added by 24590-WTP-J8N-J11T-00001*, dated February 2013
- *CWP Document List: LII9033-00*, report run date: May 8, 2013
 - HEE0001-01, *HLW Equipment Handling, Storage and Installation of Melter Power Supplies* along with multiple drawings and field changes
 - LCS0142-00, *Miscellaneous Framing for Building Penetrations*
- *CWP Document List: LCS0142-00*, report run date: May 9, 2013
- 24590-LAW-SS-S15T-00183, *LAW Vitrification Bldg. Main Building Structural Steel Partial GIRT Elevation Along COL Line "A,"* Rev. 3, and three related field changes
- 24590-WTP-3DP-G04B-00027, *Design Verification*, Rev. 13, February 25, 2013
- 24590-WTP-DVM-M-03-001, *Mechanical Systems and HVAC Design Verification Scope and Approach Overview Matrix*, Rev. 20, October 18, 2012
- 24590-WTP-DVM-M-05-0002, *Design Verification Matrix for Mechanical Handling Structures, Systems and Components*, Rev. 8, March 6, 2012
- 24590-WTP-DVM-PL-03-001, *Design Verification Matrix for Plant Design*, Rev. 13, June 19, 2012

- 24590-WTP-DVM-J-03-001, *Design Verification Matrix for Controls & Instrumentation Structures Systems and Components*, Rev. 8, November 12, 2012
- 24590-WTP-DVM-E-03-001, *Design Verification Matrix for Electrical Systems and Component*, Rev. 4, March 17, 2013
- 24590-PTF-DVM-CSA-03-001, *Pretreatment Facility - CSA Structural - Design Verification Matrix*, Rev. 10, June 7, 2011
- 24590-LAW-DVM-CSA-03-001, *Law Facility - CSA Structural Design Verification Matrix*, Rev. 18, June 17, 2011
- MS DESK INSTRUCTION #21, *Mechanical & Process Engineering Design Re-Verification*, Rev. 0, September 11, 2008
- 24590-HLW-DVR-E-04-00001, *Design Verification Report – HLW Low Voltage (LV) Emergency Power Distribution Equipment (TTS)*, Rev. 3, July 6, 2011
- 24590-HLW-DVR-M-12-002, *Design Verification Report – HLW CSV Remote Change HEPA Filter Housings*, Rev. 0, January 15, 2013
- 24590-PTF-DVR-M-03-008, *Design Verification Report – Pretreatment Facility (PTF) – Treated Law Concentrate Storage Process (TCP)*, Rev. 2, December 20, 2011
- 24590-LAW-DVR-M-10-0001, *Design Verification Report – Law Carbon Dioxide Vessel and Pressure Relief Devices*, Rev. 0, August 4, 2010
- 24590-PTF-DVR-E-04-0002, *Design Verification Report – PTF UPS Power Distribution System for The PPJ System Components*, Rev. 3, June 3, 2010
- 24590-WTO-DVR-J-03-034, *Design Verification Report - Material Requisition 24590-CM-MRA-JF00-00001*, January 8, 2013
- 24590-WTP-DVR-J-03-039, *Design Verification Report – Instrument Racks and Stands*, Rev. 0, September 11, 2012
- 24590-WTP-DVR-J-03-034, *Design Verification Report – Material Requisition 24590-Cm-Mra-Jf00-00001 For Head Flow Instruments*, Rev. 0, January 8, 2013
- 24590-HLW-DVR-M-11-003, *Design Verification Report – HLW Canister Grapples*, Rev. 0, February 8, 2011
- 24590-HLW-DVR-M-12-001, *Design Verification Report – Crane Cable Reels*, Rev. 0, January 4, 2012
- 24590-BOF-DVR-M-11-0001, *Design Verification Report – Emergency Diesel Generator*, Rev. 0, January 19, 2011
- 24590-WTP-SV-QA-13-005, *Review Recommendations From The WTP Sponsored Assessment Report 24590-WTP-SAA-MGT-12-0002 – Reliability Validation Process (RVP) Foundational Process Review – Design Verification*, Rev. 0, January 22, 2013
- CCN: 114079, *Submittal of Design Verification Path Forward*, Rev. 0, April 15, 2005
- CCN: 127756, *Submittal of Independent Design Verification Assessment*, Rev. 0, October 5, 2005
- 24590-WTP-RPT-ENG-11-160, *Checking Credited For Fulfillment Of Design Verification*, Rev. 1, March 29, 2012

- 24590-WTP-E0-E50-02104001, *Typical Support for Seismic Category III and IV Conduits*, Rev. 1, December 26, 2007
- 24590-WTP-E0-E50-02104002, *Typical Support for Seismic Category III and IV Conduits*, Rev. 1, March 26, 2009
- 24590-WTP-FC-E-12-0527, *Add Option for Type H Support*, December 14, 2012
- 24590-WTP-E0-E50-0210001, *Typical Support for Seismic Category III and IV Conduits*, Rev. 3
- 24590-WTP-E0-E50-0210001, *Typical Support for Seismic Category III and IV Conduits*, Rev. 4
- 24590-LAW-P3-ISA-GL01750002, *ISA-GL-01750-S10A-1 - LAW Vitrification Building Isometric*, Rev. 0, June 15, 2005
- 24590-LAW-P3-DOW-WV01915008, *DOW-WV-01915-S11A-2 - LAW Vitrification Building Isometric*, Rev. 1, May 10, 2007
- *LAW Construction Work Packages Daily Update List* dated May 9, 2013
- Field Change Notice 24590-WTP-FC-12-0636, *LAW +3 Re-route conduit 20ECSA1065 through room L-0109C*
- Field Change Notice 24590-WTP-FC-C-11-0468, *PTF-PCC5630 Cut and weld 9 #11 east-west bars to install top rebar mat*
- Field Change Notice 24590-WTP-FC-E-12-0662, *LAW-Allow Node Change for 20ECJA0229 and 20CYA0121*
- Field Change Request 24590-WTP-FC-M-13-0008, *LAW-Melter Mica Repair Instructions*
- Supplier Deviation Disposition Request, 24590-WTP-SDDR-J-12-0001, *Thermowells Provided with Flats and HEX Ends for Tightening Wrench*
- Supplier Deviation Disposition Request, 24590-WTP-SDDR-J-12-00030, *Acceptability of Current/Latest ASTM, ASME Codes for Tubing*
- PIER: 24590-WTP-PIER-MGT-10-0999-B, *Inconsistency in PT-PDSA Fire Barrier Design Feature Requirements*, Rev. 0
- PIER: 24590-WTP-PIER-MGT-11-1235-C, *Inadequate Basis for HLW PDS Requirements for HPAV*, Rev. 0 and related action correspondence
- *Flowchart of Engineering & Nuclear Safety Alignment Process*
- *Safety System Reconciliation Actions* (updated April 1, 2013)
- 24590-WTP-PSAR-ESH-01-002-04, *Preliminary Documented Safety Analysis to Support Construction Authorization; HLW Facility Specific Information*, Rev. 4
- *WTP Qualification List/Plateau Training Database*
- *WTP Read and Discuss Evaluations by Job Position*
- DOE O 205.1B, Chg 1, *Department of Energy Cyber Security Program*, December 7, 2012
- NQA-1-2000, *Quality Assurance Requirements for Nuclear Facility Applications*
- DOE quality assurance requirements and description (QARD) Audit, 12-DOE-AU-005.
- S-12-Q18-RPPWTP-002

- 24590-WTP-GPG-J-0050, Rev. 0, *Implementation Guide for ICN Basic Control Software Using ABB Function Designer®*, June 2, 2010
- 24590-WTP-GPG-J-0054, Rev. 0, *Design Guide for WTP Developed Software Objects for the Integrated Control Network (ICN)*, May 27, 2010
- 24590-WTP-GPG-J-025, Rev. 8, *Configuration Management Guide for the Integrated Control Network (ICN)*, June 15, 2011
- 24590-WTP-GPG-SQP-0002, Rev. 0, *Guidance for Developing Software Life Cycle Documents*, February 4, 2009
- 24590-WTP-GPG-SQP-0004, Rev. 0, *Guide to Software Life Cycle Work Activities*, February 4, 2009
- 24590-WTP-GPP-MGT-028 Rev. 4, *WTP Procedures and Guides*, April 5, 2012
- 24590-WTP-GPP-SQP-202, Rev. 3, *Development and Management of Levels A, B, C, and D Software for Plant*, February 21, 2012
- 24590-WTP-GPP-SQP-208, Rev. 2, *Plant Software Life Cycle Management*, December 6, 2011
- 24590-WTP-GPG-SQP-0001, Rev. 4a, *Glossary of Terms for Software Quality Assurance*, April 8, 2013
- 24590-WTP-GPP-SQP-102, Rev. 1, *Development and Management of Levels A, B, C, D Software for EPCC*, April 26, 2012
- 24590-WTP-GPP-SQP-104, Rev. 2, *Acquisition, Development, and Management of Levels E and F Software*, August 13, 2012
- 24590-WTP-GPP-SQP-008, Rev. 6, *EPCC Software Life Cycle Management*, May 10, 2012
- 24590-WTP-GPP-SQP-308, Rev. 0, *Plant Administrative Software Life Cycle Management*, May 24, 2011
- 24590-WTP-QAM-QA-06-001, Rev. 12, *Quality Assurance Manual*, 2012
- 24590-WTP-GPP-SQP-106, Rev. 2, *Development and Management of Utility Calculation Software Levels A, B, C, D*, April 16, 2012
- 24590-WTP-GPP-SQP-005, Rev. 2, *Project IT Change Control Process*, April 26, 2012, Software Life Cycle Documents
- 24590-BOF-PISW-J-08-0007-01, Rev. 3, *System Design Document for the BOF Building 82 Chiller/Compressor Plant*, February 8, 2013
- 24590-LAB-PISW-J-08-0001-01, Rev. 0, *System Design Document for the LAB Facility*, August 11, 2011
- 24590-LAB-PISW-J-08-0001-03, Rev. 0, *LAB Facility System Subproject Acceptance Test*, August 20, 2011
- 24590-WTP-ITC-J-13-0035, Rev. 0, *IT Change Request, LSIT PJM Control System Software*
- 24590-WTP-PISW-J-08-0001-01, Rev. 4, *Software Project Plan for the Integrated Control Network*, September 4, 2012
- 24590-WTP-PISW-J-08-0001-02, Rev. 2, *Software Requirements Specification for the Integrated Control Network (ICN)*, June 18, 2012
- 24590-WTP-PISW-J-08-0001-03, Rev. 0, *System Design Document for the Integrated Control Network (ICN)*, August 18, 2011
- 24590-WTP-PISW-J-08-0001-04, Rev. 0, *WTP Developed Software Object Test Plan*, June 15, 2011
- 24590-WTP-PISW-J-08-0001-05, Rev. 1, *Plant System Sub-Project Test Plan*, January 3, 2012

- 24590-WTP-PSRA-ENG-09-0107 Rev. 0, *PSRA Developed Software for operation of the WTP Integrated Control Network (ICN)*, March 1, 2010
- 24590-WTP-RPT-J-08-009, Rev. 79, *C&I Project Baseline Report for the Integrated Control Network*, April 5, 2013
- 24590-WTP-3DP-04T-00913, Rev. 12, *Review of Engineering Documents*, February 25, 2013
- 24590-WTP-SWLCD-ENG-12-0002-01, Rev. 2, *Software Project Plan for Large Scale Integrated Testing Pulse Jet Mixers*, April 10, 2013
- 24590-WTP-SWLCD-ENG-12-0002-02, Rev. 2, *Software Life Cycle Document for Large Scale Integrated Testing Pulse Jet Mixers*, Rev 1, April 11, 2013
- 24590-WTP-SWLCD-ENG-12-0002-03, Rev. 1, *Large Scale Integrated Testing Pulse Jet Mixers Software Acceptance Test*, April 10, 2013
- 24590-WTP-PRSA-CSA-09-0015, Rev. 1, *HLW Wall Reinf Template, Vertical Cuts*, May 7, 2009
- 24590-WTP-UIF-CSA-09-0015, Rev. 1, *HLW Wall Reinf Template, Vertical Cuts*, May 7, 2009
- 24590-WTP-VV-08-004, Rev. 0, *HLW Shear Wall Design – QAS Routine*, April 10, 2010
- 24590-WTP-PRSA-CSA-09-0023, Rev. 1, *PT Wall Reinf Template, Horizontal Cuts*, May 7, 2009
- 24590-WTP-UIF-CSA-09-0023, Rev. 1, *PT Wall Reinf Template, Horizontal Cuts*, May 7, 2009
- 24590-WTP-VV-ST-08-002, Rev. 2, *PTF Shear Wall Design, QAS Routine*, September 4, 2009
- 24590-WTP-PIER-MGT-13-0553, Rev. 0, *PIER, Admin Screens Issue*, May 14, 2013
- 24590-WTP-3DP-G04B-0037, Rev. 21, *Engineering Calculations*, February 25, 2013
- 24590-WTP-PIER-MGT-09-0212-D, Rev. 0, *PIER, Software being used by Engineering is impacted by new requirements*, February 5, 2009
- 24590-WTP-SWLCD-ENG-09-0027, Rev. 0, *Software Life Cycle Documentation for Piping Code ANSYS Post Processor (PCAPP)*, September 21, 2009
- 24590-WTP-SWLCD-ENG-09-0027, Rev. 1, *Software Life Cycle Documentation for Piping Code ANSYS Post Processor (PCAPP)*, October 1, 2009
- CCN: 155938, *Action Required to Implement Software Quality Assurance Requirements*, February 11, 2009
- CCN: 188871, *Closure of PIER 09-0212-D Action 15 – Software Being Used by Engineering is Impacted by New Requirements*, May 19, 2009
- CCN: 190346, *New EPCC Software Procedures and Engineering Criteria for Continued Software Use*, February 5, 2009
- CCN: 190353, *Process for Safety Software Requirements Implementation*, February 19, 2009
- CCN: 194405, *Action Required to Implement Software Quality Assurance Requirements*, February 11, 2009
- 24590-WTP-PSRA-CSA-09-0023, *Project Software Risk Assessment for EPCC (PT Wall)*, Rev. 1
- 24590-WTP-VV-ST-08-002, *PTF Shear Wall Design – QAS Routine*, Rev. 2
- 24590-WTP-PSRA-CSA-09-0015, *Project Software Risk Assessment for EPCC (HLW Wall)*, Rev. 1
- 24590-WTP-VV-ST-08-004, *HLW Shear Wall Design – QAS Routine*, Rev. 0

- 24590-WTP-UIF-CSA-09-0015, *User Information Form for EPCC (HLW Wall)*, Rev. 1
- 24590-WTP-UIF-CSA-09-0023, *User Information Form for EPCC (PT Wall)*, Rev. 1
- Employee Training Report, LMS Id 12674, Ryan L. Ciolli, May 13, 2013
- 24590-WTP-CRM-TRA-000703_Rev_002, project program sponsor (PPS) Training for Software Designated Levels A, B, C, and D
- 24590-WTP-PIER-MGT-13-0572-C, *Change Control Requirements for Developed Software*, Rev. 0
- 24590-WTP-PIER-MGT-13-0553, Rev. 0, *PIER, Admin Screens Issue*, May 14, 2013
- 24590-GPP-PADC-002, *Project Records Management*, Rev. 13A, dated August 29, 2012
- 24590-WTP-3DP-G04B-00049, *Engineering Specifications*, Rev. 20 dated November 27, 2012
- 24590-WTP-3DP-G04B-00058, *Supplier Engineering and Quality Verification Documents*, Rev. 14, dated February 24, 2012
- 24590-WTP-3DP-G04B-00063, *Supplier Deviation Disposition Request*, Rev. 20 dated February 25, 2013
- 24590-WTP-3DP-G04B-00913, *Review of Engineering Documents*, Rev. 12, dated February 25, 2013
- 24590-WTP-3DP-G06B-00001, *Material Requisitions*, Revision 25A dated December 20, 2012.
- 24590-WTP-3DP-G06B-00002, *Subcontracts*, Revision 14 dated February 25, 2013
- 24590-WTP-3DP-G06B-00010, *Specifying Supplier Quality Assurance Program and Quality Requirements*, Rev. 8, dated March 1, 2011
- 24590-WTP-3PS-E000-T0001 Rev. 7, *Engineering Specification for Electrical Bulk Materials*
- 24590-WTP-3PS-G000-T0019, *Acquisition of Commercial Items and Services for Use in Safety Applications at WTP*, Rev. 0, dated January 21, 2010
- 24590-WTP-DM-ENG-08-001, *Supplier Document Review Matrix*, Rev. 16, dated December 17, 2012
- 24590-WTP-GPP-CMNT-006, *Area Operations Material Control*, Rev. 0A, dated August 1, 2011
- 24590-WTP-GPP-CON-7105, *Subcontractor Submittals*, Rev. 4A, dated December 20, 2012
- 24950-WTP-GPP-CON-7109, *Material Control*, Rev. 7A, dated May 17, 2011
- 24590-WTP-GPP-CON-7111, *Field Material Requisitions*, Rev. 7B, dated January 31, 2013
- 24590-WTP-GPP-COPS-020, *Plant Equipment Labeling Procedure*, Rev. 4A, dated March 21, 2013
- 24590-WTP-GPP-GCB-00100, *Field Material Management*, Rev. 19D, dated February 21, 2013
- 24590-WTP-GPP-GPA-025, *Control of Government Property*, Rev. 4D, dated August 21, 2012
- 24590-WTP-GPP-GPA-028, *Disposal of Scrap Property*, Rev. 1, dated February 9, 2011
- 24590-WTP-GPP-GPX-00301, *Solicitation, Proposal Evaluation, Negotiations and Award Documentation*, Rev. 6D, dated May 3, 2012
- 24590-WTP-GPP-GPX-00305, *Subcontractor and Purchase Order Formation*, Rev. 6B, dated August 7, 2012
- 24590-WTP-GPP-MATL-002, *Inventory Control*, Rev. 0B, dated May 18, 2009

- 24590-WTP-GPP-MATL-005, *Commercial Dedication Material Requisition*, Rev. 2C, dated December 22, 2010
- 24590-WTP-GPP-MATL-009, *Performance of Commercial Grade Surveys and Annual Supplier Evaluations*, Rev. 4B, dated March 6, 2013
- 24590-WTP-GPP-MATL-010, *Evaluation and Acceptance of Commercial Grade Items and Services*, Rev. 2A, dated November 26, 2012
- 24590-WTP-GPP-MATL-014, *Commercial Grade Surveillances and Source Verifications*, Rev. 0, dated August 16, 2012
- 24590-WTP-GPP-MGT-012, *Control of Suspect/Counterfeit Items*, Rev. 13B, dated July 19, 2012
- 24590-WTP-GPP-MGT-013, *Acceptance of Procured Material*, Rev. 17D, dated December 17, 2012
- 24590-WTP-GPP-MGT-019, Rev. 3, *Administration of Bulk Electrical Materials*
- 24590-WTP-GPP-MGT-044, *Non-Conformance Reporting and Control*, Rev. 1B, dated May 2, 2013
- 24590-WTP-GPP-MGT-045, *Spare Parts Management*, Rev. 4, dated March 29, 2012
- 24590-WTP-GPP-MGT-051, *Supplier/Subcontractor Quality Assurance Audits*, Rev. 2A, dated February 11, 2013
- 24590-WTP-GPP-PADC-002, *Project Records Management*, Rev. 13A, dated August 29, 2012
- 24590-WTP-GPP-PSQ-042, *In-Process Source Verification*, Rev. 8, dated May 6, 2011
- 24590-WTP-GPP-PSQ-043, *Source Verification Reporting*, Rev. 6, dated June 17, 2011
- 24590-WTP-GPP-PSQ-044, *Final Source Verification*, Rev. 9, dated May 6, 2011
- 24590-WTP-GPP-PSQ-045, *Quality Verification Document Review*, Rev. 5E, dated March 13, 2012
- 24590-WTP-GPP-PSQ-046, *Release for Shipment*, Rev. 5A, dated April 15, 2010
- 24590-WTP-GPP-PSQ-050, *Receiving Inspections*, Rev. 14, dated August 13, 2012
- 24590-WTP-GPP-QA-020, *Q Supplier Qualification*, Rev. 2, dated February 17, 2011
- 24590-WTP-GPP-QA-021, *Q Supplier Quality Assurance Program Review*, Rev. 1, dated July 26, 2010
- 24590-WTP-GPP-QA-024, *Supplier Annual Evaluations*, Rev. 2, dated March 5, 2012
- 24590-WTP-GPP-SQP-200, *Acquisition and Management of Level A, B, and C Plant Installed Safety Software*, Rev. 1, dated January 18, 2012
- 24590-WTP-GPP-SREG-002, *E&NS Screening and Authorization Basis Maintenance*, Rev. 25E, dated April 30, 2013
- 24590-WTP-GPP-SS-009, *Export Controlled Items (ECI)*, Rev. 3, dated December 19, 2012
- Desktop Instruction No. 002 - *Receiving Desktop Guide*, Rev. 5, dated April 25, 2013
- 24590-CD-POB-MBT0-00007, Rev. 19, *Purchase Order, Gulf Coast Environmental Systems, Oxidizers, Thermal Catalytic LAW*, dated May 6, 2013
- 24590-CM-MRA-E000-00003, Rev. 4, with 7 supplements
- 24590-CM-MRA-MBT0-00002, Rev. 1, *Material Requisition, Ionex Research Corporation, HLW Thermal Catalytic Oxidizers/Reducers*, dated February 25, 2011
- 24590-CM-POA-MBT0-00002, Rev. 18, *Purchase Order, Ionex Research Corporation, HLW Thermal Catalytic Oxidizers/Reducers*, dated April 30, 2013

- 24590-HLW-RPT-PR-01-001, Waste Acceptance Impacting Items and Activities, Rev. 10, dated March 7, 2012
- 24590-QL-MRA-JA03-00003, Rev. 0, Material Requisition, dated February 14, 2013, Process Gas Analyzers, Not Awarded
- 24590-QL-MRA-MBT0-0007, Rev. 1, Material Requisition, Gulf Coast Environmental Systems, Oxidizers, Thermal Catalytic LAW, dated August 25, 2012
- 24590-QL-POA-ADDP-00001-22-00001, G-321-E Premier Technology, Inc., Supplier Submittal, Shield Window Assemblies, Rev. 00G, dated May 16, 2013
- 24590-WTP-ACEF-PROC-13-0003, Rev. 1, Apparent Cause Evaluation, WTP CGD Process, dated April 18, 2013
- 24590-WTP-CDR-CON-10-0070, Construction Deficiency Report, 24590-CM-POA-HCHH-00003 Components Storage Condition, MRR 17613, dated March 2, 2010
- 24590-WTP-CDR-CON-11-0217, Construction Deficiency Report, Replacement of Ineffective Proximity Switches for HLW, PTF, Shield Doors, dated May 24, 2011
- 24590-WTP-CDR-CON-12-0214, Construction Deficiency Report, Welding Issues MRR-27486, dated June 6, 2012
- 24590-WTP-CGD-MATL-12-0013, LAW TCO/R and Ammonia Dilution Skid Ball Valves, Commercial Grade Dedication Plan, dated December 4, 2012
- 24590-WTP-CGD-MATL-12-0023, Thermo well, HLW thermal catalytic oxidizer/reducer skid (TCO) and Ammonia Dilution Skid, Commercial Grade Dedication Plan, dated May 1, 2012
- 24590-WTP-CGD-MATL-12-0026, HLW TCO and Ammonia Dilution Skid Structural Skid, Commercial Grade Dedication Plan, dated August 20, 2012
- 24590-WTP-CGD-MATL-12-0035, Gaskets, Pressure Boundary, HLW Thermal Catalytic Oxidizers/Reducers, Commercial Grade Dedication Plan, dated August 1, 2012
- 24590-WTP-CGD-MATL-12-0046, Ammonia Gas Flow Meter and Transmitter HLW Ammonia, Skid, Commercial Grade Dedication Plan, dated July 27, 2012
- 24590-WTP-CGD-MATL-13-0001, LAW Ammonia Dilution Skid Gas Flow Meter, Commercial Grade Dedication Plan, dated January 14, 2013
- 24590-WTP-CGS-MATL-11-008, Velan, Inc., Commercial Grade Survey Checklist, dated February 9, 2012
- 24590-WTP-CGS-MATL-11-009, Premier Technologies, Inc., Commercial Grade Survey Checklist, dated February 13, 2012
- 24590-WTP-CGS-MATL-12-001, Chromalox, Inc., Commercial Grade Survey Checklist, dated September 21, 2012
- 24590-WTP-CGS-MATL-12-004, Flowserve Flow Control LTD., Commercial Grade Survey Report, dated July 19, 2012
- 24590-WTP-CGS-MATL-12-004, Flowserve Flow Control, Commercial Grade Survey Checklist, dated July 19, 2012
- 24590-WTP-CGS-MATL-12-007, Gulf Coast Environmental Systems, Commercial Grade Survey Checklist, dated November 2, 2012
- 24590-WTP-CGS-MATL-12-009, Ionex Research Corp, Commercial Grade Survey Checklist, dated January 10, 2013
- 24590-WTP-DECX-AS-12-0264, Property Disposition Form, Rev. 0, dated October 1, 2012
- 24590-WTP-EDR-J-11-0105, Rev. 0, engineering document review (EDR), dated August 12, 2011

- 24590-WTP-FIR-CON-11-00202, Field Inspection Report, dated July 11, 2011
- 24590-WTP-IAR-QA-12-0002, Rev. 0, June 20, 2012, Commercial Grade Dedication Audit
- 24590-WTP-MAP-AS-04-00204, Material Acceptance Plan, Shielded Window Lead Glass L/DS (MH009), Rev. 3, dated March 20, 2013
- 24590-WTP-MAP-AS-13-00083, Material Acceptance Plan, Technical Services Subcontract for closed circuit television (CCTV), Rev. 0, dated May 8, 2013
- 24590-WTP-MRR-PROC-0026565, Material Receiving Report (Kick and Count), Shaw NAPTech multiple pipe spools, dated June 7, 2011
- 24590-WTP-NCR-CON-08-0090, Nonconformance Report, IHLW Screenings Upgrade Quality Requirements, dated May 20, 2008
- 24590-WTP-NCR-CON-13-0003, Nonconformance Report, Damaged HEPA Filter Housings (MRR-28650), dated January 10, 2013
- 24590-WTP-PIER-MGT-12-0125-B, project issues evaluation report (PIER), dated February 1, 2012
- 24590-WTP-PIER-MGT-12-0135-D, PIER, dated February 2, 2012
- 24590-WTP-PIER-MGT-12-0295-D, PIER, dated February 16, 2012
- 24590-WTP-PIER-MGT-12-0442-B, PIER, dated March 27, 2012
- 24590-WTP-PIER-MGT-12-0598-A, PIER, dated May 3, 2012
- 24590-WTP-PIER-MGT-12-0918-C, PIER, dated July 27, 2012
- 24590-WTP-PIER-MGT-12-0919-C, PIER, dated July 27, 2012
- 24590-WTP-PIER-MGT-12-0939-B, PIER, dated July 31, 2012
- 24590-WTP-PIER-MGT-12-1435-C, PIER, dated December 7, 2012
- 24590-WTP-PIER-MGT-13-0221, Rev. 0, PIER, WTP CGD Process, dated May 9, 2013
- 24590-WTP-PIER-MGT-13-0528-C, PIER, dated May 7, 2013
- 24590-WTP-PIER-MGT-13-0544-C, PIER, dated May 13, 2013
- 24590-WTP-PIER-MGT-13-0545-C, PIER, dated May 13, 2013
- 24590-WTP-SAR-PROC-13-0002, Rev. 0, WTP Self-Assessment Report - NQA-1 Flow down into Project CGD Procedures, dated March 18, 2013
- 24590-WTP-SDDR-CSA-13-00006_Rev_NA (Shield Plate Plug Hole Miss-drilled)
- 24590-WTP-SDDR-E-13-00003_Rev_NA (Solenoid)
- 24590-WTP-SDDR-HV-13-00001_Rev_NA (Elec Parts with Wiring)
- 24590-WTP-SDDR-HV-13-00002_Rev_001 (Air Cond Unit)
- 24590-WTP-SDDR-J-13-00010_Rev_NA (Pipe Stainless Weld Process Changes)
- 24590-WTP-SDDR-MH-10-00129_Rev_001 (Stainless Pipe ASTM edition)
- 24590-WTP-SDDR-MH-12-00042_Rev_NA (Boogie Wheel Load Increase)
- 24590-WTP-SDDR-MH-12-00122_Rev_NA (Boogie Wash Cable)
- 24590-WTP-SDDR-MS-13-00006_Rev_NA (LOCTITE)
- 24590-WTP-SDDR-MS-13-00017_Rev_NA (Shielding Weld Deficiency)
- 24590-WTP-SDDR-PL-13-00004_Rev_NA (Flat Bar Steel CGD test)
- 24590-WTP-SDDR-CSA-13-00005_Rev_NA (HLW steel plate)
- 24590-WTP-SSV-MATL-12-001, Special Applications Technology, Commercial Grade Survey Report, dated October 11, 2012
- 24590-WTP-SSV-MATL-12-002, Gulf Coast Environmental Systems, Commercial Grade Survey Report, dated November 2, 2012

- 24590-WTP-SSV-MATL-12-003, Ionex Research Corporation, Commercial Grade Survey Report, dated January 10, 2013
- 24590-WTP-SV-PSQ-10-005, Receiving Inspection & Test Surveillance Report, MHF, South Laydown Yard, 4N571W395 (Unsat), CDR-10-0070, Rev. 0, dated February 25, and March 1, 2010
- Applied Technical Services, Inc., American Association for Laboratory Accreditation (A2LA) Certifications 1888.04, 1888.02, 1888.03, 1888.04 per CCN: 241407, dated March 15, 2012, BNI Surveillance 24590-WTP-SUV-QA-12-005
- ASME/NQA-1 Technical Interpretation Record Number 10-1365, 12-QAT-0015, dated November 15, 2012
- BNI Purchase Order Template, Commercial Requirements, Part 3
- BNI Purchase Order Template, Supplemental General Conditions, Part 4
- CCN: 254181, dated February 13, 2013, DOE Level I Finding on Vendor Submittals, Compensatory Actions
- CCN: 254186, dated March 21, 2013, DOE Level I Finding on Vendor Submittals, Clarification of Compensatory Actions on material acceptance plan (MAP) Checklist
- Consolidated Power Supply, Kick and Count Report, Checked by Leroy Wheeler, September 17, 2012, 24590-WTP-MRR-PROC-0028468
- Consolidated Power Supply, Kick and Count Report, Checked by William Dow, April 3, 2012, 24590-WTP-MRR-PROC-0027937
- Consolidated Power Supply, Material Acceptance Plan, 24590-WTP-MAP-AS-09-00118, Rev. 1, dated June 24, 2009, 24590-WTP-MRR-PROC-0027937
- Consolidated Power Supply, Material Acceptance Plan, 24590-WTP-MAP-AS-04-00511, Rev. 3, dated January 17, 2012, 24590-WTP-MRR-PROC-0028468
- Consolidated Power Supply, Material Receiving Inspection Report, Inspector Don Matzick, September 19, 2012, 24590-WTP-MRR-PROC-0028468
- Consolidated Power Supply, Material Receiving Inspection Report, Inspector Mark Hansen, April 2, 2012, 24590-WTP-MRR-PROC-0027937
- Consolidated Power Supply, Material Receiving Receipt Report, Material Specialist Nikki Kinzer, September 20, 2012, 24590-WTP-MRR-PROC-0028468
- Consolidated Power Supply, Material Receiving Receipt Report, Material Specialist Andrea Pizzarella, April 3, 2012, 24590-WTP-MRR-PROC-0027937
- Consolidated Power Supply, Material Receiving Report 24590-WTP-MRR-PROC-0028468, Rev. 0, dated September 20, 2012
- Consolidated Power Supply, Material Receiving Report 24590-WTP-MRR-PROC-0027937, Rev. 0, dated April 3, 2012
- Consolidated Power Supply, Material Requisition 24590-QL-MRA-DG00-00004, Rev. 1, dated May 21, 2007, S/S Piping/Bulk Material
- Consolidated Power Supply, Material Requisition 24590-QL-MRA-PB00-00004, Rev. 4, dated January 31, 2012
- Consolidated Power Supply, Purchase Order 24590-QL-BOB-PB00-00004, Rev. 10, dated February 21, 2013, Stainless Steel Pipe
- Consolidated Power Supply, Purchase Order 24590-QL-BPO-DG00-00004, Rev. 6, dated March 23, 2012
- Consolidated Power Supply, Quality Manual Review, CCN: 249931, dated July 24, 2012, Manual 24590-WTP-VQP-QA-10-00007, Rev. 4

- Consolidated Power Supply, Quality Verification Document, Supplier Quality Representative Mark Hansen, April 2, 2012, 24590-WTP-MRR-PROC-0027937
- Consolidated Power Supply, Quality Verification Document, Supplier Quality Representative Mike Graydon, August 17, 2012, 24590-WTP-MRR-PROC-0028468
- Consolidated Power Supply, Source Verification Report, 24590-QL-YQB-PB00-40029, Rev. 0, dated November 16, 2012, Source Verification Inspector Mike Graydon
- Consolidated Power Supply, Source Verification Report, 24590-QL-YQB-PB00-40026, Rev. 0, dated May 11, 2012, Source Verification Inspector Mike Graydon
- Consolidated Power Supply, Supplier Audit 24590-WTP-AR-QA-12-021, Performed June 12 through 14, 2012, CCN: 244489 dated July 5, 2012
- Energy & Process Corporation, Kick and Count Report, Checked by Jerry Thompson, November 19, 2012, 24590-WTP-MRR-PROC-0028626
- Energy & Process Corporation, Kick and Count Report, Checked by Jerry Thompson, February 13, 2013, 24590-WTP-MRR-PROC-0028740
- Energy & Process Corporation, Material Acceptance Plan, 24590-WTP-MAP-AS-04-00511, Rev. 3, January 17, 2012, 24590-WTP-MRR-PROC-0028626
- Energy & Process Corporation, Material Acceptance Plan, 24590-WTP-MAP-AS-04-00511, Rev. 3, January 17, 2012, 24590-WTP-MRR-PROC-0028740
- Energy & Process Corporation, Material Receiving Inspection Report, Inspector Bill Beem, December 12, 2012, 24590-WTP-MRR-PROC-0028626
- Energy & Process Corporation, Material Receiving Inspection Report, Inspector Erg Lopic, February 19, 2013, 24590-WTP-MRR-PROC-0028740
- Energy & Process Corporation, Material Receiving Receipt Report, Material Specialist Nikki Kinzer, December 13, 2012, 24590-WTP-MRR-PROC-0028626, S/S Piping/Bulk Material
- Energy & Process Corporation, Material Receiving Receipt Report, Material Specialist Kathy Allison, February 21, 2013, 24590-WTP-MRR-PROC-0028740
- Energy & Process Corporation, Material Receiving Report 24590-WTP-MRR-PROC-0028626, Rev. 0, dated December 12, 2012, S/S Piping/Bulk Material
- Energy & Process Corporation, Material Receiving Report 24590-WTP-MRR-PROC-0028740, Rev. 0, dated February 21, 2013
- Energy & Process Corporation, Purchase Order 24590-QL-FPA-PP00-00084, Rev. 1, dated July 27, 2010
- Energy & Process Corporation, Quality Verification Document, Supplier Quality Representative Mike Graydon, October 25, 2012, 24590-WTP-MRR-PROC-0028626
- Energy & Process Corporation, Quality Verification Document, Supplier Quality Representative Mike Graydon, February 5, 2013, 24590-WTP-MRR-PROC-0028740
- Energy & Process Corporation, Supplier Audit 24590-WTP-AR-QA-12-012, Performed April 17 through 19, 2012, CCN: 243221 dated June 7, 2012
- Energy & Process Corporation, Quality Manual Review, CCN: 244982, dated March 23, 2012, Manual 24590-WTP-VQP-QA-10-00027, Rev. 1
- Energy & Process Corporation, Supplier Deviation Disposition Request, 24590-WTP-SDDR-PL-11-00015 dated February 28, 2011, 24590-WTP-MRR-PROC-0028740
- Energy Northwest Standards Laboratory, American Association for Laboratory Accreditation (A2LA) Certification 2724.01 per CCN: 256310, dated April 30, 2013, BNI Surveillance 24590-WTP-SUV-13-013

- Energy Solutions Quality Manual Review, CCN: 221357, dated July 12, 2010, Manual 24590-WTP-VQP-QA-10-00001, Rev. 1
- Energy Solutions, Supplier Audit 24590-WTP-AR-QA-10-025, CCN: 222743, dated October 7, 2010
- Energy Solutions, Supplier Audit 24590-WTP-AR-QA-11-036, CCN: 232660, dated November 10, 2011
- Energy Solutions, Supplier Audit 24590-WTP-AR-QA-12-031, CCN: 249205 dated October 1, 2012
- IMR KHA-Portland, American Association for Laboratory Accreditation (A2LA) Certification 1140.07 per CCN: 241410, dated January 12, 2012, BNI Surveillance 24590-WTP-SUV-QA-057
- Invensys Systems, Inc, Material Receiving Report 24590-WTP-MRR-PROC-08862, Rev. 0, dated July 22, 2003, Software Accessories/Computer System
- Invensys Systems, Inc, Material Requisition 24590-QL-MRA-JD03-00001, Programmable Protection System – ITS (JFL1), Rev. 5, dated August 16, 2011
- Invensys Systems, Inc, Supplier Audit 24590-WTP-AR-QA-12-004, Rev. 1, CCN: 253249, dated November 20, 2012
- Invensys Systems, Inc, Technical Change Notice 24590-QL-MRA-JD03-00001-T0001, dated December 14, 2011
- Invensys Systems, Inc, Technical Change Notice 24590-QL-MRA-JD03-00001-T0002, dated May 1, 2012
- Invensys Systems, Inc, Technical Change Notice 24590-QL-MRA-JD03-00001-T0006, dated August 30, 2012
- Invensys Systems, Inc., Quality Manual Review, CCN: 244972, dated June 20, 2012, Manual 24590-WTP-VQP-QA-10-00061, Rev. 2
- Invensys Systems, Inc., Supplier Audit 24590-WTP-AR-QA-12-004, Performed January 24 through 26, 2012, and March 12 through 14, 2012, CCN: 253249, dated November 20, 2012
- Invensys Systems, Quality Manual Review, CCN: 212404, dated September 1, 2010
- Invensys Systems, Quality Manual Review, CCN: 212404, dated September 1, 2010
- Invensys Systems, Quality Manual Review, CCN: 244972, dated June 20, 2010
- Invensys Systems, Quality Manual Review, CCN: 244972, dated June 20, 2012
- Invensys Systems, Surveillance 24590-WTP-SUV-QA-11-024, Rev. 0, CCN: 232321, dated September 29, 2011
- Ithaca Materials Research and Testing Inc., American Association for Laboratory Accreditation (A2LA) Certifications 1140.01, 1140.02 per CCN: 243237, dated April 30, 2012, BNI Surveillance 24590-WTP-SUV-QA-12-009
- Lab Impex Systems, Material Requisition 24590-QL-MRA-JA03-00001, Rev. 0, dated August 27, 2009, Stack Discharge System
- Material Acceptance Plan Readiness Checklist and Readiness for Shipment Checklist, CCN: 254181, dated February 13, 2013, and CCN: 254186, dated March 21, 2013
- MWR-58739, Material Withdrawal Request, Multiple Units listed-Expired material
- NuWeld, Inc., Kick and Count Report, Checked by Bruce Shaw, February 13, 2012, 24590-WTP-MRR-PROC-0027762
- NuWeld, Inc., Kick and Count Report, Checked by Tony Harradon, January 5, 2012, 24590-WTP-MRR-PROC-0027590

- NuWeld, Inc., Material Acceptance Plan, 24590-WTP-MAP-AS-04-00165, Rev. 4, dated June 24, 2009, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Material Acceptance Plan, 24590-WTP-MAP-AS-04-00165, Rev. 4, dated June 24, 2009, 24590-WTP-MRR-PROC-0027762
- NuWeld, Inc., Material Receiving Inspection Report, Inspector Candace Pedersen, January 10, 2012, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Material Receiving Inspection Report, Inspector Michael Trevino, February 16, 2012, 24590-WTP-MRR-PROC-0027762
- NuWeld, Inc., Material Receiving Receipt Report, Material Specialist James Nygard, February 16, 2012, 24590-WTP-MRR-PROC-0027762
- NuWeld, Inc., Material Receiving Receipt Report, Material Specialist Nikki Kinzer, January 10, 2012, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Material Receiving Report 24590-WTP-MRR-PROC-0027590, Rev. 0, dated January 10, 2012, Offset Piping Assembly
- NuWeld, Inc., Material Receiving Report 24590-WTP-MRR-PROC-0027762, Rev. 0, dated February 16, 2012, Offset Piping Assembly
- NuWeld, Inc., Material Requisition 24590-QL-MRA-PY00-00004, Rev. 18, dated July 20, 2010
- NuWeld, Inc., Purchase Order 24590-QL-POA-PY00-00004, Rev. 33, dated September 4, 2012, Offset Piping Assemblies
- NuWeld, Inc., Quality Manual Review, CCN: 243944, dated January 24, 2012, and CCN: 249212, dated July 13, 2012, Manual 24590-WTP-VQP-QA-10-00013, Rev. 1
- NuWeld, Inc., Quality Verification Document, Supplier Quality Representative Paul Falbo, February 1, 2012, 24590-WTP-MRR-PROC-0027762
- NuWeld, Inc., Quality Verification Document, Supplier Quality Representative Paul Falbo, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Supplier Audit 24590-WTP-AR-QA-12-005, Performed January 24 through 26, 2012, CCN: 238244, dated February 24, 2012
- NuWeld, Inc., Supplier Deviation Disposition Request, 24590-WTP-SDDR-PL-11-00042 dated May 3, 2011, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Supplier Deviation Disposition Request, 24590-WTP-SDDR-PL-11-00043 dated May 3, 2011, 24590-WTP-MRR-PROC-0027590
- NuWeld, Inc., Supplier Deviation Disposition Request, 24590-WTP-SDDR-PL-11-00124 dated September 27, 2011, 24590-WTP-MRR-PROC-0027590
- Office of Inspector General (OIG) Issue Regarding Lack of Nuclear Safety Review of Revised Safety Related Documents, 12-WTP-0313, dated October 10, 2012
- Oregon Iron Works, Standard Form 1428, Surplus Government property dated January 9, 2013
- ORP Assessment Report A-12-WED-RPPWTP-004, Review of WTP Vendor Design Submittals, 12-WTP-0217, dated July 16, 2012
- ORP Audit U-12-ESQ-RPPWTP-002, DOE/ORP Procurement Process Vertical Slice Audit (Black Cell and Hard to reach Piping Both Quality and Commercial) of BNI, 12-QAT-0019, dated December 12, 2012
- ORP Letter 12-WTP-0399, dated December 19, 2012, Stop Work Recommendation and Basis, Gary E Brunson, WTP Engineering Division to Dr. Steven Chu, Secretary of Energy

- ORP Surveillance S-13-QAT-RPPWTP-001, DOE/ORP Surveillance of BNI Emergency Turbine Generator Procurement Activities, 13-QAT-0015
- ORP Surveillance, S-13-QAT-RPPWTP-001, Surveillance of Bechtel National Inc. (BNI) Emergency Turbine Generator Procurement Activities, dated April 25, 2013
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- 24590-WTP-PIER-MGT-09-0658-D Limit Leak Flowrate in NOx and NH3 Affected Rooms, April 30, 2009
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- A-10-ESQ-RPPP-WTP-003-F01 0
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 - WTP Performance Improvement Review Board Meeting, May 14, 2013
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 - 24590-WTP-PIER-MGT-13-0438-D, Corrective Action Description in CAP Improvement Opportunity, April 11, 2013
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- 24590-WTP-PIER-MGT-10-1067-C, user information form (UIF) for Software Used in Calculations is Not Referenced in Calculations, October 18, 2010
- 24590-WTP-PIER-MGT-10-1060-D, Design Changes from Revised Dose Rate Calculations not Formally Transmitted to Engineering, October 18, 2010
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- 24590-WTP-SAR-QPA-11-0003, Sept 2010 through Aug 2011 PIER Customer Satisfaction, October 3, 2011
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- 24590-WTP-PIER-MGT-12-0457-A, Finding S-12-WED-RPPWTP-012-F02, Priority Level 1 Finding – Surveillance Report “Review of WTP Plant Design and Safety Margin Management, and Request for Actions to Address Cumulative Management and Performance Concern,” April 3, 2012
- S-12-NSD-RPPWTP-001-F01, Surveillance of BNI's Evaluation of Black Cell Discharge Nozzle, Pipe, and Vessel Erosion Allowances to Support the Documented Safety Analysis - Programmatic Non-Compliance with QAM, March 19, 2012
- 24590-WTP-PIER-MGT-12-1454-A, Finding S-12-NSD-RPPWTP-001-F02, Priority Level 1 – DOE Surveillance of BNI Evaluation of Black Cell Discharge Nozzle, Pipe, and Vessel Erosion Allowances to Support documented safety analysis (DSA), December 12, 2012
- S-12-NSD-RPPWTP-001-F02, Surveillance of BNI's Evaluation of Black Cell Discharge Nozzle, Pipe, and Vessel Erosion Allowances to Support the Documented Safety Analysis - Conservative Material Confirmation, March 19, 2012
- 24590-WTP-PIER-MGT-12-1454-A, Finding S-12-NSD-RPPWTP-001-F02, Priority Level 1 – DOE Surveillance of BNI Evaluation of Black Cell Discharge Nozzle, Pipe, and Vessel Erosion Allowances to Support DSA, December 12, 2012
- A-12-WED-RPPWTP-004-F05, Review of WTP Vendor Design Submittals - Lack of Compliance with Contract Requirements – Compliance, July 16, 2012
- 24590-WTP-PIER-MGT-12-1939-B, DOE Level 1 Finding: Vendor Design Submittal Finding F05
- 24590-WTP-PIER-MGT-12-1102-C, CNS SASSI Assessment (S.F.) – F01 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1103-C, CNS SASSI Assessment (S.F.) – F02 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1104-C, CNS SASSI Assessment (S.F.) – F03 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1105-C, CNS SASSI Assessment (S.F.) – F04 Level 2, September 13, 2012

- 24590-WTP-PIER-MGT-12-1106-C, CNS SASSI Assessment (S.F.) – F05 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1107-C, CNS SASSI Assessment (S.F.) – F06 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1108-C, CNS SASSI Assessment (S.F.) – F07 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1109-C, CNS SASSI Assessment (S.F.) – F08 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1110-D, CNS SASSI Assessment (S.F.) – F09 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1111-C, CNS SASSI Assessment (S.F.) – F10 Level 2, September 13, 2012
- 24590-WTP-PIER-MGT-12-1111-C, CNS SASSI Assessment (S.F.) – F11 Level 2, September 13, 2012.



OFFICE OF RIVER PROTECTION

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JUL - 2 2013

13-QAT-0018

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION (ORP) SURVEILLANCE REPORT S-12-TRS-RPPWTP-003, FOCUSED PROCUREMENT PROCESS VERTICAL SLICE SURVEILLANCE OF BECHTEL NATIONAL, INC. (BNI) VESSEL PROCUREMENTS FROM JOSEPH OAT CORPORATION (JOC)

This letter transmits ORP Surveillance Report S-12-TRS-RPPWTP-003 (formerly designated as S-12-TRS-RPPWTP-002). This surveillance focused on the BNI procurement process for black cell vessels being procured from JOC. The team used the vertical slice surveillance audit technique which evaluated the procurement process from the initial preparation of the procurement contract, including incorporation of requirements, Material Acceptance Plan development, and designation of supplier required submittals, up to preparation of the Quality Verification Document package required for release to ship. Factual accuracy comments were requested of BNI staff; however, no response was provided to the surveillance team leader.

During the review, the surveillance team identified two Priority Level 2 findings, two Priority Level 3 findings, nine Opportunities for Improvement (OFI), and two Assessment Follow-up Items. The Priority Level 2 findings address issues discovered with respect to BNI instructions to (b)(6) and the performance of (b)(6)

The Priority Level 3 findings address a range of less significant deficiencies associated with supplier oversight and reviews of supplier submittals. The OFIs document observations of areas where increased rigor and attention to detail in supplier management activities can ensure more significant supplier deficiencies are discovered and corrected.

Within 45 days of receipt of this letter, BNI should respond to Findings S-12-TRS-RPPWTP-003-F01 and F02 noted in the report. For each finding, provide a corrective action plan that includes:

- Immediate and remedial actions to correct the specific deficiencies identified in each finding;
- The extent of condition, including a summary of how the extent of condition was established;
- The apparent cause(s) of the finding;

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- Corrective actions to correct the condition and cause(s) to prevent further findings; and
- The date when all corrective actions will be completed, verified, and compliance to applicable requirements achieved.

No response is required for the Priority Level 3 findings. The Priority Level 3 findings shall be entered into your corrective action management system and tracked until the identified issues are corrected.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Jeffrey D. May, Supervisor, Quality Assurance Team, (509) 373-7884.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

QAT:WBS

Attachment

cc w/attach:

L. W. Baker, BNI
M. S. Cochrane, BNI
S. C. Foelber, BNI
A. E. French, BNI
D. E. Kammenzind, BNI
F. M. Russo, BNI
L. M. Weir, BNI
D. M. Gutowski, DNFSB
R. G. Quirk, DNFSB
M. D. Evarts, NWS
J. B. Reiten, NWS
BNI Correspondence

Attachment
13-QAT-0018
(32 Pages)

Focused Procurement Process Vertical Slice Surveillance of Bechtel
National, Inc. Vessel Procurements from Joseph Oat Corporation

Surveillance Report S-12-TRS-RPPWTP-003

Surveillance Report Number: S-12-TRS-RPPWTP-003

Organization: Quality Assurance

Integrated Assessment Schedule Number: 475

Title: Focused Procurement Process Vertical Slice
Surveillance of Bechtel National, Inc. Vessel
Procurements from Joseph Oat Corporation

Date(s): September 11 through 13, 2012

Lead(s): Walter Scott, ORP, Team Leader
Ivan Bolanos, ORP, WTP Engineering Subject
Matter Expert
Jeff Reiten, North Wind Services, Auditor
Mike Evarts, Lucas Engineering and
Management Services, Welding Subject
Matter Expert

LIST OF ACRONYMS

AFI	Assessment Follow-up Item
ATL	Audit Team Lead
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
BNI	Bechtel National, Inc.
CGD	Commercial Grade Dedication
CGIC	Commercial Grade Item Certificate
CMTR	Certified Material Test Report
DOE	U.S. Department of Energy
HLW	High-Level Waste
HTR	Hard-to-Reach
JOC	Joseph Oat Corporation
MAP	Material Acceptance Plan
MR	Material Requisition
NDE	Nondestructive Examination
NIAC	Nuclear Industry Assessment Committee
OFI	Opportunity for Improvement
ORP	Office of River Protection
PIER	Project Issues Evaluation Report
PJV	Pulse Jet Ventilation System
PMI	Positive Material Identification
PO	Purchase Order
PT	Liquid Penetrant Examination
QA	Quality Assurance
QAM	Quality Assurance Manual
QC	Quality Control
QVD	Quality Verification Document
RE	Responsible Engineer
RFD	Reverse Flow Diverters
SDDR	Supplier Deviation Disposition Request
SME	Subject Matter Expert
SQR	Supplier Quality Representative
SVR	Source Verification Report
TCN	Technical Change Notice
UT	Ultrasonic Test
VT	Visual Examination
WTP	Waste Treatment and Immobilization Plant

EXECUTIVE SUMMARY

Introduction and Scope

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted a focused vertical slice surveillance of the Bechtel National, Inc. (BNI) procurement process for black cell vessels, designated as safety class, from Joseph Oat Corporation (JOC), located in Morristown, New Jersey. These vessels were for installation in the Waste Treatment and Immobilization Plant (WTP) being constructed by BNI in Richland, Washington. The surveillance was conducted from September 11 through 13, 2012. The ORP surveillance team evaluated BNI's flowdown of requirements and BNI's and JOC's implementation of procedures and effectiveness in meeting procurement process requirements contained in DOE O 414.1C, "Quality Assurance" (the DOE Order currently cited in the BNI contract); 10 CFR 830, "Nuclear Safety Management," and the American Society of Mechanical Engineers (ASME) NQA-1-2000, "Quality Assurance Requirements for Nuclear Facility Applications," as delineated in 24590-WTP-QAM-QA-06-001, "Bechtel National, Inc. Quality Assurance Manual," (QAM).

This surveillance focused on the BNI procurement process for black cell vessels from JOC through the utilization of the vertical slice surveillance audit technique that evaluated the procurement process from the initial preparation of the procurement contract including incorporation of requirements, Material Acceptance Plan (MAP) development, and designation of supplier required submittals up to preparation of the Quality Verification Document (QVD) package required for release to ship.

The following vessels and equipment were being procured from JOC:

- RLD-VSL-00007, High-Level Waste (HLW) Acidic Waste Vessel;
- PJV-DMST-00002A, Pulse Jet Ventilation System (PJV) Demisters;
- PJV-DMST-00002B, PJV Demisters; and
- PJV-DMST-00002C, PJV Demisters.

The scope of the surveillance included:

- Contract provisions for Technical, Quality Assurance (QA) program, and documentation/records requirements;
- MAP preparation and selection of MAP criteria;
- Preparation, completion, and selection of criteria of the QVD (i.e., G-321-E and G-321-V Forms);
- BNI receipt, final review, and control of supplier-generated documents;
- Source verification including, MAP completion, G-321-V QVD completion, Supplier Quality Representative and Nondestructive Examination (NDE) qualifications and certifications; and
- Evaluation of NDE Service Providers.

The surveillance team interviewed BNI personnel, evaluated BNI implementation of procedures and processes, and reviewed objective evidence. In addition, the surveillance team evaluated

BNI's flowdown of requirements into the procurement documents including the MAP, and the G-321-E and G-321-V forms, as defined in BNI's QAM, and implementing procedures. The surveillance team documented four findings (two Priority Level 2 and two Priority Level 3), nine Opportunities for Improvement (OFI), and two Assessment Follow-up Items (AFI) as shown in the following section.

Presentation of Issues

Finding S-12-TRS-RPPWTP-003-F01 (Priority Level 2): The BNI MAP-AS-05-00026, Revision 2, did not provide sufficient instructions to (b)(6) to assure materials used in the RLD-VSL-00007 vessel were (b)(6)

(b)(6)

Finding S-12-TRS-RPPWTP-003-F02 (Priority Level 2): The ORP surveillance team found four instances where the BNI (b)(6)

(b)(6)

Finding S-12-TRS-RPPWTP-003-F03 (Priority Level 3): Material Acceptance Plans were required to be developed specifically for the particular characteristics associated with each Material Requisition/Commercial Dedication Material Requisition/Field Material Requisition. BNI used Material Acceptance Plan 24590-WTP-MAP-AS-04-00224, "Pressure Vessels, Shop Fabricated, Medium," Revision 6, for both the RLD-VSL-00007 and RLD-VSL-00008 Vessels even though the RLD-VSL-00007 vessel was deleted from the Material Requisition, and each vessel's procurement and fabrication process was unique and involved different circumstances.

Finding S-12-TRS-RPPWTP-003-F04 (Priority Level 3): Project Issues Evaluation Report, 24590-WTP-PIER-MGT-12-0473-C, Action 2, required a complete and satisfactory quality verification document package for the formed head from Bendalls. The quality verification document package used to transfer the RLD-VSL-00008 vessel head from Bendalls to Joseph Oat Corporation was marked "preliminary," contrary to the requirement of Action 2 of 24590-WTP-PIER-MGT-12-0473-C that required a complete and satisfactory quality verification document package for the formed head.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O01: BNI did not use the same approach for closing corrective actions that are similar or involve similar issues. The approach BNI used to close 24590-WTP-PIER-MGT-12-0473-C actions associated with receiving and accepting the RLD-VSL-00007 vessel formed head was not consistent with the approach used for the actions associated with the receipt and acceptance of the Reverse Flow Diverters and Ejectors.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O02: BNI's performance of supplier commercial grade dedication package reviews was not always rigorous or detailed. BNI approved the Joseph Oat Corporation, JP-2693-3, Commercial Grade Dedication Plan that was missing the requirement to verify that all the stainless steel material had less than three percent carbon content.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O03: BNI's Material Acceptance Plan and contract specifications were not always aligned and consistent.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O04: BNI's inspections and audits of supplier records storage areas were not rigorous or detailed. Joseph Oat Corporation quality assurance records were not maintained in a manner that minimized the risk of damage or destruction.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O05: BNI was not rigorous in tracking areas reviewed or not reviewed during audits to ensure areas that were not reviewed are reviewed during subsequent audits.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O06: BNI's review of supplier audits of subtier suppliers was not detailed and lacked rigor.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O07: BNI's review of supplier nondestructive examination personnel qualifications was not always rigorous or detailed.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O08: BNI's reviews of supplier nondestructive examination personnel certification records were not always rigorous or detailed.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O09: BNI's review of the Joseph Oat Corporation process for qualifying suppliers was not rigorous or detailed.

Assessment Follow-up Item S-12-TRS-RPPWTP-003-A01: BNI was not rigorous or detailed in assuring that visual examinations are performed in accordance with all contract specifications. This issue was previously identified by BNI in a Project Issues Evaluation Report and this Assessment Follow-up Item is to track issuance of the specified technical change notice for revising Purchase Order 24590-QL-MRA-MVA0-00027 to Joseph Oat Corporation to delete the requirement for using American Welding Society D1.6.

Assessment Follow-up Item S-12-TRS-RPPWTP-003-A02: BNI did not assure that Joseph Oat Corporation issued and BNI approved a Supplier Deviation Disposition Request to allow ultrasonic testing in lieu of radiography for joints that are not conducive to radiography.

Conclusions

With the exceptions documented in this report, the surveillance team concluded the BNI procurement processes and procedures for black cell vessels from JOC were adequate, however, weaknesses in the performance and compliance with procedures were identified that need correction.

Report Details

The surveillance team conducted interviews with BNI personnel, witnessed work activities, reviewed documents, and evaluated BNI's procedures within the following areas of BNI's procurement process. The following section is a summary of the surveillance results:

Map Preparation And Selection Of Map Criteria

The surveillance team reviewed the implementation of the BNI MAP process found in Procedure 24590-WTP-GPP-MGT-013, "Acceptance of Procured Material." MAPs were developed through an evaluation of approved technical requirements from applicable specifications, drawings, codes, and standards. MAPs were integrated planning documents in which quality acceptance attributes and/or activities were documented by the project team for verification and ultimate acceptance of procured material, and from which each designated functional organization performed assigned responsibilities. MAPs were further utilized for quality acceptance verification of procured material during the material receiving process.

The surveillance team evaluated the development of MAPs by reviewing the implementation of the technical requirements. This was done by comparing the issued versions of MAPs against the requirements in the related technical specifications and purchase order technical notes. The flowdown of applicable codes and standards and upper level project requirements (Safety Requirements Document and Basis of Design) used in developing the requirement specifications was also reviewed. Two completed MAPs for JOC commodities were evaluated to ensure conformance to specified requirements beginning with the initial concurrence and approval and continuing through implementation of assigned oversight by the various responsible functional organizations, and finally to the verification and/or acceptance activities.

During interviews with BNI personnel and reviews of documentation, the surveillance team determined that BNI's MAP did not provide sufficient detail to (b)(6)

(b)(6) to assure materials used on the RLD-VSL-00007 vessel (b)(6)
(b)(6)

BNI-issued MAP 24590-WTP-MAP-AS-10-00035, Step 3, only required (b)(6)

(b)(6)

(b)(6) As a result, Finding S-12-TRS-RPPWTP-003-F01 was documented by the surveillance team.

In addition, the surveillance team also discovered that MAP 24590-WTP-MAP-AS-04-00224, Revision 6, was used as the single MAP for both vessels RLD-VSL-00007 and

RLD VSL-00008 even though each vessel's procurement and fabrication process involved unique and specific circumstances.

Procedure 24590-WTP-GPP-MGT-013 required that a MAP be utilized for each Material Requisition (MR)/Commercial Dedication Material Requisition/Field Material Requisition. A single MAP for both vessels was not the best approach to handle the material acceptance aspects of vessels RLD-VSL-00007 and RLD-VSL-00008 since these vessels no longer shared the same fabricator, were in completely different stages of fabrication, and had distinct fabrication challenges that needed to be addressed prior to acceptance. Furthermore, these vessels had different materials of fabrication, which could impact the applicability and selection of critical attributes that warrant independent verification. The surveillance team was aware that at one point MR 24590-QL-MRG-MVA0-00002 identified both vessels; however, Revision 4 of the document removed vessel RLD-VSL-00007 from the order.

Procedure 24590-WTP-GPP-MGT-013 also required the MAP development process to identify any special requirements, instructions, sampling methods/techniques, or other unique conditions associated with verification/acceptance activities. Based on the unique set of circumstances surrounding the fabrication and acceptance of vessels RLD-VSL-00007 and RLD-VSL-00008 (transfer of fabrication scope from a foreign to a national vendor and unresolved technical issues), a single MAP was not the best approach to capture all of the critical attributes associated with each vessel that warrant independent verification prior to equipment acceptance by WTP. As a result, Finding S-12-TRS-RPPWTP-003-F03 was documented by the surveillance team.

The surveillance team reviewed the approach used to close 24590-WTP-PIER-MGT-12-0473-C actions associated with BNI's receipt and acceptance of the RLD-VSL-00007 formed head after shipment from Bendalls to JOC. Those actions were not consistent with the approach used for receipt and acceptance of the Reverse Flow Diverters (RFD) and ejectors.

BNI initiated Project Issues Evaluation Report (PIER) 24590-WTP-PIER-MGT-12-0473-C to document that there was no evidence of a formal receipt inspection or acceptance of the RDL-VSL-00007 formed head at the JOC job site by BNI. As part of the investigation, BNI looked into the ejectors and RFDs for the vessel as well. BNI indicated the RFDs and ejectors had been received on the project as evidenced by two Material Receiving Reports (MRR-09654 and MRR-16908), which indicated the equipment was accepted by BNI from AEA Technology Engineering Services, Inc. (the original supplier) prior to being sent to the initial vendor [Bendalls] and the subsequent vendor [JOC] for use in the vessel. BNI did not follow the same approach to address receipt issues for the RLD-VSL-00007 formed head since they did not complete a formal receipt process, an inspection, or an acceptance of the head from the original overseas fabrication shop [KONIG + CO.] prior to shipment to Bendalls and then to JOC for use in the vessel. There were no extent-of-condition actions documented in this PIER. As a result, OFI S-12-TRS-RPPWTP-003-O01 was documented by the surveillance team.

In addition, during interviews with BNI personnel and reviews of documentation, the surveillance team found that PIER 24590-WTP-PIER-MGT-12-0473-C, Action 2 required a

complete and satisfactory QVD package for the formed head from Bendalls, yet only a "Preliminary" copy of the QVD was provided by Bendalls when the head was shipped to JOC.

It was not clear that Action 2 of PIER 24590-WTP-PIER-MGT-12-0473-C was completely addressed by the PIER verification process because the action required the complete and satisfactory QVD package for the formed head from Bendalls, but the verification statement indicated only a preliminary RLD-VSL-00007 head QVD (Revision 1) was reviewed. As a result, Finding S-12-TRS-RPPWTP-003-F04 was documented by the surveillance team as a noncompliance with 24590-WTP-GPP-MGT-043, "Corrective Action Management," Section 5.4.3, Step 10.

Results

With the exception of Finding S-12-TRS-RPPWTP-003-F01, Finding S-12-TRS-RPPWTP-003-F03, OFI S-12-TRS-RPPWTP-003-O01, and Finding S-12-TRS-RPPWTP-003-F04 the surveillance team found that flowdown of requirements into procedures and processes to be adequate. However, overall performance and compliance with BNI Procedure 24590-WTP-GPG-MGT-013 for MAPs was weak and in need of improvements, but marginally acceptable.

Preparation, Completion, and Selection of Criteria for the G-321-E and G-321-V Forms

The surveillance team reviewed the BNI process for receipt, review, and approval of Supplier G-321-E submittals. The processing and review of Supplier G-321-E submittals were implemented through BNI Procedures 24590-WTP-GPG-ENG-037, "Supplier Document Request and Review," 24590-WTP-3DP-G04B-00058, "Supplier Engineering and Quality Verification Documents," and 24590-WTP-GPP-PADC-010, "Supplier and Subcontractor Submittal Document Control."

The G-321-E forms were attached to the MR and summarized the engineering documentation requirements for supplier submittals. Completed supplier submittals (either in hard or electronic copy) received by the supplier were required to be logged by the BNI Project Archive and Document Control into the Electronic Document Management System. Responsibility for coordination, review, and acceptance of supplier submittals resided with the Responsible Engineer (RE) or Engineering Subcontract Technical Representative, with input from other organizations, when required.

During interviews with BNI personnel and reviews of documentation, the surveillance team discovered that JOC had not completed (b)(6)

(b)(6) vessel RLD-VSL-00007. Even so, the BNI (b)(6) (b)(6) that the (b)(6) The (b)(6)

(b)(6) This is one instance of the (b)(6) (b)(6) (b)(6) (b)(6) and is addressed in Finding S-12-TRS-RPPWTP-003-F02.

The surveillance team also found that BNI approved the JOC CGD Plan, JP-2693-3, that did not include the requirement to assure that all of the stainless steel material had less than three percent carbon content, as required by 24590-HLW-MVD-RLD-00005, "Bechtel National, Inc.'s Mechanical Systems Data Sheet [Vessel]," Revision 10. Because there was no objective evidence that JOC had purchased stainless steel material that had more than three percent carbon, this was considered an OFI. As a result, OFI S-12-TRS-RPPWTP-003-002 was documented by the surveillance team.

The surveillance team reviewed Purchase Order (PO) 24590-QL-MRA-MVA0-00027. The PO included Technical Note 1.5.26, which stated "Visual examination (VT) shall be performed in accordance with AWS D1.6:1999." JOC Procedure QC-2693-60 used acceptance criteria from ASME Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Pressure Vessels, and did not include the requirements of American Welding Society (AWS) D1.6:1969. The AWS requirements were over and above the requirements of the ASME Section VIII code.

BNI had already documented this issue in their PIER system and was awaiting issuance of a Technical Change Notice (TCN) to JOC. Action Item 3 of PIER 24590-MGT-12-0598-A stated that a TCN was being written to address the technical note in the PO requiring all welds to meet AWS D1.6. The PIER was written prior to the surveillance team going to JOC. As a result, AFI S-12-TRS-RPPWTP-003-A01 was documented by the surveillance team for later verification that the TCN had been issued.

BNI Specification 24590-WTP-3PS-MV00-T0001, "Pressure Vessel Design and Fabrication," stated that radiography was the preferred method of volumetric testing. Where it was considered impractical to perform radiographic examination due to joint configuration, the specification allowed the seller to propose ultrasonic examination. However, JOC did not prepare and submit to BNI a Supplier Deviation Disposition Request (SDDR) to obtain approval to use ultrasonic examination in-lieu of radiography for joints where the configuration was not conducive for radiography. Previously, BNI had documented the same issue in PIER 24590-WTP-PIER-MGT-12-0882-B for another fabricator that also did not use an SDDR to obtain permission to use ultrasonic examination. Since the PIER was a Level B PIER, BNI was required to perform an extent of condition. This issue, therefore, should be part of the corrective actions of PIER 24590-PIER-MGT-12-0882-B. As a result, AFI S-12-TRS-RPPWTP-003-A02 was identified by the surveillance team to assure that the JOC SDDR issue was investigated and appropriate corrective actions were identified and implemented.

Results

With the exception of (b)(6) cited in Finding S-12-TRS-RPPWTP-003-F02, OFI S-12-TRS-RPPWTP-003-002, AFI S-12-TRS-RPPWTP-003-A01, and AFI S-12-TRS-RPPWTP-003-A02, the surveillance team found overall processes and procedures adequate but in need of improvement to eliminate weaknesses in the processes. The surveillance team concluded that performance in compliance with the BNI Procedures 24590-WTP-GPG-ENG-037, 24590-WTP-3DP-G04B-00058, and

24590-WTP-GPP-PADC-010 for Supplier G-321-E submittals was adequate, but also in need of significant improvement to correct performance weaknesses.

Source Verification Including, Map Completion, G-321-V QVD Completion, Documentation/Records

The surveillance team reviewed the BNI process for performing (b)(6)
(b)(6)

The surveillance team interviewed (b)(6) and (b)(6). During the interview, the BNI staff stated that (b)(6)

According to the BNI procedural requirements, (b)(6) were required to be performed (b)(6) by the (b)(6) to assure the following:

- (b)(6)
-
-
-
-

Results of the (b)(6) were required to be documented in (b)(6). Upon satisfactory completion of all prerequisites, (b)(6)
(b)(6)

The surveillance team evaluated 11 (b)(6) and 28 (b)(6) (b)(6) in accordance with approved MAPs, procurement documents, and procedures.

(b)(6) (b)(6) were required to be reviewed progressively by (b)(6) throughout the assignment and, as required, documents were presented to (b)(6). Upon completion of this review, the surveillance team verified that (b)(6) in accordance with BNI Procedure (b)(6).

Examples included the following:

- JOC [VT] NDE Report, Job 2693-3A, Weld 101, dated February 7, 2012;
- JOC Liquid Penetrant Examination (PT) NDE Report, Job 2693-3A, Weld 101, dated February 7, 2012;
- JOC [VT] NDE Report, Job 2693-3C, Weld 101, dated February 7, 2012;
- JOC [PT] NDE Report, Job 2693-3C, Weld 101, dated February 7, 2012;
- JOC [VT] NDE Report, Job 2693-3D, Weld 101, dated February 7, 2012; and
- JOC [PT] NDE Report, Job 2693-3D, Weld 101, dated February 7, 2012.

However, the surveillance team found three PT reports and three VT reports had been

(b)(6) were, in fact, unfinished and incomplete documents not yet appropriate for such review. Therefore, (b)(6) completed and approved by JOC prior to BNI (b)(6) review and acceptance. (b)(6) failure to accurately follow procedures was the fourth (b)(6) failure instance cited in Finding S-12-TRS-RPPWTP-003-F02.

The surveillance team reviewed MAPs associated with the demisters (PJV-DMST-00002A, PJV-DMST-00002B, and PJV-DMST-00002C) and the HLW Acid Waste Vessel RLD-VSL-00007. Step 6 of MAP-AS-05-00026 required first operation (b)(6).

(b)(6) However, Table 1 of Specification 24590-WTP-3PS-G000-T0002, (b)(6) for Shop Fabrication," did not require (b)(6) for 304 and 304L stainless steel components in non-black cell and Hard-to-Reach (HTR) areas. During an interview with the BNI RE, the surveillance team found that BNI had not notified JOC that the demisters (PJV-DMST-00002A, PJV-DMST-00002B, and PJV-DMST-00002C) were HTR components. This condition was previously documented on 24590-WTP-PIER-12-0896-C, "Inclusion of Hard-to-Reach Requirements for PJV-DMST-00002 A/B/C and PJV-HEME-00001 A/B/C," dated July 19, 2012. As a result, BNI was in the process of preparing and issuing updated equipment datasheets for the demisters to incorporate HTR requirements in the associated material requisitions. As a result, OFI S-12-TRS-RPPWTP-003-003 was documented by the surveillance team.

The surveillance team inspected in-process QA records in several locations at JOC. Given the recent interpretation from the NQA-1 committee that radiographs are QA records, the surveillance team specifically inspected the storage of radiographs associated with WTP project work. JOC stored radiographs and other NDE records in the shop Quality Control (QC) office, located upstairs from the main shop area in an alcove adjacent to the QC office. The records were stored on open shelving, some in plastic bins, some laid flat on the shelving, and some records in binders on the shelves. The area was dirty, infested with spiders (as evidenced by the cobwebs), and exposed to a direct vent to the shop below. There

was a wall-mounted air conditioning unit in the QC office that provided cooling in the summer months. This condition was discussed during the surveillance with BNI. As a result, JOC elected to move the records to one-hour fire rated file cabinets in a more controlled environment prior to the conclusion of the surveillance fieldwork. This condition resulted in OFI S-12-TRS-RPPWTP-003-O04.

Upon discovery of the storage conditions noted above, the surveillance team investigated whether previous BNI oversight activities reviewed the in-process records storage conditions. The surveillance team found that a previous BNI audit in 2011 (24590-WTP-AR-QA-11-005, "Issuance of Joseph Oat Corporation Audit Report") did not include a welding/NDE Subject Matter Expert (SME) and, consequently, contained no information regarding NDE records storage. Subsequently, in 2012, Surveillance 24590-WTP-SUV-QA-12-021, "Issuance of Joseph Oat Corporation Surveillance Report," was performed with a weld/NDE SME. Again, NDE QA records were not discussed in the report or checklist. Nevertheless, both the audit and the surveillance reports concluded that JOC met QA records requirements. This condition resulted in OFI S-12-TRS-RPPWTP-003-O05.

The surveillance team reviewed JOC procurements for compliance with NQA-1 procurement requirements. JOC issued PO 066332-00 (no revision number) to South Jersey Welding on July 19, 2012. The PO required "all weld wire shall be supplied in accordance with your [South Jersey Welding] audited quality assurance program that meets NQA-1. Use only Joseph Oat audited mills for wire. Certified mill test reports are required showing actual test results." Further, South Jersey Welding was listed on JOCs Active Qualified Suppliers List as an NQA-1 supplier. The surveillance team found, however, that the JOC audit of South Jersey Welding was performed using a single-page checklist based on the material upgrade requirements contained in the ASME "Boiler and Pressure Vessel Code," Subsection NCA, "Rules for Construction of Nuclear Facility Components, Article NCA-3800, Responsibilities of Material Organizations." The JOC checklist did not identify any NQA-1 criteria. This resulted in OFI S-12-TRS-RPPWTP-003-O06.

Results

In summary, with the exceptions of these instances of (b)(6) failures to follow procedures cited in Finding S-12-TRS-RPPWTP-003-F02, OFI S-12-TRS-RPPWTP-003-O03, OFI S-12-TRS-RPPWTP-003-O04, OFI S-12-TRS-RPPWTP-003-O05, and OFI S-12-TRS-RPPWTP-003-O06, the surveillance team found that overall the overall processes and procedures (24590-WTP-GPP-PSQ-043, 24590-WTP-GPP-PSQ-042, and WTP-GPP-PSQ-044 for (b)(6)) adequately flowed down the requirements, however, (b)(6) implementation and performance in compliance with approved procedures had significant weaknesses and needed improvement. The surveillance team concluded that with the significant self-imposed delays in procurements and suspensions of critical procurements now being experienced by the project, BNI has sufficient time to implement remedial and corrective actions prior to resumption of significant procurement releases.

Qualifications and Certifications of BNI Supplier Quality Representatives

The surveillance team reviewed the BNI training and qualification process to determine whether supplier quality personnel performing source verification activities were qualified as required in BNI Procedure 24590-WTP-GPP-PSQ-011, "Supplier Quality Personnel Training and Qualification."

The surveillance team interviewed the BNI Supplier Quality Manager and evaluated documents related to the training and qualification of supplier quality personnel as defined in BNI Procedure 24590-WTP-GPP-PSQ-011. The team focused their evaluation on the training and qualification documents for SQRs. A sampling of three Level II mechanical SQR qualification and training packages were evaluated. Individuals reviewed were selected from actual source verification activities associated with the Acid Waste Vessel and PJV demisters reviewed during this surveillance.

Qualifications were verified by the surveillance team through a review of required education and experience, satisfactory completion of visual acuity examination, acceptable completion of required on-the-job training, and successful completion of subject area written examinations.

Results

In summary, the surveillance team found overall compliance to and implementation of the BNI Procedure 24590-WTP-GPP-PSQ-011 adequate, satisfactory, and effective.

Evaluation and Qualification of Joseph Oat Corporation Nondestructive Examination Personnel, Inspection and Test Personnel, and Lead Auditor Personnel

The surveillance team reviewed the JOC training and qualification process to verify that NDE, inspection and test, and auditor personnel were qualified as defined in JOC Procedures SP-1579, "Qualification and Certification of Nondestructive Examination Personnel," SP-1562, "Training and Qualification of Inspection, Examination and Testing Personnel," and SP-1560, "Training and Qualification of Auditors."

The surveillance team interviewed the JOC QA manager and evaluated documents related to the training and qualification of personnel as defined in the JOC procedures. The surveillance team reviewed qualification records for five JOC NDE technicians, four JOC inspection and test personnel, and three JOC auditors. All individuals were selected from completed NDE, inspection, and auditing records associated with the Acid Waste Vessel and PJV demisters reviewed during this surveillance.

Qualifications were verified by the surveillance team through a review of applicable education and experience, satisfactory completion of visual acuity examination, acceptable completion of required on-the-job training, and successful completion of subject area written examinations as required by JOC Procedures SP-1579, SP-1562, and SP-1560.

The results of the review determined that the three JOC auditor qualifications were satisfactory. However, a review of the five JOC NDE technician qualifications found that the results of required physical examinations (i.e., eye exams) were not documented on individual "Letters of Certification" for JOC NDE personnel qualifications records as required by JOC Procedure SP-1579. In addition, the review of the four JOC inspection and test personnel qualification records revealed that the individuals being certified were not being recorded on individual "Certifications of Qualification" for JOC NQA-1 personnel "Floor Inspector" qualification records as required by JOC Procedure SP-1562.

In addition, the surveillance team found that BNI had performed a previous audit of JOC (24590-WTP-AR-QA-11-005) and two previous surveillances of JOC (24590-WTP-SUV-QA-12-021 and 24590-WTP-SUV-QA-11-036, "Issuance of Joseph Oat Corporation Surveillance Report)." During these assessments, a review of NDE requirements was performed for JOC NDE technicians and inspection and test personnel. The results of this BNI review were determined to be satisfactory without identifying the deficiencies noted by the surveillance team.

As a result, OFI S-12-TRS-RPPWTP-003-007 and OFI S-12-TRS-RPPWTP-003-008 were documented by the surveillance team. In addition, it should be noted that PIER 24590-WTP-PIER-12-1051-B was initiated by BNI as a result of ORP's earlier Surveillance, S-12-ESQ-RPPWTP-001, of Northwest Copper Works documenting similar conditions.

The surveillance team reviewed several JOC supplier qualifications and found three suppliers that were qualified using the Nuclear Industry Assessment Committee (NIAC) process. The team reviewed JOC Procedure SP-1544, "Evaluation of NIAC Reports," for using suppliers qualified by NIAC. The surveillance team found that the NIAC reports used to accept the qualifications of these three suppliers to JOC contained insufficient levels of detail to provide a basis for acceptance of the reports and the companies as suppliers. For example, only one of the three supplier reports used to qualify the suppliers by NIAC audits had the required cross-reference table showing which sections of the NIAC audit checklist addressed the required sections of NQA-1. Additionally, the edition of NQA-1 was not specified in the cross-reference table. The surveillance team found no evidence that BNI had reviewed this procedure for adequacy of supplier qualification. This condition is documented in OFI S-12-TRS-RPPWTP-003-009.

Results

In summary, the surveillance team found JOC NDE, inspection and test, and lead auditor personnel qualification processes and procedures compliant with upper level requirements. However, OFIs S-12-TRS-RPPWTP-003-007, S-12-TRS-RPPWTP-003-008, and S-12-TRS-RPPWTP-003-009, demonstrated minor implementation and performance weaknesses in the overall compliance to JOC Procedures SP-1579, SP-1562, and SP-1560.

Findings, Opportunities for Improvement, and Assessment Follow-Up Items

Finding S-12-TRS-RPPWTP-003-F01 (Priority Level 2): BNI Material Acceptance Plan

MAP-AS-05-00026, Revision 2, did not provide sufficient instructions to (b)(6)

(b)(6) to assure materials used in the RLD-VSL-00007 vessel (b)(6)

(b)(6)

Requirements

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), required BNI to develop and implement a QA program.

BNI QAM 24590-WTP-QAM-QA-06-001, Revision 11, dated July 30, 2012, contained the following requirements:

- Policy Q-05.1, "Instructions, Procedures, and Drawings," Paragraph 5.1.2.1: "Activities affecting items and services shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings that identify or reference appropriate quantitative or qualitative acceptance criteria for determining prescribed results have been satisfactory attained."
- Policy Q-05.1, "Instructions, Procedures, and Drawings," Paragraph 5.1.2.2: "The activity shall be described to a level of detail commensurate with the complexity of the activity and the need to assure consistent and acceptable results."

Procedure 24590-WTP-GPP-MGT-013, "Acceptance of Procured Material," Revision 17B, dated January 23, 2012, Paragraph 4.3.2: "Each MAP shall be developed through an evaluation of approved technical requirements from applicable specifications, drawings, codes, standards, Commercial Grade Dedication Plans Packages and/or other similar sources."

Discussion

Contrary to the above requirements, MAP 24590-WTP-MAP-AS-10-00035, Revision 0, Pressure Vessels, Shop Fabricated, Medium, Step 3 stated: "Pressure boundary materials are verified to conform to specified requirements – Type and Thickness." Contrary to the requirements of 24590-WTP-GPP-MGT-013, "Acceptance of Procured Material," the MAP did not require the SQR verify that the vessel pressure boundary material met all applicable specifications; it only required dimensional verifications.

Finding S-12-TRS-RPPWTP-003-F02 (Priority Level 2): The ORP surveillance team found four instances where (b)(6)

(b)(6)

Requirements

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), required BNI to develop and implement a QA program.

BNI QAM 24590-WTP-QAM-QA-06-001 contained the following requirements:

- Policy Q-05.1, "Instructions, Procedures, and Drawings," Paragraph 5.1.2.1: "Activities affecting items and services shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings that identify or reference appropriate quantitative or qualitative acceptance criteria for determining prescribed results have been satisfactory attained."
- Policy Q-05.1, Paragraph 5.1.2.2: "The activity shall be described to a level of detail commensurate with the complexity of the activity and the need to assure consistent and acceptable results."
- Policy Q-07.1, "Control of Purchased Items and Services," Paragraph 7.1.2.1.1 and 7.1.2.1.1.3: The procurement of items and services shall be controlled to assure conformance with requirements. Such controls shall provide for "Source Inspection."
- Policy Q-07.1, Paragraph 7.1.2.1.2 and 7.1.2.1.2.2: Records shall be established and maintained to indicate the performance of acceptance of items.
- Policy Q-07.1, Paragraph 7.1.2.1.1 and 7.1.2.1.1.3: The procurement of items and services shall be controlled to assure conformance with requirements. Such controls shall provide for "Source Inspection."

JOC Procedure JP-2693-2, "Commercial Grade Dedication Procedure," Revision 1, dated September 6, 2011, contained the following requirements:

- Paragraph 8.1: "Results of the dedication process, as outlined in the Commercial Grade Item Dedication Plan, shall be documented in a Commercial Grade Item Dedication Certificate (CGIDC)."
- Paragraph 8.2: "the Commercial Grade Item Dedication Certificate shall be reviewed and approved by the Chief Engineer and the QA Manager or their designees."

BNI Procedure 24590-WTP-GPP-MGT-042, "In-Process Source Verification," Revision 8, contained the following requirements:

- Section 4.0: The assigned SQR was responsible for completing and reporting in-process source verification activities in accordance with the applicable MAP and this procedure.
- Section 5.2: Required, in part, that unless otherwise directed, in-process source verification by the assigned SQR consists of the following:
 - Section 5.2.4 (Note): QVDs are reviewed progressively throughout the assignment as required documents are presented to the SQR. The assigned SQR routinely statuses and/or confirms supplier progress in providing acceptable QVDs while fabrication and/or manufacturing was still in-progress.

- Section 5.2.5a(3): Verify that material was properly identified and was traceable to QVD.
- Section 5.2.5a(4a-c): Verify that materials to be used for "Q" applications have been procured from a qualified supplier.
- Section 5.2.5a (4c Note): These verifications are documented in the SVR for MAP Activities/Attributes that require material verification.

BNI Procedure 24590-WTP-GPP-MGT-043, Revision 8, "Source Verification Reporting," contained the following requirement:

- Section 3.3: Required, in part, that completed SVRs identify the item(s) verified.

BNI Procedure 24590-WTP-GPP-MGT-045, "Quality Verification Document Review," Revision 5E, contained the following requirement:

- Section 5.3.1: Required, in part, that upon satisfactory review of completed documentation, the SQR stamped each conforming document, if not previously stamped.

BNI Procedure 24590-WTP-GPP-PSQ-042, "In-Process Source Verification," Revision 8, contained the following requirement:

- Section 5.2: The SQR shall perform in process source verifications to the extent specified by the approved MAP, Special Instructions when issued, and this procedure.

Discussion

Contrary to the above, the following examples did not meet the above requirements:

- The BNI (b)(6) (b)(6) used in the fabrication of the vessel as required by JOC procedures. Therefore, the BNI (b)(6) (b)(6)

When the BNI (b)(6) JOC had not (b)(6) as required by procedure. BNI's (b)(6) This action eliminated the (b)(6) (b)(6) This was a violation of the BNI QAM Requirement 5 (24590-WTP-QAM-QA-06-001) that work shall be performed in accordance with documented instructions.

- No (b)(6) could be provided by the BNI (b)(6) documenting in-process witness points (b)(6) of MAP (b)(6) (MAP-AS-05-00026, Revision 2) for verifying pressure boundary material traceability or conformance to specified requirements.

Examples:

- JOC [VT] NDE Report, Job 2693-3A, Weld 101, dated February 7, 2012;
- JOC [PT] NDE Report, Job 2693-3A, Weld 101, dated February 7, 2012;
- JOC [VT] NDE Report, Job 2693-3C, Weld 101, dated February 7, 2012;
- JOC [PT] NDE Report, Job 2693-3C, Weld 101, dated February 7, 2012;
- JOC [VT] NDE Report, Job 2693-3D, Weld 101, dated February 7, 2012; and
- JOC [PT] NDE Report, Job 2693-3D, Weld 101, dated February 7, 2012.

(b)(6) The surveillance team found three PT reports and three VT reports that had been reviewed (b)(6) BNI (b)(6) when they were, in fact, (b)(6) JOC documents that were not yet appropriate for (b)(6) review. In accordance with BNI Procedure 24590-WTP-GPP-PSQ-042, QVDs are reviewed progressively throughout the (b)(6) assignment as the required documents were presented to the (b)(6). Upon completion of this review, (b)(6) was required to (b)(6) (b)(6) in accordance with BNI Procedure 24590-WTP-GPP-PSQ-045.

Finding S-12-TRS-RPPWTP-003-F03 (Priority Level 3): Material Acceptance Plans were required to be developed specifically for the particular characteristics associated with each Material Requisition/Commercial Dedication Material Requisition/Field Material Requisition. BNI used Material Acceptance Plan 24590-WTP-MAP-AS-04-00224, Revision 6, for both RLD-VSL-00007 and RLD-VSL-00008 vessels even though RLD-VSL-00007 was deleted from the Material Requisition, and each vessel's procurement and fabrication process was unique and involved different circumstances.

Requirements

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), required BNI to develop and implement a QA program.

BNI QAM, 24590-WTP-QAM-QA-06-001, Revision 11, dated July 30, 2012, Policy Q-05.1, "Instructions Procedures, and Drawings:"

- Section 5.1.2.1: "Activities affecting items and services shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings that identify or reference appropriate quantitative or qualitative acceptance criteria for determining prescribed results have be satisfactorily attained."

BNI QAM, 24590-WTP-QAM-QA-06-001, Revision 11, dated July 30, 2012, Policy Q-07.1, "Control of Purchased Items and Services," contained the following requirements:

- Section 7.1.2.1.1: The procurement of items and services [Q/CM] shall be controlled to assure conformance with specified requirements. Such control shall provide for

- 7.1.2.1.1.5, Examination of items or services upon delivery or completion, as appropriate; and
- Section 7.1.2.1.2: Records shall be established and maintained to indicate the performance of the following functions: 7.1.2.1.2.2 acceptance of items or services.

BNI Procedure 24590-WTP-GPP-MGT-013, Revision 17B, "Acceptance of Procured Material," contained the following requirements:

- Section 4.3.1: Each MAP shall be developed taking into consideration the critical attributes, safety function, commercial risk, and complexity of the item;
- Section 4.3.3: Each MAP shall establish the specific attributes/activities that require oversight, verification, and/or acceptance by the assigned functional organization and shall include performing one or more combination of source verifications, receiving inspection, surveillance, or audit; and
- Section 4.3.9: MAPs shall identify any special requirements, instructions, sampling methods/techniques, or other unique conditions associated with verification/acceptance activities.

Discussion:

Contrary to the above, a single MAP was used for both RLD-VSL-00007 and RLD-VSL-00008. According to the requirements of 24590-WTP-GPP-MGT-013, consideration was to be given to the differences between the vessels (e.g., different material), and most certainly the larger commercial risk associated with RLD-VSL-00008 that was removed from fabrication at Bendalls and sent to JOC for completion.

Finding S-12-TRS-RPPWTP-003-F04 (Priority Level 3): Project Issues Evaluation Report 24590-WTP-PIER-MGT-12-0473-C, Action 2, required a complete and satisfactory quality verification document package for the formed head from Bendalls. The quality verification document package used to transfer the RLD-VSL-00008 vessel head from Bendalls to Joseph Oat Corporation was marked "preliminary," contrary to the requirement of Action 2 of 24590-WTP-PIER-MGT-12-0473-C that required a complete and satisfactory quality verification document package for the formed head.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), required BNI to develop and implement a QA program.

BNI QAM, (24590-WTP-QAM-QA-06-001), Revision 11, dated July 30, 2012, Policy Q-05.1, "Instructions, Procedures, and Drawings," contained the following requirements:

- Section 5.1.2.1: Activities affecting items and services shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed results have been satisfactorily attained;

24590-WTP-GPP-MGT-043, "Corrective Action Management (Revision 4A)," contained in the following requirements:

- Section 5.4.3, Step 10: Shall review for final closure to ensure documentation is current, and verify that the following information is documented in the PIER (excerpted) (24590-WTP-PIER-MGT-12-0473-C):
 - Action(s) taken addresses the identified action(s). Deviation(s) from actions as written is addressed in the PIER. Action(s) taken is substantiated with objective evidence. Action(s) taken addresses the issue as identified.
 - Documents, as needed, are correctly identified, attached, or referenced, and retrievable.

Discussion:

Contrary to the above, Action 2 of 24590-WTP-PIER-MGT-12-0473-C was not completed as required by the procedural instructions required by Policy Q-05.1 of the QAM (24590-WTP-QAM-QA-06-001). The PIER action required the completion of a satisfactory QVD package for the formed head from Bendalls, but the PIER Verification Statement indicated that a preliminary RLD-VSL-00007 head QVD (Revision 1) was reviewed prior to transferring the head to JOC. The use of a preliminary QVD was not allowed by any of the following procedures:

- 24590-WTP-GPP-MGT-013, Acceptance of Procured Material;
- 24590-WTP-GPP-MGT-059, Quality Program Verification; or
- 24590-WTP-3DP-G04B-00058, Supplier Engineering and Quality Verification Documents.

Opportunity for Improvement S-12-TRS-RPPWTP-003-001: BNI did not use the same approach for closing corrective actions that are similar or involve similar issues. The approach BNI used to close 24590-WTP-PIER-MGT-12-0473-C actions associated with receiving and accepting the RLD-VSL-00007 formed head was not consistent with the approach used for the actions associated with the receipt and acceptance of the reverse flow diverters and ejectors.

Discussion:

BNI initiated PIER 24590-WTP-PIER-MGT-12-0473-C to document that there was no evidence of a formal receipt inspection or acceptance of the formed head for RDL-VSL-00007 at the job site by BNI. As part of the investigation, BNI looked into the ejectors and RFDs for the vessel as well. BNI indicated the RFDs and ejectors had been received on the project as evidenced by MRR-09654 and MRR-16908, which indicated that the equipment was accepted by BNI from AEA Technology Engineering Services, Inc. (original supplier) prior to being sent to the initial vendor [Bendalls] and subsequent vendor [JOC] for use in the vessel. BNI did not appear to follow the same approach to address receipt issues for the RLD-VSL-00007 formed head since BNI did not complete formal receipt, inspection or acceptance of the head from the original overseas fabrication

shop [KONIG + CO.] prior to being sent to the initial vendor [Bendalls] and subsequent vendor [JOC] for use in the vessel. There were no extent-of-condition actions documented in this PIER.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O02: BNI's performance of supplier commercial grade dedication package reviews was not always rigorous or detailed. BNI approved the Joseph Oat Corporation Commercial Grade Dedication Plan, JP-2693-3, that was missing the requirement to verify that all the stainless steel material had less than three percent carbon content.

Discussion:

JOC's Procedure JP-2693-2, "Commercial Grade Dedication Procedure," Revision 1, dated September 6, 2011, Paragraph 1.3.2 stated "Customer responsibility. Since Joseph Oat Corporation did not always know the exact end use application of the item(s) or material(s) being dedicated, it was the customer's responsibility to accept or approve Commercial Grade Item Dedication Plans submitted to the customer by Joseph Oat Corporation, or to provide Joseph Oat Corporation with commercial grade dedication criteria, instructions or plans to be followed."

Contrary to the above, the BNI-approved JOC Procedure, JP-2693-3, did not have a requirement to assure all the stainless steel material had less than three percent carbon content as required by BNI's 24590-HLW-MVD-RLD-00005. Because there was no objective evidence that JOC had purchased stainless steel material that had carbon content greater than three percent, this issue was considered an OFI.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O03: BNI's Material Acceptance Plan and contract specifications were not always aligned and consistent.

Discussion:

MAP 24590-WTP-MAP-AS-05-00026, Step 6, required the SQR to observe the first operation of PMI. However, 24590-WTP-3PS-G000-T0002, Table 1, did not require PMI for Grades 304 and 304L stainless steel components in non-black cell and HTR areas. During an interview with the BNI RE, the surveillance team found that BNI had not notified JOC that the demisters (PJV-DMST-00002A, PJV-DMST-00002B, and PJV-DMST-00002C) were HTR components. This condition was previously documented on 24590-WTP-PIER-12-0896-C. As a result, BNI was in the process of preparing and issuing updated equipment datasheets for the demisters to incorporate HTR requirements in the associated material requisitions.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O04: BNI's inspections and audits of supplier records storage areas were not rigorous or detailed. Joseph Oat Corporation quality assurance records were not maintained in a manner that minimized the risk of damage or destruction.

Discussion:

BNI recently received an interpretation from the NQA-1 committee that specified radiographs were QA records. During this surveillance, the team reviewed radiographic film storage and found JOC QA records were not being maintained in a manner that minimized the risk of damage or destruction. Specifically, radiographic film and in-process NDE and inspection records were not stored in one-hour fire proof cabinets. Records were stacked loosely on shelving in a dusty and dirty QC office area over the machine shop.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O05: BNI was not rigorous in tracking areas reviewed/not reviewed during audits to ensure areas not reviewed are reviewed during subsequent audits.

Discussion:

BNI did not review JOC document storage conditions during a January 2011 Audit (24590-WTP-AR-QA-11-005) to confirm compliant record storage. The audit did not have a weld/nondestructive examination SME, so radiographic film was not included in the scope of the audit. BNI performed Surveillance 24590-WTP-SUV-QA-12-021 with a weld/NDE SME; however, nondestructive examination QA records were not reviewed. Both the BNI audit and the surveillance concluded that JOC QA records storage conditions met QA requirements.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O06: BNI's review of supplier audits of subtier suppliers was not detailed and lacked rigor.

Discussion:

JOC issued PO 066332-00 (no revision number) to South Jersey Welding on July 19, 2012. The PO stated "all weld wire shall be supplied in accordance with your [South Jersey Welding] audited quality assurance program that meets NQA-1. Use only Joseph Oat audited mills for wire. Certified mill test reports are required showing actual test results." South Jersey Welding was listed on JOC's Active Qualified Suppliers List as an NQA-1 supplier. However, the JOC audit of South Jersey Welding was performed using a single-page ASME "Boiler and Pressure Vessel Code, Subsection NCA, Rules for Construction of Nuclear Facility Components, Article NCA-3800, Responsibilities of Material Organizations," checklist that did not identify any NQA-1 criteria.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O07: BNI's review of supplier nondestructive examination personnel qualifications was not always rigorous or detailed.

Discussion:

BNI failed to identify that the results of physical examinations (i.e., eye exams) were not being documented on individual "Letters of Certification" for JOC NDE personnel qualifications records as required by JOC Procedure SP-1579. BNI performed Audit 24590-WTP-AR-QA-11-005 of JOC dated February 16, 2011; Surveillance 24590-WTP-SUV-QA-12-021, dated May 17, 2012; and Surveillance 24590-WTP-SUV-QA-11-036, dated March 20, 2012. During these assessments, "Letters of Certifications" for JOC NDE personnel were reviewed and documented in the audit checklist. Based on these reviews, BNI determined the qualification and certification of NDE personnel to be satisfactory. The ORP surveillance team considered this to be a minor issue since all eye exams were actually properly conducted. During the surveillance, JOC immediately drafted a revision to their procedure to remove the extraneous requirement. Note: This is not required by SNT-TC-1A to be on the certification; it was only required by the JOC procedure.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O08: BNI's reviews of supplier nondestructive examination personnel certification records were not always rigorous or detailed.

Discussion:

BNI failed to identify that the "Certification of Qualification" for JOC NQA-1 "Floor Inspector" personnel qualification records were not signed by the individuals being certified as required by JOC Procedure SP-1562. BNI performed Audit 24590-WTP-AR-QA-11-005 of JOC dated February 16, 2011. During the audit, inspection and test personnel qualifications were reviewed. As a result of these reviews, BNI determined the qualifications were satisfactory. It should be noted that the surveillance team's review of the audit checklist found that JOC Procedure SP-1562 was not listed as being reviewed in the audit report. In addition, the checklist also referenced Table 1 as listing the inspection and test personnel reviewed. Table 1 did not identify any inspection and test personnel qualifications. However, during an interview, the BNI Audit Team Lead (ATL) explained that although the wrong procedure had been referenced and Table 1 did not identify any inspection and test personnel qualifications, the ATL was confident a selection of inspection and test personnel qualifications were reviewed during the audit and found to be acceptable. The surveillance team determined this was a minor issue of audit documentation discrepancies since no evidence of unqualified inspection and test personnel was found. During the surveillance, JOC immediately drafted a revision to their procedure to remove the extraneous requirement. Note: This was not required by NQA-1 to be on the certification; it was only required by the JOC procedure.

Opportunity for Improvement S-12-TRS-RPPWTP-003-O09: BNI's review of the Joseph Oat Corporation process for qualifying suppliers was not rigorous or detailed.

Discussion:

JOC qualification of several suppliers was based on JOC acceptance of NIAC audits. Evidence of the basis for JOC acceptance of NIAC audits was not sufficiently detailed, a cross-reference table was not consistently included, and the audit checklists did not identify which edition of NQA-1 was used for qualification of the suppliers.

Assessment Follow-up Item S-12-TRS-RPPWTP-003-A01: BNI was not rigorous or detailed in assuring visual examinations are performed in accordance with all contract specifications. This issue was previously identified by BNI in a Project Issues Evaluation Report and this Assessment Follow-up Item is to track issuance of the specified technical change notice for revising Purchase Order 24590-QL-MRA-MVA0-00027 to Joseph Oat Corporation to delete the requirement for using AWS D1.6.

Discussion:

JOC was issued PO 24590-QL-MRA-MVA0-00027 with a Technical Note 1.5.26 that required "Visual examination shall be performed in accordance with American Welding Society (AWS) D1.6:1999." JOC Procedure QC-2693-60 only referenced acceptance criteria from ASME "Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Pressure Vessels." BNI had already documented this issue in their PIER system and was awaiting issuance of the TCN to JOC. This AFI was to track issuance of the TCN for revising PO 24590-QL-MRA-MVA0-00027 to JOC to delete the requirement for using AWS D1.6. Specifically, action Item 3 of PIER 24590-MGT-12-0598-A stated that a TCN was being written to address the technical note in this PO that required all welds to meet AWS D1.6.

Assessment Follow-up Item S-12-TRS-RPPWTP-003-A02: BNI did not assure that Joseph Oat Corporation issued and BNI approved a Supplier Deviation Disposition Request to allow ultrasonic testing in lieu of radiography for joints that are not conducive to radiography.

Discussion:

Specification 24590-WTP-3PS-MV00-T0001, Paragraph 6.2.2 stated; "Radiography was the preferred method of volumetric testing. Where it was considered impractical to perform radiographic examination due to joint configuration, the seller may propose ultrasonic examination." However, JOC did not issue an SDDR to obtain approval to use ultrasonic examination in lieu of radiography for joints that the configuration was not conducive for radiography. BNI had written 24590-WTP-PIER-MGT-12-0882-B, DOE Finding Level 2: Clarify Proper Mechanism for Allowing Alternate NDE in Place of RT for Pressure Vessels," for another fabricator that also did not obtain an approved SDDR for the same issue. This AFI was to track BNI's completion of the PIER extent of condition analysis and corrective actions to ensure it addressed the NDE issue at JOC.

Conclusions

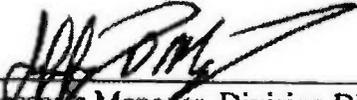
With the exceptions documented in this report, the surveillance team concluded the BNI procurement processes and procedures for black cell vessels from JOC were adequate, however, weakness in the performance and compliance with procedures were identified that needed correction.

Signatures:



Surveillance Team Leader

Date: 6/24/2013



Assessor's Manager, Division Director, or Supervisor

Date: 6/26/2013

Appendix A – Personnel Contacted during Surveillance

Bechtel National, Inc. (BNI) Supplier Quality Manager (acting)
BNI Administrative Specialist [RI&T]
BNI Responsible Engineer
BNI Health Physics Technician Procurement Manager
BNI (b)(6)
BNI
BNI
BNI Procurement Engineering Manager
Joseph Oats Corporation (JOC) Quality Assurance Manager
JOC Quality Control Manager
JOC President, Engineering
JOC Operations Manager

Appendix B – Documents Reviewed During Surveillance

- 24590-HLW-MVD-RLD-00005, "Bechtel National, Inc.'s Mechanical Systems Data Sheet [Vessel]," Revision 10.
- 24590-QL-MRA-MVA0-00001, "Purchase Order."
- 24590-QL-MRG-MVA0-00002, "Material Requisition Pressure Vessels, Shop Fabricated, Medium," Revision 4, dated January 19, 2011.
- 24590-QL-POA-MVA0-00027-01-00001, "Procedure – Standard Procedure for Penetrant Inspection [Water Washable Visible]," Revision 00a, dated July 28, 2011.
- 24590-QL-POA-MVA0-00027-01-00003, "Procedure – Standard Procedure for Head Forming," Revision 00a, dated July 28, 2011.
- 24590-QL-POA-MVA0-00027-01-00004, "Procedure – Pickle Procedure," Revision 00a, dated July 28, 2011.
- 24590-QL-POA-MVA0-00027-01-00008, "Procedure – Commercial Grade Dedication Procedure," Revision 00c, dated October 2, 2012.
- 24590-QL-POA-MVA0-00027-01-00013, "Procedure – Quality Control Procedure QC-2693-40 – Hydrostatic Pressure Testing," Revision 00a, dated September 7, 2011.
- 24590-QL-POA-MVA0-00027-01-00021, "Procedure – Welding Procedure Specification – WPS-5301 Submerged Arc Welding American Society of Mechanical Engineers P#8 with Response to Comments," Revision b, dated December 13, 2011.
- 24590-QL-YQA-MVA0-27001, "Source Verification Report," dated January 21, 2012.
- 24590-QL-YQA-MVA0-27002, "Source Verification Report," dated February 18, 2012.
- 24590-QL-YQA-MVA0-27003, "Source Verification Report," dated March 2, 2012.
- 24590-QL-YQA-MVA0-27004, "Source Verification Report," dated March 8, 2012.
- 24590-QL-YQA-MVA0-27005, "Source Verification Report," dated March 30, 2012.
- 24590-QL-YQA-MVA0-27006, "Source Verification Report," dated April 13, 2012.
- 24590-QL-YQA-MVA0-27007, "Source Verification Report," dated May 1, 2012.
- 24590-QL-YQA-MVA0-27008, "Source Verification Report," dated May 22, 2012.
- 24590-QL-YQA-MVA0-27009, "Source Verification Report," dated May 24, 2012.
- 24590-QL-YQA-MVA0-27010, "Source Verification Report," dated June 9, 2012.
- 24590-QL-YQA-MVA0-27013, "Source Verification Report," dated September 10, 2012.
- 24590-QL-YQB-MVA0-13001, "Source Verification Report," dated February 26, 2009.
- 24590-QL-YQB-MVA0-13002, "Source Verification Report," dated April 10, 2009.
- 24590-QL-YQB-MVA0-13003, "Source Verification Report," dated May 2, 2009.
- 24590-QL-YQB-MVA0-13004, "Source Verification Report," dated May 21, 2009.
- 24590-QL-YQB-MVA0-13005, "Source Verification Report," dated June 26, 2009.
- 24590-QL-YQB-MVA0-13006, "Source Verification Report," dated July 23, 2009.
- 24590-QL-YQB-MVA0-13007, "Source Verification Report," dated August 14, 2009.
- 24590-QL-YQB-MVA0-13008, "Source Verification Report," dated August 27, 2009.
- 24590-QL-YQB-MVA0-13009, "Source Verification Report," dated November 30, 2009.
- 24590-QL-YQB-MVA0-13010, "Source Verification Report," dated November 11, 2009.
- 24590-QL-YQB-MVA0-13011, "Source Verification Report," dated January 4, 2010.

- 24590-QL-YQB-MVA0-13012, "Source Verification Report," dated February 24, 2010.
- 24590-QL-YQB-MVA0-13013, "Source Verification Report," dated April 5, 2010.
- 24590-QL-YQB-MVA0-13014, "Source Verification Report," dated April 30, 2010.
- 24590-QL-YQB-MVA0-13015, "Source Verification Report," dated May 27, 2010.
- 24590-QL-YQB-MVA0-13016, "Source Verification Report," dated July 2, 2010.
- 24590-QL-YQB-MVA0-13017, "Source Verification Report," dated August 9, 2010.
- 24590-QL-YQB-MVA0-13018, "Source Verification Report," dated October 12, 2010.
- 24590-QL-YQB-MVA0-13019, "Source Verification Report," dated December 24, 2010.
- 24590-QL-YQB-MVA0-13020, "Source Verification Report," dated February 4, 2011.
- 24590-QL-YQB-MVA0-13021, "Source Verification Report," dated April 11, 2011.
- 24590-QL-YQB-MVA0-13022, "Source Verification Report," dated June 20, 2011.
- 24590-QL-YQB-MVA0-13023, "Source Verification Report," dated September 2, 2011.
- 24590-QL-YQB-MVA0-13024, "Source Verification Report," dated September 26, 2011.
- 24590-QL-YQB-MVA0-13025, "Source Verification Report," dated November 8, 2011.
- 24590-QL-YQB-MVA0-13026, "Source Verification Report," dated November 18, 2011.
- 24590-QL-YQB-MVA0-13027, "Source Verification Report," dated January 4, 2012.
- 24590-QL-YQB-MVA0-13028, "Source Verification Report," dated March 5, 2012.
- 24590-WTP-3DP-G04B-00058, "Supplier Engineering and Quality Verification Documents," Revision 12, dated January 27, 2012.
- 24590-WTP-3PS-G000-T0002, "Positive Material Identification for Shop Fabrication," Revision 8, dated January 4, 2010.
- 24590-WTP-3PS-MV00-T0001, "Pressure Vessel Design and Fabrication," Revision 4, dated September 27, 2010.
- 24590-WTP-AR-QA-11-005, "Issuance of Joseph Oat Corporation Audit Report," CCN: 226060, dated February 16, 2011.
- 24590-WTP-GPP-MGT-013, "Acceptance of Procured Material," Revision 17B, dated October 15, 2012.
- 24590-WTP-GPP-MGT-059, "Quality Program Verification," Revision 0, dated April 28, 2011.
- 24590-WTP-GPP-PSQ-011, "Supplier Quality Training and Qualification," Revision 8, dated January 6, 2011.
- 24590-WTP-GPP-PSQ-042, "In-Process Source Verification," Revision 8, dated May 6, 2011.
- 24590-WTP-GPP-PSQ-043, "Source Verification Reporting," Revision 6, dated June 17, 2011.
- 24590-WTP-GPP-PSQ-045, "Quality Verification Document Review," dated March 13, 2012.
- 24590-WTP-MAP-AS-04-00224, "Pressure Vessels, Shop Fabricated, Medium," Revision 6, dated July 23, 2012.
- 24590-WTP-MAP-AS-05-00026, "Material Acceptance Plan," Revision 2, dated January 5, 2009.
- 24590-WTP-MAP-AS-10-00035, Revision 0.

- 24590-WTP-MRR-PROC-0016908, "Tyco Valves and Controls Limited Partnership," Revision 0, dated December 19, 2005.
- 24590-WTP-MRR-PROC-09654, "AEA Technology Engineering Services, Inc.," Revision 0, dated November 13, 2003.
- 24590-WTP-PIER-12-0882-B, "DOE Finding Level 2: Clarify Proper Mechanism for Allowing Alternate NDE in Place of RT for Pressure Vessels."
- 24590-WTP-PIER-12-0896-C, "Inclusion of Hard-to-Reach Requirements for PJV-DMST-00002 A/B/C and PJV-HEME-00001 A/B/C," dated July 19, 2012.
- 24590-WTP-PIER-MGT-12-0473-C, "Project Issue Evaluation Report," dated April 6, 2012.
- 24590-WTP-QAM-QA-06-001, "Bechtel National, Inc. Quality Assurance Manual," Revision 11, dated July 30, 2012.
- 24590-WTP-SUV-QA-11-036, "Issuance of Joseph Oat Corporation Surveillance Report," CCN: 239827, dated March 20, 2012.
- 24590-WTP-SUV-QA-12-021, "Issuance of Joseph Oat Corporation Surveillance Report," CCN: 244478, dated May 17, 2012.
- ASME Boiler and Pressure Vessel Code, Section VIII, "Rules for Construction of Pressure Vessels."
- ASME Boiler and Pressure Vessel Code, Subsection NCA, "Rules for Construction of Nuclear Facility Components, Article NCA-3800, Responsibilities of Material Organizations."
- (b)(6) - Level II, Floor Inspector - dated June 15, 2012. Eye Exam dated September 15, 2012.
- (b)(6) - Level II, Liquid Penetrant Examination (PT)/Visual Examination (VT) - dated June 15, 2012, and Level II Film Interpretation dated June 15, 2012. Eye Exam dated September 15, 2012.
- (b)(6) - Auditor - Initial certification December 15, 2003 - Current recertification dated December 22, 2011.
- (b)(6) - Lead Auditor - Initial certification dated July 13, 1990 - Current recertification dated November 13, 2011.
- (b)(6) - Level III, PT/Ultrasonic Test (UT)/Radiographic Test/VT - dated February 5, 2009. Eye Exam dated August 6, 2012.
- (b)(6) - Mechanical Level II-Initial certification dated March 11, 1982 - Current recertification dated January 7, 2010. Eye Exam dated June 12, 2010. Retired.
- (b)(6) - Mechanical Level II-Initial certification dated June 14, 2010 - Current recertification dated June 4, 2012. Eye Exam dated August 16, 2012.
- "Joseph Oat Corporation [PT] Nondestructive Examination Report, Job 2693-3A, Weld 101," dated February 7, 2012.
- "Joseph Oat Corporation [PT] Nondestructive Examination Report, Job 2693-3C, Weld 101," dated February 7, 2012.
- "Joseph Oat Corporation [PT] Nondestructive Examination Report, Job 2693-3D, Weld 101," dated February 7, 2012.
- "Joseph Oat Corporation [VT] Nondestructive Examination Report, Job 2693-3A, Weld 101," dated February 7, 2012.

- "Joseph Oat Corporation [VT] Nondestructive Examination Report, Job 2693-3C, Weld 101," dated February 7, 2012.
- "Joseph Oat Corporation [VT] Nondestructive Examination Report, Job 2693-3D, Weld 101," dated February 7, 2012.
- Joseph Oat Corporation Procedure JP-2693-2, "Commercial Grade Dedication Procedure," Revision 1, dated September 6, 2011.
- Joseph Oat Corporation Procedure JP-2693-3, "Commercial Grade Dedication Plan," Revision 2, dated January 31, 2012.
- Joseph Oat Corporation, "Quality Assurance Manual," Revision 24, dated June 13, 2012.
- (b)(6) - Mechanical Level II-Initial certification, dated October 9, 2003 - Current recertification, dated December 1, 2011. Eye Exam dated January 16, 2012.
- QC-2693-20, Joseph Oat Corporation, Quality Control Procedure "Radiographic Examination," Revision 0, dated July 26, 2011.
- (b)(6) - Level II, Floor Inspector - dated November 1, 2010. Eye Exam dated November 3, 2011.
- (b)(6) - Level II, PT/VT - dated November 1, 2010, and Level II, UT dated January 6, 2011. Eye Exam dated November 3, 2011.
- (b)(6) - Lead Auditor - Initial certification dated October 25, 1996 - Current recertification, dated October 10, 2011.
- SP-1544, "Evaluation of Nuclear Industry Assessment Committee Reports," Revision 0, dated November 28, 1994.
- SP-1554, "Suspect/Counterfeit Items," Revision 1, dated February 3, 2012.
- SP-1560, Joseph Oat Corporation Standard Procedure "Training and Qualification of Auditors," Revision 6, dated September 19, 2009.
- SP-1562, Joseph Oat Corporation Standard Procedure "Training and Qualification of Inspection, Examination and Testing Personnel," Revision 10, dated August 16, 2011.
- SP-1579, Joseph Oat Corporation Standard Procedure "Qualification and Certification of Nondestructive Examination Personnel," Revision 20, dated November 30, 2011.
- (b)(6) - Level II, Floor Inspector - dated May 20, 2012. Eye Exam dated May 20, 2012.
- (b)(6) - Level II, PT/VT - dated April 19, 2012, and Level II, UT dated May 19, 2012. Eye Exam dated May 20, 2012.
- (b)(6) - Level II, Floor Inspector - dated May 1, 2012. Eye Exam dated December 2, 2011.
- (b)(6) - Level II, Leak Test - dated July 23, 2012; Level II, VT - dated April 9, 2012; Level II, PT - dated February 17, 2012; and Level II, Film Interpretation dated May 23, 2011. Eye Exam dated December 2, 2011.



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUL 26 2013

13-TRS-0029

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) ASSESSMENT REPORT A-13-TRS-RPPWTP-001, BECHTEL NATIONAL, INC. (BNI) WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP) FACILITIES FIRE PROTECTION PROGRAM IMPLEMENTATION

This letter forwards the results of the DOE ORP assessment of the BNI WTP Facilities Fire Protection Program Implementation conducted between March 4 through 15, 2013. The purpose of the assessment was to evaluate BNI's fire protection program for the WTP against DOE contract fire protection requirements.

Overall, ORP observed improvements in the fire protection program since the ORP Assessment of the BNI fire protection program in 2009. However, in evaluating requirement implementation for preventing and minimizing the effects of fire during the construction phase of the WTP and in the evaluation of fire protection program commitment involving the implementation of specific National Fire Protection Association Standards, the assessment identified three Priority Level 2 findings which need correction. ORP also identified four Opportunities for Improvements (OFI) which warrant BNI attention, none of which are a direct noncompliance with a Contract requirement.

Within 45 days of the date of this letter, BNI shall respond to the Priority Level 2 assessment findings. BNI's response shall include a Corrective Action Plan for each finding that includes: 1) immediate and remedial actions to correct the specific deficiency identified in the finding; 2) the extent of condition, including a summary of how the extent of condition was established; 3) the apparent cause of the condition; 4) corrective actions to correct the condition and actions to prevent further conditions; and 5) the date when all corrective actions will be completed, verified, and compliance to applicable requirements achieved. No response is required for the OFIs.

Mr. J. M. St. Julian
13-TRS-0029

-2-

JUL 26 2013

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

TRS:CPC

Attachment

cc w/attach:

D. E. Kammenzind, BNI
D. M. Gutowski, DNFSB
R. G. Quirk, DNFSB
BNI Correspondence

U.S. Department of Energy
Office of River Protection

Assessment: Fire Protection Program Implementation
Report: A-13-TRS-RPPWTP-001
Integrated Assessment Number: FY13 IAS# 11
Facility: Bechtel National, Inc. Waste Treatment and Immobilization Plant Facility
Location: Hanford Site
Dates: March 4 through 15, 2013
Assessors: Craig P. Christenson, Lead Assessor
Paul A. Schroder, Assessor
Fred B. Hidden, Assessor
Approved by: Paul G. Harrington, Assistant Manager
Technical and Regulatory Support

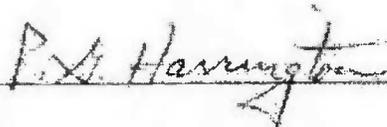
Assessor or Lead Assessor:



Date:

7-16-13

Approved:



Date:

7/23/13

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted an assessment of the Bechtel National, Inc. (BNI) fire protection program from March 4 through March 15, 2013. The purpose of the assessment was to evaluate BNI's fire protection program for the Waste Treatment and Immobilization Plant (WTP) against DOE's contract fire protection requirements.

The team observed improvements in the overall fire protection program since the ORP assessment of the BNI fire protection program in 2009. The team noted that BNI continues to improve in a number of areas, including improvement in the quality and clarity of the written fire protection program, maturity in the development of the process facility Fire Hazard Analyses necessary to support future plant operations, and progress in the comprehensive plant fire protection systems design and installation. Furthermore, the team noted improvement in fire protection oversight and self-assessments with the location of additional fire safety and fire protection engineering staff at the construction site, including a fire system impairment coordinator and fire system maintenance staff who are knowledgeable of the integration and execution of National Fire Protection Association (NFPA) maintenance requirements at the WTP.

However, in evaluating requirement implementation for preventing and minimizing the effects of fire during the construction phase of the WTP and in the evaluation of fire protection program commitment implementation, the team identified three Priority Level 2 findings needing correction.

Finding A-13-TRS-RPPWTP-001-F01 (Priority Level 2; Christenson) regards the WTP construction site not fully implementing NFPA 241, "Standard for Safeguarding Construction Alteration, and Demolition Operations." Implementation of this NFPA standard is required by WTP Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), through DOE O 420.1B, "Facility Safety," Attachment 2, Chapter II, Section 3.a.(3), which incorporates the NFPA requirements. Implementation of the NFPA 241 standard is important to ensure a reasonable degree of safety to life and property from fire during the WTP construction phases. Fire potential is inherently greater during construction operations than in a completed structure due to the presence of ever changing combustible materials, together with such ignition sources as temporary heating devices, cutting and welding operations, and automatic suppression systems that are typically not completed and in service while other permanent life safety features are not yet in place.

To support this initial finding, the team observed the following issues:

- The Low-Activity Waste (LAW) Facility does not have at least one stairway enclosed to support construction life safety and emergency response, required by NFPA 241, imposed through DOE O 420.1.B.

- The BNI Fire Protection Program and Prevention Procedure for construction, which included partial implementation of the NFPA standard for stairs, did not include incorporation of the required enclosed stairway feature specified by NFPA.
- The team determined while BNI was completing weekly facility safety walk-downs, the safety walk-downs did not specifically address all of the fire protection aspects contained in the NFPA standard.
- Qualified fire protection personnel did not participate in the weekly safety walk-downs.
- WTP security had not received training on the use of construction elevators, such as the one in use on the north side of the Pretreatment Facility, which would meet the requirements of the NFPA standard. The intent of this requirement was to give the fire department access in the event elevator use is needed for emergency operations when only security personnel are located at the construction site.

BNI had already taken initial actions to address several of the issues above, including but not limited to, enclosing one of the LAW Facility stairwells, and training WTP security of the emergency use of the construction elevators.

Finding A-13-TRS-RPPWTP-001-F02 (Priority Level 2; Christenson) concerned BNI designating some facility areas as 'hot work areas' and issuing a BNI permit procedure for fire watches, which were not in compliance with NFPA 51B, "Standard for Fire Prevention During Welding, Cutting, and Other Hot Work." NFPA 51B is also required by DOE O 420.1B. The NFPA 51B standard defines designated hot work areas as specific areas designed or approved for hot work, such as a maintenance shop or a detached outside location that is of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. Additionally, the standard defines 'approved' as being acceptable to the Authority Having Jurisdiction (AHJ).

The team observed that BNI had designated hot work areas at the minus 21 foot elevation of the High-Level Waste (HLW) Facility and in the T-16 Operating Engineer's Maintenance Shop. However, the designated 'hot work area' inside the HLW Facility was not free of combustible materials and it was not segregated from the rest of the areas in the minus 21 foot elevation as required by NFPA 51B. The arrangement observed in HLW could result in unintended damage to specialized plant equipment during hot work operations since designated hot work areas do not have the rigorous fire watch requirements of non-designated areas.

Additionally, none of the WTP process facilities, including the HLW Facility, are designed for permanent hot work (e.g., the welding shop found in the T-15 Combination Shop) as required by NFPA 51B. Furthermore, the fire protection AHJ has not approved any WTP process facilities as designated hot work areas. However, the BNI Hot Work Permit procedure allows designated hot work areas to be established by the BNI construction area superintendent without consideration to the permanent design purpose of the facility and without AHJ approval. The team also observed a designated hot work area in the T-16 Operating Engineer's Maintenance Shop. While an attempt was made to install fire-resistive tarpaulins to separate the

designated area of T-16 from a portion of the combustible construction, T-16 is not considered a fire resistive or noncombustible constructed building since the facility structure is primarily made of wood. Furthermore, covering the wooden structure with welding pads, blankets, curtains, or fire-resistive tarpaulins does not make it fire resistive per NFPA requirements.

NFPA 51B allows an administrative approach for conducting hot work in the WTP process facilities and other facilities under a permit system to achieve an equivalent safe level of fire protection. The permit system results in more rigorous verification of field conditions and a fire watch to prevent and minimize fires since hot work is conducted in areas not designed for hot work. It appears that BNI was using a less rigorous administrative approach in applying temporary designated hot work areas to avoid fire watches when conducting hot work in these areas. However, hot work conducted in the major process facilities at the WTP is a serious fire hazard, which could result in property loss of unique equipment that has a long-lead time if stringent compliance with NFPA requirements is not recognized and implemented. In addition, since fire protection systems have not yet been activated in the WTP process facilities and as additional commodities are installed into the facilities, including combustible cabling and electric equipment, more unprotected fire hazards will be created and permanent plant equipment could be easily damaged by hot work, resulting in deleterious impacts to the WTP schedule and mission. In past assessments, ORP had also identified several instances where combustibles have been allowed to accumulate in BNI's "designated hot work areas." Not only did the team determine that BNI is not meeting important NFPA 51B requirements, but BNI's on-going allowance of combustibles in BNI's "designated hot work areas" and temporarily designating these areas for hot work in BNI facilities not designed for hot work (and without AHJ approval), could result in a fire that has serious negative consequences to WTP, BNI, and DOE. The team also identified an error in the BNI hot work procedure involving the permits that required fire watches to be maintained for hot work areas for a period of at least "30 minutes (+)." This would allow for a fire watch to be conducted for a shorter period than the requirement of NFPA 51B, Section 5.5.2, which specifies that a fire watch be maintained for at least 1/2 hour after completion of hot work operations in order to detect and extinguish smoldering fires.

Finding A-13-TSD-RPPWTP-001-F03 (Priority Level 2; Christenson) concerned the BNI program, intended to minimize the lengths of periods for fire system impairments, which does not actually result in limiting the time duration of the impairments, required by NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," Section 14.1. NFPA 25 is also required by DOE O 420.1B.

The team reviewed documentation of many fire system impairments, which exist in the WTP site support facilities that drastically exceed timeframes listed in the BNI impairment procedure. These included items such as control valves that are not electrically supervised as required by the NFPA requirements, fire detectors that are either over spaced or not meeting sensitivity testing requirements, corroded sprinkler heads, and other miscellaneous issues. Some of these fire system impairments have been in place for four years and many have been in place for over two years. However, the BNI impairment procedure established the maximum impairment time period as 60 days for those that do not require long-term planning. The result is that these fire systems and their components, including supervisory signals, may not function as required during an emergency because the item is not presently functioning as required.

The team determined BNI is not giving fire system equipment impairments the proper priority, most likely because fire protection components are not routinely needed or frequently used on a daily basis, they are perceived as less important. However, the paradigm is these systems and components are expected to operate on demand and when they do not operate as required there is often an unacceptable consequence. Continuance of this perception may result in serious implications in the near future as construction activities are completed and fire systems become active throughout the WTP nuclear facilities. BNI must give serious attention to a permanent plan to correct this finding since commercial industries in the United States have billions of dollars of fire loss each year attributed to fire protection equipment that did not function under expected demands during fires.

Finally, the team identified four Opportunity for Improvement (OFI) items, which warrants management's attention, although they are not in direct noncompliance with a contract requirement. These OFI's are discussed along with the rest of the details in the attached assessment report.

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LIST OF ACRONYMS

AHJ	Authority Having Jurisdiction ¹
BNI	Bechtel National, Inc.
BOD	Basis of Design
BOF	Balance of Facilities
CRD	Contractor Requirements Document
DOE	U.S. Department of Energy
EDG	Emergency Diesel Generator
ENS	Environmental and Nuclear Safety
ETG	Emergency Turbine Generator
FHA	Fire Hazard Analysis
HLW	High-Level Waste
LAB	Analytical Laboratory
LAW	Low-Activity Waste
MPFL	Maximum Possible Fire Loss
NFPA	National Fire Protection Association
OFI	Opportunity for Improvement
ORP	Office of River Protection
PDSA	Preliminary Documented Safety Analysis
PFHA	Preliminary Fire Hazard Analysis
PIER	Project Issues Evaluation Report
PTF	Pretreatment Facility
SRD	Safety Requirements Document
WTP	Waste Treatment and Immobilization Plant

¹ The term AHJ as used in this report refers to the decision-making authority in matters concerning fire protection. DOE O 420.1B, delegates the AHJ to the Head of the DOE Field Office. NFPA Codes and Standards, required by DOE, also describe the AHJ as approving fire related equipment, material installations and procedures which is more appropriately within the responsibility of the contractor. In DOE letter 07-WTP-314, dated November 30, 2007, ORP clarified a limited AHJ delegation for approving routine fire protection equipment, materials, installation, operational procedures, and routine fire protection code interpretations under the NFPA to BNI with input from their qualified fire protection engineer. ORP is the highest level AHJ on all other issues and any final matter for fire protection.

NFPA CODES AND STANDARDS²

NFPA 13	Standard for the Installation of Sprinkler Systems, 1999 Edition
NFPA 25	Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2002 Edition
NFPA 51B	Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2003 and 2009 Editions
NFPA 101	Life Safety Code [®] , 2003 Edition
NFPA 241	Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2004 Edition

² This listing does not establish a comprehensive listing of NFPA codes and standard applicable to the WTP. Rather this is a condensed list of specific NFPA codes and standards referenced throughout this report.

**U.S. Department of Energy, Office of River Protection Assessment of
Bechtel National, Inc.
Waste Treatment and Immobilization Plant
Fire Protection Program Implementation**

1.0 REPORT DETAILS

The purpose of this assessment was to conduct the triennial assessment of the Bechtel National, Inc. (BNI) fire protection program, with emphasis on fire protection during construction. The assessment scope included a comprehensive evaluation to determine whether or not:

- BNI's fire protection elements address the basic program features of the U.S. Department of Energy (DOE) Fire Protection Program as required by contractual requirements.
- BNI's fire protection program commitments are implemented and an adequate number of technically competent, experienced, and fully qualified personnel are assigned to address the fire protection commitments.
- BNI has implemented comprehensive elements into the fire protection program that include, fire safety training to employees, life safety provisions into facilities, and fire prevention methods to minimize facility fire risks and fire loss potential.
- BNI had made improvements in the overall fire protection program since the previous DOE, Office of River Protection (ORP) assessment of the fire protection.

To address the assessment scope, the assessment team investigated various performance objectives, using evaluation of documentation, interviews with the contractor, and facility walk-downs as the primary methods of data gathering to evaluate key fire protection assessment elements. The elements included programmatic and facility implementation areas within fire protection as specified in the ORP G 420.1-3, "DOE Implementation Guide for DOE Fire Protection and Emergency Services Programs."

To evaluate fire protection program implementation improvement, the team conducted physical tours of select onsite Waste Treatment and Immobilization Plant (WTP) facilities under construction to determine the effective implementation of the specific program elements. The buildings toured including but not limited to, the Material Handling Facility, Building 58 Simulator Building, Building 82 Chiller Compressor Facility, Building 87 Main Switchgear Facility, Building 91 Balance of Facilities (BOF) Switchgear Facility, Low-Activity Waste (LAW) Facility, High-Level Waste (HLW) Facility, Pretreatment Facility (PTF), Analytical Laboratory (LAB), Building T-15 Combination Shop, Building T-1 Main Construction Office, and Warehouse Buildings T-47 and T-43. The assessment focused on the BNI/WTP fire protection elements that are required to be addressed by basic program features of DOE and ORP contractual requirements, including but not limited, to the following:

- Implementation and comprehensiveness of fire protection program commitments including an adequate number of qualified fire protection engineers to address the fire protection commitments;
- Comprehensive Fire Hazard Analyses (FHA) consistent with document safety analyses;
- Fire safety training to employees;
- Conformance with fire protection requirements found in DOE O 420.1B, the Safety Requirements Document (SRD), Basis of Design (BOD), applicable National Fire Protection Association (NFPA) codes and standards, and DOE standards (e.g., DOE-STD-1066-97).
- Life safety provisions in facilities;
- Fire prevention methods and administrative controls to minimize facility fire risks and fire loss potential;
- Procedures for engineering design, review, and acceptance testing by a qualified fire protection engineer;
- Procedures for the maintenance, testing, and inspection of fire protection systems and features;
- Process for fire safety related exemptions and documented equivalencies;
- Completeness of BNI facility and program fire protection assessments and other elements specified in DOE G 420.1-3;
- Verification of incorporation of fire protection corrective actions from ORP and BNI fire-protection-related assessments; and
- Evaluation of appropriate measures for preventing or minimizing the effects of fire during the construction phase of the WTP necessary to provide a reasonable degree of safety to life and property, including provisions to prevent fires as a result of hot work.

1.1 PERFORMANCE OBJECTIVE FP.1, FIRE PROTECTION PROGRAM

This performance objective was to determine if the contractor implemented the basic fire protection program elements as required by contractual requirements. To evaluate this area, the assessment team:

- Reviewed a number of key BNI procedures and policies;
- Conducted interviews with fire safety personnel, construction management, operations leads, field engineers, managers, and fire protection engineers;
- Conducted a review of the ORP evaluation of the most recent WTP Preliminary Fire Hazard Analyses (PFHA) and conducted a cursory review of the recently updated and released LAW, LAB, and BOF FHAs; and
- Conducted key facility tours to observe fire protection program implementation with respect to implementation of administrative controls found in the higher-tiered WTP procedures and facility specific procedures.

Overall, the team concluded BNI satisfied this performance objective but determined one condition as an Opportunity for Improvement (OFI).

1.1.1 Summary

The purpose of the Criteria Review and Approach Document topic was to evaluate the basic program features of the BNI Fire Protection Program against contractual requirements, evaluate the FHA's implementation and integration into the nuclear safety basis, and evaluate important administrative controls and compensatory measures related to fire protection.

Overall contract requirements from the design, construction, and commissioning of the WTP contract affecting fire protection are found in the source document of DOE O 420.1B. Additionally, documents that are reviewed and approved by the ORP that contain fire protection commitments are found in the SRD and BOD. The specific program and design requirements for the WTP fire protection are derived from this set of documents.

To assess the written BNI fire protection program, the team reviewed a number of key BNI procedures and policies and conducted interviews with fire safety staff, fire protection engineers, and key construction personnel. The WTP fire protection program expertise resides within a number of BNI organizations on and off the construction site, primarily split between engineering, which is responsible for plant design and oversight of the major fire protection installations (e.g., fire alarm and fire sprinkler systems) and environmental and nuclear safety where fire safety staff are responsible for the assessment and FHA programs, the overall written fire protection program, and coordination with nuclear safety.

BNI has a fire protection policy statement that discusses the essential DOE fire protection program objectives to minimize the occurrence and consequence of a fire and maintain property losses from fire within limits established by the DOE. The BNI policy is that the health and safety of personnel at the WTP are of paramount importance and WTP project management is committed to providing a high level of fire protection capability at the WTP throughout the life of the project. With the project director's leadership, the WTP project team is responsible for planning and conducting work consistent with approved fire protection procedures. The WTP Fire Protection Program is established to minimize the chance that a fire will occur, and to limit damage as a result of a fire. From a review of the WTP Fire Protection Program, the team determined that the program objectives were consistent with DOE requirements.

In order to implement the fire protection objectives, the environmental and nuclear safety manager developed and is responsible for implementing a comprehensive Fire Protection Program contained in 24590-WTP-PL-ESH-02-004, "WTP Fire Protection Program." This program addressed the items noted above based on a graded approach. The graded approach was applied to distinguish between levels of risk for both permanent and nonpermanent structures/facilities for the WTP project. Within this approach, the program evaluated items associated with improved risk/highly protected risk status in private industry.

The WTP Fire Protection Program established the upper-tier principal responsibilities and expectations for WTP project employees, facility management, fire safety and fire protection organizations, and engineering with respect to fire protection consistent with the DOE and ORP expectations and requirements. The team concluded that the overall WTP upper tier written procedures and policies addressed the fundamental written fire protection requirements and expectations of the DOE requirements contained in DOE O 420.1B and its fire protection guide, the SRD, and BOD.

However, the team noted some inconsistencies in the written BNI Fire Protection Program documents and guides, which were not always consistent with other BNI procedures and requirements. The 24590-WTP-RPT-CON-05-007, "Project List of Codes Applicable to Construction Activities" and 24590-WTP-RPT-OP-05-002, "Commissioning" list many different editions of NFPA codes other than those found in the core BNI implementing procedures.

Several examples of these inconsistencies include the following:

- 24590-WTP-GPP-SIND-034, "Gas Cylinders," referenced NFPA 58, 2008 Edition (05-007 specified the 2001 Version), and NFPA 55, 2010 Edition (24590-WTP-RPT-CON-05-007 specified the 1998 Version);
- 24590-WTP-GPG-SIND-017, "Emergency Access and Egress," specified NFPA 101, "Life Safety Code[®]," 2006 Edition (24590-WTP-RPT-CON-05-007 specified the 2000 Version);
- 24590-WTP-GPP-SIND-026, "Fire Prevention," specified NFPA 241, "Standard for Safeguarding Construction, Alteration, and Demolition Operations," 2004 Edition (24590-WTP-RPT-CON-05-007 specified the 2000 Version);
- 24590-WTP-GPP-SIND-013, "Hot Work," specified NFPA 51B, 2009 Edition (24590-WTP-RPT-CON-05-007 specified the 1999 Version);
- 24590-WTP-GPP-SRAD-058, "Compressed Gas Cylinders," specified NFPA 58, 2005 Edition [there is no 2005 Edition of NFPA 58] (24590-WTP-RPT-OP-05-002 specified the 2004 Version);
- 24590-WTP-GPP-SRAD-042, "Control Combustibles," referenced NFPA 30, 2000 Edition (24590-WTP-RPT-OP-05-002 specified the 2003 Version) and NFPA 101, 2000 Edition (24590-WTP-RPT-OP-05-002 specified the 2003 Version);

Note: This could also be an issue with the NFPA list applicable to 24590-WTP-RPT-FP-04-002, "Design," which lists NFPA 101, 1997 and 2000 Editions);

- 24590-WTP-GPP-SRAD-063, "Inspecting, Testing, and Maintenance of Fire Doors," "Dampers and Fire & Smoke Dampers," referenced NFPA 90A, 1999 Edition (24590-WTP-RPT-OP-05-002 specified the 2002 Version; also the NFPA list applicable to 24590-WTP-RPT-FP-04-002, listed NFPA 90A, 1999 Version); and
- 24590-WTP-GPP-SRAD-065, "Prepare Fire Hazard Analysis," referenced NFPA 1, 2009 Edition (24590-WTP-RPT-OP-05-002 specified the 2003 Version that was not included in the NFPA list applicable to 24590-WTP-RPT-FP-04-002).

While each of these inconsistencies do not result in a finding, these issues collectively support the conclusion that the written BNI Fire Protection Program's documents and guides were not always consistent with other BNI procedures, requirements, and overall program requirements. Procedures should be consistent to avoid conflicts that could impact the project. These inconsistencies could result in unintended consequences in the actual implementation of standards intended/not intended by the scope of the BNI Fire Protection Program.

Performance Objective FP.3 also identified inconsistencies in contact instructions contained in the Emergency Action Plan, Emergency Action Training Module, and the posted emergency information. See Section 1.3 for additional details.

Therefore, the team identified these inconsistencies as an OFI that the fire-protection-related documents in BNI's processes contain some inconsistencies that could result in unintended outcomes (**OFI A-13-TRS-RPPWTP-001-O03; Christenson**).

In summary, OFI A-13-TRS-RPPWTP-001-O03 includes the following items:

- The WTP Project list of NFPA codes applicable to construction and commissioning reference different editions of NFPA codes than editions found in the actual BNI 'SIND/SRAD' implementing procedures;
- The Emergency Action Plan, Emergency Action Training Module, and the posted emergency information contain inconsistent contact instructions; and
- The Preliminary Documented Safety Analysis (PDSA) documents do not consistently reference the actual FHA documents (discussed in Section 1.1.1).

To evaluate FHA's implementation, the team reviewed the March 2012 ORP surveillance (S-12-TRS-RPPWTP-001) of the FHA updates, which included the most current versions of the BNI preliminary FHAs. That surveillance evaluated the FHA updates against the SRD and WTP project requirements. It was concluded that BNI deleted several of the key assumptions in the most recent revisions to the Preliminary FHA's appendices without a comprehensive technical basis, in contradiction to a 2008 Condition of Acceptance. The ORP also identified that BNI made very little progress, if any, to identify which fire barriers are considered to be safety class or safety significant in the PFHA documents since DOE identified this deficiency in 2008. BNI has submitted a corrective action plan to address these deficiencies that the ORP accepted but actions have not been completed at the time of this assessment.

BNI recently released initial FHAs for the LAB, BOF, and LAW and copies were obtained for this assessment. A cursory review of these LAB, BOF, and LAW FHAs determined these are updates of the preliminary FHAs for the same facilities including the results of deficiencies found from fire safety walk downs. These appear to be consistent with DOE fire protection requirements. However, due to the size and volume of these documents, the ORP will conduct a separate comprehensive surveillance of these documents at a later date.

To evaluate the FHA's implementation and integration into the nuclear safety basis, the team reviewed the PDSAs for the LAB, LAW, HLW, PTF, and BOF to determine whether the results of the FHAs were incorporated into the PDSAs. The team determined, with the exception of the BOF PDSA (24590-WTP-PSAR-ESH-01-002-05), that each of the facility PDSAs incorporated the overall results of the FHAs. However, only the LAB PDSA included reference to the actual FHA document in the PDSA. Therefore, as noted in Section 1.1.1 of this report, the team concluded that not all of the PDSA documents (with the exception of the LAB PDSA) referenced the actual FHA documents and the BOF PDSA did not incorporate the overall results of the BOF FHA or PFHA document (**OFI A-13-TRS-RPPWTP-001-003; Christenson**).

The team also reviewed a number of administrative control aspects of the construction process. Aspects of fire prevention administrative and compensatory controls are addressed in hot work procedures, fire prevention procedures, fire protection system impairment, and other program documents.

The WTP Fire Protection Program includes specific procedures to address control of combustibles, flammable/combustible liquids and compressed gasses, and hot work. Some weaknesses in the hot work program and fire system impairment program were identified by this assessment and are addressed in detail in Sections 1.2 and 1.4.

1.1.2 Conclusions

The performance objective of this area was satisfied but the team noted in one OFI that some of BNI's fire-protection-related documents and processes contained some inconsistent references to codes and standards that could result in unintended outcomes (**OFI A-13-TRS-RPPWTP-001-003; Christenson**).

1.2 PERFORMANCE OBJECTIVE FP.2, IMPLEMENTATION OF COMMITMENTS

This performance objective evaluated whether or not the Fire Protection Program commitments were implemented and that adequate numbers of technically competent, experienced, and fully qualified personnel were assigned to address the fire protection commitments.

To evaluate this area, the team:

- Reviewed the BNI Fire Protection Program definition of a qualified fire protection engineer against the requirements contained in DOE-STD-1066-97 and reviewed the WTP qualification matrix of key fire protection personnel;

- Reviewed the BNI Fire Protection Program roles, responsibilities, authorities, and expectations, contained within 24590-WTP-PL-ESH-02-004 and a number of other WTP implementing procedures;
- Reviewed BNI facility fire protection and fire protection program assessments;
- Reviewed contractor policy and procedures that specify design criteria for when fire protection systems are installed; for company fire protection, inspection, and testing requirements; and when fire department personnel are interviewed;
- Evaluated a number of actions tracked in the WTP Project Issues Evaluation Report (PIER) system to determine whether issues relative to fire protection identified in the assessments were tracked and resolved;
- Reviewed a number of preventative maintenance and corrective action work packages relative to fire protection systems that are currently in service on the WTP construction site; and
- Conducted key facility tours to observe fire protection program implementation with respect to specific key fire protection controls and attributes, including installed fire suppression and alarm systems, general overall condition of these key fire protection systems, positioning of system valves and pressure gages indicating system operability, and observation of fire alarm control panel status trouble and fire alarm status lamps.

Overall, the team concluded that BNI has satisfied the majority of the performance objectives but the team identified issues with the implementation of fire protection requirements to minimize the lengths for fire system impairments. The team also concluded that improvement was needed in clarifying the roles and responsibilities between Environmental and Nuclear Safety (ENS) fire safety, BNI fire protection engineering, and construction safety assurance, and identified issues with BNI's process for determining when fire protection systems should be placed into service.

1.2.1 Summary

To evaluate adequacy of site fire protection resources, the team reviewed the BNI Fire Protection Program definition of a qualified fire protection engineer against the requirement contained in DOE-STD-1066-97 and reviewed the WTP qualification matrix of the key fire protection personnel. The team determined that the definition of a qualified fire protection engineer in the BNI program was consistent with the DOE requirements and that the staff of the key fire protection personnel had varying degrees of experience and expertise across the company, including a number who had recently relocated to the WTP site to support construction and start-up efforts.

The team reviewed the roles, responsibilities, authorities, and expectations of the BNI Fire Protection Program contained within 24590-WTP-PL-ESH-02-004, other WTP implementing procedures, and interviewed fire protection technical and professional staff in the ENS and Engineering areas.

In support of the LAB, BOF, and LAW project team's efforts to complete construction milestones, ENS fire safety had recently undergone an extensive effort to validate and finalize

facility FHAs, and as a result, identified a number of deficiencies relative to the installed, but not completed, sprinkler systems; issues with fire barrier designs; and other related fire safety issues. In discussion with BNI ENS, they expressed dissatisfaction with the level of engineering oversight of the subcontractor sprinkler system design and installation, and that fire protection engineering was not meeting ENS fire safety expectations.

In 2012, the ORP also evaluated the fire sprinkler system design and installation for the WTP and issued a Priority Level 2 Finding (S-12-TRS-RPPWTP-002-F01). This finding indicated that BNI's reviews of subcontractor fire sprinkler submittals were not consistently identifying deficiencies with NFPA requirements, as required by DOE, which had allowed unsatisfactory installations, which were not considered complete, to occur. The ORP WTP engineering also identified a systemic problem with BNI that vendor-related procurement oversight demonstrates a lack of compliance with contract requirements and issued a Priority Level 1 Finding (A-12-WED-RPPWTP-004-F05).

The team reviewed a BNI corrective action plan in CCN: 254141 for the Priority Level 2 sprinkler system Finding (S-12-TRS-RPPWTP-002-F01). Coupled with Priority Level 1 Finding A-12-WED-RPPWTP-004-F05, the team determined that BNI had historically relied on their subcontractors to correctly implement the flow-down of requirements for NFPA requirements. BNI also relied on their contractors to monitor their own work rather than implement a more formal in-progress inspection process to ensure the on-going work met requirements before system completion. The team also interviewed BNI fire protection engineering and confirmed acknowledgement of the issue and the commitment for improvement in subcontractor in process oversight for sprinkler system installation. Since this issue is already addressed in separate assessment Findings S-12-TRS-RPPWTP-002-F01 and A-12-WED-RPPWTP-004-F05, a separate finding is not required.

The team also reviewed BNI fire protection engineering, responsible for the fire protection system design and ENS fire safety, responsible to ensure that the facility design reflects an appropriate FHA. New managers of these organizations have been working to resolve technical differences. However, because ENS Fire Safety, Fire Protection Engineering, and Construction Safety Assurance have not coordinated on a consistent basis in the past with respect to their roles and responsibilities involving NFPA requirements and the fire related systems, conflicts between the two organizations continue to occur that impact construction (e.g., differences of opinions, interpretations of codes and requirements that are not consistent, and identification of issues after systems are installed). Although the corrective action plan to address the sprinkler system deficiencies had yet to be completed, improvement in the overall coordination and collaboration between ENS Fire Safety, Fire Protection Engineering, and Construction Safety Assurance could avoid potential technical conflicts at the completion of the construction job (OFI A-13-TRS-RPPWTP-001-001; Christenson).

The team reviewed the 24590-WTP-G63-MGT-007, "Fire Protection Policy Statement" and several of the related implementing fire protection program procedures. The policy statement adequately incorporated the fire protection requirements of DOE O 420.1B and affirmed commitment to fire protection and fire suppression capabilities sufficient to minimize losses from fire and related hazards as required by the DOE. The team performed tours of the Main

Construction Office, PTF, HLW, LAW, LAB, Switchgear Building, Warehouse Building, Combination Shop, Warehouse, Operating Engineer's Maintenance Shop, Operating Engineer's Fabrication Shop, Material Handling Facility, Simulator Building, and the Temporary Propane Storage Yard. Based upon these tours, the team concluded that the Fire Protection Program was being implemented at all facilities observed.

Two of the objectives captured in the BNI policy statement were to minimize the potential for unacceptable interruptions as a result of fire and related hazards that can affect the ability to meet project objectives; and to minimize the potential fire damage to (loss of) critical process controls and safety class structures, systems, and components. Although these objectives are predicated upon an operational facility, a fire during the construction phase of a project could have a significant impact on project objectives or potentially damage safety class systems and components. As a result, an active Fire Protection Program must be put in place during all stages of the project.

The team evaluated fire protection systems that were being installed, some near completion, or were in progress of installation during construction. The team noted NFPA 241, Section 8.7.3, required, if suppression systems are to be provided, the installation "shall be in service as soon as practically possible." The ORP recognized that for a project of this magnitude, it is difficult to activate water based suppression systems prior to the installation of heating systems, since fire systems could freeze and damage facility and system components. Furthermore, the overall decision for suppression activation should be commensurate with the hazards that are introduced as part of the construction. In a 2007 ORP assessment of BNI's Fire Protection Program, the ORP recognized the importance of defining the activation of fire systems in the context of a plan commensurate with the overall construction schedule, including heating systems and fire related hazards. The 2007 assessment team observed that installed fire protection systems were not put in use and a plan to evaluate when to put the system in use did not exist (**OFI A-06-ESQ-RPPWTP-001-004**).

BNI subsequently developed the plan in 2007 by issuing Procedure 24590-WTP-PL-MGT-07-0003, "Plan to Put WTP Permanent Plant Fire Protection Systems in Service." This plan required periodic meetings (quarterly) with Engineering, Construction, Startup, and Commissioning to decide systems status and set goals for the upcoming 12 months for fire protection systems. However, BNI had only held meetings three times since 2008 to address this plan. Therefore, the team determined while BNI had been very serious in installing sprinkler systems into the WTP major nuclear facility and BOF, BNI had not been proactive in determining and defining when these systems should be placed into service (**OFI A-13-TRS-RPPWTP-001-002; Christenson**).

Commensurate with fire hazards, fire protection systems should be operable as soon as practically possible to avoid the potential fire loss of long-lead procurements. The team also evaluated combustible controls, housekeeping, and hot work fire hazards. The evaluation of these areas is documented in Sections 1.3 and 1.4.

The team evaluated operability of fire system suppression and alarm systems, and other fire protection features in operating facilities that support the WTP construction project (including

T-1 Office, T-52 Warehouse, T-15 Combination Shop, and T-47 Warehouse) and facilities already turned over to operations (e.g., the fire water pumps, hoses, and fire water tanks). These systems were evaluated against NFPA inspection, testing, and maintenance requirements. The team conducted facility walk-downs to establish if the systems were in operable status based on valve configurations and fire alarm panel annunciator and lamp status. A sampling review of inspection, testing, and maintenance records were also evaluated to determine if fire equipment was being inspected, tested, and maintained as required by the NFPA, including the frequency of the intervals required. The team determined that most of the active systems and components are being inspected, tested, and maintained as required by the DOE.

However, in the course of this evaluation, the team determined that several fire systems had impairments having existed for an extended time, which exceeded the BNI impairment procedure limit of 60 days. These include items such as control valves not electrically supervised, as required by the NFPA requirements; fire detectors that are either over spaced or not satisfying sensitivity testing requirements; corroded sprinkler heads; and other miscellaneous issues. As a result, some fire systems and their components may not function as required during an emergency or have functioning supervisory signals.

Therefore, the team concluded that the BNI program, intended to minimize the lengths of times for fire system impairments, did not consistently result in limiting the duration of the impairments as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, to incorporate NFPA 25, Section 14.1 (**Finding A-13-TRS-RPPWTP-001-F03, Priority Level 2; Christenson: A noncompliance with a requirement that could affect worker safety and facility operations**).

The team also reviewed the process to involve fire protection engineers in facility design and construction. The Fire Protection Engineers were able to demonstrate that they were actively involved in ongoing design reviews for several different projects. BNI Fire Safety was able to also demonstrate their involvement in plans, specifications, procedures, and inspection test reviews in 2013, as well as their lead role in developing the project FHAs documentation. Additionally, qualified fire protection technical and professional staff at the construction site were added since the last ORP triennial assessment of the BNI fire protection program. The team concluded that documented reviews by qualified fire protection engineers are being implemented by BNI for plans, specifications, procedures, and acceptance tests as required by DOE O 420.1B. Fire Safety and Fire Protection Engineering also demonstrated to the team how designs, procedures, system descriptions, and acceptance tests are tracked and assigned to qualified fire protection personnel for review. Based upon these demonstrations, the team concluded that contractor engineering disciplines ensured the requirements of the Fire Protection Program are incorporated into facility design and construction.

To evaluate the contractor program for self-assessments and facility assessments, the team reviewed the contractor's Fire Protection Program requirements with respect to assessment frequencies, content, and past fire protection program assessments conducted by BNI against ORP and DOE requirements. The team also reviewed a number of actions tracked in the BNI PIER system to determine whether issues identified in the assessments are tracked and appropriately resolved.

The team concluded fire protection program and facility assessments were being conducted on an on-going basis to capture the required areas at a three year and annual frequency, as required by the DOE fire protection program.

Finally, the team reviewed a number of actions tracked in the PIER system to determine whether issues identified in assessments were tracked and resolved. The team determined that when issues were identified from assessments they were entered into the contractor's PIER system and tracked until closed. The team concluded recommendations and findings from assessments and evaluations, both internal and external, were formally entered and tracked via the PIER system. The team performed a spot check of closed actions and concluded actions were being completed as the project matures.

1.2.2 Conclusions

The performance objective of this area was only partially satisfied, mainly due to weaknesses associated with the fire system impairment program, which did not consistently result in limiting the time duration of the impairments. The team summarized this weakness in the following finding:

- **Finding A-13-TRS-RPPWTP-001-F03 (Priority Level 2; Christenson):** The BNI program, intended to minimize the length of periods for fire system impairments, did not consistently result in limiting the time duration of the impairments, as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, to incorporate NFPA 25, Section 14.1.

The assessment team also noted deficiencies with the overall coordination and collaboration between ENS Fire Safety, Fire Protection Engineering, and Construction Safety Assurance, which was needed to avoid technical conflicts at the completion of the construction job, and the lack of progress BNI had made in determining and defining when fire protection systems should be placed into service. These conditions were documented as OFIs A-13-TRS-RPPWTP-001-001 (Christenson) and A-13-TRS-RPPWTP-001-002 (Christenson).

1.3 PERFORMANCE OBJECTIVE FP.3, COMPREHENSIVE FIRE PROTECTION ELEMENTS

This performance objective was to determine if the contractor had implemented comprehensive elements into the fire protection program that included fire safety training to employees, life safety provisions into facilities, and fire prevention methods to minimize facility fire risks and fire loss potential.

To evaluate this area, the team:

- Reviewed the fire safety training provided to all WTP employees;
- Reviewed key BNI procedures for implementation of NFPA 101 requirements, combustible controls, and fire prevention inspections;

- Conducted key facility tours to observe implementation of NFPA 101 and applicable NFPA 241 egress requirements for facilities under construction where life safety features of NFPA 101 have yet to be completed, determine if controls have been in place to address combustible, flammable, and hazardous materials to minimize the risk from fire and observed evidence of installed fire suppression systems in facilities where required by the DOE; and
- Reviewed WTP fire protection design criteria, the facility assessments, and facility FHAs against the property protection requirements contained in DOE requirements for the major WTP facilities under construction and other facilities utilized to support construction.

Overall, the team concluded BNI satisfied this performance objective but noted one condition as an OFI.

1.3.1 Summary

The purpose of this performance objective was to determine if the contractor had implemented comprehensive elements into their fire protection program to include, fire safety training, implementation of the NFPA 101, fire prevention inspections, and property protection to minimize facility fire risks and fire potential.

To evaluate fire safety training, the team reviewed BNI's written Worker Safety and Health Program, and orientation and refresher training programs to ensure fire safety was adequately addressed. Site training records were reviewed and personnel interviews were conducted to determine if all personnel completed the training and if trained personnel had retained fire protection knowledge. The team determined fire safety training content adequately included recognizing, preventing, and controlling fire hazards; minimizing fire losses; and ensuring life safety, portable fire extinguishers, and emergency response. Furthermore, the training was initially delivered to all WTP personnel and contractor and subcontractor personnel, prior to being assigned to work at the WTP; annual refreshers were required to be completed each year.

However, the team observed minor inconsistencies found in the training versus requirements contained in site postings and BNI procedures relative to notifying emergency response personnel in the event of a fire as identified in Table 1.

Table 1
Examples of Inconsistencies within Emergency Response Instructions and Postings

Reviewed Source	Contact Instructions
Site Orientation Training module	9-911 (in-town offices and Material Handling Facility) 521.5013 (WTP Security) Radio Channel #1 -Mayday! Mayday! Mayday!
HGET Module for BNI Employees	Use a pull box or call 9-911 <u>or</u> 521.5013 for the construction site
WTP Construction Site Emergency Instructions (posted in WTP buildings)	Call 373.0911; 9-911 (desk phone) <u>and then</u> 521.5013

Table 1
Examples of Inconsistencies within Emergency Response Instructions and Postings

Reviewed Source	Contact Instructions
<p><i>Emergency Contact Lists- Construction Site</i> (posted in WTP buildings, adjacent to the WTP Construction Site Emergency Instructions above)</p>	<p>Security/Fire: 521.5013 <u>or</u> 521.0086 Channel 1- Mayday! Mayday! Mayday! Cellular phone 373 0911 <u>and then</u> 521.5013 Desk phone 9-911 <u>and then</u> 521.5013</p>
<p>24590-WTP-GPP-SIND-003, <i>Construction Site Emergency Action Plan</i></p>	<p>Paragraph 7.2 stated, "The primary method of obtaining emergency response while on the WTP Construction site is calling 373-8200 (WTP Medical) or "Mayday, Mayday, Mayday" made over a portable radio using Channel 1. If there is no response to either of those calls, call 373-3800 (Hanford Emergency Services) and then call the WTP Site Security single point of contact at 521-5013 (alternate phone number is 521-0086), and then your Supervisory or Superintendent."</p>
<p>24590-WTP-GPP-SIND-026, <i>Fire Prevention and Protection</i></p>	<p>Paragraph 5.1 stated, "if a fire occurs, the discoverer of the fire should complete the following:</p> <ul style="list-style-type: none"> • "Activate a fire alarm (pull box), if available during evacuation from the area • "Contact WTP Site Security to report an onsite construction fire, even if the fire appears to have been extinguished. If using a cellular phone, dial 521-5013 to reach the WTP Site Security. Follow the instructions of the dispatcher. If using a radio, use channel 1 and say, "Mayday! Mayday! Mayday!" Provide any information regarding the fire and its location."

HGET = Hanford General Employee Training.
WTP = Waste Treatment and Immobilization Plant.

Although each of the procedures and postings in the examples observed would result in a response from the fire department, an OFI exists to provide consistent emergency contact instructions to WTP personnel. Therefore, the team included this issue in a collective OFI that fire-protection-related documents in BNI's processes contain some inconsistencies that could result in unintended outcomes (OFI A-13-TRS-RPPWTP-001-003; Christenson). This OFI is discussed in greater details in Section 1.1.

To determine if all WTP personnel had completed the annual and refresher training, the team reviewed the related training records and interviewed the WTP construction site training manager. The team determined all personnel (e.g., contractor, subcontractor, and DOE) that required refresher training within the next month were being actively tracked by the WTP training manager. The team performed a spot check review to determine if personnel at the construction site had retained the completed general training related to fire prevention. To accomplish this review, approximately 12 individuals (contractor, subcontractor, and DOE) were randomly selected and interviewed to determine if they were familiar with the actions to take in

the event of a fire and if they could identify fire hazards at the WTP construction site. All of the responses were consistent with the Hanford General Employee Training.

To evaluate implementation of the NFPA 101 requirements, the team reviewed the BNI Fire Protection Program procedures, facility fire hazards analyses, and facility assessments, and conducted tours of a number of WTP facilities against NFPA 101 requirements. The team examined specific life safety provisions, such as exit signs, emergency lighting, obstructions to egress, protection of means of egress, common path of travel, travel distance, remote access, unobstructed exiting, door swings and ease of opening, and fire barriers necessary for life safety (e.g., stairs, shafts, horizontal exits). The team also interviewed a BNI fire protection engineer/coordinator and a distributable lead field engineer to determine the extent to which life safety related issues occur. To evaluate facilities under construction, the team also walked down the major nuclear facilities under construction to compare the life safety features against NFPA 241 requirements since all of the life safety features and requirements of NFPA 101 have yet to be completed.

The team concluded BNI had the basic life safety features (e.g., emergency lighting, exit lighting, and protection of egress) requirements of NFPA 101 in the construction support facilities. In evaluating the life safety provisions for the facilities under construction, the team observed that the LAW did not have at least one stairway enclosed to support construction life safety and emergency response as required by NFPA 241 imposed through DOE O 4201.B. Furthermore, the BNI Fire Protection Program and Prevention Procedure for construction, which included partial implementation of the NFPA standard for stairs, did not incorporate the required enclosed stairway feature specified by NFPA.

Implementation of the NFPA 241 Standard is important to ensure a reasonable degree of safety to life and property from fire during the WTP construction phases. Fire potential is inherently greater during construction operations than in the completed structure due to the presence of ever changing combustible materials together with such ignition sources as temporary heating devices, and cutting and welding operations. Additionally, automatic suppression systems are not completed and in service and other permanent life safety features are not yet in place which increases the fire risk.

Overall, for life safety, the Team identified in a Priority Level 2 finding concerning WTP construction site not fully implement NFPA 241, as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, Contracts Requirements Document (CRD), incorporating DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (**Finding A-13-TRS-RPPWTP-001-F01: Priority Level 2; Christenson**).

BNI had already taken initial actions to address several of these issues, including but not limited to, enclosing one of the LAW stairwells and training WTP security on the emergency use of the construction elevators.

To evaluate fire prevention inspections, the team reviewed the fire protection program procedures and processes, facility fire hazards analyses, facility assessments, and conducted walkthrough tours of a number of WTP facilities that are being used for construction support as well as those under construction for the purpose of evaluating implementation of life safety

provisions in the work spaces. The team also reviewed several BNI fire protection procedures and processes.

The team determined, while BNI was completing weekly facility safety walk downs, the safety walk downs did not specifically address all of the fire protection aspects contained in NFPA 241. Furthermore, qualified fire protection personnel did not participate in the weekly safety walk downs. And finally, the team determined that WTP security had not received training on the use of construction elevators, such as the one in use on the north side of the PTF, to meet this requirement as required by NFPA 241. The intent of this requirement is to assist with fire department access in the event that elevator use is needed for emergency operations when only security personnel are located at the construction site. Therefore, the team included this issue in Priority Level 2 Finding **A-13-TRS-RPPWTP-001-F01**.

During the facility walk downs, the team observed a significant amount of rebar and piping around the HLW Facility and south of the PTF, which could delay access close to the building in an emergency. The team documented this issue as an OFI in **OFI A-13-TRS-RPPWTP-001-O04 (Christenson)** because 24590-WTP-GPP-SIND-073, "General Housekeeping Procedure," Section 5.2(a) requires that roads and fire lanes provided for emergency access shall not be blocked with vehicles, staged material, or equipment.

The assessment team observed one isolated issue during the walkthrough that was corrected on the spot. A cart containing a compressed gas (nitrogen) cylinder had been left unattended within the temporary propane yard. The observed condition was reported to BNI supervision and immediate actions were taken to relocate the cylinder to an appropriate storage area.

The team reviewed BNI's Fire Protection Policy, aspects of the written Fire Protection Program, and the WTP Tobacco Use Policy, to validate if a policy or programmatic statement that restricts smoking in areas of high fire concern (e.g., inside facilities, wildland areas, or near flammable liquids storage tanks) had been established. The BNI Fire Protection Policy was defined in 24590-WTP-G63-MGT-007. As part of the defined policy, the objectives of the Fire Protection Program were described. Consistent with the objectives of DOE O 420.1B, the BNI policy stated to minimize the potential for:

- The occurrence of a fire, explosion, or related event at the WTP Site and offsite support facilities;
- Fires that cause an unacceptable on-site or off-site release of hazardous or radiological materials that could impact the health and safety of employees, the public, or the environment;
- Unacceptable interruptions as a result of fire and related hazards that can affect the ability to meet project objectives;
- Fire damage to (loss of) critical process controls and safety class structures, systems, and components (for the protection of the public only) as a result of a fire; and
- Property losses from a fire exceeding limits established by the DOE.

Each of the objectives listed above were implemented via 24590-WTP-PL-ESH-02-004. Although the policy statement did not include a programmatic statement that restricts smoking in areas of high fire concern, Paragraph 7.1 of the implementing procedure stated "Fire prevention includes prohibiting smoking in buildings, within 25 feet of entrances and ventilation penetrations, and in the vicinity of specific fire hazards." Further requirements were included in 24590-WTP-G63-HR-006, "WTP Tobacco Use Policy." Paragraph 2.0 of the policy stated that smoking was prohibited indoors and in some outdoor locations as defined in Paragraph 3.0. Paragraph 3.0 defined outdoor areas that were considered a high fire concern. Related to the BNI smoking policy, the team also observed several examples where safe receptacles for smoking material had been located outside of designated (i.e., not posted) smoking areas. The team determined this was not a finding because smoking had not been observed by personnel outside of designated areas, and BNI took immediate actions to ensure receptacles were placed within designated areas once the issue was brought to their attention.

To review property protection requirements and incorporation into the project, the team reviewed the BNI fire protection design criteria, the FHAs, and completed fire loss potential (Maximum Potential Fire Loss [MPFL]/Maximum Credible Fire Loss determinations against DOE requirements. Each of these records was reviewed to validate that adequate fire protection had been specified via engineering design controls or currently in place for the following conditions:

- Automatic suppression for all structures where required by the SRD;
- Automatic suppression for all structures where required by the building code, NFPA code, or DOE Standard (DOE-STD-1066-97); and
- Although not directly stated in the SRD, DOE typically requires automatic fire suppression where (DOE G 420.1-3):
 - The maximum possible fire loss exceeds \$3 million.
 - Redundant automatic suppression, including redundant water supplies, for all structures where the maximum possible fire loss exceeds \$50 million.
 - Redundant automatic suppression plus physical separation via 3 hour fire barriers for all structures where the maximum possible fire loss exceeds \$150 million.
 - Automatic suppression is provided in locations housing safety class equipment.
 - Redundant automatic suppression in cases where no redundant capabilities to safety class equipment exist.
 - Automatic suppression for locations housing high value property.

In general, the team concluded that property loss potential was addressed through the use of automatic suppression systems, fire barriers, fire alarm systems, and separation distances. The team performed a cursory review of completed FHA and MPFL determinations related to the BOF, PTF, LAB, HLW, and LAW Facilities. The DOE specified that automatic suppression was required when the MPFL exceeds \$3 million; redundant automatic suppression, including redundant water supplies, for all structures where the MPFL exceeds \$50 million; and redundant automatic suppression plus physical separation via 3 hour fire barriers for all structures where the

MPFL exceeds \$150 million. The reviewed determinations were complete and reasonable. The team did observe a FHA analysis for the BOF and General (24590-WTP-FHA-RAFP-FP-0001) and supporting calculation sheet had been issued at the end of Calendar Year 2012. Although BNI had determined Emergency Diesel Generators (EDG) would be replaced by Emergency Turbine Generators (ETG) and placed in a single building, the FHA and MPFL calculations for the BOF (24590-BOF-UIC-FPW-00003) still referenced the EDGs. The team also reviewed the arrangement drawing for the BOF ETG Facility Plan (24590-BOF-P1-89-00013) related to the ETG Facility and discussed the issue with the fire protection engineer. Based upon this review and the discussion with the fire protection engineer, it was evident to the team that BNI had planned to update the FHA and MPFL calculations once the design and equipment had been finalized. The reviewed ETG drawing was recently issued on November 31, 2012.

The team observed installed fire suppression systems in the facility walkthroughs to determine if the installed systems had met the reviewed requirements for protecting property and high value equipment. The facility walkthroughs provided additional evidence that fire protection systems were being installed in accordance with the DOE O 420.1B, the DOE G 420.1-3 Fire Protection Implementation Guide for DOE Fire Protection and Emergency Services Programs, and the SRD (24590-WTP-SRD-ESH-01-001-02). For example, Paragraph 4.5 of the SRD stated WTP facilities, sites, and activities (including design and construction) shall be characterized by a level of fire protection that is sufficient to fulfill the requirements of the best protected class of industrial risks ("Highly Protected Risk" or "Improved Risk") and shall be provided protection to achieve Defense-in-Depth. Redundant safety significant structures, systems, and components in systems that must satisfy the single failure criteria should be in separate fire areas.

1.3.2 Conclusions

Overall, the team concluded BNI satisfied the majority of this performance objective but identified a Priority Level 2 finding in this area concerning the lack of full implementation of NFPA 241 requirements (**Finding A-13-TRS-RPPWTP-001-F01: Priority Level 2; Christenson**). The team also identified one OFI (**A-13-TRS-RPPWTP-001-O04; Christenson**) due to the presence of a significant amount of rebar and piping that had been observed around the HLW Facility and south of the PTF, which could delay emergency access close to the building.

1.4 PERFORMANCE OBJECTIVE FP.4, HOT WORK AND MEASURES TO PREVENT OR MINIMIZE THE EFFECTS OF FIRE DURING CONSTRUCTION

This performance objective was to determine if the contractor had implemented appropriate safety measures for preventing or minimizing the effects of fire during the construction phase of the WTP necessary to provide a reasonable degree of safety to life and property, including provisions to prevent fires as a result of hot work. To evaluate this area, the team:

- Evaluated the general aspects of fire prevention and fire protection with respect to life safety and property protection throughout the construction phase (24590-WTP-RPT-CON-05-007 and NFPA 241);

- Reviewed the contractor's procedures and processes to determine if hot work roles and responsibilities are clearly defined and precautions are implemented under a formal permit program that includes a fire watch per NFPA 51B;
- Reviewed whether or not fire hazards in partially constructed facilities, where little or no construction activities, are occurring and are safeguarded from the accumulation of unnecessary combustible and storage materials; and
- Reviewed temporary heating equipment, to determine if it is visually inspected at a reasonable frequency to ensure combustibles have not fallen over or accumulated near the temporary heating device to create fire hazards.

The team concluded that BNI had not satisfied this performance objective due to their temporary designation of hot work areas inside WTP facilities not designed or approved by the Authority Having Jurisdiction (AHJ) for hot work, situations where such designated areas had accumulated combustibles, and issuance of a BNI permit for fire watches that did not meet NFPA 51B requirements. BNI's on-going allowance of combustibles in the "designated hot work areas" and temporary designation of these areas for hot work in BNI facilities not designed for hot work (and without AHJ approval), could result in a fire that has serious negative consequences to WTP, BNI, and DOE. In addition, since fire protection systems have not yet been activated in the WTP process facilities, where some of the areas have been designated for hot work, and as additional commodities are installed into the facility, including combustible cabling and electric equipment, the unprotected fire hazards will increase over time. Therefore, permanent plant equipment could be easily damaged by hot work, resulting in deleterious impacts to the WTP schedule and mission, if this situation is not adequately addressed by BNI.

1.4.1 Summary

To evaluate the general aspects of fire prevention and the Fire Protection Program with respect to life safety and property protection throughout the construction phase, the team evaluated the contractor's Fire Protection Program procedures and processes, and conducted tours of a number of WTP Facility areas for compliance with NFPA 241 requirements.

This evaluation was included in this assessment because fires during construction activities are potentially a greater threat than during operation. The fire potential is inherently greater during construction operations than in the completed structure because of the presence of large quantities of combustible materials and construction debris, together with such ignition sources as temporary heating devices, cutting and welding operations, and potential smoking. Additionally, suppression and alarm systems, as well as other fire protection features, have yet to be placed into service, which increases the risk of fire.

The team determined most elements of NFPA 241 were incorporated into the WTP; however, the team identified the following deficiencies:

- The LAW Facility did not have at least one stairway enclosed to support construction life safety and emergency response as required by NFPA 241, Section 7.5.6.4.

- The 24590-WTP-GPP-SIND-026, Revision 5A, Section 7.8.2, includes implementation of code requirements for facility stairs in buildings under construction, except it does not include the enclosed stairway feature required by NFPA 241, Section 7.5.6.4.
- NFPA 241, Section 7.2.4.4, requires a weekly self-inspection program to be implemented, with records maintained and made available. The team could not find evidence that a weekly inspection program had been formalized in a procedure or that weekly fire inspection records had been completed as required. Although BNI had completed weekly safety walk-downs, the safety walk-downs did not specifically address all of the fire protection aspects contained in NFPA 241. Additionally, qualified fire protection personnel did not participate in the weekly safety walk down process.
- 24590-WTP-GPP-SIND-026, Revision 5 does not specify the Fire Prevention Program manager as having the authority to enforce the provisions of NFPA 241 as required, Section 7.2.1.1.
- WTP security had not received training on the use of construction elevators, such as the two in use on the north side of the PTF, to meet this requirement as required by NFPA 241, Section 7.2.5.2.

Therefore, overall the team identified, in a Priority Level 2, finding that the WTP construction site did not fully implement NFPA 241 as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, CRD, incorporating DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (**Finding A-13-TRS-RPPWTP-001-F01: Priority Level 2; Christenson**).

To review BNI hot work roles and responsibilities and determine whether precautions are implemented under a formal permit program, including a fire watch, the team evaluated program procedures and processes and reviewed facilities where hot work was being conducted, including the HLW, T-16 Operating Engineer's Maintenance Shop, and T-15 Combination shop.

The team observed that BNI had designated hot work areas inside the minus 21-foot elevation of the HLW and in the T-16 Operating Engineer's Maintenance Shop. The team observed that the designated 'hot work area' inside the HLW area was not free of combustible materials and it was not segregated from the rest of the areas in the minus 21-foot elevation as required by NFPA 51B requirements. The arrangement observed in HLW could result in unintended damage to specialized plant equipment during hot work operations since designated hot work areas do not have the rigorous fire watch requirements for nondesignated areas because these designated areas are intended to be engineered and designed for hot work operations.

The NFPA 51B, Section 5.2.2.1 defines designated hot work areas as "a specific area designed or approved for hot work, such as a maintenance shop or a detached outside location that is of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas." Additionally, the standard defines 'approved' as acceptable to the AHJ. However, none of the WTP process facilities, including the HLW Facility, are designed for permanent hot work (e.g., the welding shop as found in T-15 Combination Shop) as required by NFPA 51B. Furthermore, the fire protection AHJ had not approved any WTP process facilities as designated hot work areas. However, the BNI Hot Work

Permit Procedure (24590-WTP-GPP-SIND-013) allowed designated hot work areas to be established by the BNI construction area superintendent without consideration to the permanent design purpose of the facility and without AHJ approval.

The team observed a designated hot work area at the T-16 Operating Engineer's Maintenance Shop. While an attempt was made to install fire-resistive tarpaulins to separate the designated area of T-16 from a portion of the combustible construction, T-16 is not considered a fire resistive or noncombustible constructed building since the facility structure is primarily made of wood. Furthermore, covering the T-16 wooden structure with welding pads, blankets, curtains, or fire-resistive tarpaulins does not make it fire resistive by NFPA requirements.

NFPA 51B allows an administrative approach for conducting hot work in the WTP process and other WTP support facilities under a permit process to achieve an equivalent safe level of fire protection. The permit process results in more rigorous verification of field conditions and a fire watch to prevent and minimize fires since hot work is conducted in areas not designed for hot work. It appeared BNI was using a less rigorous administrative approach in applying temporary designated hot work areas to avoid fire watches when conducting hot work in these areas.

However, hot work conducted in the major process facilities at the WTP is a serious fire hazard, which could result in property loss of unique equipment that has a long-lead time if stringent compliance with NFPA requirements is not recognized and implemented. In addition, since fire protection systems have not yet been activated in the process facilities and as additional commodities are installed into the facility, including combustible cabling and electric equipment, the unprotected fire hazards will increase over time and permanent plant equipment could be easily damaged by hot work, resulting in deleterious impacts to the WTP schedule and mission. In past assessments the ORP had also identified several instances where combustibles were allowed to accumulate in the BNI 'designated hot work areas.' Not only did the team determine that BNI was not meeting important NFPA 51B requirements, but that their on-going allowance of combustibles in the BNI 'designated hot work areas' and temporarily designating these areas for hot work in BNI facilities not designed for hot work (and without AHJ approval), could result in a fire that has serious negative consequences to WTP, BNI, and DOE.

The team also identified an error in the BNI hot work Procedure (24590-WTP-GPP-SIND-013) involving the permits, which required fire watches to be maintained for hot work areas for a period of at least "30 minutes (+/-)." This would allow for a fire watch to be conducted for a shorter period than the requirements of NFPA 51B, Section 5.5.2, which specifies that a fire watch be maintained for at least a 1/2 hour after completion of hot work operations in order to detect and extinguish smoldering fires.

Therefore, the team identified these issues as **Finding A-13-TRS-RPPWTP-001-F02 (Priority Level 2; Christenson)** for BNI designating some facility areas as 'hot work areas' and issuing a BNI permit procedure for fire watches, which were not in compliance with NFPA 51B as required by DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (3).

To review fire hazards in partially constructed facilities, with little or no construction activities, the team conducted key facility tours to verify if partially constructed facilities (with emphasis

on the PTF) were not accumulating unnecessary combustible or storage materials and BNI conducted inspections on a designated frequency to ensure that a reasonable level of fire safety is maintained. The team conducted a thorough walk down of the PTF and determined the PTF to have good housekeeping with essentially no combustible or equipment storage in all of the completed elevations.

General housekeeping requirements are contained in 29 CFR 1926.25, "Safety and Health Regulations for Construction," and 24590-WTP-GPP-SIND-073. Title 29 CFR 1926.25 stated that during construction:

- Form and scrap lumber with protruding nails, and all other debris shall be kept cleared from the work areas, passageways, and stairs in and around buildings or other structures;
- Combustible scrap and debris shall be removed at regular intervals;
- Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse; and
- Garbage and other waste shall be disposed of at frequent and regular intervals.

Paragraph 5.2(c) of 24590-WTP-GPP-SIND-073 stated that roads and fire lanes provided for emergency access shall not be blocked with vehicles, staged material, or equipment.

In general, adequate housekeeping had been accomplished within all areas observed in the WTP. The areas had been kept clear of debris, lumber, and combustible material; waste receptacle and dumpsters had been staged near the work areas. Passageways and stairways had been maintained clear. However, the team observed that emergency lanes had been potentially obstructed by material lay down areas surrounding the HLW Facility, which is documented as an issue in Section 1.3.

To review temporary heating equipment, the team conducted tours throughout the WTP facilities to visually review temporary heating equipment for the purpose of determining whether or not temporary heating equipment was listed [National Recognized Testing Laboratory] and combustible materials were separated, had not fallen over, or had accumulated near the temporary heating device to create a fire hazards in accordance with NFPA 241. The team determined there were no issues observed with the temporary heating.

1.4.2 Conclusions

The team concluded that BNI had not satisfied this performance objective due to their temporary designation of hot work areas inside WTP facilities not designed or approved by the AHJ for hot work, situations where such designated areas had accumulated combustibles, and issuance of a BNI permit for fire watches that did not meet NFPA 51B requirements. BNI's on-going allowance of combustibles in the BNI 'designated hot work areas' and temporarily designating these areas for hot work in BNI facilities not designed for hot work (and without AHJ approval) could result in a fire that has serious negative consequences to WTP, BNI, and DOE. In addition, since fire protection systems had not yet been activated in the process facilities where some of the areas have been designated for hot work, and as additional commodities are installed into the facility, including combustible cabling and electric equipment, the unprotected fire

hazards will increase over time and permanent plant equipment could be easily damaged by hot work, resulting in deleterious impacts to the WTP schedule and mission.

The team identified the following findings in the area:

- **Finding A-13-TRS-RPPWTP-001-F01 (Priority Level 2; Christenson):** WTP construction site does not fully implement NFPA 241 as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, CRD, incorporating DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (3).
- **Finding A-13-TRS-RPPWTP-001-F02 (Priority Level 2; Christenson):** BNI designated hot work areas and issued a permit procedure for fire watches, which were not in compliance with NFPA 51B as required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, CRD, incorporating DOE O 420.1B Attachment 2, Chapter II, Section 3.a. (3).

2.0 CONCLUSION

The team observed improvements in the overall fire protection program since the ORP assessment of the BNI Fire Protection Program in 2009. The team noted that BNI continues to improve in a number of areas, including improvement in the quality and clarity of the written Fire Protection Program, maturity in the development of the process facility FHAs necessary to support future plant operations and progress in comprehensive plant fire protection systems design and installation. Furthermore, the team noted improvement in fire protection oversight and self-assessments with the location of additional fire safety and fire protection engineering staff at the construction site, including a fire system impairment coordinator and fire system maintenance staff who are knowledgeable of the integration and execution of NFPA maintenance requirements at the WTP.

However, in evaluating requirement implementation for preventing and minimizing the effects of fire during the construction phase of the WTP and in the evaluation of Fire Protection Program commitment implemented, the team identified three Priority Level 2 findings in the BNI Fire Protection Program needing correction.

The team also identified four OFIs, which warrant management's attention but none of which are a direct noncompliance with a contract requirement. These OFIs, along with details of the findings are discussed in this assessment report.

3.0 SUMMARY OF FINDINGS AND OPPORTUNITY FOR IMPROVEMENT ITEMS

This chapter discusses the summary of findings and the OFIs.

3.1 FINDINGS

Finding A-13-TRS-RPPWTP-001-F01 (Priority Level 2; Christenson): WTP construction site does not fully implement NFPA 241.

Requirement: Implementation of NFPA codes and standards is required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, CRD, incorporating DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (3).

Discussion: Contrary to the above requirement the LAW Facility did not have at least one stairway enclosed to support construction life safety and emergency response and 24590-WTP-GPP-SIND-026 did not include the required enclosed stairway feature required by NFPA 241, Section 7.5.6.4, the safety walk downs do not specifically address all of the fire protection aspects contained in NFPA 241, and WTP security has not received training on the use of construction elevators as required by NFPA 241, Section 7.2.5.2.

Finding A-13-TRS-RPPWTP-001-F02 (Priority Level 2; Christenson): BNI designated hot work areas and issued a permit procedure for fire watches, which are not in compliance with NFPA 51B.

Requirement: Implementation of NFPA codes and standards is required by Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, CRD, incorporating DOE O 420.1B, Attachment 2, Chapter II, Section 3.a. (3).

Discussion: Contrary to the above requirement BNI had designated hot work areas at the minus 21-foot elevation of the HLW Facility and in the T-16 Operating Engineer's Maintenance Shop. However, the designated 'hot work area' inside the HLW Facility was not free of combustible materials and it was not segregated from the rest of the areas in the minus 21-foot elevation as required by the NFPA 51B, Section 5.2.2.1. The designated area in T-16 was also not in compliance to requirements in NFPA 51B, Section 5.2.2.1 because the facility is not considered a fire resistive or noncombustible constructed building since the facility structure is primarily made of wood. Additionally, none of the WTP process facilities, including the HLW Facility, are designed for permanent hot work (e.g., the welding shop found in the T-15 Combination Shop) as required by NFPA 51B, Section 5.2.2.1. The BNI hot work permit Procedure (24590-WTP-GPP-SIND-013) allowed designated hot work areas to be established by the BNI construction area superintendent without consideration to the permanent design purpose of the facility and without AHJ approval. However, the fire protection AHJ has not approved any WTP process facilities as designated hot work areas as required by NFPA 51B, Section 5.2.2.1. Finally, 24590-WTP-GPP-SIND-013 involving the permits that required fire watches to be maintained for hot work areas for a period of at least "30 minutes (+/-)." This would allow for a fire watch to be conducted for a shorter period than the requirement of NFPA 51B, Section 5.5.2, which specifies that a fire watch be maintained for at least 1/2 hour after completion of hot work operations in order to detect and extinguish smoldering fires.

Finding A-13-TSD-RPPWTP-001-F03 (Priority Level 2; Christenson): The BNI program, intended to minimize the lengths of periods for fire system impairments, does not consistently result in limiting the time duration of the impairments.

Requirement: Contract No. DE-AC27-01RV14136, Section J, Attachment E (a), which specifies DOE O 420.1B, to incorporate NFPA 25, Section 14.1.

Discussion: Contrary to the requirement above many fire system impairments that exist in the WTP site support facilities that drastically exceed time frames listed in the BNI impairment Procedure (24590-WTP-GPP-SRAD-069). These included items such as control valves that are not electrically supervised as required by the NFPA 13 and 72 requirements, fire detectors that are either over spaced or not meeting sensitivity testing requirements, corroded sprinkler heads, and other miscellaneous issues. Some of these fire system impairments have been in place for four years and many have been in place for over two years. However, the BNI impairment procedure established the maximum impairment time period as 60 days for those that do not require long-term planning. The result is that these fire systems and their components, including supervisory signals, may not function as required during an emergency because the item is not functioning as required.

3.2 OPPORTUNITY FOR IMPROVEMENT

OFI A-13-TRS-RPPWTP-001-001: Continued improvement is needed in clarifying the roles and responsibilities between ENS fire safety, fire protection engineering, and construction safety assurance including better technical coordination between the organizations to minimize subcontractor design and construction installation deficiencies in the fire protection area and construction fire safety oversight.

Discussion: ENS fire safety, fire protection engineering, and construction safety assurance have not coordinated on a consistent basis in the past with respect to their roles and responsibilities involving NFPA requirements and the fire related systems, conflicts between these organizations continue to occur that impact construction (e.g., differences of opinions, interpretations of codes and requirements that are not consistent, and identification of issues after systems are installed). Improvement in the overall coordination and collaboration between ENS fire safety, fire protection engineering, and construction safety assurance could avoid potential technical conflicts at the completion of the construction job.

OFI A-13-TRS-RPPWTP-001-002: While BNI has been very serious in installing sprinkler systems into the WTP major nuclear and BOP, BNI has not been proactive in determining and defining when these systems should be placed into service. Commensurate with fire hazards, fire protection systems should be operable as soon as practically possible to avoid the potential of long-lead procurements resulting from fire loss.

Discussion: The 24590-WTP-PL-MGT-07-0003 requires periodic meetings (quarterly) with Engineering, Construction, Startup, and Commissioning to decide fire systems status

and to set goals for the upcoming 12 months for fire protection systems. However, BNI had only held meetings three times since 2008 to address this plan.

OFI A-13-TRS-RPPWTP-001-003: Fire protection related documents in BNI's processes contain some inconsistencies that could result in unintended outcomes.

Discussion: The WTP Project List of NFPA Codes Applicable to Construction and Commissioning (24590-WTP-PLT-CON-05-0007 and 24590-WTP-RPT-OP-05-002) references different editions of NFPA codes than editions found in the actual BNI fire protection related implementing procedures, the Emergency Action Plan, Emergency Action Training Module, and the posted emergency information contain inconsistent contact instructions, and the PDSA documents do not consistently reference the actual FHAs documents.

OFI A-13-TRS-RPPWTP-001-004: Procedure 24590-WTP-GPP-SIND-073, Section 5.2 (a) requires that roads and fire lanes provided for emergency access shall not be blocked with vehicles, staged material, or equipment.

Discussion: A significant amount of rebar and piping had been observed around the HLW Facility and south of PTF, which could delay access close to the building in an emergency.

4.0 REFERENCES

DOE and other Federal Documents:

DOE G 420.1-3, "DOE Implementation Guide for DOE Fire Protection and Emergency Services Programs," September 27, 2007.

DOE O 420.1B, "Facility Safety," Chg 1, April 19, 2010.

DOE-WTP letter from W. F. Hamel to J. St. Julian, BNI, "Upcoming Assessment of Bechtel National, Inc. (BNI) Waste Treatment and Immobilization Plant (WTP) Facilities Fire Protection Program Implementation," 13-TRS-0008, dated February 11, 2013.

ORP letter from G. A. Girard to R. W. Bradford, BNI, "Assessment Report A-10-ESD-RPPWTP-001 Fire Protection Program Implementation of Bechtel National, Inc. (BNI) Waste Treatment and Immobilization Plant (WTP) Facilities," 10-ESQ-008, dated April 19, 2010.

DOE-STD-1066-97, "DOE Standard Fire Protection Design Criteria," July 1999.

DOE-STD-1088-95, "DOE Standard Fire Protection for Relocatable Structures," June 1995.

U.S. Department of Energy Contract No. DE-AC27-01RL14136, "Waste Treatment and Immobilization Plant Contract."

ORP letter from D. A. Brockman to F. M. Russo, BNI, "Approval of Bechtel National, Inc. (BNI) Authorization Basis Amendment Request (ABAR) 25490-WTP-SE-ENS-09-0063, Revision 0, "AB Changes Regarding Safe State to Support Elimination of DOE/RL-96-0006 from the Waste Treatment and Immobilization Plant (WTP) Authorization Basis," 10-NSD-052, dated July 26, 2010.

DOE-WTP letter from D. L. Noyes to R. W. Bradford, BNI, "Surveillance Report S-12-TRS-RPPWTP-001 - Bechtel National, Inc. (BNI) Waste Treatment and Immobilization Plant (WTP) Preliminary Fire hazard Analyses (PFHA)," 12-TRS-0003, dated May 1, 2012.

S-12-TRS-RPPWTP-001, "ORP Surveillance of the Waste Treatment and Immobilization Plant Preliminary Fire Hazard Analyses," March 5 through 15, 2012.

DOE-WTP letter from D. L. Noyes to R. W. Bradford, BNI, "Response to Waste Treatment and Immobilization Plant (WTP) Preliminary Fire Hazard Analyses (PFHA) Surveillance Report, Priority Level 2 Finding S-12-TRS-RPPWTP-001-F01," 12-TRS-0052, dated October 24, 2012.

Code of Federal Regulations, Title 29, Part 1926, "Safety and Health Regulations for Construction," U.S. Government Printing Office, Washington, D.C., July 1, 2003, <<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl>> (April 2012).

BNI Documents:

24590-WTP-G63-MGT-007, Revision 1, "Fire Protection Policy Statement," January 15, 2010.

24590-WTP-SRD-ESH-01-001-02, Revision 6, "Safety Requirements Document Volume II," August 27, 2012.

24590-WTP-PL-SA-06-0002, Revision 8, "WTP Worker Safety and Health Program," May 15, 2012.

24590-WTP-3YD-FSW-00001, Revision 1, "System Description for the Fire Service Water (FSW), Fire Protection Water (FPW) and the Fire Detection and Alarm (FDE) Systems," February 27, 2012.

24590-WTP-DB-ENG-01-001, Revision 1Q, "Basis of Design," August 4, 2011.

24590-WTP-3PS-JQ05-T0001, Revision 2, "Waste Treatment Plant Engineering Specification for Fire Detection and Alarm Systems," April 26, 2004.

24590-WTP-3PS-PZ41-T0001, Revision 4, "Waste Treatment Plant Engineering Specification for Preaction Fire Suppression System," March 11, 2010.

24590-WTP-3PS-PZ41-T0002, Revision 4 "Waste Treatment Plant Engineering Specification for Dry Pipe Fire Suppression System," March 11, 2010.

24590-WTP-3PS-PZ41-T0003, Revision 5, "Waste Treatment Plant Engineering Specification for Wet Pipe Fire Suppression System," March 11, 2010.

24590-WTP-GPG-SRAD-0003, Revision 1, "Fire Protection Glossary of Terms," August 26, 2011.

24590-WTP-GPG-SRAD-0004, Revision 1, "Guide to Preparing a Fire Hazards Analysis," August 31, 2011.

24590-WTP-UIC-FPW-00001, Revision C, "Maximum Possible Fire Loss (MPFL) for LAW, HLW, PTF, BOF and Laboratory Facilities," October 16, 2009.

24590-LAB-FHA-RAFP-FP-0001, Revision 0, "Analytical Laboratory Fire Hazard Analysis," December 19, 2012.

24590-WTP-FHA-RAFP-FP-0001, Revision 0, "Balance of Facilities & General Fire Hazard Analysis," December 19, 2012.

24590-LAW-FHA-RAFP-FP-0001, Revision 0, "Low Level Waste Fire Hazard Analysis," December 20, 2012.

24590-LAB-UIC-FPW-00002, Revision 0, "Maximum Possible Fire Loss (MPFL) for the Analytical Laboratory (LAB)," December 10, 2012.

24590-LAW-UIC-FPW-00002, Revision 0, "Maximum Possible Fire Loss (MPFL) for the Low Activity Waste Facility (LAW)," December 10, 2012.

24590-BOF-UIC-FPW-00003, Revision 0, "Maximum Possible Fire Loss (MPFL) for the Balance of Facilities," December 10, 2012.

24590-WTP-GPG-SRAD-0005, Revision 0, "Fire Protection for Stored Material," May 22, 2009.

24590-WTP-GPP-SRAD-049, Revision 1A, "Non-Statutory Fire Protection Exemptions and Equivalencies Procedure," May 11, 2011.

24590-WTP-GPP-SRAD-059, Revision 1, "Fire Prevention," May 20, 2011.

24590-WTP-GPP-SRAD-063, Revision 1, "Inspection, Testing, and Maintenance of Fire Doors, Fire Dampers, and Combination Fire/Smoke Dampers," March 30, 2011.

24590-WTP-GPP-SRAD-064, Revision 1, "Inspection of Fire Rated Walls, Ceilings, Floors and Fire Penetrations," May 17, 2011.

24590-WTP-GPP-SRAD-065, Revision 3, "Preparing a Fire Hazards Analysis," March 1, 2012.

- 24590-WTP-GPP-SRAD-069, Revision 2, "Fire Protection System Impairment Procedure," May 14, 2012.
- 24590-WTP-GPP-SIND-013, Revision 8, "Hot Work Permit," February 8, 2012.
- 24590-WTP-GPP-SIND-009, Revision 5c, "Safety Watches," August 24, 2012.
- 24590-WTP-GPP-SIND-026, Revision 5, "Fire Prevention and Protection," January 25, 2013.
- 24590-WTP-PL-MGT-07-0003, Revision 1, "Plan to Put WTP Permanent Plant Fire Protection Systems in Service," September 16, 2010.
- 24590-WTP-PL-ESH-02-004, Revision 8, "WTP Fire Protection Program," December 14, 2009.
- 24590-WTP-PL-ENS-06-0002, Revision 3, "Fire Protection Facility Assessments Management Assessment Plan," August 28, 2012.
- 24590-WTP-PL-ESH-02-009, Revision 3, "Fire Safety Management Assessment Plan," January 14, 2013.
- 24590-WTP-PL-RAFP-FP-0001, Revision 0, "Fire Safety Management Assessment Plan," January 1, 2013.
- 24590-WTP-RPT-FP-04-0002, Revision 2, "List of Applicable NFPA Codes and Standards to Design," July 23, 2007.
- 24590-WTP-PLT-CON-05-0007, Revision 3, "List of Applicable NFPA Codes and Standards to Construction," January 31, 2012.
- 24590-WTP-RPT-OP-05-002, Revision 0, "List of Applicable NFPA Codes and Standards to Commissioning," July 13, 2005.
- 24590-LAB-FHA-RAFP-FP-0001, Revision 0, "Analytical Laboratory Fire Hazard Analysis," December 19, 2012.
- 24590-LAW-FHA-RAFP-FP-0001, "Low Level Waste Fire Hazard Analysis," Revision 0, December 20, 2012.
- 24590-WTP-UIC-FPW-00001, Revision C, "Maximum Possible Fire Loss (MPFL) for LAW, HLW, PTF, BOF and Laboratory Facilities," October 16, 2009.
- 24590-WTP-GPG-SRAD-0004, Revision 1, "Guide to Preparing a Fire Hazards Analysis," August 31, 2011.
- 24590-LAB-UIC-FPW-00002, Revision 0, "Maximum Possible Fire Loss (MPFL) for the Analytical Laboratory (LAB)," December 10, 2012.

24590-LAW-UIC-FPW-00002, Revision 0, "Maximum Possible Fire Loss (MPFL) for the Low Activity Waste Facility (LAW)," December 10, 2012.

24590-WTP-FHA-RAFP-FP-0001, Revision 0, "Fire Hazard Analysis for the General Facilities/Balance of Facilities (BOF)," December 19, 2012.

24590-HLW-RPT-ESH-01-001, Revision 4, "Preliminary Fire Hazards Analysis for the High Level Waste Building," March 30, 2010.

24590-HLW-FHACN-ENS-11-0001, "HLW PFHA Revisions to Appendix B and Appendix C," 2011.

24590-PTF-RPT-ESH-02-001, Revision 4, "Preliminary Fire Hazards Analysis for the Pretreatment Facility," June 30, 2010.

24590-PTF-FHACN-ENS-11-0001, "Update Appendices B & C of the PTF Preliminary Fire Hazard Analysis," 2011.

BNI letter CCN: 244430, "Response to WTP Preliminary Fire Hazard Analyses Surveillance Report, S-12-TRS-RPPWTP-001, Finding F01," dated September 18, 2013.

24590-WTP-PSAR-ESH-01-002-02, Revision 4y, "Preliminary Documented Safety Analysis to Support Construction Authorization, PT Facility Specific Information," November 20, 2012.

24590-WTP-PSAR-ESH-01-002-04, Revision 4z, "Preliminary Documented Safety Analysis to Support Construction Authorization; HLW Facility Specific Information," November 7, 2012.

24590-WTP-PSAR-ESH-01-002-06, Revision 3j, "Preliminary Documented Safety Analysis to Support Construction Authorization; LAB Facility Specific Information," October 25, 2012.

24590-WTP-PSAR-ESH-01-002-03, Revision 4S, "Preliminary Documented Safety Analysis to Support Construction Authorization; LAW Facility Specific Information," October 25, 2012.

24590-WTP-PSAR-ESH-01-002-05, Revision 4M, "Preliminary Documented Safety Analysis to Support Construction Authorization; Balance of Facility Specific Information," December 11, 2012.

CCN: 254141, "BNI Response to S-12-TRS-RPPWTP-002-Bechtel National, Inc. Waste Treatment and Immobilization Plant Fire Sprinkler Design and Installation Process, Finding F01," dated February 20, 2013.

National Fire Protection Association Documents:

NFPA 13, "Standard for the Installation of Sprinkler Systems," 1999.

NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2002.

NFPA 51B, "Standard for Fire Prevention during Welding, Cutting, and Other Hot Work,"
2003 and 2009.

NFPA 101, "Life Safety Code[®]," 2003.

NFPA 241, "Standard for Safeguarding Construction Alteration, and Demolition Operations,"
2004.



OFFICE OF RIVER PROTECTION

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JUL - 2 2013

13-SHD-0056

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 -- REVIEW OF BECHTEL NATIONAL, INC. (BNI)
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
INJURY/ILLNESS RECORDKEEPING FOR MARCH 4 THROUGH 28, 2013
(SURVEILLANCE S-13-SHD-RPPWTP-003)

This letter forwards the results of the U.S. Department of Energy, Office of River Protection review of the BNI, OSHA Injury/Illness Recordkeeping for the Waste Treatment and Immobilization Plant during the period March 4 through 28, 2013.

This surveillance evaluated the effectiveness of the Contractor's implementation of procedures and practices which satisfy the requirements of OSHA 29 CFR 1904, "Recording and Reporting Occupational Injuries and Illnesses." No findings or opportunities for improvement were made. A Surveillance Report was completed and is attached.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-SHD-0056

-2-

JUL - 2 2013

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:PRH

Attachment

cc w/attach:

D. E. Kammenzind, BNI

F. M. Russo, BNI

BNI Correspondence

Attachment
13-SHD-0056
(6 Pages)

Review of Bechtel National, Inc. Occupational Safety and Health
Administration Injury/Illness Recordkeeping

Surveillance Report S-13-SHD-RPPWTP-003

Surveillance Report

Surveillance Report Number: S-13-SHD-RPPWTP-003

Division Performing the Surveillance: Safety and Health Division

Integrated Assessment Schedule Number: 231

Title of Surveillance: Review of Bechtel National, Inc. (BNI) Occupational Safety and Health Administration (OSHA) Injury/Illness Recordkeeping

Dates of Surveillance: March 4 through March 28, 2013

Surveillance Lead: Paul R. Hernandez, Industrial Safety Subject Matter Expert

Scope:

The U.S. Department of Energy (DOE), Office of River Protection (ORP) conducted a surveillance of BNI OSHA injury/illness recordkeeping program.

The purpose of the surveillance was to evaluate the effectiveness of BNI's implementation of procedures and practices to satisfy the requirements of OSHA 29 CFR 1904, "Recording and Reporting Occupational Injuries and Illnesses." The surveillance focused on determining the effectiveness of the processes associated with identifying, evaluating, and recording injuries and illnesses on OSHA forms and in the DOE Computerized Accident/Incident Reporting System (CAIRS) database. The surveillant evaluated the procedural requirements, interviewed employees, and examined records pertaining to the surveillance subject.

Requirements Reviewed:

- ORP Procedure TRS-OA-IP-01-R6, "Integrated Assessment Process."
- 29 CFR 1904, "Recording and Reporting Occupational Injury and Illness." Associated OSHA Interpretation dated March 10, 2005.
- DOE Manual 231.1-1A, "ES&H Reporting Manual."
- BNI Procedure 24590-WTP-GPP-SIND-040, Revision 8, "Environment, Safety, and Health Reporting in Accordance with DOE Order 231.1A."

Records/Design/Installation Documents Reviewed (if applicable):

CAIRS log for BNI Code # 4700805, dated March 2, 2012.
 2012 OSHA Form 300A Summary of Work-Related Injuries and Illnesses, signed January 10, 2013.
 BNI List of Safety Data System cases from September 1, 2012, through February 25, 2013.
 DOE Form 5484.3 for BNI Case No. 4932-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 4937-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 4985-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5012-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5014-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5027-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5015-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5013-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5053-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5054-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5159-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5186-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5199-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5218-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5141-11, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5274-12, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5290-12, dated March 2, 2012.
 DOE Form 5484.3 for BNI Case No. 5296-12, dated March 2, 2012.
 BNI Claim ID, Worker Name, Date of Injury List for 2012 and 2013.
 Case No. 5583-12FRL, Medcor Progress Notes for November 12, 2012.
 Case No. 5631-13N, Medcor Progress Notes for January 16, 2013.
 Case AN 00052, Medcor Progress Note for October 11, 2012.
 Case AL 07755, Medcor Progress Note for November 8, 2012.
 Case AL 07712, F242-130-000, Report of Industrial Injury or Occupational Disease, dated March 4, 2013.
 Case AL 07712, Waste Treatment and Immobilization Plant (WTP) Work Related Injury/Illness Notification, dated February 27, 2013.
 Case AL 07712, Medcor Progress Note for February 27, 2013.
 Case AL 07772, Medcor Progress Note for December 12, 2012.
 Case AL 07772, Medcor Progress Note for December 17, 2012.
 Case AL 07772, Medcor Progress Note for December 20, 2012.
 Case AL 07772, Medcor Progress Note for December 27, 2012.
 Case AL 07772, Medcor Progress Note for January 14, 2013.
 Case AL 07772, Medcor Progress Note for February 4, 2013.
 Case AL 07772, Report of Industrial Injury or Occupational Disease, dated December 19, 2012.
 Case AL 07772, State of Washington Labor and Industries Notice of Decision, dated December 26, 2012.
 Case AS 13746, Report of Industrial Injury or Occupational Disease, dated January 11, 2013.
 Case AL 13746, Kadlec Regional Medical Center Encounter Notes, dated January 11, 2013.
 Case AL 13746, Medcor Progress Note for January 11, 2013.

Case AL 13746, Medcor Progress Note for January 14, 2013.
Case AL 13746, Medcor Progress Note for January 17, 2013.

Listing of Personnel Interviewed (if applicable):

Medcor Lead Registered Nurse
Medcor Physician's Assistant
Medcor Physician, Site Occupational Medical Director
BNI WTP Labor and Industries Coordinator

Discussion of Areas or Activities Reviewed:

Review of Procedures

The ORP surveillant reviewed BNI Procedure 24590-WTP-GPP-SIND-040, Revision 8, "Environment, Safety, and Health Reporting in Accordance with DOE Order 231.1A," and determined a clear process was described for reporting injuries for CAIRS and OSHA recordkeeping purposes. The latest revision of the procedure, dated September 17, 2009, met the minimum requirements in the DOE Environmental, Safety, and Health Reporting Manual, DOE M 231.1-1A.

Comparison of CAIRS Data to Medical Files

The ORP surveillant accessed the CAIRS production database for BNI and subcontractors and reviewed all cases from September 2012 through March 2013, which indicated an OSHA-recordable injury, including restricted or lost work days. A total of nine OSHA recordable cases occurred in the six-month timeframe. Those cases included two Restricted Work Day cases and two Lost Work Day cases. Using assigned case numbers from the log, the surveillant accessed the applicable DOE Form 5484.3, "Individual Accident/Incident Reports," for each case and evaluated it to ensure the required information had been provided. The surveillant determined that the Individual Accident/Incident Reports reviewed adequately described the activity performed at the time of injury, event, nature and cause of the injury, and contributing factors leading to the event.

The ORP surveillant also interviewed medical staff and reviewed employee medical files maintained in the WTP onsite Project Medical Facility, managed by Medcor. The medical provider has populated a computer-based system of medical records, NextGen. Patient medical files were stored electronically and accessible to ORP upon request.

Comparison of Labor and Industries (L&I) Data to CAIRS Data

The ORP surveillant reviewed the Washington Department of L&I data received from BNI's workers' compensation coordinator. The reviewer focused on cases L&I compensated that BNI had not reported as OSHA-recordable. In theory, all L&I cases are not necessarily OSHA recordable and, conversely, all OSHA-recordable cases are not necessarily compensable. However, OSHA often reviews L&I records because there may be an overlap. Many cases in

which the state compensates individuals for injuries would be work related and could involve medical treatment beyond first aid.

The ORP surveillant selected eight cases from the L&I records from September 2012 through March 2013, and interviewed the workers' compensation coordinator and Medcor medical staff who treated injured employees to understand initial injuries and subsequent treatment. ORP reviewed several L&I cases in detail and discussed the specifics with BNI and Medcor staff.

Selected Cases Discussed

Case No. 5660-13, Date of Injury, February 27, 2013.

At about 1600 hours an iron worker was tightening a nut on a bolt when the wrench slipped, causing the right hand to come in contact with the sharp edge of an adjacent structural member. The employee reported to the WTP Clinic with a laceration on the right finger. The laceration was prepped, sterilized, anesthetized, and four sutures were used to close the wound. The patient was instructed to return about a week later for suture removal.

BNI did record this case in the CAIRS database and correctly considered the case to be OSHA recordable. The applicable OSHA regulations are as follows:

1904.7(a)

You must consider an injury or illness to meet the general recording criteria, and therefore to be recordable, if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid...

1904.7(b)(5)(ii)(D)

Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™ (other wound closing devices such as sutures, staples, etc., are considered medical treatment);

The ORP surveillant concurred with the BNI determination that the case was OSHA recordable.

Case No. AL 07712, Date of Injury, December 12, 2012.

A pipefitter was stepping out on an air-handler unit and felt a sharp stabbing pain. Walking on it made the pain worse. The employee reported to the WTP Clinic with a complaint of left heel pain at a scale of 3 out of 10. An examination was performed and an x-ray of the foot performed. Over-the-Counter (OTC) medication and ice were administered. The employee was returned to work.

On December 17, 2012, the employee returned to the WTP clinic for a follow-up exam. The employee proposed the use of a Dr. Scholl's insert. OTC medication and ice were administered.

On December 20, 2012, the employee returned to the WTP clinic for a follow-up exam. The employee stated he was experiencing right side pain due to favoring the left foot. The x-ray results indicated a calcaneal spur; the patient was referred to an outside podiatrist.

On December 27, 2012, the employee returned to the WTP clinic for a follow-up exam, claiming the pain had gotten worse. At this point, the WTP clinic progress notes considered an assessment differential diagnosis of plantar fasciitis. The employee was seen by an offsite podiatrist the second week of January where he was administered prescription medication which is typically considered medical treatment beyond first aid. The employee had a follow-up visit to the offsite podiatrist and was given a corticosteroid injection, which is also considered medical treatment beyond first aid. The regulations are clear on the determination of OSHA recordability.

29 CFR 1904.7(a) "Basic requirement." You must consider an injury or illness to meet the general recording criteria, and therefore, to be recordable, if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness.

OSHA Interpretation dated March 10, 2005, stated, "The agency concluded that all prescription medications should be considered medical treatment because they are powerful substances that can only be prescribed by a licensed health care professional."

Initially, BNI concluded that the nature of the injury was not consistent with the mechanism of injury described on December 12, 2012. Plantar fasciitis is caused by straining the ligament that supports your arch. Repeated strain can cause tiny tears in the ligament. These can lead to pain and swelling. The BNI initial position on this case was that the medical treatment beyond first aid was administered for a personal condition, and was not work-related.

Following several months of treatment and after consultation with medical providers, BNI reconsidered the recordability of this case. Looking at the patient medical history they found no evidence of a pre-existing condition, and no treatment for any pre-existing medical condition. Ultimately BNI declared that the injury would be reported as OSHA recordable. The ORP surveillant concurred with the BNI determination that the case was OSHA recordable, based upon the information reviewed.

Case No. AL 13746, Date of Injury, January 11, 2013

A pipefitter was climbing the stairs at the Low-Activity Waste Facility when she felt a pop in the back side of the left knee. The employee reported to the WTP Clinic with a complaint of pain to the left knee and was treated with ice and over the counter medications. The employee was transported to Kadlec Regional Medical Center Emergency Department for evaluation. The patient was issued a prescription medication, and an x-ray was ordered. The x-ray results described spurs off the anterior and posterior tibial plateau, which is more consistent with a personal condition and osteoarthritis, than with an acute injury from work activities. The employee was returned to work after receiving a knee immobilizer and crutches.

On January 14, 2013, the employee returned to the WTP clinic for a follow-up exam. She reported a numerical pain score of zero out of ten, and demonstrated a full range of motion for the left knee. The employee was returned to work with no restrictions. On January 17, 2013, the employee returned to the WTP clinic for a follow-up exam. She reported that the swelling decreased significantly, and that there was no pain when walking or standing. The assessment by Medcor stated the most likely cause of the pain was a baker cyst, which would be a non-work-related, personal condition. Due to the lack of a work relationship, BNI determined this case to not be OSHA recordable. The ORP surveillant concurred with the BNI determination that the case was not required to be reported as OSHA recordable.

Summary of Findings, Observations, or Assessment Follow-up Items:

None

Conclusions:

The ORP surveillant concluded reporting of work-related injuries by BNI was acceptable. For the September 2012 to March 2013 period ORP found BNI cases reported in accordance with OSHA requirements.

Signatures:

Assessor or Lead Assessor:

Paul Hernandez

Date:

6/28/13

Division Director:

Bruno A. Hahn

Date:

7/1/13



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUN - 3 2013

13-SHD-0062

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 - TRANSMITTAL OF SURVEILLANCE REPORT
S-13-SHD-RPPWTP-007 - REVIEW OF BECHTEL NATIONAL, INC. (BNI) HEAT STRESS
PREVENTION PROGRAM AT THE WASTE TREATMENT AND IMMOBILIZATION
PLANT (WTP)

The U.S. Department of Energy, Office of River Protection, Technical and Regulatory Support, Safety and Health Division (SHD) conducted a review of the BNI heat stress prevention program at the WTP construction site. The BNI program elements reviewed were found to be adequate by SHD. Attached is a copy of the subject surveillance report.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, - "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support. (509) 376-5700.

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:MRM

Attachment

cc w/attach: See Page 2

Mr. J. M. St. Julian
13-SHD-0062

-2-

cc w/attach:
D. E. Kammenzind, BNI
F. M. Russo, BNI
BNI Correspondence

**Attachment
13-SHD-0062
(3 Pages)**

Review of the Bechtel National, Inc., Heat Stress Prevention Program

Surveillance Report S-13-SHD-RPPWTP-007

**U.S. Department of Energy
Office of River Protection
Surveillance Report**

Surveillance Report Number: S-13-SHD-RPPWTP-007

Division Performing the Surveillance: Safety and Health Division

Integrated Assessment Schedule Number: 25

Title of Surveillance: Review of the Bechtel National, Inc. (BNI) Heat Stress Prevention Program

Dates of Surveillance: May 15 through May 31, 2013

Surveillance Lead: Mario R. Moreno, Certified Industrial Hygienist

Team Member(s)(if any): N/A

Scope:

The purpose of the surveillance is to evaluate the BNI Waste Treatment and Immobilization Plant (WTP) construction site heat stress preparation and prevention program.

Requirements Reviewed:

- 10 CFR 851, Worker Safety and Health Program (WSHP)
- American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices – 2005.

Records/Design/Installation Documents Reviewed:

- 24590-WTP-GPP-SIND-068, Heat and Cold Stress Prevention, Revision 4, dated May 11, 2010.
- 24590-WTP-GPP-SAIH-007, Heat and Cold Stress Assessment, Revision 1, dated May 24, 2012.
- 24590-WTP-SAR-SA-12-0026, Heat Stress 2011-2012, Revision 0, dated July 9, 2012.

- 24590-WTP-GPP-SAIH-002, Surveillance Monitoring and Sampling, Revision 1, dated November 29, 2010.
- 24590-WTP-WBGT-SA-12-0001, Zone 3 WBGT, Revision 0, dated April 23, 2012.
- 24590-WTP-WBGT-SA-12-0010, Special WBGT, Revision 0, dated June 21, 2012.
- 24590-WTP-WBGT-SA-12-0020, Zone 3 WBGT, Revision 0, dated July 9, 2012.
- 24590-WTP-WBGT-SA-12-0022, Zone 4 WBGT, Revision 0, dated July 10, 2012.
- 24590-WTP-WBGT-SA-12-0031, Zone 3 WBGT, Revision 0, dated July 13, 2012.
- 24590-WTP-WBGT-SA-12-0038, Cool Down Area WBGT, Revision 0, dated July 19, 2012.
- 24590-WTP-WBGT-SA-12-0041, Zones 2, 3, & 4 WBGT, Revision 0, dated July 25, 2012.
- 24590-WTP-WBGT-SA-12-0045, Zones 3 & 4 WBGT, Revision 0, dated July 30, 2012.
- 24590-WTP-WBGT-SA-12-0050, Zone 3 – Unit B&C WBGT, Revision 0, dated August 1, 2012.
- 24590-WTP-WBGT-SA-12-0061, Unit B WBGT, Revision 0, dated August 8 through 13, 2012.
- 24590-WTP-WBGT-SA-12-0068, Zone 3 & 4 WBGT, Revision 0, dated August 21, 2012.
- 24590-WTP-WBGT-SA-12-0080, Zone 3 & 4 WBGT, Revision 0, dated August 28, 2012.
- 24590-WTP-WBGT-SA-12-0086, Zones 3 & 4 WBGT, Revision 0, dated September 19, 2012.

Discussions of Areas Reviewed:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(1)(ii), requires BNI to develop a non-radiological WSHP which conforms to the requirements of 10 CFR 851. BNI through 10 CFR 851.10 (a)(1) must provide a place of employment that is free from recognized hazards that are causing or have the potential to cause death or serious physical harm to workers. In addition, as required by 10 CFR 851.23(a)(9), BNI adopted the 2005 ACGIH TLV for heat stress and heat strain.

The Surveillant reviewed a representative sample of completed Industrial Hygiene (IH) Wet-Bulb Globe Temperature (WBGT) surveys (conducted during Calendar Year 2012). The surveys support the work/rest cycle determination through WBGT input for different conditions



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JUN 28 2013

13-SHD-0069

Mr. J. M. St. Julian
Project Manager
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2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-SHD-RPPWTP-006, WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP) DOSE ASSESSMENT REVIEW PROCESS

Attached is the documentation from a U.S. Department of Energy, Office of River Protection review of the Bechtel National, Inc. process for producing a dose assessment report documenting the anticipated worker dose during normal Hanford WTP operations. This review documented two Priority Level 2 findings. One opportunity for improvement was identified for your consideration.

Within 45 days of date of this letter you should respond to the Priority Level 2 findings contained in the attached report. Provide a Corrective Action Plan that includes:

- Immediate and remedial actions to correct the specific deficiencies identified in the finding;
- The extent of condition, including a summary of how the extent of condition was established;
- The apparent cause(s) of the finding;
- Corrective actions to correct the cause(s) to prevent further findings; and
- The date when all corrective actions will be completed, verified, and compliance to applicable requirements achieved.

Mr. J. M. St. Julian
13-SHD-0069

-2-

JUN 28 2013

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:BAH

Attachment

cc w/attach:
D. E. Kammenzind, BNI
F. M. Russo, BNI
BNI Correspondence

Attachment
13-SHD-0069
(21 Pages)

Waste Treatment and Immobilization Plant
Dose Assessment Review Process

Surveillance Report S-13-SHD-RPPWTP-006

**U.S. Department of Energy
Office of River Protection**

Surveillance Report Number: S-13-SHD-RPPWTP-006

Division Performing the Surveillance: Safety and Health Division

Integrated Assessment Schedule Number: 56

Title of Surveillance: Waste Treatment and Immobilization Plant
Dose Assessment Review Process Surveillance

Dates of Surveillance: March 1 through May 10, 2013

Surveillance Lead: Rick Jansons, North Wind Services,
Subcontractor to the U.S. Department of
Energy

Scope:

The surveillant reviewed the Bechtel National, Inc. (BNI) process for producing a dose assessment report documenting the anticipated worker dose during normal Hanford Waste Treatment and Immobilization Plant (WTP) operations. Procedure 24590-WTP-GPP-SRAD-006, "Prospective Dose Assessment Report," Revision 5, dated May 24, 2012, describes this process. The surveillant reviewed this procedure to validate compliance and ensure completeness. Subsequently, the surveillant used the procedure to evaluate the following reports:

- 24590-LAW-RPT-ENS-11-011, "Dose Assessment Report for the Low-Activity Waste Facility," Revision 1, dated August 13, 2012;
- 24590-HLW-RPT-ENS-11-011, "Dose Assessment Report for the High-Level Waste Facility," Revision 0, dated May 3, 2012; and
- 24590-LAB-RPT-ENS-11-011, "Dose Assessment Report for the WTP Laboratory Facility," Revision 1, dated August 13, 2012.

Requirements Reviewed:

- 10 CFR 835.103.
- 10 CFR 835.104.
- 10 CFR 835.202.
- 10 CFR 835.704 (b).
- 10 CFR 835.1002 (b).
- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 311.

- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 312.1.
- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 313.3.

Records/Design/Installation Documents Reviewed:

- 24590-WTP-DB-ENG-01-001, "Basis of Design," Revision 1Q, dated August 4, 2011.
- 24590-HLW-RPT-ENS-11-011, "Dose Assessment Report for the High-Level Waste Facility," Revision 0.
- 24590-WTP-RPT-PET-07-003, "Waste Treatment Plant Reliability Availability Maintainability (RAM) Basis Report," (RAM Report) Revision 1, dated June 7, 2012.
- 24590-LAW-RPT-ENS-11-011, "Dose Assessment Report for the Low-Activity Waste Facility," Revision 1.
- 24590-LAB-RPT-ENS-11-011, "Dose Assessment Report for the WTP Laboratory Facility," Revision 1.
- 24590-WTP-GPG-ENG-009, "Design Guide: Reliability, Availability, Maintainability, and Inspectability (RAMI)," Revision 2.
- 24590-WTP-GPG-SANA-003, "Reliability, Availability, Maintainability, and Inspectability (RAMI) Program for the Waste Treatment Plant," cancelled on January 29, 2010.
- DOE-WTP letter from D. L. Noyes to R. W. Bradford, BNI, "Transmittal of Surveillance Report S-12-ESQ-RPPWTP-008, Review of the As Low As Reasonably Achievable (ALARA) Design Process for Waste Treatment and Immobilization Plant (WTP) Design Activities," 12-ESQ-0092 REISSUE, dated June 21, 2012.
- BNI letter from R. W. Bradford to S. L. Samuelson, ORP, "Response to S-12-ESQ-RPPWTP-008, Review of the As Low As Reasonably Achievable (ALARA) Design Process for WTP Design Activities, Findings F01, F02, and F03," CCN: 244426, dated September 17, 2012.

Listing of Personnel Interviewed:

- WTP Radiological Control Manager (RCM).
- Plant Operations Manager.
- Low-Activity Waste (LAW) Balance of Facilities Laboratory (LBL) Commissioning Manager.
- Radiation Safety/As Low As Reasonably Achievable (ALARA) Engineers [two].
- WTP Commissioning and Testing (C&T) Operations Managers [two].
- Commissioning Operations Manipulator Operations and Maintenance Activities Engineer.
- LBL Operations Manager.
- LBL/Analytical Laboratory (LAB) Nuclear Facility Manager.

Discussion of Areas or Activities Reviewed:

The surveillant reviewed the process for producing a dose assessment report documenting the anticipated worker dose during normal WTP operations. Procedure 24590-WTP-GPP-SRAD-006, "Prospective Dose Assessment Report," describes this process. Appropriate revisions of this procedure were used to generate the following reports:

- 24590-LAW-RPT-ENS-11-011;
- 24590-HLW-RPT-ENS-11-011; and
- 24590-LAB-RPT-ENS-11-011.

The dose assessment reports are intended to be used to demonstrate that the proposed design, operations, and maintenance activities meet 10 CFR 835 and contractual requirements to implement ALARA principles for each facility.

The Dose Assessment Report developed through the process described in Procedure 24590-WTP-GPP-SRAD-006, "Prospective Dose Assessment Report," estimates workforce radiation doses resulting from all activities anticipated during normal facility operations. Operational events and other abnormalities (e.g., upset or accident conditions) are not included in the dose analysis. The dose analysis includes the evaluation of radiological exposure resulting from routine operations and surveillances, as well as maintenance and testing activities.

Several issues were noted with the WTP processes for incorporating ALARA and radiological controls into the WTP Facility design and maintenance/operations processes.

Title 10 CFR 835 requires facility design and planning processes to incorporate ALARA and radiological considerations early in the planning stages. These design activities and processes require review and concurrence by the Radiological Control Organization (RCO).

24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," also prescribes requirements for RCO support and concurrence as follows:

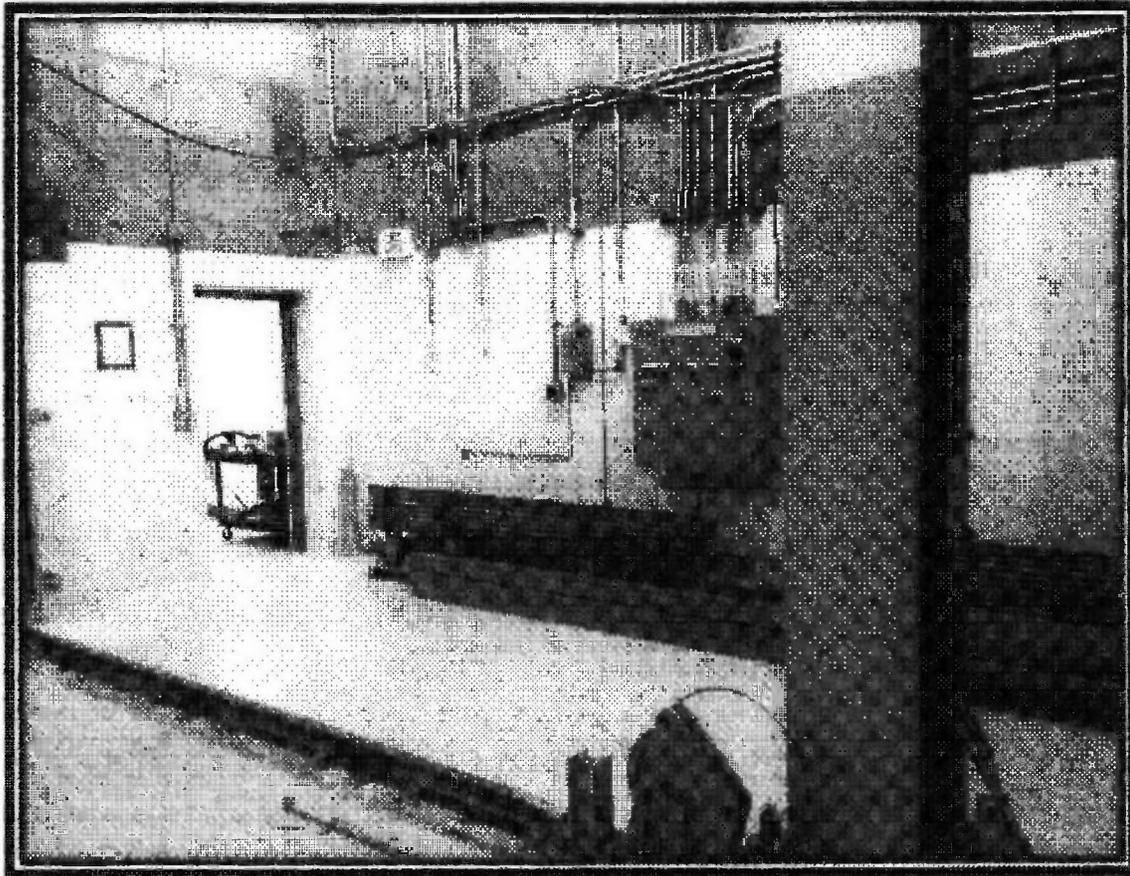
- Article 311 states, in part, "the design and planning processes should incorporate radiological considerations in the early planning stages."
- Article 312 requires, in part, "support and concurrence from the Radiological Control Organization" for line management review of maintenance and operations plans and procedures to identify and incorporate radiological requirements.
- Article 313 discusses, in part, first-time operations and requires that planning during the design process should include, "review and approval by the Radiological Control Organization."

Contrary to these requirements, WTP processes did not always incorporate ALARA and radiological considerations early in the planning stages nor require that the RCO review and concur with WTP design or operational/maintenance planning processes.

Lack of meaningful radiological control or operations considerations were also evident in reviewing the data used in preparing equipment and instrumentation maintenance/repair dose estimates. In reviewing the technical bases for maintenance and repair activities identified in the WTP Dose Assessment Reports, little or no radiological implications or planning details have been developed or provided for these estimates. Interviews with the Health Physicist performing the Dose Assessments indicated data from 24590-WTP-RPT-PET-07-003, "Waste Treatment Plant Reliability Availability Maintainability (RAM) Basis Report," was used as a basis. However, interviews with maintenance personnel, commissioning managers, and other personnel responsible for developing the RAM Report indicated that formal participation by members of the RCO was not procedurally required, and operational radiological control personnel did not routinely participate in estimating times required for radiological control aspects of maintenance or repair of equipment in these nuclear facilities. In addition, operational data developed to ensure the WTP Facility meets or exceeds contractual availability requirements, were not reviewed and concurred with by members of the RCO. As a result, the WTP operational availability could be significantly less than expected because of inaccurate or incomplete time estimates for implementing radiological controls.

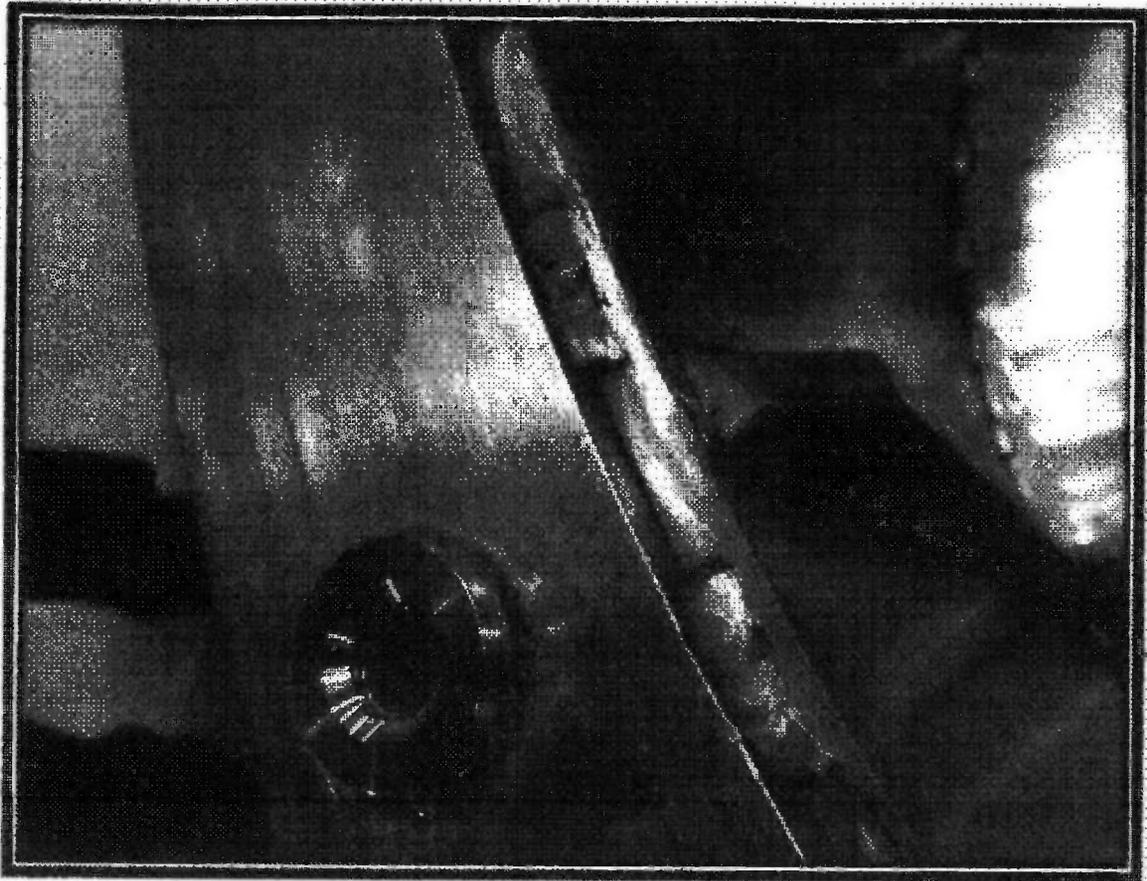
Failure to include operational radiological control personnel with the appropriate experience, education, training, and skills to develop and implement ALARA and radiological controls has also resulted in completed construction and fabrication that have not incorporated adequate ALARA or radiological controls. The following radiological issues were noted during a walk down of the LAW Facility and are considered to be examples (but not a complete listing) of poor ALARA/radiological design requiring review and possible rework:

- Electrical panels and local operating stations are unnecessarily located inside a C3 (Contamination Area). Locating operating stations and electrical panels inside C3 areas increases worker dose during routine and maintenance activities, increases generation of radioactive waste (e.g., coveralls, swipes, and decontamination supplies, and results in costly maintenance due to use of personal protective equipment, use of contamination control supplies, and added personnel (Operators and Radiological Control Technicians [RCT])).



Electrical panel and Local Operating Panel in C3 LAW Bogie Maintenance Room

- The LAW container holder is designed to be inserted into the LAW melter cave turntable. The container holder has the potential to become contaminated. However, the container holder was not designed and fabricated in a manner to ease decontamination. Welds inside the holder are not continuous and provide nooks and crevices that will be difficult to decontaminate.



LAW Container Holder Weld Detail Showing Nooks and Crevices

Although the RCO is involved with the implementation of ALARA and radiological controls through the ALARA Design Review Process in 24590-WTP-GPP-SRAD-002, "Application of ALARA in the Design Process," the RCO is not sufficiently incorporated into the WTP Design Process to meet the objectives of 10 CFR 835, Subpart K, to incorporate radiological controls and assure occupational exposure is maintained ALARA in developing and justifying facility design and physical controls. Review and concurrence by operational radiological control personnel with appropriate education, training, and skills to develop and implement radiological controls required in 10 CFR 835 could prevent these poor ALARA practices (see Finding S-13-SHD-RPPWTP-006-F01).

The surveillant reviewed 24590-HLW-RPT-ENS-11-011, "Dose Assessment Report for the High-Level Waste Facility," Revision 0. Interviews with the WTP RCM found that (b)(6)

(b)(6)

In this instance, the WTP RCM stated that (b)(6) was not knowledgeable in the conduct of operations and maintenance in nuclear facilities.

However, the WTP RCM subsequently reported that (b)(6)
 (b)(6)
 (b)(6) (b)(6)
 (b)(6)
 (b)(6) This was an isolated issue and promptly resolved by the BNI RCO.

Radiation Dose Rates:

Limits and design targets for direct radiation are discussed in 24590-WTP-DB-ENG-01-001, "Basis of Design." In part, Section 5.1.1 states:

"The dose equivalent rates are limited using the methodology described below:

Two dose equivalent rate levels have been established for each radiological classification: a target and a maximum dose equivalent rate. The target dose equivalent rate, if achieved, would be expected to readily satisfy both the requirements of ALARA and the annual dose criteria of 10 CFR 835.202. In contrast, the maximum dose equivalent rate is the level beyond which it would be very difficult to show compliance with the ALARA requirements."

The target and maximum dose equivalent rates are also provided in Table 5-1 of 24590-WTP-DB-ENG-01-001 and in 24590-WTP-GPP-SRAD-007, "Classification of Areas." The applicable table, in part, is as follows:

Table 1. Radiological Area Classification Based on Dose Rate

Classification	Target Equivalent Dose Rate (mrem/hr) for Wide-Spread and Static Radiation Fields	Maximum Equivalent Dose Rate (mrem/hr)
R1 Radiological Controlled Area	0.025	0.050
R2 Radiological Buffer Area	0.250	0.500
R3 (Average Radiation Area)	2.5	10
R4 (Maximum Radiation Area)	25	100
R5 (High and Very High Radiation Area)		No specific limit

24590-WTP-DB-ENG-01-001, "Basis of Design," states, "The target dose equivalent rate, if achieved, would be expected to readily satisfy both the requirements of ALARA and the annual dose criteria of 10 CFR 835.202," and Procedure, 24590-WTP-GPP-SRAD-007, "Classification of Areas," Section 3.1 states, in part, "The proper classification of areas ensures ALARA implementation and compliance with annual dose limits and targets as documented in facility dose assessment reports." Contrary to these statements, the Dose Assessment Reports did not use the Target Dose Equivalent Rates from the table but used, instead, a much lower value in calculating collective dose for each facility.

For example, 24590-LAW-RPT-ENS-11-011, Revision 1, Section 2.1 used a "modified target dose rate of 0.1 mrem/hr" for R2 areas and "0.5 mrem/hr for R3 areas" rather than the target dose rate of 0.250 mrem/hr for R2 areas and 2.5 mrem/hr for R3 areas as defined in the "Basis of Design" (24590-WTP-DB-ENG-01-001).

Similarly, 24590-HLW-RPT-ENS-11-011, Revision 0, Section 2.1 used "a modified target dose rate of 0.125 mrem/hr" for R2 areas and "1.25 mrem/hr for R3 areas." An even lower target dose rate of 0.1 mrem/hr for operations routines in R2 areas and 1.0 mrem/hr was used for operations routines in R3 areas.

Report 24590-LAB-RPT-ENS-11-011, Revision 1, Section 2.1 used "50% of the target dose" in R3 areas and "20% of the target" for general R2 areas. The details are summarized in the following table:

Area Classification	Design Dose Rates	Assumed Dose Rates Used in Calculations		
	Target Dose from "Basis of Design" and WTP Procedures (mrem/hr)	LAW Dose Assessment (mrem/hr)	HLW Dose Assessment (mrem/hr)	LAB Dose Assessment (mrem/hr)
R2	0.250	0.1	0.125	0.05
R3	2.5	0.5	1.25	1.25
HLW	=	High-Level Waste.		
LAB	=	Analytical Laboratory.		
LAW	=	Low-Activity Waste.		
mrem/hr	=	millirem per hour.		
WTP	=	Waste Treatment and Immobilization Plant		

If the target dose equivalent rates from 24590-WTP-DB-ENG-01-001, "Basis of Design," and WTP procedures, which WTP documents state would be "expected to readily satisfy both the requirements of ALARA and the annual dose criteria of 10 CFR 835.202," were used in collective dose calculations instead of the assumed lower dose rates, collective dose estimates for crafts, Operators and RCTs would increase by factors of 100 percent to 500 percent, resulting in increased operations staffing to ensure individual dose results do not exceed contractual requirements and 10 CFR 835.202 limits.

Worker Utilization Factors:

Dose assessment calculations require determining area dose rates where work will be performed along with the amount of work time necessary to perform the task and the number of workers needed for the task. Maintenance activity work times were judged to require different amounts of time for various crafts and support personnel performing the work. To account for differing participation among these groups a Utilization Factor (UF) was applied. If a craft person was required for the entire work activity, a UF of 1.0 was assigned and used in calculating the dose. If a person was judged to be needed for only half the work activity, a UF of 0.5 was assigned.

The surveillant reviewed Dose Assessment Reports for the HLW, LAB, and LAW Facilities (24590-LAW-RPT-ENS-11-011, 24590-HLW-RPT-ENS-11-011, and 24590-LAB-RPT-ENS-11-011). In each report, both operations and health physics assumptions used to determine mechanical and instrument repair and maintenance dose estimate calculations were reviewed. The surveillant then reviewed actual operations and health physics usage data for tasks at the Hanford Tank Farms, CH2M HILL Plateau Remediation Company-operated facilities, and at the 222-S Laboratory Facility that were similar to analyzed WTP tasks in the Dose Assessment Reports. In most all cases the numbers of Operators and RCTs as well as the time required on task in each of the WTP Dose Assessment Reports was much lower than the numbers and time required for similar tasks at other Hanford facilities. The under-assumptions in the Dose Assessment Reports could result in an order of magnitude increase in Operator and RCT collective doses for some or many of the tasks.

For example, the dose assessment assumptions for maintenance tasks for 24590-LAW-RPT-ENS-11-011, Revision 1, 24590-HLW-RPT-ENS-11-011, Revision 0, and 24590-LAB-RPT-ENS-11-011, Revision 1, all assumed operations and health physics UF of 0.1 unless determined otherwise on a case-by-case basis. Review of similar radiological tasks at other Hanford facilities found the operator and RCTs to be required full-time for most tasks in radiological areas (UF of 1.0).

A sampling of results from each of the WTP Dose Assessment Reports is provided in the sections that follow.

Worker UF in LAW Facility Dose Assessment Calculations:

Report 24590-LAW-RPT-ENS-11-011, "Dose Assessment Report for the Low-Activity Waste Facility," Revision 1, provided the basis for estimating maintenance and repair collective doses for LAW in Appendix A, "Maintenance Dose Evaluation – Equipment," and Appendix B, "Maintenance Dose Evaluation – Instrumentation." The surveillant reviewed the calculations used evaluating the Operator and RCT doses for each listed task. No provision was made to include the Operator or RCT dose associated with the use of radiological containment, decontamination activities, or radiological monitoring required for contaminated areas. However, many of the tasks were assumed to be performed in dose rates equivalent to R2 or R3 areas because of decontamination activities.

Appendix A of the report (24590-LAW-RPT-ENS-11-011) identified that 16 percent of the total collective equipment maintenance dose will be due to the maintenance and repair of "Pumps-General" with 42 of the pumps being located in a R2 area, 21 located in a R3 area, and 10 located in a R5 area. Even though all of these pumps are located in radiological areas, with the majority being located in Radiation or High Radiation Areas, which will require Operator or RCT coverage, the dose calculations assumed only one Operator and one RCT with a UF of 0.1 for each of the pumps listed. No consideration was given to the contamination status of these areas, which could require radiological containment or decontamination activities that could significantly increase the numbers of Operators and RCTs used for the job as well as increase the time to complete the task.

Similarly, there are 10 in-vessel pumps located in High Radiation Areas (R5) requiring maintenance and repair that generate 13 percent of the total collective equipment maintenance dose. The dose calculations for these tasks assumed only one operator and one RCT with a UF of 0.2 each for maintenance and 0.1 each for repair of each of the pumps listed. Similar tasks at the Hanford Site involve full-time coverage by Operators and RCTs.

In Appendix A of the report (24590-LAW-RPT-ENS-11-011) only two of the 134 analyzed LAW equipment maintenance/repair tasks (LAW Melter Repair and Tank Inspections) were assumed to require more than one Operator and/or RCT for the task. In no analyzed LAW tasks were more than two Operators or RCTs assumed to be used in dose calculations. In most all of the analyzed cases Operator and RCT UFs were 0.1.

Tasks that were assumed to use only one Operator and one RCT include, but are not limited, to the following:

- Manned entries for agitator replacement (UF of 0.2 for maintenance and 0.1 for repair);
- Crane maintenance and repair;
- Bubbler replacement;
- Maintenance and repair of thousands of valves in radiological areas (UF of 0.1 each);
- Heating, Ventilation, and Air Conditioning (HVAC) damper repair and maintenance in R2, R3, and R5 areas (UF of 0.1 each);
- HVAC exhaust HEPA filter changes in R2 and R3 areas (UF of 0.1 each);
- LAW turntable repair and maintenance (UF of 0.1 each);
- Glove box and decontamination booth HEPA filter replacement (UF of 0.1 each); and
- Manipulator maintenance, repair, and inspection (UF of 0.1 each).

In Appendix B of the report (24590-LAW-RPT-ENS-11-011), no LAW instrument maintenance/repair tasks were assumed to use more than one Operator or more than one RCT at a UF of greater than 0.1. These tasks include the following:

- Hundreds of temperature elements, flow elements, and pressure transmitters located in R2, R3, and R5 areas;
- Pressure relief valves located in R2 and R3 areas;
- Flow indicators in R2 and R3 areas;

- Flow transmitters in R2 and R3 areas; and
- Level Element – radar located in R3 and R5 areas.

Similar tasks at other Hanford facilities almost uniformly require near full-time coverage by Operators and RCTs, with the exception of some types of shop bench work. These tasks typically require intermittent RCT coverage.

Worker UF in HLW Facility Dose Assessment Calculations:

Report 24590-HLW-RPT-ENS-11-011, "Dose Assessment Report for the High-Level Waste Facility," Revision 0, provided the basis for estimating the maintenance and repair collective dose for HLW in Appendix A, "Maintenance Dose Evaluation – Equipment," and Appendix B, "Maintenance Dose Evaluation – Instrumentation." The surveillant reviewed the calculations used evaluating the Operator and RCT dose for each listed task. Similar to the LAW report, no provision was made to include Operator or RCT dose associated with the use of radiological containment, decontamination activities, or radiological monitoring required for contaminated areas.

In Appendix A of the report (24590-HLW-RPT-ENS-11-011), only three of the 130 analyzed HLW equipment maintenance/repair tasks (melter repair, breakpot repair, and tank inspections) were assumed to require more than one Operator and/or RCT. In no cases were more than two Operators or RCTs assumed to be used in dose calculations. In most all of the analyzed cases Operator and RCT UFs were 0.1. Similar tasks at the Hanford Site involve full-time coverage by Operators and RCTs.

In Appendix B of the report (24590-HLW-RPT-ENS-11-011), no HLW instrument maintenance/repair tasks assumed more than one Operator or more than one RCT. All of the Operator and RCT UF assumptions were listed as "0 UF" in Appendix B. It is assumed by the surveillant that this data is inaccurate because the operator and health physics dose is listed as a positive number (collective dose of 256 mrem per year for both operations and health physics as listed in Table 3-5 of the report) mathematically indicating a UF other than 0 was used in the dose calculations.

Similar tasks at other Hanford facilities almost uniformly require near full-time coverage by Operators and RCTs, with the exception of some types of shop bench work. These tasks typically require intermittent RCT coverage.

Worker UF in WTP LAB Facility Dose Assessment Calculations:

Report 24590-LAB-RPT-ENS-11-011, "Dose Assessment Report for the WTP Laboratory Facility," Revision 1, provided the basis for estimating maintenance and repair collective dose for the WTP LAB in Appendix A, "Maintenance Dose Evaluation – Equipment," and Appendix B, "Maintenance Dose Evaluation – Instrumentation." The surveillant reviewed the calculations used evaluating Operator and RCT dose for each listed task. Similar to LAW and HLW dose assessment reports, no provision was made to include an Operator or RCT dose

associated with the use of radiological containment, decontamination activities, or radiological monitoring required for contaminated areas.

In Appendix A of the report (24590-LAB-RPT-ENS-11-011), none of the 106 analyzed LAB equipment maintenance/repair tasks assumed more than one Operator and/or RCT to be required for the task. In no cases did the Operator or RCT UF assumptions exceed 0.1. These tasks included maintenance and repair of the 44 manipulators located in R5 areas, change-out of HEPA filters located in R2 and R3 areas, valve maintenance and repair in R2 and R3 areas, and other higher dose rate, radiologically contaminated tasks. Similar tasks at the Hanford Site involve full-time coverage by Operators and RCTs.

In Appendix B of the report (24590-LAB-RPT-ENS-11-011), none of the 65 LAB instrument maintenance/repair dose tasks were assumed to use more than one Operator or more than one RCT. In no cases did Operator or RCT UF assumptions exceed 0.1. Similar tasks at other Hanford facilities almost uniformly require near full-time coverage by Operators and RCTs, with the exception of some types of shop bench work. These tasks typically require intermittent RCT coverage.

Collective Dose Estimate Results:

The following table summarizes WTP calculated results from the approved Dose Assessment Reports:

Dose Assessment Results by Group and Plant (mrem/year)					
Work Group	LAW Average Dose	LAW Average Dose Melter Outage Year	HLW Average Dose	HLW Average Dose Melter Outage Year	LAB Average Dose
Mechanical	358.1	436.2	371.5	446.4	40.0
Electrical and Instrumentation	296.5	326.0	247.7	271.0	79.3
Operations	396.6	429.6	388.0	410.6	95.5
Health Physics	91.3	110.7	125.7	142.4	18.2
Analytical Operations	N/A	N/A	N/A	N/A	210.8
HLW	= High-Level Waste.				
LAB	= Analytical Laboratory.				
LAW	= Low-Activity Waste.				
mrem/year	= millirem per year.				
N/A	= not applicable.				

Even with very favorable assumptions about ambient work area radiation levels and worker utilization factors for Operators and RCTs, the average worker dose was not demonstrated to be well below applicable limits or ALARA. For example, during melter outage years at both the

LAW and HLW Facilities, the operations worker dose was just below the 500 mrem/year Administrative Control Level. Given Operator UFs of 10 percent of the typical time on task at operating nuclear facilities for similar tasks, along with assumed dose rates 50 percent to 80 percent less than 24590-WTP-DB-ENG-01-001, "Basis of Design," target dose rates, Operator individual annual dose estimates could easily exceed 1 roentgen equivalent man (Rem) per year. The same was true for the other crafts working in WTP Facilities (see Finding S-13-SHD-RPPWTP-006-F02).

Finally, RAM data developed and maintained to ensure the WTP Facility meets or exceeds contractual availability requirements were not reviewed and concurred with by members of the RCO. This has resulted in potentially inaccurate and incomplete time estimates for implementing required radiological and ALARA controls (e.g., decontamination activities, installation and use of radiological containments, and work inefficiencies due to use of anti-contamination clothing, respiratory protection, and other considerations). These missing time estimates could increase the time equipment and processes are unavailable, resulting in less overall plant operational availability to produce glass.

Section 2 of the RAM Report (24590-WTP-RPT-PET-07-003) documented the management and technical representatives from the WTP organization who participated in the development and verification of RAM information to support the RAM data development and assessment. The list did not include representatives from the RCO.

Interviews with the WTP Radiological Engineering Manager indicated that members of the RCO were not procedurally required to and did not routinely participate in estimating times required for radiological control aspects of maintenance or repair of equipment in these nuclear facilities.

The stated purpose of the RAM Report (24590-WTP-RPT-PET-07-003), Section 1.6 is "to document the RAM data developed and maintained to support WTP facility availability assessment." Section 1.7 defines availability as follows:

"Availability: A measure of the degree to which an item is in an operable and committable state. It takes into account an item's reliability and maintainability.

There are numerous types of availability (instantaneous, steady-state, and so on) depending on various parameters. The primary type used for the WTP project is achieved or operational availability, which is the ratio of the combined uptime to the sum of the combined uptime and the combined down time (including all repair time [corrective and preventive maintenance time], administrative time, and logistic time) for a defined time interval:

$$\frac{\text{UPTIME}}{\text{UPTIME} + \text{DOWNTIME}}$$

The surveillant reviewed 24590-WTP-GPG-ENG-009 to evaluate what guidance is provided for radiological control and ALARA information time estimates used to support RAMI development. Section 6.1 states, in part:

“Commissioning and Testing (C&T) is responsible for supporting RAMI analysis through the development of repair and replacement times. The following are taken into account in establishing the bases for MTTR and MTTM:

- The time required to move and replace components in order to gain access to the equipment needing maintenance
- Actual maintenance activities, including time to accommodate ALARA....”

Interviews with C&T management found that in most all cases members of the RCO were not included in determining the added time required to include radiological controls and accommodate ALARA during task performance time estimates. However, the interviewees indicated that additional time was added in some cases to account for time needed to implement ALARA and radiological controls, but the estimates were not based on input from personnel from the RCO or from personnel with operational radiological control experience, education, training, or skills.

The guidance provided in 24590-WTP-GPG-ENG-009 was not sufficient to ensure RCO expertise in developing radiological control and ALARA time estimates for incorporation into estimates for Mean Time to Repair and Mean Time to Maintain.

Because the process did not fully take into account radiological control and ALARA information necessary to accurately determine repair and maintenance time of radiologically contaminated equipment, estimates for repair, and maintenance times are most likely to be uniformly low. This has resulted in the likelihood of WTP Facility availability being lower than predicted in WTP documents (see Opportunity for Improvement S-13-SHD-RPPWTP-006-O01).

In conclusion, the dose assessment process performed by BNI for the LAW, HLW, and WTP LAB Facilities did not take into account radiological control and ALARA information necessary to accurately determine repair and maintenance time of radiologically contaminated equipment resulting in estimates that are most likely to be uniformly low compared with similar data from other operational nuclear facilities. This has resulted in dose assessment results that are unrealistically low, and the likelihood of WTP Facilities availability being lower than predicted in WTP documents.

Summary of Findings, Opportunities for Improvement, or Assessment Follow-up Items:

Finding S-13-SHD-RPPWTP-006-F01 (Priority Level 2): The Radiological Control Organization is not sufficiently incorporated into the WTP Facility design process to meet the objectives of 10 CFR 835, Subpart K to incorporate radiological controls and assure occupational exposure is maintained ALARA in developing and justifying facility design and physical controls.

Requirements:

- WTP Contract No. DE-AC27-01RV14136, conformed through Modification 302, Section C, "Statement of Work," Subsection C.4, "Environment, Safety, Quality and Health," (a)(2) states, in part:

"The Contractor shall comply with applicable Federal, DOE, State, and local regulations and requirements for:

(2) Radiological, nuclear, and process safety;"

- WTP Contract No. DE-AC27-01RV14136, conformed through Modification 302, Section I, "Contract Clauses," Clause L117(a) states:

"I.117 DEAR 970.5204-78 LAWS, REGULATIONS, AND DOE DIRECTIVES (JUN 1997)
(a) In performing work under this Contract, the Contractor shall comply with the requirements of applicable Federal, State, and local laws and regulations (including DOE regulations), unless relief has been granted in writing by the appropriate regulatory agency. A List of Applicable Laws and regulations (List A) may be appended to this Contract for information purposes. Omission of any applicable law or regulation from List A does not affect the obligation of the Contractor to comply with such law or regulation pursuant to this paragraph."

- 10 CFR 835.103:

"Individuals responsible for developing and implementing measures necessary for ensuring compliance with the requirements of this part shall have the appropriate education, training, and skills to discharge these responsibilities."

- 10 CFR 835.1001(a):

"Measures shall be taken to maintain radiation exposure in controlled areas ALARA through engineered and administrative controls. The primary methods used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls shall be employed only as supplemental methods to control radiation exposure."

- 10 CFR 835.1001(b):

"For specific activities where use of engineered controls is demonstrated to be impractical, administrative controls shall be used to maintain radiation exposures ALARA."

- 10 CFR 835.1002(a):

"During the design of new facilities or modification of existing facilities, the following objectives shall be adopted:

(a) Optimization methods shall be used to assure that occupational exposure is maintained ALARA in developing and justifying facility design and physical controls."

- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 311, Paragraph 2:

"The primary methods used to maintain exposures ALARA shall [10 CFR 835.1001(a)] be engineered controls (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls shall [835.1001(a)] be employed only as supplemental methods to control radiation exposure. For specific activities where use of engineered controls are demonstrated to be impractical, administrative controls shall [835.1001(b)] be used to maintain radiation exposures ALARA. To accomplish this, the design and planning processes should incorporate radiological considerations in the early planning stages."

- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 312.1:

"Maintenance and modification plans and procedures shall [835.104; 835.1003] be reviewed to identify and incorporate radiological requirements, such as engineered controls and dose and contamination reduction considerations. Performance of this review is the responsibility of line management, with support and concurrence from the Radiological Control Organization."

- 24590-WTP-MN-ESH-01-001, "Waste Treatment Plant Radiological Control Manual," Revision 6, Article 313.3:

"At those facilities with routine, recurring process operations, special management attention should be directed to radiological activities that are infrequently conducted or represent first-time operations. During the design process projected events of this nature, other than accident events, should be evaluated based on the projected exposures and the frequency of the activity, and reflected as appropriate in the ALARA implementation. Planning for such activities should include:

3. Review and approval by the Radiological Control Organization."

Discussion:

Contrary to these requirements, WTP processes did not always incorporate ALARA and radiological considerations early in the planning stages nor require that the RCO review and concur with WTP design or operational/maintenance planning processes.

In reviewing the technical bases for maintenance and repair activities identified in the WTP Dose Assessment Reports, little or no radiological implications or planning details have been developed or provided for these estimates. Interviews with the Health Physicist performing the Dose Assessments indicated data from the RAM Report (24590-WTP-RPT-PET-07-003), was used as a basis. However, interviews with maintenance personnel, commissioning managers, and other personnel responsible for developing the RAM Report indicated that formal participation by members of the RCO was not procedurally required, and operational radiological control personnel did not routinely participate in estimating times required for radiological control aspects of maintenance or repair of equipment in these nuclear facilities.

As noted in S-13-SHD-RPPWTP-006-O01, operational data documented in the RAM Report (24590-WTP-RPT-PET-07-003), developed to ensure the WTP Facility meets or exceeds contractual availability requirements, were not reviewed and concurred with by members of the RCO.

Failure to include operational radiological control personnel with the appropriate experience, education, training, and skills to develop and implement ALARA and radiological controls has also resulted in completed construction and fabrication that have not incorporated adequate ALARA or radiological controls.

Finding S-13-SHD-RPPWTP-006-F02 (Priority Level 2): The Dose Assessment Reports technical bases for radiation dose rates and worker utilization factors were inadequate to demonstrate that the WTP design will meet 10 CFR 835.1002(b) objectives for exposure rates to be ALARA and not exceed 20 percent of the applicable standards in 10 CFR 835.202 with current staffing assumptions.

Requirement:

- WTP Contract No. DE-AC27-01RV14136, conformed through Modification 302, Section C, "Statement of Work," Subsection C.4, "Environment, Safety, Quality and Health," (a)(2) states, in part:

"The Contractor shall comply with applicable Federal, DOE, State, and local regulations and requirements for:

(2) Radiological, nuclear, and process safety;"

- WTP Contract No. DE-AC27-01RV14136, conformed through Modification 302, Section I, "Contract Clauses," Clause I.117(a) states:

"I.117 DEAR 970.5204-78 LAWS, REGULATIONS, AND DOE DIRECTIVES (JUN 1997)
(a) In performing work under this Contract, the Contractor shall comply with the requirements of applicable Federal, State, and local laws and regulations (including DOE regulations), unless relief has been granted in writing by the appropriate regulatory agency.

A List of Applicable Laws and regulations (List A) may be appended to this Contract for information purposes. Omission of any applicable law or regulation from List A does not affect the obligation of the Contractor to comply with such law or regulation pursuant to this paragraph.”

- 10 CFR 835.202, Occupational dose limits for general employees:
 - “(a) Except for planned special exposures conducted consistent with § 835.204 and emergency exposures authorized in accordance with § 835.1302, the occupational dose received by general employees shall be controlled such that the following limits are not exceeded in a year:
 - (1) A total effective dose of 5 rems (0.05 Sv);
 - (2) The sum of the equivalent dose to the whole body for external exposures and the committed equivalent dose to any organ or tissue other than the skin or the lens of the eye of 50 rems (0.5 Sv);
 - (3) An equivalent dose to the lens of the eye of 15 rems (0.15 Sv); and
 - (4) The sum of the equivalent dose to the skin or to any extremity for external exposures and the committed equivalent dose to the skin or to any extremity of 50 rems (0.5 Sv).
 - (b) All occupational doses received during the current year, except doses resulting from planned special exposures conducted in compliance with § 835.204 and emergency exposures authorized in accordance with § 835.1302, shall be included when demonstrating compliance with §§ 835.202(a) and 835.207.
 - (c) Doses from background, therapeutic and diagnostic medical radiation, and participation as a subject in medical research programs shall not be included in dose records or in the assessment of compliance with the occupational dose limits.”

- 10 CFR 835.704
 - “(b) Actions taken to maintain occupational exposures as low as reasonably achievable, including the actions required for this purpose by § 835.101, as well as facility design and control actions required by §§ 835.1001, 835.1002 and 835.1003, shall be documented.”

- 10 CFR 835.1002
 - “(b) The design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) shall be to maintain exposure levels below an average of 0.5 millirem (5 μ Sv) per hour and as far below this average as is reasonably achievable. The design objectives for exposure rates for potential exposure to a radiological worker where occupancy differs from the above shall be ALARA and shall not exceed 20 percent of the applicable standards in § 835.202.”

Discussion:

Contrary to these requirements, Dose Assessment Reports did not use Target Dose Equivalent Rates provided in 24590-WTP-DB-ENG-01-001, "Basis of Design," and WTP procedures, but instead used dose equivalent rates that range from 20 percent to 50 percent of the procedure rates when performing the calculations used to develop Dose Assessment Reports.

If the target dose equivalent rates from 24590-WTP-DB-ENG-01-001, "Basis of Design," and WTP procedures, which WTP documents state would be "expected to readily satisfy both the requirements of ALARA and the annual dose criteria of 10 CFR 835.202," were used in collective dose calculations instead of the assumed lower dose rates, collective dose estimates for crafts, Operators and RCTs would increase by factors of 100 percent to 500 percent, resulting in increased operations staffing to ensure individual dose results do not exceed contractual requirements and 10 CFR 835.202 limits.

In addition, no technical basis was provided for assumptions regarding the numbers and time required on task for Operators and RCTs. In each report reviewed, (24590-LAW-RPT-ENS-11-011, 24590-HLW-RPT-ENS-11-011, and 24590-LAB-RPT-ENS-11-011), both operations and health physics assumptions used to determine mechanical and instrument repair and maintenance dose estimate calculations were reviewed. The surveillant also reviewed actual operations and health physics usage data for tasks at the Hanford Tank Farms, CH2M HILL Plateau Remediation Company-operated facilities, and at the 222-S Laboratory Facility that were similar to analyzed WTP tasks in the Dose Assessment Reports. In most all cases the numbers of Operators and RCTs as well as the time required on task in each of the WTP Dose Assessment Reports was much lower than the numbers and time required for similar tasks at other Hanford facilities. The under-assumptions in the Dose Assessment Reports could result in an order of magnitude increase in Operator and RCT collective doses for some or many of the tasks.

Even with very favorable assumptions about ambient work area radiation levels and worker utilization factors for Operators and RCTs, the average worker dose was not demonstrated to be well below applicable limits or ALARA. For example, during melter outage years at both the LAW and HLW Facilities, the operations worker dose was just below the 500 mrem/year Administrative Control Level. Given operator UFs of 10 percent of the typical time on task at operating nuclear facilities for similar tasks, along with assumed dose rates 50 percent to 80 percent less than 24590-WTP-DB-ENG-01-001, "Basis of Design," target dose rates, Operator individual annual dose estimates could easily exceed 1 Rem per year on average assuming current operational staffing levels. The same was true for the other crafts working in WTP Facilities.

In sum, collective dose estimates for WTP Facilities were not technically based and did not demonstrate that the WTP design will meet 10 CFR 835.1002(b) objectives for exposure rates to be ALARA and not exceed 20 percent of the applicable standards in 10 CFR 835.202.

Opportunity for Improvement S-13-SHD-RPPWTP-006-001: The WTP operational availability estimates could be significantly improved with more accurate and complete time estimates for implementing required radiological and ALARA controls by fully incorporating the Radiological Control Organization into the development of the technical bases supporting RAM development.

Discussion:

The surveillant reviewed the RAM Report (24590-WTP-RPT-PET-07-003). Section 2 of the report documented the management and technical representatives from the WTP organization who participated in the development and verification of RAM information to support the RAM data development and assessment. The list did not include representatives from the RCO.

Interviews with the WTP Radiological Engineering Manager indicated that members of the RCO were not procedurally required to and did not routinely participate in estimating times required for radiological control aspects of maintenance or repair of equipment in these nuclear facilities.

Interviews with C&T management found that in most all cases members of the RCO were not included in determining the added time required to include radiological controls and accommodate ALARA during task performance time estimates. However, the interviewees indicated that additional time was added in some cases to account for time needed to implement ALARA and radiological controls, but the estimates were not based on input from personnel from the RCO or from personnel with operational radiological control experience, education, training, or skills.

Because the process did not fully take into account radiological control and ALARA information necessary to accurately determine repair and maintenance time of radiologically contaminated equipment, estimates for repair, and maintenance times are most likely to be uniformly low. This has resulted in the likelihood of WTP Facility availability being lower than predicted in WTP documents.

Conclusion:

The surveillant reviewed the process for producing a dose assessment report documenting anticipated worker doses during normal WTP operations. The surveillant found that the lack of sufficient review and approval by members of the RCO with appropriate operational experience, education, training, and skills early in the WTP design process have contributed to dose assessment results that are unrealistically low, and the likelihood of WTP Facility availability being lower than predicted in WTP documents.

Title 10 CFR 835 requires facility design and planning processes to be reviewed and approved by the RCO and to incorporate ALARA and radiological considerations early in the planning stages. As noted in Finding S-13-SHD-RPPWTP-006-F01, this has not occurred in all cases. As a result, inaccurate data was used in calculations for plant operational availability and for assessing WTP Facility collective dose. In addition, the surveillant noted poor

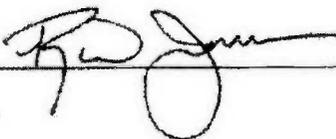
ALARA/radiological design of some WTP Facility areas and components as a result of inadequate review and concurrence by the RCO.

As noted in Finding S-13-SHD-RPPWTP-006-F02, the dose rate and worker utilization factor technical bases used in developing the Dose Assessment Reports were not adequate to demonstrate that the WTP design will meet 10 CFR 835.1002(b) objectives for exposure rates to be ALARA and not exceed 20 percent of the applicable standards in 10 CFR 835.202 with current facility staffing assumptions.

Interviews indicated repair and maintenance times in the current version of the RAM Report (24590-WTP-RPT-PET-07-003) and other bases of estimates developed by the Operations and Maintenance groups did not include ALARA and radiological control input from the RCO. As noted in S-13-SHD-RPPWTP-006-O01, the WTP operational availability could be significantly less than expected because of inaccurate and incomplete time estimates for implementing required radiological and ALARA controls. Incorporating the RCO into the process for developing the technical bases for the RAM Report could result in a more accurate forecast of WTP Facility operational availability.

Two Priority Level 2 findings, and one opportunity for improvement were identified.

Signatures:

Assessor or Lead Assessor:  Date: 6/19/2013

Division Director: Bruno A. Harkin Date: 6/19/13



OFFICE OF RIVER PROTECTION

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JUL - 2 2013

13-SHD-0074

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 - TRANSMITTAL OF VERIFICATION SURVEILLANCE, S-13-SHD-RPPWTP-008, OF BECHTEL NATIONAL, INC. (BNI) CORRECTIVE ACTIONS IN RESPONSE TO U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) LEVEL 2 FINDING S-12-SHD-RPPWTP-005-F01

- References:
1. ORP letter from D. L. Noyes to R. W. Bradford, BNI, "Transmittal of Surveillance Report S-12-SHD-RPPWTP-005 - Di-Methyl Mercury (DMHg) at the Waste Treatment and Immobilization Plant," 12-SHD-0084, dated October 9, 2012.
 2. BNI letter from R. W. Bradford to S. L. Samuelson, ORP, "Response to DOE-ORP Surveillance Report Finding S-12-SHD-RPPWTP-005-F01, CCN: 251567, dated November 8, 2012.
 3. ORP letter from D. L. Noyes to R. W. Bradford, BNI, "Approval of Bechtel National, Inc. (BNI) Corrective Action Plan (CAP) in Response to Finding S-12-SHD-RPPWTP-005-F01," 12-SHD-0128, dated November 29, 2012.

The DOE ORP Technical and Regulatory Support, Safety and Health Division conducted a verification review of the BNI corrective action documented in Reference 2. The BNI corrective actions were found to be adequately met except for one action resulting in the identification of a Priority Level 3 finding. Contrary to Reference 2, BNI did not revise a procedure as necessary to ensure that it interfaced with the new facility and equipment hazard evaluations. Additional details are provided in the attached surveillance. The Priority Level 3 finding shall be entered into your corrective action management system and tracked until the identified issue is corrected. In addition, two Opportunities for Improvement were identified and are also documented in the attached surveillance for your consideration.

Mr. J. M. St. Julian
13-SHD-0074

-2-

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The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:MRM

Attachment

cc w/attach:

D. E. Kammenzind, BNI

F. M. Russo, BNI

BNI Correspondence

**Attachment
13-SHD-0074
(8 Pages)**

**Verification Review of Bechtel National, Inc., Corrective Actions in
Response to U.S. Department of Energy, Office of River Protection
Priority Level 2 Finding S-12-SHD-RPPWTP-005-F01**

Surveillance Report S-13-SHD-RPPWTP-008

U.S. Department of Energy
Office of River Protection

Surveillance Report Number: S-13-SHD-RPPWTP-008

Division Performing the Surveillance: Safety and Health Division

Integrated Assessment Schedule Number: 493

Title of Surveillance: Verification Review of the Bechtel National, Inc., Corrective Actions in Response to U.S. Department of Energy, Office of River Protection, Priority Level 2 Finding S-12-SHD-RPPWTP-005-F01

Dates of Surveillance: May 1 through June 30, 2013

Surveillance Lead: Mario R. Moreno, Certified Industrial Hygienist

Team Member(s)(if any): Not Applicable

Scope:

The purpose of this surveillance is to document the verification review of the Bechtel National, Inc. (BNI), corrective actions in response to U.S. Department of Energy, Office of River Protection (ORP) Priority Level 2 Finding S-12-SHD-RPPWTP-005-F01: BNI did not document the occupational hazard prevention and abatement of Di-Methyl Mercury (DMHg) through design and controls into appropriate facility design or procedures.

Requirements Reviewed:

Not applicable.

Records/Design/Installation Documents Reviewed:

- ORP letter from D. L. Noyes to R. W. Bradford, BNI, "Transmittal of Surveillance Report S-12-SHD-RPPWTP-005 – Di-Methyl Mercury (DMHg) at the Waste Treatment and Immobilization Plant," 12-SHD-0084, dated October 9, 2012.
- BNI letter from R. W. Bradford to S. L. Samuelson, ORP, "Response to DOE-ORP Surveillance Report Finding S-12-SHD-RPPWTP-005-F01, Di-Methyl Mercury at WTP," CCN: 251567, dated November 8, 2012.

- ORP letter from D. L. Noyes to R. W. Bradford, BNI, "Approval of the Bechtel National Inc. (BNI) Corrective Action Plan (CAP) in Response to Finding S-12-SHD-RPPWTP-005-F01," 12-SHD-0128, dated November 29, 2012.
- Project Issue Evaluation Reporting (PIER): 24590-WTP-PIER-MGT-12-1256-C, BNI Received a Copy of subject Surveillance S-12-SHD-RPPWTP-005.
- BNI Qualitative Exposure Assessment(s) 24590-WTP-BEAP-SA-13-002 sequentially through 24590-WTP-BEAP-SA-13-026.
- BNI Exposure Control Plan(s) 24590-WTP-BECP-SA-13-002 sequentially through 24590-WTP-BECP-SA-13-026.
- 24590-LAW-M4C-LOP-00001, "LAW Melter Offgas System Design Basis Flowsheets," Revision 3, November 1, 2010.
- 24590-WTP-RANS-NS-00002, "Hazards Analysis Handbook," Revision 0, Bechtel National, Inc., Richland, Washington, July 24, 2012.
- 24590-WTP-GPP-RANS-NS-0005, "Hazards Analysis Procedure," Revision 0, Bechtel National, Inc., Richland, Washington, July 24, 2012.
- 24590-LAB-HAR-NS-12-0001-02, "Hazard Analysis Report for the Analytical Laboratory Volume 02: Autosampling System (ASX)," Revision D, DRAFT, Bechtel National, Inc., Richland, Washington.
- 24590-WTP-GPP-SAIH-001, "Chemical and Biological Exposure Assessment Strategies," Revision 2C, Bechtel National, Inc., Richland, Washington, January 31, 2013.
- 24590-WTP-PL-SA-06-0005, "WTP Industrial Hygiene Program Plan," Revision 3, Bechtel National, Inc., Richland, Washington, November 29, 2010.

Discussions of Areas Reviewed:

Review of BNI occupational hazard prevention and abatement actions to DMHg (Surveillance S-12-SHD-RPPWTP-005) resulted in Priority Level 2 Finding S-12-SHD-RPPWTP-005-F01. BNI did not document the occupational hazard prevention and abatement of DMHg through design and controls into appropriate facility design or procedures. In response to the Priority Level 2 finding, BNI submitted a Corrective Action Plan (CAP) (BNI Letter CCN: 251567), which was subsequently approved by ORP. The CAP actions consist of the following information found in Table 1.

Table 1. Corrective Action Plan Actions (2 pages)

	<p align="center">BNI Action 24590-WTP-PIER-MGT-12-1256-C</p>	<p align="center">Evidence of Completion</p>
<p>1</p>	<p>Review and revise 24590-WTP-GPP-SAIH-001, "Chemical and Biological Exposure Assessment Strategies," as necessary to ensure:</p> <p>(a) The procedure effectively describes the means and methods that will be used to analyze and assess workplace hazards and identify the controls that will be relied upon to protect workers from those hazards</p> <p>(b) The workplace hazards and controls as discussed in paragraph (a) above are adequately documented</p> <p>(c) The procedure provides for compliance with the requirements set forth in 10 CFR 851(a)(4), 10 CFR 851.22(b), and 10 CFR 851.22(a)(1)</p> <p>(d) The procedure interfaces with new facility and equipment hazard evaluations developed by other organizations.</p>	<p>Revised procedure available in InfoWorks</p>
<p>2</p>	<p>Revise the Baseline Exposure Assessment Plan (BEAP) related to the analysis of designs of new facilities and equipment for potential workplace hazards using revised Procedure 24590-WTP-GPP-SAIH-001 as required under paragraphs (a) through (d) above.</p>	<p>Complete a spreadsheet (or similar report) that includes, at a minimum, the following information:</p> <ul style="list-style-type: none"> • BEAP number • Date BEAP originally completed • Completed by • Results of review. <p>Submit the report to Waste Treatment and Immobilization Plant iDocSearch.</p> <p>If the report shows proper assessment, no further actions are required. If the report shows areas where the assessment was lacking, additional actions will be added to the PIER to revise the BEAPs, as necessary.</p>

Action # 1: Review and revise the chemical and biological exposure assessment strategies procedure as necessary to ensure the following:

- Surveillant found action 1(a) was adequately met.
- Surveillant found action 1(b) was adequately met.
- Surveillant found action 1(c) was adequately met.
- Surveillant found for action 1(d): Procedure 24590-WTP-GPP-SAIH-001 did not have a requirement for interface with new facility and equipment hazard evaluations developed by other BNI organizations. For example Standard Industrial Hazards (SIH) identified by the BNI engineering and nuclear safety group do not require interface with 24590-WTP-GPP-SAIH-001 for the amelioration of occupational hazards deemed to be a SIH. In addition, the procedure did not identify key organizations responsible for the qualitative exposure assessments and corollary exposure control plans when implementing the referenced 10 CFR 851 requirements of action 1(c) from design, commissioning, and operations. Contrary to the CAP, BNI did not revise Procedure 24590-WTP-GPP-SAIH-001 as necessary to ensure that the procedure interfaces with new facility and equipment hazard evaluations developed by other organizations (see Finding S-13-SHD-RPPWTP-008-F01 below).

Action #2: Revise the BEAP related to the analysis of designs of new facilities and equipment for potential workplace hazards using revised Procedure 24590-WTP-GPP-SAIH-001 as required under Action 1 paragraphs (a) through (d) listed in Table 1.

BNI did not produce a spreadsheet (or similar report) that includes, at a minimum, the following information:

- BEAP number
- Date BEAP originally completed
- Completed by
- Results of review

In response to the Priority Level 2 finding, BNI developed specific work activity BEAPs and Baseline Exposure Control Plans (BECP), which is an expansion from 1 for each Low-Activity Waste (LAW) Facility, Pretreatment Facility, and High-Level Waste (HLW) Facility to 26 total for areas where there is a potential of occupational exposure to DHMg during operations or maintenance.

2(a) The BEAP documented references used for chemical agents considered in the qualitative exposure assessment and controls selection. Review of the BEAP identified an Opportunity for Improvement (OFI) relative to documenting occupational exposure limits, Volatile Organic Content (VOC) as an included chemical agent, and physical parameters of DHMg.

Specifically:

- The Vapor Pressure (VP) assumed for DHMg to be the same as elemental mercury, one of the inherent hazards of DHMg is its relatively higher VP than elemental mercury, for example 55 to 80 millimeters at 20° Centigrade and it is flammable as opposed to elemental mercury.
- The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for iodine is based on the Inhalable Fraction plus Vapor, which is not acknowledged in the exposure assessment.
- The ACGIH TLV for sulfur dioxide is a short-term exposure limit, which is not acknowledged in the exposure assessment.
- The BEAP hazardous substance tables are missing VOC as a component for the qualitative exposure assessment, in addition the referenced source for the chemical agents and material balance identifies alkyl alcohol as the representative VOC. This chemical agent TLV has a higher health effects ranking (per 24590-WTP-GPP-SAIH-001) and has a relatively lower immediately dangerous to life or health concentration that will affect conclusions of the chemical agent exposure ranking score.

(See OFI S-13-SHD-RPPWTP-008-001 below.)

2(b) The occupational hazards and controls were adequately documented to the extent of information available to the BNI safety assurance staff of operations and maintenance activities. A majority of engineered controls in the BECP is based on assumptions made by the authors of the BEAP which both still need to be validated.

2(c) The BEAP/BECP as discussed above contain control assumptions based on the hierarchy of controls but the procedure is somewhat limited during design in documenting compliance with requirements set forth in the following rule requirements:

- 10 CFR 851.21(a)(4):
 - Analyze designs of new facilities and modifications to existing facilities and equipment for potential workplace hazards.
- 10 CFR 851.22(b):
 1. Elimination or substitution of the hazards where feasible and appropriate.
 2. Engineering controls where feasible and appropriate.
 3. Work practices and administrative controls that limit worker exposures.
 4. Personal protective equipment.

- 10 CFR 851.22(a)(1):
 - For hazards identified either in the facility design or during the development of procedures, controls must be incorporated in the appropriate facility design or procedure.

Currently there is a BNI team executing a LAW/HLW ammonia-air skid review (occupational safety controls) unrelated to DHMg. The BNI team's purpose is to identify and evaluate options to manage industrial exposure and potential production impacts related to ammonia in LAW and HLW. The surveillant oversight of the BEAP process during construction, subject of this surveillance, and BNI team leads to identifying an OFI. BNI conclusions on meeting the referenced surveillance 10 CFR 851 requirements for the different stages of design, operations, and maintenance can be improved through institutionalization of a programmatic process (see OFI S-13-SHD-RPPWTP-008-O02 below).

2(d) See 1(d) narrative.

Summary of Findings, Opportunities for Improvement, or Assessment Follow Up Items:

Finding S-13-SHD-RPPWTP-008-F01 (Priority Level 3): Contrary to the CAP, BNI did not revise Procedure 24590-WTP-GPP-SAIH-001 as necessary to ensure that the procedure interfaces with new facility and equipment hazard evaluations developed by other organizations for the adequate amelioration of hazards where feasible and appropriate or identification of controls using the principles of 10 CFR 851.22(b).

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(1)(ii), requires BNI to develop a nonradiological worker safety and health program, which conforms to the requirements of 10 CFR 851, "Worker Safety and Health Program."

Controls must be incorporated in the appropriate facility design or procedure according to 10 CFR 851.22(a)(1) requirements for hazards identified in either the facility design or during the development of procedures.

10 CFR 851.22(b) requires:

1. Elimination or substitution of the hazards where feasible and appropriate.
2. Engineering controls where feasible and appropriate.
3. Work practices and administrative controls that limit worker exposures.
4. Personal protective equipment.

Title 10 CFR 851.22(a) requires contractors to establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner.

Discussion:

The surveillant found that Procedure 24590-WTP-GPP-SAIH-001 did not have a requirement for interface with new facility and equipment hazard evaluations developed by other BNI organizations. For example SIH identified by the BNI engineering and nuclear safety group do not require interface with Procedure 24590-WTP-GPP-SAIH-001 for the amelioration of occupational hazards deemed to be an SIH. In addition, the procedure did not identify key organizations responsible for the qualitative exposure assessments and corollary exposure control plans when implementing the referenced 10 CFR 851 requirements of Action 1(c) from design, commissioning, and operations. Contrary to the CAP BNI did not revise Procedure 24590-WTP-GPP-SAIH-001 as necessary to ensure that the procedure interfaces with new facility and equipment hazard evaluations developed by other organizations.

Opportunity for Improvement S-13-SHD-RPPWTP-008-O01: The BNI qualitative exposure assessment quality of conclusions reached for the chemical agent exposure ranking score can be improved through incorporation of provided comments.

Discussion:

Review of the BEAP identified an OFI relative to documenting occupational exposure limits, VOC as an included chemical agent, and physical parameters of DHMg.

Specifically:

- The VP assumed for DHMg to be the same as elemental mercury, one of the inherent hazards of DHMg is its relatively higher VP then elemental mercury, for example 55 to 80 millimeters at 20° Centigrade and it is flammable as oppose to elemental mercury.
- The ACGIH TLV for iodine is based on the Inhalable Fraction plus Vapor, which is not acknowledged in the exposure assessment.
- The ACGIH TLV for sulfur dioxide is a short-term exposure limit, which is not acknowledged in the exposure assessment.
- The BEAP hazardous substance tables are missing VOC as a component for the qualitative exposure assessment, in addition the referenced source for the chemical agents and material balance identifies alkyl alcohol as the representative VOC. This chemical agent TLV has a higher health effects ranking (24590-WTP-GPP-SAIH-001) and relatively lower immediately dangerous to life or health concentration that will affect conclusions of the chemical agent exposure ranking score.

Opportunity for Improvement S-13-SHD-RPPWTP-008-O02: BNI conclusions on meeting the referenced surveillance 10 CFR 851 requirements for the different stages of design, operations, and maintenance can be improved through institutionalization of a programmatic process.

Discussion:

Recently a BNI team began evaluating the LAW/HLW ammonia-air skid for occupational safety controls in compliance for the same 10 CFR 851 requirements referenced in this surveillance. Their purpose is to identify and evaluate options to manage industrial exposures and potential production impacts related to ammonia in the LAW and HLW Facilities. BNI, in response to the Priority Level 2 finding, expanded their current process for qualitative exposure assessment and identification of controls used at the construction site to also be used for design, commissioning, and operations. The BNI team is using a different method to meet the same referenced 10 CFR 851 requirements of this surveillance. The quality and clarity of conclusions on meeting the referenced surveillance 10 CFR 851 requirements for the different stages design, commissioning, operations, and maintenance can be improved through institutionalization of a programmatic process.

Conclusion:

The surveillant's review of actions for the BNI CAP found that one action, 1d, was not met resulting in a Priority Level 3 finding, the balance of actions were met. There were two OFIs identified and are as documented in this surveillance.

Signatures:

Surveillant: _____ Date: 28 JUN 13

SHD Division Director: Brian A. Hall Date: 7/1/13



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

SEP - 4 2013

13-SHD-0092 REISSUE

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF LEVEL 2 ASSESSMENT REPORT S-13-SHD-RPPWTP-010 – MID-POINT REVIEW OF THE BECHTEL NATIONAL, INC. (BNI) PREPARATION IN RESPONSE TO GLOBAL HARMONIZATION: CLASSIFICATION AND LABELING OF CHEMICALS

This letter is being reissued due to lack of signatures on the attachment.

The U.S. Department of Energy, Office of River Protection, Technical and Regulatory Support, Safety and Health Division conducted a review of the BNI preparation implementation of a near-term employer milestone related to the revised requirements of final rule from the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS): Train employees on the new label elements and Safety Data Sheet, formally known as Material Safety Data Sheets, format by December 1, 2013. The BNI actions related to implementation of the first revised OSHA HCS milestone are still in the planning stages, but roll-out and objective evidence strategy to meet the milestone appear to be adequate. No findings, opportunity for improvement items, or assessment follow-up items were identified.

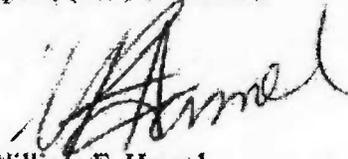
The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7, -- "Notification of Changes."** Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-SHD-0092

-2-

SEP - 4 2013

If you have any questions, please contact me, or your staff may contact Paul G. Harrington,
Assistant Manager, Technical and Regulatory Support, (509) 376-5700.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:MRM

Attachment

cc w/attach:
M. McCullough, BNI
BNI Correspondence

Attachment
13-SHD-0092
(3 Pages)

**Mid-Point Review of Bechtel National, Inc., Preparation in Response to
Global Harmonization: Classification and Labeling of Chemicals**

Level 2 Assessment Report S-13-SHD-RPPWTP-010

**U.S. Department of Energy
Office of River Protection**

Level 2 Assessment Report Number: S-13-SHD-RPPWTP-010

Division Performing the Assessment: Safety and Health Division

Integrated Assessment Schedule Number: 023

Title of Assessment: Mid-Point Review of the Bechtel National, Inc.,
Preparation in Response to Global
Harmonization: Classification and Labeling of
Chemicals

Dates of Assessment: July 1 through July 30, 2013

Assessment Lead: Mario R. Moreno, Certified Industrial Hygienist

Team Member(s) (if any): Not Applicable

Scope:

The purpose of this assessment was to evaluate Bechtel National, Inc. (BNI) mid-point implementation of a near-term employer milestone related to the revised requirements of the final rule from the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS): Train employees on the new label elements and Safety Data Sheet (SDS), formally known as Material Safety Data Sheets, format by December 1, 2013.

Requirements Reviewed:

- 10 CFR 851, Worker "Safety and Health Program," "Code of Federal Regulations," as amended.
- 29 CFR 1910.1200, "Hazard Communication," "Code of Federal Regulations," as amended.
- 29 CFR 1926.59, Hazard Communication," "Code of Federal Regulations," as amended.

Records/Design/Installation Documents Reviewed (if applicable):

- 24590-WTP-GPP-SAIH-001, "Chemical and Biological Exposure Assessment Strategies," Revision 2C, Bechtel National, Inc., Richland, Washington, January 31, 2013.
- 24590-WTP-GPP-SIND-014, "Hazard Communication," Revision 3B, Bechtel National, Inc., Richland, Washington, June 3, 2013.

- 24590-WTP-PL-SA-06-0005, "WTP Industrial Hygiene Program Plan," Revision 3, Bechtel National, Inc., Richland, Washington, November 29, 2010.
- BNI, "BNI Computer Based Training (CBT) for Hanford General Employee Training (HGET) module on the Hazard Communication Standard," Bechtel National, Inc., Richland, Washington, April 22, 2013.
- OSHA Fact Sheet: "December 1, 2013, Training Requirements for the Revised Hazard Communication Standard."

Discussion of Area(s) or Activities Reviewed:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(1)(ii), requires BNI to develop a nonradiological worker safety and health program, which conforms to the requirements of 10 CFR 851. The BNI worker safety and health program, through 10 CFR 851.23, identifies the HCS(s) of OSHA 29 CFR 1910.1200 and 29 CFR 1926.50 as the applicable regulatory requirement(s) for construction activities. OSHA revised its HCS to align with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals and published it in the Federal Register in March 2012. Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for SDS, formerly known as, Material Safety Data Sheets.

The first milestone date of the revised HCS is December 1, 2013. By that time, BNI must have trained their workers on the new label elements and the SDS format. In support of the revised HCS, OSHA issued a training fact sheet, which includes topical areas that must be included for each subject (i.e., labeling and SDS). New HCS training was developed within the U.S. Department of Energy (DOE) complex aided locally by Volpentest Hazardous Materials Management and Emergency Response Training and Education Center. BNI evaluated several options including the DOE product, and their selection was to use other than the DOE product, as listed below.

As of the date of this surveillance, BNI had not revised their current CBT HGET to incorporate the new HCS training subjects in support of meeting the December 1, 2013, milestone. The BNI plan to meet the milestone is a combination of CBT, safely speaking forums, and on-board training. The milestone requires the subject content to be provided as training to contractor employees. The BNI training department finds presenting at the safely speaking is also considered to be training. In addition, BNI tracks completed worker training so that compliance to meeting the HCS milestone can be shown to have been met. The content of the training on the revised HCS is a BNI-corporate product, and content was shown but not provided for review during the surveillance period. Review of the HCS training content and delivery will take the form of a Level 3 assessment when readily available or provided.

Review of Procedure 24590-WTP-GPP-SIND-014, "Hazard Communication," that was updated to implement the revised HCS was found to be adequate.

Summary of Findings, Opportunities for Improvement, or Assessment Follow-Up Items:

None

Conclusion:

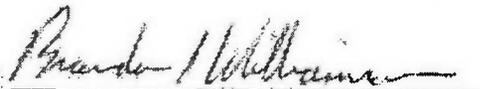
The BNI actions related to implementation of the first revised OSHA HCS milestone: Train employees on the new label elements and SDS, formally known as Material Safety Data Sheets, format by December 1, 2013, is still in the planning stages but roll-out and objective evidence strategy to meet the milestone are adequate. Review of the HCS training content will be in the form of a Level 3 assessment when it becomes available to the DOE Office of River Protection. Review of Procedure 24590-WTP-GPP-SIND-014, which was updated to implement the revised HCS, was found to be adequate.

Assessor:



Date: 3 Sep 13

SHD Division Director:


Acting for SHD DD

Date: 9/3/2013



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

OCT - 1 2013

13-SHD-0111

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

**CONTRACT NO. DE-AC27-01RVI4136 – TRANSMITTAL OF SURVEILLANCE REPORT
S-13-SHD-RPPWTP-012 – EVALUATION OF BECHTEL NATIONAL, INC. (BNI) FIELD
DRILLS**

The U.S. Department of Energy, Office of River Protection, Technical and Regulatory Support, Safety and Health Division conducted an evaluation of two BNI field drills on the Waste Treatment and Immobilization Plant construction site. The drills were found to be well planned, executed, and critiqued. There were no issues identified in this assessment that BNI did not self-identify and initiate corrective actions on. Attached is a copy of the subject surveillance report.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7, -- "Notification of Changes."** Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Paul G. Harrington, Assistant Manager, Technical and Regulatory Support, (509) 376-5700.

A handwritten signature in black ink, appearing to read "W. F. Hamel", is written over the typed name.

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

SHD:PJS

Attachment

cc w/attach:
L. A. Koenig, BNI
M. McCullough, BNI
BNI Correspondence

**Attachment
13-SHD-0111
(3 Pages)**

**Evaluation of Bechtel National, Inc. Field Drills
Surveillance Report S-13-SHD-RPPWTP-012**

**U.S. Department of Energy
Office of River Protection**

Assessment Report Number: S-13-SHD-RPPWTP-012
Division Performing the Assessment: Safety and Health Division
Integrated Assessment Schedule Number: 55
Title of Assessment: Evaluation of Bechtel National, Inc. Field Drills
Dates of Assessment: May 22, 2013 through August 20, 2013
Assessment Lead: Patrick Swann

Scope: This assessment evaluated two field drills that Bechtel National, Inc. (BNI) conducted during the May through September 2013 time period. The field drills were evaluated for their scope, execution as planned, performance, and issues identification and management.

Requirements Reviewed:

- DOE/RL-94-02, 2012, *Hanford Emergency Management Plan*, U.S. Department of Energy, Rev. 5, Washington, D.C., December 20.
- DOE-0223, RLEP-3.30, *Emergency Management Drill Program*, U.S. Department of Energy.
- DOE G 151.1-3, 2007, *Programmatic Elements*, U.S. Department of Energy, Emergency Management Guide, Washington, D.C., July 11.

Records/Design/Installation Documents Reviewed:

- 24590-WTP-GPP-SIND-019, *Emergency Management Plan*, Rev. 9C, Bechtel National, Inc., Richland, Washington.
- 24590-WTP-GPP-SIND-003, *Construction Site Emergency Action Plan*, Rev. 8B, Bechtel National, Inc., Richland, Washington.
- 24590-WTP-GPP-MGT-043, *Corrective Action Management*, Rev. 3, Bechtel National, Inc., Richland, Washington.

Discussion of Area(s) or Activities Reviewed: This assessment consisted of reviewing and observing five fundamental components of conducting a field drill. Two drills were held at/in the Low-Activity Waste Facility and Balance of Facilities at the Waste Treatment and Immobilization Plant (WTP) construction site. Those five components are identified as:

1. Predrill plan
2. Predrill controller and player briefings
3. Drill execution (conduct)
4. Post-drill debrief

5. Post-drill report.

Predrill plan: Predrill plans are created following a template contained on WTP form 24590-SIND-F00101. The template is generally aligned with the requirements contained within DOE-0223 RLEP 3.30, *Emergency Management Drill Program*. The predrill plans that the assessment team reviewed were well prepared documents that contained the applicable criteria required to safely perform an emergency preparedness drill. The predrill plans for both observed field drills contained well defined objectives that were relevant, obtainable, and measurable. The scope of BNI's emergency preparedness drills continues to be both relevant and challenging to the affected parties such that demonstration of proficiency is achievable while simultaneously pushing the envelope to improve the response organizations. The drill objectives contained on the predrill plans for both drills were identical and followed the template. There were no changes to the drill objectives for the second drill to focus on areas identified for improvement in the previous drill(s). This was discussed with the emergency management administrator and will be considered in future drill packages.

Predrill controller and player briefing: Separate predrill briefings were given to the controller/evaluators as well as the drill players. The briefings were all well attended and good interaction was observed between the attendees. Issues were identified and most were rectified on the spot. Both players' briefings were detailed to the point that the assessor felt too much information was given to the responding individuals. The drill scope copied from both predrill plans reads "The purpose of this drill is to provide members of the Balance of Facility (BOF)/ Low-Activity Waste (LAW) Emergency Response Organization (ERO) with the opportunity to demonstrate and maintain individual and organizational proficiency and to satisfy the drill participation requirements established in the Emergency Management Program (24590-WTP-GPP-SIND-019)." Too much information given to the players prior to the drill minimizes the opportunity for the Emergency Response Organization to demonstrate proficiency and react with the same level of stress and uncertainty that would occur in an actual event.

Drill Execution (Conduct): The field drills that were observed by the assessment team were well conducted with no safety or operational issues observed. Initial communications from the event scene were conducted via job radio on Channel 1 and then transitioned over to Channel 9, the emergency frequency. The initial information is transmitted from the discoverer to the WTP medical staff and then on to the Hanford Patrol Operations Center and finally bridged into the Hanford Fire Department dispatch as appropriate. In both drills the initial communication of relaying critical information was weak. In particular, the communication in the second drill, an excavation accident, did not include an appropriate level of detail. The WTP medical staff did not question the discoverer, nor were there repeat backs of information. This has been a recurring issue identified during the execution of drills for over a year despite attempts to improve the process.

The WTP medical staff and safety assurance organization responded to the scene quickly in both observed drills and performed well in assessing the scene and patients. During the performance of the excavation drill, the medical staff solicited patient information from the drill controller by asking questions instead of performing a hands-on assessment of the patient. This was a minor issue in the drill related to artificialities that are introduced by having the victim played by a mannequin. Overall, the response by the medical staff on scene was appropriate for both drills.



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUL 12 2013

13-WTP-0134

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-WCD-RPPWTP-005 – MAY 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

This letter transmits the results of the Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) review of Bechtel National, Inc.'s (BNI) construction performance at the WTP during May 2013. A summary of the surveillance activities is documented in the attached report.

One Priority Level 3 finding, one opportunity for improvement item, and one assessment follow up item were identified during the surveillance period. The Priority Level 3 finding was written to document BNI had over torqued and accepted as correct the 1³/₄ inch man-way fasteners on the Plant Service Air Receiver in the Analytical Laboratory. A summary of the finding, assessment follow-up item, and opportunity for improvement item are provided in Section III of the attachment report.

No response is required for the Priority Level 3 finding or opportunity for improvement item. The Priority Level 3 finding shall be entered into your corrective action management system and tracked until the identified issues are corrected.

Within 45 days of receipt of this letter, BNI shall provide an update to the additional actions intended to address finding S-12-WCD-RPPWTP-006-F05, documented in assessment follow up item S-13-WCD-RPPWTP -005-A01. The response should include when all additional actions will be completed.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7, -- "Notification of Changes"**. Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

JUL 12 2013

Mr. J. M. St. Julian
13-WTP-0134

-2-

If you have any questions, please contact me, or you may contact Ken Wade, Director, WTP Construction Oversight and Assurance Division, (509) 373-8637.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP: DAH

Attachment

cc w/attach:

D. E. Kammenzind, BNI
F. M. Russo, BNI
K. A. Smith, BNI
L. M. Weir, BNI
W. Walton, RL-FIN
BNI Correspondence

**Attachment
13-WTP-0134**

**Waste Treatment and Immobilization Plant (WTP) Construction
Oversight and Assurance Division (WCD) May 2013 Construction
Surveillance Summary Report S-13-WCD-RPPWTP-005**

10 Pages (Including this Coversheet)

U.S. DEPARTMENT OF ENERGY
WASTE TREATMENT AND IMMOBILIZATION PLANT PROJECT

INSPECTION: Waste Treatment and Immobilization Plant (WTP) Construction Oversight
and Assurance Division (WCD) May 2013 Construction Surveillance
Summary Report

REPORT NO.: S-13-WCD-RPPWTP-005

INTEGRATED ASSESSMENT SCHEDULE (IAS) NUMBERS: (See Section VII of this report
for a listing of IAS numbers)

FACILITY: Bechtel National, Inc.; Waste Treatment and Immobilization Plant Project

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: May 1 through May 31, 2013

INSPECTORS: F. Hidden, Facility Representative
D. Hoffman, Facility Representative
P. Schroder, Facility Representative
H. Taylor, Construction Cost & Schedule
*M. Evarts, Site Inspector
*W. Meloy, Site Inspector
*R. Taylor, Site Inspector
*D. Wallace, Site Inspector

*Subcontractor to Lucas Engineering and Management Services, Inc.
Supporting ORP-WTP

APPROVED BY: K. G. Wade, Director
WTP Construction Oversight and Assurance Division

WTP CONSTRUCTION OVERSIGHT AND ASSURANCE DIVISION MAY 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

I. Introduction

During the period May 1 through May 31, 2013, the U.S. Department of Energy (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) conducted construction inspections of Important-To-Safety (ITS) and Non-ITS (Balance of Plant) activities during WTP construction. These inspections were documented in surveillance reports and maintained electronically. A total of 13 sub-tier surveillance reports were generated during the inspection period and have been summarized in Sections II and III below. These sub-tier surveillance reports are available upon request. The Facility Representatives (FR) also documented 21 WTP construction activities in the Operational Awareness Database. These activities included 20 FR Activity Log Entries (used for logging notifications and other events). FR Activity Log Entries, involving events and medical reports, were communicated by Bechtel National, Inc. (BNI) to the on-call FR.

One Priority Level 3 finding was identified during this assessment period; the finding included:

S-13-WCD-RPPWTP-005-F01 (Priority Level 3) – The man-way bolts on the Plant Service Air Receiver, PSA-RCVR-00001, in the Analytical Laboratory (LAB) were over tightened. (Sub-Tier 005-12)

Sections II and III provide additional discussions of oversight activities and summary of findings, Opportunity for Improvement (OFI) items, and assessment follow-up items.

Section IV of this report discusses WCD identified emerging performance trends. There were no open emerging negative performance trends identified by WCD during the surveillance period.

Section V of this report contains a listing of items opened, closed, and discussed during this period. There was one finding, one OFI, and one assessment follow-up item opened; one OFI was closed.

Section VI contains a summary listing of the 13 sub-tier surveillance reports written during this inspection period.

Section VII contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this inspection period.

II. Oversight Activities

Sub-Tier Surveillance Report Activity Conclusions

- ORP-WTP observed BNI performing and/or completing eleven pre-designated or field surveillance selected welded connections at the Low-Activity Waste (LAW), Balance of Facilities (BOF), and High-Level Waste (HLW) Facilities during the month of May 2013. This included visual assessment of fit-up and final weld condition, and review of radiographic film. For items examined visually, configuration and orientation of the items installed conformed to the drawings; welding met the specified criteria. For radiographic film review, results were found to be acceptable in accordance with American Society of Mechanical Engineers (ASME) B31.3. BNI used correct materials and welded with the correct filler material using processes and personnel qualified in accordance with the applicable requirements. BNI's examination personnel had been trained and certified for the examination method used; inspection records reviewed were satisfactory. (Sub-Tier 005-01)
- ORP-WTP reviewed a total of 767 weld and test records during the month of May 2013. The records had been completed by various BNI Field Engineering or Quality Control personnel, and submitted to Project Document Control. Reviewed records conformed to the ASME B31.3 code requirements. (Sub-Tier 005-02)
- ORP-WTP observed BNI performing pressure testing at the WTP site during the month of May 2013. BNI had performed testing in accordance with procedures, engineering specifications, and required codes and standards. Quality control and testing personnel had been trained and certified for the test methods used, and pertinent attributes of quality assurance documentation had been satisfactorily completed. (Sub-Tier 005-03)
- The ORP-WTP site inspector reviewed BNI's subcontractor (Energy Solutions) installation of Zirmul pre cast refractory blocks in LAW Melter number two. The review found the refractory blocks were installed in accordance with the requirements of castable refractory procedure *MAN-5575-MG-0002*. (Sub-Tier 005-04)
- ORP-WTP reviewed Heating Ventilating and Air Conditioning (HVAC) testing performed at the LAW Building during the month of May. Testing included door latch repair areas for C2V-HEPA-00004H, and flow element ports installed on previously tested systems or portions thereof. Components tested were subjected to requisite test pressures based on ductwork designators in the design drawings; test activities were conducted in accordance with requirements of the approved test procedure by properly trained personnel using currently calibrated test instrumentation; and test records attested to satisfactory results and were traceable to the items tested. (Sub-Tier 005-05)
- ORP-WTP performed a review of BNI pressure testing activities completed in May 2012. Activities were reviewed for compliance with the standards contained in ASME B31.3, Section 345. The review found completed tests met the expectations of ASME B31.3,

construction work packages adequately document required worker safety during pressure testing, and BNI had adequately trained the construction workforce to the requirements of pressure testing. Based on the reviews performed during this assessment, BNI was found to be performing pressure testing at WTP safely and within the parameters of the Basis of Design. (Sub-Tier 005-06)

- ORP-WTP observed BNI's subcontractor (Energy Solutions) installation of Zirmul pre cast refractory blocks making up the second layer of refractory floor build-up in LAW melter number one. The site inspector noted Energy Solutions performed the installation in accordance with the castable refractory procedure *MAN-5575-MG-0001*; no deficiencies were noted. (Sub-Tier 005-07)
- During the month of May, BNI was observed testing, placing, and consolidating concrete for three placements at the HLW Facility: Wall *HCC3103* at elevation (+) 37'-0", pour-back *HCC3107/08* at elevation (+) 37'-0", and pour-back *HCC3110/10A* at elevation (+) 37'-0". Concrete placement conformed to procedures, engineering specifications, and the relevant codes and standards. Concrete receipt activities were conducted in accordance with the applicable codes and standards. Quality control and testing personnel had been trained and certified for the examination and test methods used, and pertinent attributes of the quality assurance documentation had been completed. (Sub-Tier 005-08)
- ORP-WTP observed BNI's Start-up organization performing a functional test and flush of the fire water lead-in to Building 91. The test failed because the required pressure of 19 lbs could not be achieved. The test was properly stopped by the Startup Engineer who documented the test results in the startup failure report as expected. During the testing the site inspector noted there was an Opportunity for Improvement (OFI) to allow test engineers to more easily verify clear flush water was free of debris by attaching a burlap bag or pillow case to the hose discharge. OFI *S-13-WCD-RPPWTP-005-001* was opened to document the item; OFI *S-13-WCD-RPPWTP-005-001* was closed following discussions with the BNI's Startup Manager. (Sub-Tier 005-09)
- A review was performed of the corrective actions performed by BNI to address Finding *S-12-WCD-RPPWTP-006-F05* (Priority Level 2), which found BNI had not adequately completed the corrective actions developed to address Occurrence Report *EM-RP--BNRP-RPPWTP-2011-0012* where an in-process weld failure resulted in a 558 pound steel girder falling 62 feet to the ground. To ensure the original actions were adequately completed, BNI developed and ORP accepted four additional corrective actions. Each of these additional actions were reviewed as part of this surveillance. Based upon this review Finding *S-12-WCD-RPPWTP-006-F05* (Priority Level 2) could not be closed because BNI had not adequately completed and documented the additional actions. BNI had made improvements to how critical steps were developed and documented in work packages; however, additional action was necessary to adequately complete the additional actions contained in *CCN 251571*. BNI did not adequately document that modifications had been made to the structural steel work package involved with the dropped girt event or adequately modify other tasks associated with the same work activity as evidenced by the work activity attached to the Project Issues Evaluation

Report. Examples of critical steps added to Appendix M of 24590-WTP-GPP-WPHA-001 were lacking the specificity necessary to provide acceptable guidance to those who may be using them. This review was discussed with the Field Engineering Manager, the Construction Issues Manager, and the Construction Quality Assurance Manager; Assessment Follow-up Item S-13-WCD-RPPWTP-005-A01 was opened to track the need for ORP-WTP to review BNI's efforts to develop or complete necessary corrective actions to finding S-12-WCD-RPPWTP-006-F05. (Sub-Tier 005-10)

- The ORP-WTP site inspector reviewed BNI's subcontractor (Energy Solutions) installation of 5" thick K-3 pre-cast refractory blocks in LAW Melter number two. K-3 refractory blocks are used for the third layer of the refractory floor. The review found the material had been shipped in adequately marked containers and Energy Solutions had installed the blocks in accordance with the requirements of *Melter Assembly Procedure, (MAN-5575-MG-0002)*; no deficiencies were noted. (Sub-Tier 005-11)
- ORP-WTP conducted a review of completed work and records associated with LAB permanent plant equipment. During the review it was noted the Plant Service Air Receiver PSA-RCVR-00001 man-way fasteners had been over tightened. A review of records indicated the bolts had been tightened in excess of procedural values and beyond the bolts' yield point. Further, the corresponding quality assurance documentation had been completed, reviewed, approved, and submitted to project record archives as a permanent record without noting the deficiency. Finding S-13-WCD-RPPWTP-005-F01 (Priority Level 3) was opened to document the non-compliant condition. (Sub-Tier 005-12)
- ORP-WTP reviewed several on-going LAW, BOF, and LAB work activities to determine if Integrated Safety Management Core Functions 3, *Development/Implement Hazard Controls*, was being properly applied using DOE G 450.4-1C attributes as guidance. Field observations, review of documentation, interviews with workers, and recent safety statistics found Core Function 3 was consistently and effectively implementing hazard controls in the observed work activities; no issues were identified during the oversight period. (Sub-Tier 005-13)

Facility Representative Event and Safety Activities

- There were no Occurrence Reportable events in May 2013.
- There was one Occupational Safety and Health Awareness recordable injury during May 2013. The event occurred when a worker was taking measurements in a small space resulting in a strained back. The injury was required to be treated with prescription pain medication and resulted in work restrictions.
- BNI notified the on-call FR of 29 medical/first aid events during May 2013. BNI's notifications to the on-call FR were timely and contained adequate detail.

III. Summary of Findings, Opportunity for Improvement Items, and Assessment Follow-up Items

A finding is defined as an individual item not meeting a committed requirement [e.g., contract, regulation, safety basis, Quality Assurance (QA) program, authorization basis document, procedure, or Standards/Requirements Identification Documents]. Findings can be characterized as Priority Level 1, Priority Level 2, or Priority Level 3. WCD will follow-up on findings once BNI has completed necessary corrective actions to address the issues.

During this inspection period, the following finding was identified:

Summary of Finding:

- **Finding S-13-WCD-RPPWTP-005-F01** (Priority Level 3) – The man-way bolts on the Plant Service Air Receiver, PSA-RCVR-00001, in the LAB were over tightened.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3) requires BNI to develop and implement a QA Program.

BNI Quality Assurance Manual (QAM), 24590-WTP-QAM-QA-06-001, Policy Q-05.1, Section 5.1.2, required activities affecting items and services to be prescribed by, and performed in accordance with documented instruction, procedures, or drawings.

For the bolting material used, BNI Procedure 24590-WTP-3PS-F000-T0002 is applicable and specifies a torque value of 295 ft. lbs.

Discussion:

Contrary to the above, the fasteners used to close the man-way cover on the Plant Service Air Receiver (PSA-RCVR-00001) were tightened in excess of the value specified by BNI Procedure 24590-WTP-3PS-F000-T0002 – fasteners had been tightened to 751 ft. lbs. and had been accepted as properly installed. Further, the requisite process to detect quality problems did not identify the discrepancy. (Sub-Tier 005-12)

Assessment Follow-Up Items are matters requiring further review because of a potential finding or problem, because contractor or ORP action is pending, or because needed information to determine compliance with requirements and/or acceptable performance was not available at the time of the assessment.

- **Assessment Follow-up Item S-13-WCD-RPPWTP-005-A01:** Follow-up on BNI's actions to complete additional actions needed to address finding S-12-WCD-RPPWTP-006-F05, including reviewing and improving documentation of completed corrective actions and performing an effectiveness review of how critical steps are being documented in work packages.

Discussion: A review was performed of the documented corrective actions taken by BNI to minimize the possibility of an event similar to the dropped girt from being repeated (documented in finding S-12-WCD-RPPWTP-006-F05). The review found BNI had not completed the modification of the girt installation work package as committed. The examples of critical steps placed in WHPA-001 were vague and in need of improvement, and an effectiveness review was scheduled to be completed in July 2013. This led the FR to conclude additional time was needed for BNI to fully accomplish the necessary corrective actions.

OFI items are observations that warrant attention, but are not a direct noncompliance with a requirement:

- **Opportunity for Improvement S-13-WCD-RPPWTP-005-001:** Improvements could be made to the test procedure to verify thorough cleaning of the lead-in piping to Building 91.

Discussion: The code requires private fire service mains and lead-in connections to system risers shall be flushed thoroughly before connection is made to system piping in order to remove foreign materials that might have entered the main during the course of installation. Start-up test procedure 24590-BOF-FSW-FTP-0002 does not provide evidence fire service lead-ins are thoroughly clean, except for a visual examination of clarity of the water. Normal industrial practices for flushing fire water lines is proof the system is thoroughly clean by placing a burlap sack or pillow case at the end of the hose so a visual inspection can be performed to assure the system is cleaned.

IV. Emerging Construction Performance Trends

Prior to issuing this WCD oversight report, WCD reviewed past identified issues and current construction performance in an attempt to identify any emerging negative performance trends. No new trends were identified.

V. List of Inspection Items Opened and Closed

Opened: The following items were opened:

S-13-WCD-RPPWTP-005-F01 (Priority Level 3)	Finding	Vessel PSA-RCVR-00001 man way bolts over tightened. (Sub-Tier 005-012)
S-13-WCD-RPPWTP-005-001	Opportunity for Improvement	Improvements could be made to how fire water flushing is performed on building tie-ins. (Sub-Tier 005-009)
S-13-WCD-RPPWTP-005-A01	Assessment Follow-up	Perform follow-up review of actions to address finding S-12-WCD-RPPWTP-006-F05. (Sub-Tier 005-

010)

Closed: The following item is closed:

S-13-WCD-RPPWTP-005-001 Opportunity Improvements could be made to how
for fire water flushing is performed on
Improvement building tie-ins. (Sub-Tier 005-009)

VI. List of Sub-Tier Surveillance Reports Issued During the Assessment Period

<u>Surveillance Report Number</u>	<u>Inspection Subject</u>
S-13-WCD-RPPWTP-005-01	11 weld inspections performed in May 2013
S-13-WCD-RPPWTP-005-02	767 completed records reviewed in May 2013
S-13-WCD-RPPWTP-005-03	Hydrostatic and Pneumatic Pressure Tests Review
S-13-WCD-RPPWTP-005-04	LAW Melter # 2 Refractory Installation (First Layer Zirmul Block)
S-13-WCD-RPPWTP-005-05	Review of LAW HVAC Testing
S-13-WCD-RPPWTP-005-06	Hydrostatic and Pneumatic Pressure Tests Review
S-13-WCD-RPPWTP-005-07	LAW Melter # 2 Refractory Installation (Second Layer Zirmul Block)
S-13-WCD-RPPWTP-005-08	HLW Concrete Placement
S-13-WCD-RPPWTP-005-09	Building 91 Fire Water Lead-in Flush; Opened/Closed S-13-WCD-RPPWTP-005-001
S-13-WCD-RPPWTP-005-10	Review of S-12-WCD-RPPWTP-006-F05, non-closure, Opened S-13-WCD-RPPWTP-005-A01
S-13-WCD-RPPWTP-005-11	LAW Melter # 2 Refractory Installation (K-3 Refractory)
S-13-WCD-RPPWTP-005-12	LAB Records Review, Manway Bolts Over Torqued, Opened S-13-WCD-RPPWTP-005-F01
S-13-WCD-RPPWTP-005-13	ISMS Review – Development/Implement Hazard Controls

VII. Integrated Assessment Schedule Number Summary

Integrated Assessment Schedule ID Number	Sub-tiered Surveillance Number	Report Issued Date	Assessor	Description
150	S-13-WCD-RPPWTP-005-13	05/24/2013	Fred Hidden	ISMS - Hazard Identification and Work Control implementation - LBL
163	S-13-WCD-RPPWTP-005-06	5/13/2013	Bob Taylor	WTP Construction Testing Program Review
167	S-13-WCD-RPPWTP-005	See Cover Letter	Doug Hoffman	Construction Acceptance Inspections



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OCT 22 2013

13-WSC-0015

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF SURVEILLANCE
REPORT S-13-WSC-RPPWTP-018 - REVIEW OF MAINTENANCE PROCESS
IMPLEMENTATION

This letter transmits the results of the subject U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP), Startup and Commissioning Integration, review of Bechtel National, Inc.'s Maintenance Process Implementation at the WTP. No findings, opportunities for improvement items, or assessment follow-up items were identified during the course of this surveillance.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J.M. St. Julian
13-WSC-0015

-2-

OCT 22 2013

If you have any questions, please contact me, or you may contact Ben Harp, Manager, WTP Startup and Commissioning Integration, at (509) 376-1462.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:JAR

Attachment

cc w/attach:

D. L. Collins, BNI

D. E. Kammenzind, BNI

M.G. McCullough, BNI

W.W. Gay, URS

K. Wells, URS

BNI Correspondence

Attachment
13-WSC-0015
S-13-WSC-RPPWTP-018

Attachment
13-WSC-0015
**REVIEW OF BECHTEL NATIONAL, INC., MAINTENANCE PROCESS
IMPLEMENTATION**
WSC Level 2 Assessment Report
August 2013
9 pages (including coversheet)

Report Number: S-13-WSC-RPPWTP-018
Organization: WSC
Integrated Assessment Schedule Number: 213
Title: Review of Bechtel National, Inc., Maintenance Process Implementation
Date(s): August 1, 2013, through September 15, 2013
Lead: Joseph Renevitz, WTP Maintenance and Operations Engineer
Team Members: Wendell Wrzesinski, WTP Chemical Engineer
Doug Hoffman, LAW Facility Representative
Jeffrey Daniels, North Wind Services, LLC
Shad Harp, ANR Group Inc.

SCOPE

The U.S. Department of Energy, Waste Treatment and Immobilization Plant (WTP) Startup and Commissioning Integrated Project Team conducted an assessment to review the equipment evaluations, implementation, and effectiveness of the Bechtel National, Inc., (BNI) maintenance process against specific lines of inquiry (Attachment 1). The purpose of the assessment was to determine (1) if the maintenance process, as implemented, effectively optimized the equipment maintenance approach for the current stage of the project and the projected startup date; and (2) what affect aging equipment has on future operations.

REQUIREMENTS REVIEWED

- Contract No. DE-AC27-01RV14136, *Design, Construction, and Commissioning of the Hanford Tank Waste Treatment and Immobilization Plant*
- 24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document Volume II, Rev. 5*
- *Federal Acquisition Regulation* Subpart 45.502, "Contractor responsibility"
- Preventive maintenance instruction templates.

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- 24590-WTP-GPG-CMNT-0006, *Asset Receipt and Evaluation, Rev. 006*
- 24590-WTP-GPP-CMNT-004, *Periodic Maintenance and Surveillance, Rev. 07A*
- 24590-WTP-GPP-MGT-031, *Asset Preservation and Maintenance Process, Rev. 03A07*

- 24590-WTP-PL-SU-12-0001, *Waste Treatment and Immobilization Plant Site Energization Plan*, Rev. 000
- 24590-WTP-PL-SU-13-0001, *System/Facility Ownership Transition Plan*, Rev. 000
- 24590-WTP-QAM-QA-06-001, *Quality Assurance Manual*, Rev. 12
- Computerized Maintenance Management System (CMMS) records for the following equipment:
 - Heating, ventilation, and air conditioning (HVAC) unit installed outside Building 87 (C1V-ACU-00014)
 - Cooling tower chemical addition controller (LTE-PNL-83001)
 - Cooling towers water pump (PCW-PMP-00005C)
 - Cooling towers fan motor (PCW-MTR-00029)
 - Argon vessel installed outside the Analytical Laboratory (BAG-VSL-00002)
 - Uninterruptable power supply panel stored at the Material Handling Facility (MHF) (UPE-UPS-100003)
 - Pressure vessel stored at the MHF (CHW-VSL-00035)
 - Pressure washer stored at the MHF (30-TOOL-00029)
 - Batteries stored at the MHF (UPE-BATT-91001)
 - Batteries stored at the MHF (UPE-BATT-87001)
 - Simulant agitator stored at the MHF (RLD-AGT-00002)
 - Radioactive liquid pump installed in High-Level Waste Facility (RLD-PMP-00020)
 - Plant service air (PSA) compressor installed in the Chiller Compressor Plant (PSA-CMP-00001A)
 - Outside stem and yolk valve installed in High-Level Waste Facility (ISA-V-34094)
- PSA compressor preservation maintenance work orders:
 - 24590-WTP-PWO-CMNT-12-1019 (December 2012)
 - 24590-WTP-PWO-CMNT-13-0140 (February 2013)
 - 24590-WTP-PWO-CMNT-13-0223 (March 2013)
 - 24590-WTP-PWO-CMNT-13-0295 (April 2013).

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

The assessment team developed lines of inquiry (Attachment 1) that divided the review into three parts: (1) interviewing the BNI Maintenance Manager and the Field Material Manager, (2) random sampling of equipment stored at the MHF and at the WTP Project site (both outdoors and inside facilities) for data mining and evaluation, and (3) review of maintenance work orders

performed on a major type of equipment (centrifugal compressors) installed as part of the Balance of Facilities.

The results of the interviews showed both understanding and effective implementation of the maintenance process. The BNI Maintenance Manager was well versed in the content of the procedures and execution of the process in accordance with implementing procedures. The Maintenance Manager indicated that his budget was sufficient to perform the required work, and was proactively addressing problems expected to result from the extended length of the project, including equipment obsolescence. The Maintenance Manager reported working closely with Startup to make sure maintenance activities will not impact startup testing. The Field Material Manager's description of his own maintenance responsibilities—from receipt inspection to the transfer of equipment—was consistent with procedures.

The assessment team sampled equipment onsite and at the MHF. The team verified that preservation maintenance assessments were completed, and that preservation maintenance tasks were developed as deemed appropriate by the cognizant engineer. The assessment team also confirmed that maintenance work orders were developed by the planner with concurrence of the cognizant engineer.

To verify recommended preservation maintenance was incorporated into the preservation maintenance task, the assessment team reviewed vendor equipment manuals. The team solicited the expertise of the mechanical Safety Systems Oversight (SSO) engineer to identify any discrepancies in pump and motor maintenance philosophy for the listed equipment. The team also contacted vendors to determine grease lifespan and corrective actions. The HVAC SSO engineer found that maintenance on C2V-AHU-0001A was adequate, but felt that belt adjustments may not be necessary because the equipment is idle. Facility representatives commented that the preservation maintenance for the Building 87 air-handling unit may be too frequent. The team identified no issues. The CMMS records were complete and accurate, which will ensure accurate engineering evaluation of the maintenance performed.

The assessment team performed an in-depth review of the following Balance of Facilities centrifugal compressor maintenance. Vendor recommendations, implementing work orders, and completed activities were reviewed. Work orders were reviewed for complete documentation, legibility, inclusion of preventative maintenance requirements, and personnel qualifications. The work orders documented completion of preservation maintenance on the centrifugal PSA compressors accomplished for early 2013.

- **Monthly PSA Compressor Preservation Maintenance Requirements.** The periodic maintenance and surveillance task form that provides the technical basis for preservation maintenance was available. The basis included vendor-recommended long-term storage requirements according to 24590-CM-POA-MCCS-00001-10-00010. Long-term storage requirements included: (1) Oil sump fill with rust inhibiting oil; (2) oil heater to maintain oil temperature between 70 and 150 °F; (3) main drive motor space heater energized to prevent moisture damage to motor; (4) oil circulated 30 minutes per month with the auxiliary oil pump; and (5) while oil pump running, rotate compressor 25 revolutions by hand. The assessment team reviewed the vendor preventive maintenance agreements, and found them applicable to operations (daily and periodic inspections) and not applicable to preservation maintenance.

- **Work Order 24590-WTP-PWO-CMNT-12-1019 (December 2012).** In December 2012, BNI performed preservation maintenance on all four centrifugal compressors, with the exception of running the auxiliary oil pump and rotating the compressor shaft on PST-CMP-00001A. A delinquent periodic maintenance form had been prepared noting that construction had locked out temporary power to PSA compressor/motor 1A in order to disassemble water boxes, sandblast, repair coating, and reassemble. Therefore, maintenance personnel were not able to start auxiliary oil pump and rotate shaft. During the maintenance activity, BNI noted concerns with oil heaters maintaining temperature, slow and no oil through motor bearings, and pressure control valves set to 60 psi (to be reset to 100 psi at startup). The maintenance team notified the cognizant engineer and halted maintenance until receiving cognizant engineer direction. The cognizant engineer signed the delinquent maintenance form. The assessment team deemed these actions appropriate because (1) a portion of the equipment had been deenergized and could not be operated, and (2) this is a monthly item that would be repeated in the near term.
- **Work Order 24590-WTP-PWO-CMNT-13-0140 (February 2013).** BNI cancelled the work order for February 2013 as a result of ongoing construction activities (24590-WTP-PMDF-CMNT-13-0004). The assessment team deemed this appropriate because (1) the equipment had been deenergized and could not be operated, and (2) this is a monthly item that would be repeated in the near term and also would be part of the refurbishment before turnover to startup.
- **Work Order 24590-WTP-PWO-CMNT-13-0223 (March 2013).** BNI cancelled the work order for March 2013 as a result of equipment unavailability (24590-WTP-PMDF-CMNT-13-0009). The assessment team deemed this appropriate because (1) the equipment had been deenergized and could not be operated, and (2) this is a monthly item that would be repeated in the near term and also would be part of the refurbishment before turnover to startup.
- **Work Order 24590-WTP-PWO-CMNT-13-0295 (April 2013).** In April 2013, BNI performed preservation maintenance for the four centrifugal compressors, with the exception of running the auxiliary oil pump and rotating the compressor shaft for PSA-CMP-00001A. BNI had completed a delinquent periodic maintenance and surveillance disposition form, which explained why the maintenance was overdue. Issues with starting the auxiliary oil pump for compressor 1A and lack of control power for compressor 1B resulted in waiver of compressor/motor rotation for 1A and 1B in April. The cognizant engineer had signed the delinquent maintenance form. The assessment team deemed these actions appropriate because the equipment had been deenergized and could not be operated.

In general, the assessment team found work orders to be legible and complete, and the preservation maintenance team did a good job of documenting completed activities, including status of equipment and issues. BNI performed maintenance, when possible, on most aspects of the compressors. However, maintenance was not performed for at least 2 months, and the monthly running of auxiliary oil pumps and compressor shaft rotation was not performed for compressors 1A/B for several months.

BNI cognizant engineers had prepared and signed preservation maintenance waivers. This requirement should ensure (1) the cognizant system engineers are aware of work performed on equipment; and (2) when maintenance cannot be performed, the cognizant system engineers perform assessments of the impacts and adjust execution as necessary. This practice is acceptable for preservation maintenance of commercial equipment.

SUMMARY OF FINDINGS, OPPORTUNITIES FOR IMPROVEMENT, OR ASSESSMENT FOLLOWUP ITEMS

No findings, opportunities for improvement, or assessment followup items were identified during this assessment.

CONCLUSION

The assessment team concluded that BNI adhered to all requirements reviewed within the scope of this assessment. BNI has a thorough process to identify the maintenance to be performed on installed equipment and equipment in storage. This process consists of performance of preservation maintenance on large value pieces of equipment and planning for refurbishment on other equipment before bringing it into service. A 9-month schedule requirement has been defined for refurbishment. No issues or failure to meet requirements were found specific to the maintenance program. Continued thorough preservation maintenance activities will help ensure this government equipment is maintained effectively.

Work record summary sheets reviewed for preservation maintenance of centrifugal compressors were legible and contained pertinent data that included issues with oil heater operability that prevented the ability to turn compressor shaft. Appropriate steps were taken following discovery of inoperable auxiliary pump by not rotating shaft and deferring performance of preservation maintenance.

Deferral of maintenance beyond the monthly requirement is not a significant concern. Requirements should be updated to reflect an appropriate period of performance based on vendor recommendations or experience to date, or increased efforts should be accomplished to perform monthly maintenance on schedule.

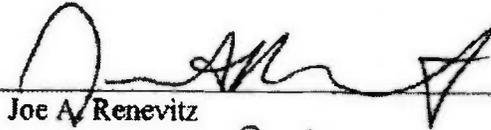
Due to the unusual nature of the duration of storage only one other comparison could be made. Watts Bar Unit 2 construction was 80% complete when halted in 1988. Despite having a robust ranking/rating system for component replacement methodology, the unpredictability of the equipment failure made it difficult to evaluate the implementation with any success. BNI has a thorough and methodical process in identifying the maintenance to be performed. No issues or failure to meet requirements were found in regards to the maintenance program. The maintenance process for WTP is mature and is effective in its implementation. Time will determine the effectiveness of the approach BNI has taken.

ATTACHMENTS

Attachment 1 – Lines of Inquiry

SIGNATURES

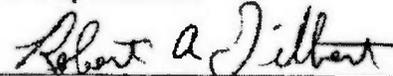
**Assessor or Lead
Assessor:**



Joe A. Renevitz

Date: 10/9/13

**Startup Program
Manager:**



Robert A. Gilbert

Date: 10/10/2013

ATTACHMENT 1 – LINES OF INQUIRY

Area of Review	LOI	Evaluation	Results (Effective/Partially Effective/Not Effective)
Does a program exist for performing maintenance on equipment procured for WTP, and is program adequate for current project schedule?	Does the program adequately distinguish between short-term preservation, long-term preservation, pre-startup, preventative, periodic, etc.? Adequately means does the written word allow workers to understand the difference and why there should be a difference? Does pre-startup maintenance allow the contractor to not perform preservation maintenance? Will the lack of preservation maintenance affect the longevity of the equipment not maintained, for cost benefit reasons?	The procedure clearly differentiates between these types of maintenance. Task forms take into account vendor information and identify either a 2-to-5-year or 5-to-10-year timeframe required for storage to make sure the proper maintenance will be performed. Example: 24590-WTP-PMTE-CMNT-11-0073. According to the interview with the maintenance manager, no, preservation maintenance continues to be conducted unless startup has an impact. Maintenance has a good relationship with startup and impacts are worked through maintenance and startup and have yet to be a significant concern. Examples are impacts from scaffolding used by startup impacting equipment access by maintenance. Yes, within 60 days the CSE is notified that the equipment is onsite and must develop a maintenance instruction in accordance with the procedure.	The program does distinguish between the various types of maintenance and is effective.
Equipment custody and tracking	Is a process in place to add procured equipment to the maintenance program for performing preservation or preventative maintenance being executed? Are notifications of location/status changes being performed? Are initial storage requirements identified by Engineering and communicated to Material Management? Are preventative maintenance (PM/PME) procedures developed for equipment turnover to startup and/or commissioning operations? Are initial storage requirements identified by Engineering and communicated to Material Management?	According to an interview with Maintenance Manager, this is an automated process that generates an email when the location of a piece of equipment is changed. According to an interview with the Maintenance Manager, engineering is informing the MHP on the storage class based on vendor recommendations or engineering evaluations. Preventative maintenance instructions are required to be developed prior to turnover to startup to ensure equipment operation for both startup testing and operations. According to an interview with Maintenance Manager, this is an automated process that generates an email sent to engineering when the piece of equipment is received. Engineering then will email back with initial storage requirements for the piece of equipment. From samples of equipment from walk downs, the team verified that the CSE is using the vendor input to generate preservation maintenance task forms. Example: 24590-WTP-FC-M-07-0110. Task forms are consistently linked to the equipment for which the task is being performed. Example: 24590-WTP-PWO-CMNT-12-1019. Team verified that the evaluation is performed with in 60days of notification according to interviews with the Maintenance Manager and Field Material Manager as well as automation of the notification process when the equipment arrives onsite.	Many items will not be maintained either because it isn't required or it is not cost effective. The 9-month refurbishment period will ensure equipment is ready for startup testing. This process is effective. This process is effective in identifying, developing, and executing maintenance for equipment received. This process is effective. This process is effective in identifying, developing, and executing maintenance for equipment received. This process is effective in identifying, developing, and executing maintenance for equipment received. This process is effective in identifying, developing, and executing storage requirements for equipment received.
Evaluation process	Is the PM /S Planner developing maintenance requirements with CSE and vendor input? Is the PM /S Task Form being generated or linked in CMMS? Is equipment being evaluated for preservation maintenance within 60days of AOM notification?	This CSE is using vendor information and documenting deviations as determined. This process is effective. This process is effective in tracking maintenance records for individual equipment. BNI is effective in performing this task in the time frame dictated by procedure.	This process is effective in performing walk downs and internal assessments of equipment maintenance results.

Area of Review	LOI	Evaluation	Results (Effective/Partially Effective/Not Effective)
Maintenance execution	Is maintenance performed in accordance with vendor requirements? If not, is approach appropriate? (Sample 5-10 items)	Vendor recommendations were followed and justification was provided for items where the approach by BNI deviated from the vendor. Example: 24590-CM-POA-MCCA-00001-16-00001, 24590-WTP-WTMF-CMNT-11-0073.	Team evaluated several items and verified that the approach was appropriate.
	Sample equipment in MHF for entry into CMMS.	Equipment did exist in CMMS for those sampled in the MHF and evaluations were performed. Example: UPE-UFS-10003.	This process is effective in capturing equipment in CMMS.
	Are requirements developed for preservation maintenance that take into account the duration of maintenance required? Evaluate engineering justification for changing vendor recommendation.	According to the Maintenance Manager, yes, the requirement is there. The maintenance team will perform an evaluation of equipment to determine what preservation maintenance needs to be performed to keep the equipment in working condition. Preservation maintenance task forms are prepared by the planner and completed by cognizant engineers to document required preservation maintenance. Task forms take into account vendor information and identify either a 2-to-5-year or 5-to-10-year timeframe required for storage to make sure the proper maintenance will be performed. There is also a 9-month refurbishment procedure that will allow 9 months before startup of the equipment to restore the equipment to working order. Preservation maintenance is not being performed on instrumentation. Instrumentation limited shelf life (a few years) will result in the need to procure new instrumentation when beyond shelf life. No discrepancies were identified in the engineering evaluations performed. They were consistent with needs of the plant.	This process is effective in identifying, developing, and executing maintenance for equipment received.
	Do startup and maintenance have an integrated plan? How to adapt in future?	Preservation maintenance is performed until startup accepts the equipment, at which time preventive maintenance is started.	Some maintenance was not performed due to construction activities that were ongoing. This is partially effective.
	Is maintenance being performed as scheduled?	Some items for the compressors were not performed as a result of conflict with construction. These activities were annotated and reviewed by the CSE. The team found no issues with the delay of this maintenance because it will be performed the following month. Example: CIV-ACU-00014, maintenance was performed on schedule. PSA-CMP-00001.	Some maintenance was not performed due to construction activities that were ongoing. This is partially effective.
Program review	Is there feedback into the system to re-sequencing purchases based on maintenance required when it arrives (i.e., is maintenance delayed for some components)?	According to the Maintenance Manager, yes because of the longevity of the project, we will run into problems with the equipment becoming obsolete by the time the plant is started as well as problems with shelf life of the equipment. This problem is on the mind of the maintenance team and is being considered when PM task forms are being developed and when walk downs are occurring.	Walk downs are being performed. Unclear on how the information is fed back into the PM system.
	Does enough budget exist as items are being turned over to startup and preservation maintenance will continue for longer than planned? What about the gap that exists?	According to the Maintenance Manager, there is enough budget to meet contractual maintenance requirements including refurbishment. For equipment past the contractual requirements is being prioritized and having further evaluations for having spares on the shelf for equipment that is not a part of the contractual requirements.	Effective
	How are external influences adopted into the maintenance plan/execution strategy?	Watus Bar's approach was evaluated and lessons learned incorporated.	Effective



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

AUG - 7 2013

13-WTP-0091

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 -- TRANSMITTAL OF THE SECOND QUARTER CALENDAR YEAR (CY) 2013 NUCLEAR SAFETY AND QUALITY CULTURE (NSQC) SUMMARY SURVEILLANCE REPORT S-13-WTP-RPPWTP-003, DOCUMENTING VERIFICATION OF COMPLETION OF BECHTEL NATIONAL, INC. (BNI) NSQC COMPREHENSIVE CORRECTIVE ACTION PLAN (CAP) ACTION ITEMS

This letter transmits the results of the U.S. Department of Energy (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) NSQC summary surveillance report of BNI actions completed before March 31, 2013. Attached is the subject summary report and copies, for your information, of each of the sub-tier surveillance reports used to generate the summary report. Although no findings were identified during these surveillances, one Opportunity for Improvement (OFI) item and one Assessment Follow-up Item (AFI) were identified.

ORP reviewed the BNI NSQC CAP Action Item list and verified most of the actions reviewed were found to be adequately completed. However, one action item (E-6) was considered incomplete. An OFI item was generated documenting that BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item. ORP requests a response to the OFI Item within 45 days of receipt of this letter identifying what, if any, actions will be taken to address the OFI Item.

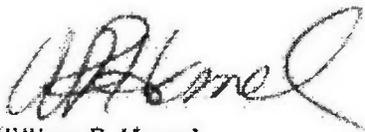
The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-WTP-0091

-2-

AUG - 7 2013

If you have any questions, please contact me, or you may contact ORP's NSQC point-of-contact, Jennifer Sands, Federal Project Director, Shared Services, at (509) 373-4300.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:JLS

Attachment

cc w/attach:
C. D. Taylor, WIND
BNI Correspondence

Attachment
13-WTP-0091

WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP)
NUCLEAR SAFETY AND QUALITY CULTURE (NSQC)
SECOND QUARTER CY 2013 SURVEILLANCE SUMMARY
REPORT S-13-WTP-RPPWTP-003

16 Pages (Including this Coversheet)

U.S. DEPARTMENT OF ENERGY
OFFICE OF RIVER PROTECTION (ORP)
WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP)
NUCLEAR SAFETY AND QUALITY CULTURE (NSQC) TEAM

SURVEILLANCE: Waste Treatment and Immobilization Plant (WTP) Nuclear Safety and
Quality Culture (NSQC) Second Quarter CY 2013

REPORT NO.: S-13-WTP-RPPWTP-003

INTEGRATED ASSESSMENT SCHEDULE (IAS) NUMBERS: (See Section VI of this report
for a listing of IAS numbers)

FACILITY: Bechtel National, Inc.; WTP

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: June 30, 2013

ASSESSORS: Jennifer Sands, Lead Assessor
Wahed Abdul
Garth Reed
Cindy Taylor*
Ken Wade

*Subcontractor to North Wind Group, LLC supporting ORP-WTP

APPROVED BY:



Jennifer L. Sands, NSQC Point of Contact

7/31/13
Date

ORP-WTP NSQC SECOND QUARTER CY 2013 SURVEILLANCE SUMMARY REPORT

I. INTRODUCTION

The Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) NSQC team conducted surveillances to verify completion of BNI NSQC Corrective Action Plan (CAP) Action Items completed by March 31, 2013. These surveillances were documented in sub-tier surveillance reports and maintained electronically. A total of 8 sub-tier surveillance reports were generated during the surveillance period and have been summarized in Sections II and III below. These sub-tier surveillance reports are attached to this surveillance summary report.

One Assessment Follow-up Item (AFI) and one Opportunity for Improvement (OFI) item were identified during this assessment period. The OFI was:

OFI Item S-13-WTP-RPPWTP-003-O01 – BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item. (Sub-tier S-13-WTP-RPPWTP-003-06)

Sections II and III provide additional discussions of oversight activities and summary of the OFI item.

Section IV of this report contains a listing of items opened, closed, and discussed during this period. There was one OFI item and one AFI opened. Four OFI items were closed during this reporting period.

Section V contains a summary listing of the nine sub-tier surveillance reports written during this reporting period.

Section VI contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this inspection period.

Section VII contains a table correlating findings and recommendations to BNI NSQC CAP Action Items and Applicable Sub-Tier Surveillances for Second Quarter CY 2013.

II. OVERSIGHT ACTIVITIES

Sub-Tier Surveillance Report Activity Conclusions

- ORP reviewed BNI's progress toward completion of BNI NSQC Corrective Action Plan (CAP) Action Item B-1, Develop a Set of Behavioral Values That Embody the Concepts of an NSQC. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-01)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item C-7, Establish a Set of Visible Metrics to Monitor Issue Resolution Timeliness for the Major Issue Resolution Processes. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-02)

- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item E-3, Annually Incorporate 1-3 NSQC Behavioral Goals and Agreed Upon Measures into All Employee Annual Reviews (ARs), Performance Management Plans (PMPs), or Development Plans (DPs). One AFI was identified; BNI provided documented objective evidence that some employee ARs, PMPs, or DPs incorporated 1-3 NSQC behavioral goals and agreed-upon measures, but did not provide documented objective evidence all employee ARs, PMPs, or DPs incorporated these goals and measures. An AFI was identified to specifically check this during the effectiveness assessment following closure of all BNI NSQC CAP action items (AFI S-13-WTP-RPPWTP-003-A02). ORP concluded this action item (E-3) was complete. (Sub-tier S-13-WTP-RPPWTP-003-03)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item E-4, Develop and Begin Delivery of a Leadership Development Curriculum Targeting WTP Managers and Supervisors. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-04)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item E-5, Institute a Graded Feedback Process for all Managers and Supervisors. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-05)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item E-6, Review and Update the New Hire Orientation. ORP concluded this action item was not complete, and one OFI item was identified; BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item (OFI item S-13-WTP-RPPWTP-003-O01). (Sub-tier S-13-WTP-RPPWTP-003-06)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item E-7, Develop and Deliver Safety Conscious Work Environment (SCWE) Awareness Training. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-07)
- ORP reviewed BNI's progress toward completion of BNI NSQC CAP Action Item F-2, Continue Delivery of an Enhanced Superintendent Leadership Workshop to New WTP Superintendents. ORP concluded this action item was complete. No findings, OFI items, or AFIs were identified. (Sub-tier S-13-WTP-RPPWTP-003-08)

III. SUMMARY OF FINDINGS, OPPORTUNITY FOR IMPROVEMENT (OFI) ITEMS, AND ASSESSMENT FOLLOW-UP ITEMS (AFIs)

No findings were identified during this surveillance; however, the following OFI item and AFI were identified:

- **OFI Item S-13-WTP-RPPWTP-003-O01** – BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item. [E-6]

Discussion:

The training viewgraphs stated the training commenced for new hires on January 7, 2013. However, none of the documentation mentioned required reading, which was part of the action item statement.

- **AFI S-13-WTP-RPPWTP-003-A01** - BNI provided documented objective evidence that some employee ARs, PMPs, or DPs incorporated 1-3 NSQC behavioral goals and agreed-upon measures, but did not provide documented objective evidence all employee ARs, PMPs, or DPs incorporated these goals and measures. Because the NSQC action item stated the behavioral goals would be incorporated into all ARs, PMPs, or DPs, this action item will be specifically verified during the NSQC CAP action item effectiveness assessment following closure of all action items in order to verify the required behavioral goals were actually being incorporated into all employees' ARs, PMPs, or DPs. [E-3]

IV. LIST OF SURVEILLANCE ITEMS OPENED AND CLOSED

Opened: The following items were opened:

DEFICIENCY NUMBER (PRIORITY LEVEL, IF APPLICABLE)	TYPE OF DEFICIENCY	DESCRIPTION OF DEFICIENCY
S-13-WTP-RPPWTP-003-001	OFI Item	BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item. [E-6]
S-13-WTP-RPPWTP-003-A01	AFI	BNI provided documented objective evidence that some employee ARs, PMPs, or DPs incorporated 1-3 NSQC behavioral goals and agreed-upon measures, but did not provide documented objective evidence all employee ARs, PMPs, or DPs incorporated these goals and measures. Because the NSQC action item stated the behavioral goals would be incorporated into all ARs, PMPs, or DPs, this action item will be specifically verified during the NSQC CAP action item effectiveness assessment following closure of all action items in order to verify the required behavioral goals were actually being incorporated into all employees' ARs, PMPs, or DPs. [E-3]

Closed: The following OFI items were closed:

DEFICIENCY NUMBER (PRIORITY LEVEL, IF APPLICABLE)	TYPE OF DEFICIENCY	DESCRIPTION OF DEFICIENCY
S-13-WTP-RPPWTP-001-001	OFI Item	BNI should consider modifying the BNI NSQC Communication Plan to address Recommendation 4-1 which was related to communication with stakeholders. (Sub-tier S-13-WTP-RPPWTP-001-04) [B-2]
S-13-WTP-RPPWTP-001-002	OFI Item	BNI should consider maintaining consistency of approach throughout the document. For example, if the strategic focus was on communications with "direct-line managers giving them resources to communicate NSQC tools to their immediate reports," the sections of the Communication Plan (e.g., Key Messages; Tactics, Tools, and Products; and Evaluation and Measurement) should clearly support that focus. (Sub-tier S-13-WTP-RPPWTP-001-04) [B-3]
S-13-WTP-RPPWTP-001-003	OFI Item	BNI should consider providing objective evidence to document benchmarking of causal analysis programs against other DOE sites and the nuclear industry. (Sub-tier S-13-WTP-RPPWTP-001-07) [C(iv)]
S-13-WTP-RPPWTP-001-004	OFI Item	BNI should consider demonstrating how the objective evidence provided meets the corrective action description in the CAP and how it supports completion of the Recommendations/Findings. (Sub-tier S-13-WTP-RPPWTP-001-08)

V. LIST OF SUB-TIER SURVEILLANCE REPORTS ISSUED DURING THE ASSESSMENT PERIOD

SURVEILLANCE REPORT NUMBER	SURVEILLANCE SUBJECT
S-13-WTP-RPPWTP-003-01	Develop a Set of Behavioral Values That Embody the Concepts of a NSQC [B-1]

SURVEILLANCE REPORT NUMBER	SURVEILLANCE SUBJECT
S-13-WTP-RPPWTP-003-02	Establish a Set Visible Metrics to Monitor Issue Resolution Timeliness for the Major Issue Resolution Processes [C-7]
S-13-WTP-RPPWTP-003-03	Annually Incorporate 1-3 NSQC Behavioral Goals and Agreed Upon Measures into All Employee Annual Reviews (ARs), Performance Management Plans (PMPs), or Development Plans (DPs) [E-3]
S-13-WTP-RPPWTP-003-04	Develop and Begin Delivery of a Leadership Development Curriculum Targeting WTP Managers and Supervisors [E-4]
S-13-WTP-RPPWTP-003-05	Institute a Graded Feedback Process for all Managers and Supervisors [E-5]
S-13-WTP-RPPWTP-003-06	Review and Update the New Hire Orientation [E-6]
S-13-WTP-RPPWTP-003-07	Develop and Deliver Safety Conscious Work Environment (SCWE) Awareness Training [E-7]
S-13-WTP-RPPWTP-003-08	Continue Delivery of an Enhanced Superintendent Leadership Workshop to New WTP Superintendents [F-2]

VI. INTEGRATED ASSESSMENT SCHEDULE NUMBER SUMMARY

IAS ID NUMBER	SUB-TIER SURVEILLANCE NUMBER	ASSESSOR	DESCRIPTION
N/A	S-13-WTP-RPPWTP-003	Jennifer Sands	NSQC Surveillance Summary Report
350	S-13-WTP-RPPWTP-003-01	Jennifer Sands	Verification of BNI NSQC CAP Action Item B-1
368	S-13-WTP-RPPWTP-003-02	Garth Reed	Verification of BNI NSQC CAP Action Item C-7
381	S-13-WTP-RPPWTP-003-03	Wahed Abdul	Verification of BNI NSQC CAP Action Item E-3
382	S-13-WTP-RPPWTP-003-04	Wahed Abdul	Verification of BNI NSQC CAP Action Item E-4
383	S-13-WTP-RPPWTP-003-05	Wahed Abdul	Verification of BNI NSQC CAP Action Item E-5
384	S-13-WTP-RPPWTP-003-06	Wahed Abdul	Verification of BNI NSQC CAP Action Item E-6

IAS ID NUMBER	SUB-TIER SURVEILLANCE NUMBER	ASSESSOR	DESCRIPTION
385	S-13-WTP-RPPWTP-003-07	Wahed Abdul	Verification of BNI NSQC CAP Action Item E-7
138	S-13-WTP-RPPWTP-003-08	Ken Wade	Verification of BNI NSQC CAP Action Item F-2

VII. TABLE CORRELATING FINDINGS AND RECOMMENDATIONS

The following is a table correlating findings and recommendations to BNI NSQC CAP Action Items and Applicable Sub-Tier Surveillances for Second Quarter CY 2013.

TABLE CORRELATING FINDINGS AND RECOMMENDATIONS TO BNI NSQC CAP ACTION ITEMS AND APPLICABLE SUB-TIER SURVEILLANCES – SECOND QUARTER CY 2013

HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012) (3 pages)

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillances
Part 1, Recommendation 1	WTP needs to establish a safety culture competence commensurate in priority to science, engineering, and project management competencies.	xi	Entire Plan	All
Part 1, Recommendation 2	The WTP project organizations (ORP, DOE-WTP, and BNI) need to evaluate and clearly delineate core values for moving forward. The development and definition of these values must be made with the engagement of individuals at all organizational levels across all functional groups to ensure alignment throughout the organization.	xii	B-1 E-1 Sec. V	S-13-WTP-RPPWTP-003-01
Part 1, Recommendation 3	ORP (including DOE WTP) and BNI each need to develop, implement, and continuously monitor their own safety culture, including SCWE, using the organizationally defined values as the foundation.	xiii	B-3 B-4 C-1 C-2 C-3 C-7 Sec. V	S-13-WTP-RPPWTP-003-02
Part 1, Recommendation 4	ORP and BNI need to develop accountability models for their organizations.	xiii	D-2 D-3 D-5	None this quarter.
Part 1, Recommendation 5	ORP and BNI can both benefit from employee engagement in many of the activities that they regularly conduct.	xiii	A-4 A-5 A-6 B-1 B-2 D-2 E-1 E-5	S-13-WTP-RPPWTP-003-01 S-13-WTP-RPPWTP-003-05

HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012) (3 pages)

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillances
Part 1, Recommendation 6	Working with ORP and DOE-WTP, BNI should enhance capabilities in behavioral sciences to assist BNI senior management in addressing problems involving organizational behaviors and interfaces.	xiii	E-2 E-4	S-13-WTP-RPPWTP-003-04
Part 1, Recommendation 7	ORP, DOE-WTP, and BNI should ensure that senior managers understand the need for and direct implementation of systematic approaches to change management in order to avoid or mitigate potential negative consequences resulting from significant changes in project plans, processes, and/or organization.	xiv	C-4 E-2	None this quarter.
Part 2, Recommendation 1	Evaluate and address factors that adversely impact the design and safety basis processes.	xv	A-1 thru A-7	None this quarter.
Part 2, Recommendation 2	Develop and implement a strategic approach to enhance management's and the professional staff's understanding of DOE expectations for the nuclear design and safety basis processes.	xv	A-1 thru A-7	None this quarter.
Part 2, Recommendation 8	Strengthen the implementation of the corrective action management program.	xvii	C-IP-1 thru vii C-2 C-6 C-7	S-13-WTP-RPPWTP-003-02
Part 2, Recommendation 9	Strengthen the implementation of the BNI employee concerns program.	xviii	C-3	None this quarter.
Part 2, Recommendation 10	Strengthen the BNI differing professional opinion program.	xviii	C-1	None this quarter.
Part 2, Recommendation 11	Strengthen the BNI management workplace visitation program.	xix	D-5 E-1 E-4 E-5 E-7	S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-07
Part 2, Recommendation 12	Evaluate and address selected aspects of safety management processes governing the work of construction craft workers.	xix	E-4 F-1 F-2	S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-08

HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012) (3 pages)

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillances
5 - Factors Affecting the Safety Culture	<p>Nuclear Design and Safety Basis Processes:</p> <ul style="list-style-type: none"> • Longstanding and Continuing Inconsistencies in Contractual Requirements • DOE and BNI Communications About the Applicability of DOE-STD-3009 • Inadequacies in the Current PDSA and Safety Basis Process • Insufficient Planning and Management Support for Developing the Safety Bases • Tension Between E&NS and Engineering 	<p>27-28</p> <p>28-30</p> <p>30</p> <p>30-31</p> <p>31-32</p>	A-1 thru A-7	None this quarter.
5 - Factors Affecting the Safety Culture	<p>Construction Activities:</p> <ul style="list-style-type: none"> • Potential for Schedule Pressure to Impact Safety and Quality • Performance Rating System • ORP Oversight of Worker Safety <p>BNI has not been fully effective in implementing its corrective action management process for documenting, evaluating, and resolving safety issues as required by:</p> <ul style="list-style-type: none"> • DOE Order 226.1B, <i>Implementation of Department of Energy Oversight Policy</i>, • BNI procedure WTP-GPP-MGT-043, <i>Corrective Action Management</i>, • the WTP Assurance Program Description CASP-MGT-06-0001, and • BNI QA Manual, WTP-QAM-QA-06 	<p>33</p> <p>33</p> <p>33-34</p>	E-4 F-1 F-2	S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-08
Supplemental Volume C.4, Finding 1	<ul style="list-style-type: none"> • BNI QA Manual, WTP-QAM-QA-06 	63	C-IP-1 thru C-9	S-13-WTP-RPPWTP-003-02

Independent Safety and Quality Culture Assessment (ISQCA) and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011) (3 pages)

Report ID	Description	Page Number	Plan C/A	Applicable Sub-Tier Surveillances
Finding 1	Evidence of pockets of a Chilled Atmosphere Adverse to Safety - Evidence of pockets where DOE and Contractor Management Suppress Technical Dissent	40	Entire Plan	All
Finding 2	Lack of Effective and Timely Disposition of Technical and Safety Issues	42	C-IP-1 thru C-9	S-13-WTP-RPPWTP-003-02
Finding 3	Safety Construct Implementation does not Support Project Schedule Supporting Statements	43	A-6	None this quarter.
Finding 4	Communications not Fully Supportive of Safety Culture	44	B-2	None this quarter.
Recommendation 1-1	Implement an improved nuclear safety culture that is strong, visible, reliable, and forward-looking across all the organizational structures of WTP, in a manner consistent with the mission and with safety being the dominant criterion intrinsic to the discharge of design, construction, and operation activities	41	Entire Plan	All
Recommendation 1-2	Implement a program to address and formally resolve, in a timely manner, isolated cases that could lead to a chilled environment adverse to safety.	41	C-3 E-1 E-4 E-5 E-7	S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-07
Recommendation 2-1	BNF should establish an effective, visible, and consistently implemented process for the timely disposition of safety and technical issues in a manner commensurate with the safety significance of the activity, including capturing, tracking, managing, providing suitable feedback, communicating, and establishing closure actions. This process should include conflict resolution.	43	C-IP-1 thru C-9	S-13-WTP-RPPWTP-003-02
Recommendation 2-2	BNF should implement a simple-to-follow corrective action program matching the above program for timely disposition of issues and the demands of the project, with periodic feedback mechanisms and accountability to a designated project executive.	43	C-2 C-6 C-7 E-3	S-13-WTP-RPPWTP-003-02 S-13-WTP-RPPWTP-003-03

Independent Safety and Quality Culture Assessment (ISQCA) and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011) (3 pages)

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillances
Recommendation 3-1	Nuclear safety must permeate all the project structures and enable project execution with sound cost and schedule goals. As a result, mission critical parameters will show continuous improvement and the project nuclear safety culture will be dominant and visible.	44	Entire Plan	All
Recommendation 3-2	A management directive regarding the dominance of the overall safety construct for this fast-track design build project is needed, including the associated impact on project execution and safety. The directive should be well communicated externally and internally, to promote the understanding of how safety design issues and safety oversight are being integrated into project execution.	44	B-1 and B-2	S-13-WTP-RPPWTP-003-01
Recommendation 3-3	The Department and BNI should implement specific project management oversight processes to fully align nuclear safety with project execution.	44	B-4 D-2 Sec. V	None this quarter.
Recommendation 3-5	The Department and BNI should implement SCWE training for all project participants.	44	E-7	S-13-WTP-RPPWTP-003-07
Recommendation 3-6	The Department and BNI should implement ECP enhancements to increase effectiveness of and confidence in these programs.	44	C-5	None this quarter.
Recommendation 4-1	The Department and BNI should improve communications with stakeholders and the public to establish better understanding of project issues, ongoing safety issues and their resolution, the status of safety culture, and its commitment to accomplish the mission within a well-articulated, overall safety construct.	44	B-2	None this quarter.
Recommendation 4-2	The Department and BNI should establish safety management and safety culture indoctrination and training at every level of the project such that a common language and common objectives are achieved.	44	B-1 E-1 thru E-7	S-13-WTP-RPPWTP-003-01 S-13-WTP-RPPWTP-003-03 S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-06 S-13-WTP-RPPWTP-003-07

Independent Safety and Quality Culture Assessment (ISQCA) and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011) (3 pages)

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillances
Recommendation 4-3	BNI should establish a communication program dedicated to identifying, tracking, and determining resolution of every issue in its corrective action program, thereby ensuring responsive and timely communication to issue originators during the process.	44	C-6	None this quarter.

**Defense Nuclear Facilities Safety Board Recommendation 2011-1,
Safety Culture at the Waste Treatment and Immobilization Plant
(January 2012) (1 page)**

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillance
Finding 1	A Chilled Atmosphere Adverse to Safety Exists	2	Entire Plan	All
Finding 2	DOE and Contractor Management Suppress Technical Dissent	4	C-1 C-2 C-3 E-1 E-2 E-5 E-7	S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-07

**Assessment of the 2011 Opinion Survey Results for Manual and Non-Manual Employees
(November 2011 - Prepared by Pillsbury) (1 page)**

Report ID	Description	Page Number	Plan CA	Applicable Sub-Tier Surveillance
Observation 1	Issues take too long to get resolved at WTP.	16	C-IP-1 thru C-9	S-13-WTP-RPPWTP-003-02
Observation 2	Cooperation among various departments on this project.	16	A-5 B-1 C-1 D-1 thru D-6 E-1 E-2 E-3	S-13-WTP-RPPWTP-003-01 S-13-WTP-RPPWTP-003-03
Observation 3	Employees are treated fairly and consistently on this project.	3	E-1 thru E-7	S-13-WTP-RPPWTP-003-03 S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-06 S-13-WTP-RPPWTP-003-07
Observation 4	I am confident "zero tolerance" policy against retaliation is enforced.	3	C-3 E-1 thru E-7	S-13-WTP-RPPWTP-003-03 S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-06 S-13-WTP-RPPWTP-003-07
Observation 5	I believe there is trust and respect on this project.	3	B-1 E-1 thru E-7	S-13-WTP-RPPWTP-003-01 S-13-WTP-RPPWTP-003-03 S-13-WTP-RPPWTP-003-04 S-13-WTP-RPPWTP-003-05 S-13-WTP-RPPWTP-003-06 S-13-WTP-RPPWTP-003-07

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-01

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 353

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item B-1, Develop a Set of Behavioral Values That Embody the Concepts of an NSQC

Dates of Surveillance: June 30, 2013

Surveillance Lead: Jennifer Sands

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item B-1. This action item is:

"Develop a set of behavioral values specific to the WTP project that embody the concepts of a NSQC utilizing significant employee engagement with senior management leadership in the communication and explanation of the developed values."

NSQC Oversight Manager:

Jennifer L. Sands

Jennifer L. Sands

7/11/13

Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-02

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 362

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item C-7, Establish a Set of Visible Metrics to Monitor Issue Resolution Timeliness for the Major Issue Resolution Processes

Dates of Surveillance: June 30, 2013

Surveillance Lead: Garth Reed

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume;
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011); and
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item C-7. This action item is:

“Establish a set of visible metrics to be used by senior project leadership to monitor issue resolution timeliness for the major issue resolution process.”

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- October 24, 2012, Performance Improvement Review Board (PIRB) Meeting Minutes, including handouts from the meeting
- February 27, 2012, Performance Improvement Review Board (PIRB) Meeting Minutes, including handouts from the meeting
- Corrective Action Program Performance Summary – December 2012
- Corrective Action Program Performance Summary – April 2013
- Corrective Action Program Performance Summary – May 2013
- Corrective Action Program Performance Summary – June 2013

Discussion of Areas or Activities Reviewed:

As stated in the scope section of this surveillance report and quoted from the Comprehensive Corrective Action Plan section for Action Item C-7, BNI listed the following corrective action to establish cycle time metrics for issue resolution:

“Establish a set of visible metrics to be used by senior project leadership to monitor issue resolution timeliness for the major issue resolution process.”

As objective evidence for completion of this action, BNI provided Performance Improvement Review Board Meeting Minutes from October 24, 2012, and February 27, 2013, as well as the Corrective Action Program Performance Summary (metrics) from December 2012, April 2013, May 2013, and June 2013. BNI established metrics and the following items which are tracked on a monthly basis:

- Self-Identification Rate
- PIER Submission Rates
- Cause Codes by Cause Element
- Root Cause Analysis Cycle Time
- Overdue PIERS
- Quality of Cause Analysis
- PIER Cycle Time, Age and Extensions.

ORP reviewed and discussed the metrics with BNI.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

No findings, OFIs, or AFIs were identified during this surveillance.

Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item C-7 was complete based on a review of the objective evidence provided.

Assessor or Lead Assessor:

Assessor's Division Director:

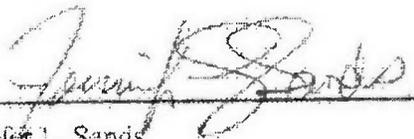


Garth R. Reed Date
6/24/13



Delmar L. Noyes Date
Deputy Federal Project Director
Waste Treatment and Immobilization Plant
7/18/13

NSQC Oversight Manager:



Jennifer L. Sands Date
7/16/13

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-03

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 381

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item E-3, Annually Incorporate 1-3 NSQC Behavioral Goals and Agreed Upon Measures into All Employee Annual Reviews (ARs), Performance Management Plans (PMPs), or Development Plans (DPs)

Dates of Surveillance: June 30, 2013

Surveillance Lead: Wahed Abdul

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item E-3. This action item is:

“Annually incorporate 1-3 NSQC behavioral goals and agreed-upon measures into all employee annual reviews (ARs), performance management plans (PMPs), or development plans (DPs).”

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- Memo, Mary Mills to Distribution, "PMP Status and Revised NSQC Goal," dated March 7, 2012, Flowdown of NSQC Goals to BNI Senior Management Personnel, including Appendix D, "Expectations Related to NSQC Focus Areas," to 24590-WTP-PL-MGT-10-0001, Revision 0
- Memo Cami Krumm to Patricia Freeman, Forwarding memo to WTP-URS, "NSQC Flowdown," dated May 7, 2012, Flowdown of NSQC Goals to URS Personnel, including Appendix D, "Expectations Related to NSQC Focus Areas," to 24590-WTP-PL-MGT-10-0001, Revision 0, and a format for a Personal Commitment Plan for Safety, Quality, Ethics, and NSQC
- Memo WTP HR to WTP HR, "NSQC Goal Flowdown for Annual Reviews," dated May 8, 2012, Flowdown of NSQC Goals to BNI Personnel, including Appendix D, "Expectations Related to NSQC Focus Areas," to 24590-WTP-PL-MGT-10-0001, Revision 0, and a format for a Personal Commitment Plan for Safety, Quality, Ethics, and NSQC
- Memo, Mary Mills to Distribution, "2013 PMP/AR Goal Cascade," dated January 31, 2013, Flowdown of NSQC Goals to BNI Senior Management Personnel
- Memo, Mary Mills to Distribution, "Goal Setting for 2013 PMPs Must Be Completed by COB Friday, February 14th," dated February 11, 2013, Notification to BNI Senior Management Personnel of 2013 Goals
- Memo, Shawn Oisen to Upward Feedback Participants, "Upward Feedback and Annual Review Development Goals," dated February 11, 2013
- Memo, WTP HR to WTP HR, "Time to Set Your Goals in TalentWorks," dated February 12, 2013
- Memo, Mary Mills to Denise Weiss for Cami Krumm, "NSQC Behavior Goals," dated March 12, 2013
- Email, Mary Mills to Wahed Abdul, June 19, 2013, NSQC Management & Supervisory Behaviors
- Email, Mary Mills to Jennifer Sands, June 24, 2013, 1st of 2 -- NSQC Management & Supervisory Behaviors.

In addition to reviewing the documents and records listed above, the surveillance team interviewed four BNI/URS supervisors.

Discussion of Areas or Activities Reviewed:

The surveillance team reviewed the documents listed above which contained expectations and goals for implementing the action item of annually incorporating 1-3 NSQC behavioral goals into the ARs, PMPs, or DPs. In addition, the surveillance team interviewed four BNI/URS supervisors. Each of the BNI/URS supervisors had incorporated NSQC behavior goals within their ARs, PMPs, or DPs.

BNI provided documented objective evidence that some employee ARs, PMPs, or DPs incorporated 1-3 NSQC behavioral goals and agreed-upon measures, but did not provide documented objective evidence all employee ARs, PMPs, or DPs incorporated these goals and measures. Because the NSQC action item stated the behavioral goals would be incorporated into all ARs, PMPs, or DPs, this action item will be specifically verified during the NSQC CAP action item effectiveness assessment following closure of all action items in order to verify the required behavioral goals were actually being incorporated into all employees' ARs, PMPs, or DPs.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

ORP documented the following AFI for BNI NSQC CAP Action Item E-3:

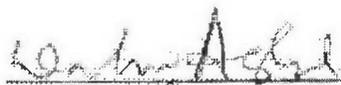
- ✓ **AFI S-13-WTP-RPPWTP-003-A01:** BNI provided documented objective evidence that some employee ARs, PMPs, or DPs incorporated 1-3 NSQC behavioral goals and agreed-upon measures, but did not provide documented objective evidence all employee ARs, PMPs, or DPs incorporated these goals and measures. Because the NSQC action item stated the behavioral goals would be incorporated into all ARs, PMPs, or DPs, this action item will be considered closed at this time, but will specifically be verified during the NSQC CAP action item effectiveness assessment following closure of all BNI NSQC CAP action items.

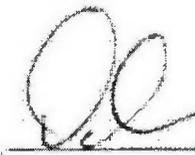
Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item E-3 was complete based on the documented objective evidence provided. AFI Item S-13-WTP-RPPWTP-003-A01 was written to verify during the effectiveness assessment following completion of all BNI NSQC CAP action items.

Assessor or Lead Assessor:

Assessor's Division Director:


Wahed Abdul
Date 7/31/13


Delmar L. Noyes
Deputy Federal Project Director
Waste Treatment and Immobilization Plant
Date 7/31/13

NSQC Oversight Manager:

Edward J. Peters FOR JENNIFER SANDS 7/16/2013
Jennifer L. Sands Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-04

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 382

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item E-4, Develop and Begin Delivery of a Leadership Development Curriculum Targeting WTP Managers and Supervisors

Dates of Surveillance: June 30, 2013

Surveillance Lead: Wahed Abdul

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item E-4. This action item is:

“Develop and begin delivery of a leadership development curriculum that is targeted at all managers and supervisors on the WTP project which is focused on improving the leadership skills needed to foster a strong NSQC as well as improving organizational performance.”

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- Human Resources (HR) Training Schedule 2013 showing at least one Forthright Conversations Course scheduled per month through December 2013
- Course Completion Record form for "Forthright Conversations" course held February 27, 2013, at PONA – 24 attendees
- Course Completion Record form for "Forthright Conversations" course held February 28, 2013, at PONA – 21 attendees
- Course Completion Record form for "Forthright Conversations" course held February 28, 2013, at T01.137 A/B – 24 attendees
- Forthright Conversations Course Evaluations for February 27 and 28, 2013
- Forthright Conversations Course, including Training Component Description, February 26, 2013.

In addition to reviewing the above documents and records, the surveillance team interviewed four BNI/URS supervisors.

Discussion of Areas or Activities Reviewed:

The surveillance team reviewed the documents described above and determined this action item is complete. The surveillance team reviewed the BNI Leadership Academy program for supervisory training, and found it is focused toward improving behaviors. The program had been enhanced to improve supervisor behavior, and identified modules for workshops on Courageous Conversation/Forthright Conversations (new); Employee Engagement: Supervisory Essentials (new); and Supervisory Development. The requirement was for all supervisors to complete this training within two years. The interviews conducted by the surveillance team with four BNI/URS supervisors indicated three of the four supervisors had completed the Forthright Conversations training as part of the leadership development training.

The HR training schedule shows at least one Forthright Conversations course is scheduled per month throughout calendar year 2013. The three Course Completion Record forms provided for courses held February 27-28, 2013, showed a total of 69 individuals had been trained. The Course Evaluation forms showed the individuals who attended the course held it in high regard. In addition, the surveillance team reviewed the content of the Forthright Conversations Course and determined it focused on the leadership skills required to foster a strong NSQC, as well as improving organizational performance.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

No findings, OFI Items, or AFIs were identified during this surveillance.

Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item E-4 was complete. This action item will be included in the effectiveness assessment to be conducted following the completion of all BNI NSQC CAP action items.

Assessor or Lead Assessor:

Assessor's Division Director:

Wahed Abdul 7/15/13
Wahed Abdul Date

[Signature] 7/16/13
Delmar L. Noyes Date
Federal Project Director
Waste Treatment and Immobilization Plant

NSQC Oversight Manager:

[Signature] FOR JENNIFER SANDS 7/16/2013
Jennifer L. Sands Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-05

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 383

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item E-5, Institute a Graded Feedback Process for All Managers and Supervisors on their Behaviors

Dates of Surveillance: June 30, 2013

Surveillance Lead: Wahed Abdul

Team Member: Cindy Taylor, Subcontractor -- North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item E-5. This action item is:

"Institute a graded feedback process for all managers and supervisors on their behaviors to be conducted at least once annually which is reviewed with their supervisor and used to pinpoint behavioral improvements to be incorporated into their performance plan."

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- Memo, Mary Mills to NSQC eRoom File, "E-5 Closure Information," dated March 6, 2013
- E-Mail from Shawn Olsen to Large Distribution, "Upward Feedback and Annual Review Development Goals," dated February 11, 2013
- Employee Engagement Upward Feedback Overview Screenshot
- Employee Engagement Website Screenshot
- January 2013 Employee Engagement Program Metric
- May 2013 Employee Engagement Program Metric.

In addition to reviewing the above documents and records, the surveillance team interviewed four BNI/URS supervisors and received additional information from the BNI Change Agent for Section E, Managerial and Supervisory Behaviors, of the BNI NSQC Comprehensive Corrective Action Plan.

Discussion of Areas or Activities Reviewed:

The surveillance team reviewed the documents described above which provided information on BNI's Employee Engagement Process Upward Feedback Sessions, and provide documentation committing BNI and URS to participate in this process. The surveillance team performed interviews with four BNI/URS supervisors to understand the rigor of the feedback process.

The feedback process is institutionalized in that it happens automatically. BNI managers are automatically notified through the Bechtel University training profile tracking system, which tracks due dates and completions for the Upward Feedback Sessions. Upward Feedback Sessions are due annually for all managers and supervisors who have taken the Employee Engagement Workshop. The Bechtel University training profile tracking system indicates when the Upward Feedback Session is due, and assigns a new due date 12 months after the last one was completed. The graded approach occurs when a BNI manager has completed the more stringent 360, their Upward Feedback Session is deferred for a year or so following the 360.

The interviews demonstrated there had been rigorous implementation ongoing. All of the interviewed supervisors had gone through formal feedback evaluation by their direct reports with the participation of Human Resources personnel. They are required to develop a plan for improvements on a number of key concerns. In addition, the WTP Project Manager rolled out "To"/"From" for the supervisors to include a few of the behavioral attributes as goals in their performance plan.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

No findings, OFI items, or AFIs were identified during this surveillance.

Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item E-5 was complete based on the documented objective evidence provided and the interviews conducted.

Assessor or Lead Assessor:

Assessor's Division Director:

Wahed Abdul 7/15/13

Wahed Abdul

Date

[Signature]

Deimar L. Noyes

Federal Project Director

Waste Treatment and Immobilization Plant

7/16/13

Date

NSQC Oversight Manager:

[Signature] FOR JENNIFER SANDS 7/16/2013

Jennifer L. Sands

Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-06

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 384

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item E-6, Review and Update New Hire Orientation (Presentations and Required Reading)

Dates of Surveillance: June 30, 2013

Surveillance Lead: Wahed Abdul

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item E-6. This action item is:

"New hire orientation (presentations and required reading) will be reviewed and updated to align with the NSQC improvement effort."

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- WTP On-Boarding Week One Checklist Screenshot
- WTP On-Boarding Website Screenshot
- Project Orientation Training for Manuals and Non-manuals, Component Description (24590-WTP-CRM-TRA-000004), Revision 17; including signed Training Material Approval form
- Project Orientation Training for Manuals and Non-manuals, with Talking Points.

Discussion of Areas or Activities Reviewed:

The surveillance team reviewed the documents described above and determined BNI reviewed and updated their WTP Project Orientation training, and it aligned with the NSQC improvement effort. Review of the training viewgraphs for the previous and current versions of training shows the current version enhanced the training with elements of Safety and Quality Culture. The training highlights various avenues an employee may utilize to raise concerns regarding Safety and Quality. The training viewgraphs stated the training commenced for new hires on January 7, 2013. However, none of the documentation mentioned required reading, which was part of the action item statement. OFI Item S-13-WTP-RPPWTP-003-002 was written to document this incomplete action item.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

ORP documented the following OFI Item for BNI NSQC CAP Action Item E-6:

- ✓ **OFI Item S-13-WTP-RPPWTP-003-001:** BNI did not specify required reading to address new hires in the documentation provided to demonstrate completion of this action item.

Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item E-6 was incomplete based on the documented objective evidence provided. OFI Item S-13-WTP-RPPWTP-003-001 was written to document this incomplete action item.

Assessor or Lead Assessor:

Wahed Abdul 7/31/13

Wahed Abdul

Date

Assessor's Division Director:

Delmar L. Noyes 7/31/13

Delmar L. Noyes

Date

Federal Project Director

Waste Treatment and Immobilization Plant

NSQC Oversight Manager:

Edward H. Masters FOR JENNIFER SANDS 7/16/2013
Jennifer L. Sands Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-07

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 385

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item E-7, Develop and Deliver Safety Conscious Work Environment (SCWE) Awareness Training

Dates of Surveillance: June 30, 2013

Surveillance Lead: Wahed Abdul

Team Member: Cindy Taylor, Subcontractor – North Wind Services, LLC; General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume;
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011); and
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item E-7. This action item is:

“Develop and deliver SCWE awareness training for all employees as part of their initial and continuous training programs.”

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- PowerPoint Presentation, "Actions to Promote a Safety Conscious Work Environment," 2012 – for in-town personnel
- PowerPoint Presentation, "Actions to Promote a Safety Conscious Work Environment," 2012 – for construction site personnel
- Graph and Table, "Percentage of Completion – SCWE Training at the WTP Project."

Discussion of Areas or Activities Reviewed:

The surveillance team reviewed the documents listed above and determined BNI had developed SCWE awareness training for in-town and construction site personnel. The training was enhanced with a new section, "What Should I do?" to focus discussion regarding what should the employees do if they have safety concerns. The graph and table provided showed the SCWE awareness training had been provided to 100% of manual and non-manual personnel between the dates of August 19 and December 18, 2012.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

No findings, OFI Items, or AFIs were identified during this surveillance.

Conclusion:

The surveillance team concluded BNI NSQC CAP Action Item E-7 was complete. This action item will be included in the effectiveness assessment to be conducted following the completion of all BNI NSQC CAP action items.

Assessor or Lead Assessor:

Wahed Abdul 7/31/13

Wahed Abdul

Date

Assessor's Division Director:

Delmar L. Noyes 7/31/13

Delmar L. Noyes

Date

Federal Project Director

Waste Treatment and Immobilization Plant

NSQC Oversight Manager:

Jennifer L. Sands

Jennifer L. Sands

7/31/13

Date

Sub-Tier Surveillance Report

Sub-Tier Surveillance Report Number: S-13-WTP-RPPWTP-003-08

Division Performing the Surveillance: Office of River Protection (ORP) Nuclear Safety and Quality Culture (NSQC) Review Team

Integrated Assessment Schedule Number: 137

Title of Surveillance: Verification of BNI NSQC Corrective Action Plan (CAP) Action Item F-2, Continue Delivery of an Enhanced Superintendent Leadership Workshop to New WTP Superintendents

Dates of Surveillance: June 30, 2013

Surveillance Lead: Ken Wade, Director, WTP Construction and Oversight Assurance Division

Team Members: Fred Hidden, WCD; and Cindy Taylor, Subcontractor – North Wind Services, LLC, General Support Services Contractor to ORP

Background:

The following three oversight assessments produced findings and recommendations contributing to the BNI NSQC CAP:

- HSS Independent Oversight Assessment of Nuclear Safety Culture and Management of Nuclear Safety Concerns at the Hanford Site Waste Treatment and Immobilization Plant (January 2012), including Supplemental Volume
- Independent Safety and Quality Assessment Team Assessment and Recommendations for Improving the Safety and Quality Culture at the Hanford Waste Treatment and Immobilization Plant (November 2011)
- Defense Nuclear Facilities Safety Board Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (January 2012).

In response to the findings and recommendations from these reports, BNI developed an NSQC CAP describing each of BNI's proposed actions to address the findings and recommendations. Each BNI NSQC CAP action item may address multiple findings or recommendations from multiple reports. ORP has reviewed and approved the BNI NSQC CAP.

Scope:

This Department of Energy, ORP surveillance was conducted to monitor, status, and assess BNI's efforts to strengthen NSQC performance with regard to BNI NSQC CAP Action Item F-2. This action item is:

“Continue delivery of an enhanced Superintendent Leadership workshop to new WTP superintendents which addresses the issues raised in the craft feedback surveys as well as their assessed developmental needs.”

Requirements Reviewed:

The surveillance team reviewed the BNI NSQC CAP action item statement and the objective evidence of completion to verify the action item was complete.

Records/Design/Installation Documents Reviewed:

The surveillance team reviewed the following documents:

- Course Completion Record form for February 28, 2013, Forthright Conversations Course
- Course Completion Record form for March 21, 2013, Forthright Conversations Course
- Course Completion Record form for April 10, 2013, Forthright Conversations Course
- Course Completion Record form for April 24, 2013, Forthright Conversations Course
- Course Completion Record form for May 1, 2013, Forthright Conversations Course
- Course Completion Record form for May 15, 2013, Forthright Conversations Course
- Training Component Description for Course Number 24590-WTP-CRM-TRA-080102, Revision 0, Forthright Conversations, Component ID #CRM-16314, including the viewgraphs for the course content
- WTP Contractor Assurance Information System (CAIS), Action Tracking System (ATS) electronic record 24590-WTP-ATS-MGT-12-0653, Construction Supervision Leadership Workshop.

Discussion of Areas or Activities Reviewed:

The 2012 HSS report identified that craft had a perceived lack of trust and/or respect at the superintendent level of management. Based upon interviews and survey responses, HSS concluded that individuals do not always get the reasons behind events communicated to them but rather just a simplified explanation. The report provided examples that craft questioned the flow down of information and indicated communications could be improved.

BNI senior construction management evaluated the craft feedback and specific examples provided in the reports and realized a majority of the comments represented communication misunderstandings and/or unplanned-for intentions or meanings. To address these misconceptions, BNI initiated the delivery of an enhanced Superintendent Leadership workshop titled, "Forthright Conversations," as part of the WTP Leadership training series. The Forthright Conversations course is a new interpersonal communications model developed by Bechtel Systems and Infrastructure, Inc. (BSII) which is being provided to Bechtel projects worldwide. Within this workshop, the term "Forthright" was defined as "direct and outspoken; straightforward and honest." "Forthright Conversations" can be challenging, but are determined to be the right thing to do, even if it may be easier to avoid them." Recognizing BNI supervisors would benefit from communication tools to help initiate and guide difficult/meaningful conversations, and interpersonal relationships improve as communications improve, BNI decided to provide the Forthright Conversations course to all non-manual supervisory positions, foremen and up, and not just the superintendents.

The surveillance team attended the April 24, 2013, Forthright Conversations class. The classes are scheduled from 7:30 a.m. until 4:30 p.m. with two short breaks and a 30-minute break for lunch. The class materials were well-organized and offered interesting examples, exercises, and instructor-led discussions. The surveillance team observed strong class participation and attention. The class indirectly incorporated discussions and examples related to the three Safety Culture Focus Areas (Leadership, Employee/Worker Engagement, and Organizational Learning), and taught how improved communications enhance the focus areas and their associated attributes. The surveillance team concluded the Forthright Conversations training was consistent with and satisfied the intent of corrective action plan commitment for BNI NSQC CAP Action Item F-2.

The surveillance team reviewed the available Course Completion Records. The inaugural class was provided on February 28, 2013. Additional courses were provided on March 21st, April 10th, April 24th, May 1st, and May 15th. A total of 134 students have completed the course. Each of the classes were attended by a selected mix of supervisors and craft/engineering disciplines to help enhance inter-class discussions, and to encourage candid feedback and questions by preventing students from attending the class with their immediate supervisors.

Summary of Findings, Opportunity for Improvement (OFI) Items, or Assessment Follow-Up Items (AFIs):

No findings, OFI Items, or AFIs were identified during this surveillance.

Conclusion:

Based upon discussions with BNI construction management, attendance at a BNI-provided Forthright Conversations class, review of the class materials, and confirmation of past class offerings and student mix, the surveillance team concluded BNI NSQC CAP Action Item F-2 was completed satisfactorily. This action item will be included in the effectiveness assessment to be conducted following the completion of all BNI CAP action items.

Assessor or Lead Assessor:

Assessor's Division Director:

Fred Hidden 6/24/13
Date

Ken G. Wade 6/24/13
Date
Ken G. Wade
Director, WTP Construction and Oversight
Assurance Division

NSQC Oversight Manager:

Jennifer L. Sands 7/16/13
Date



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUN 17 2013

13-WTP-0117

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY, WASTE TREATMENT AND IMMOBILIZATION PLANT (DOE-WTP) SURVEILLANCE REPORT S-13-WSC-RPPWTP-013, CLOSURE OF S-12-WSC-RPPWTP-002 FINDINGS F02 AND F03

This letter transmits Report S-13-WSC-RPPWTP-013, Closure of S-12-WSC-RPPWTP-002 Findings F02 and F03. The purpose of the surveillance was to verify completion of corrective actions addressing two findings issued last year in the cited report. The surveillance team verified that the actions were completed and identified no new findings or observations.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or your staff may contact Ben J. Harp, Manager, WTP Start-Up and Commissioning Integration at (509) 376-1462.

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:PL

cc: BNI Correspondence

Attachment
13-WTP-0117

TRANSMITTAL OF THE U.S. DEPARTMENT OF ENERGY, WASTE
TREATMENT AND IMMOBILIZATION PLANT (DOE-WTP)
SURVEILLANCE REPORT S-13-WSC-RPPWTP-013, CLOSURE OF S-12-
WSC-RPPWTP-002 FINDINGS F02 AND F03

(7 pages)

Surveillance Report Number: S-13-WSC-RPPWTP-013

Division Performing the Surveillance: Office of River Protection, WTP Startup and
Commissioning Integration

Integrated Assessment Schedule Number: 481

Title of Surveillance: Closure of Findings S-12-WSC-RPPWTP-002-F02 and -F03

Date Surveillance Conducted: May 20-22, 2013

Surveillance Team: Pamela Logan, General Engineer, WSC

Summary of Surveillance Activities:

The surveillance was conducted by means of an interview and a review of closure documents.

Documentation Reviewed for Surveillance:

1. CCN-247888, *BNI Response to Surveillance Report S-12-WSC-RPPWTP-002, Plant Operations Management System (POMS) Project Software Risk Assessment*, July 24, 2012
2. 24590-WTP-PL-OP-13-0001, Rev. 0, *Commissioning Information System Strategic Plan*, March 22, 2013
3. 24590-WTP-GPP-SQP-310, *Commissioning Information System Acquisition*, DRAFT
4. 24590-WTP-PIER-MGT-12-0757-B, Rev. 0, *Inadequate Hazards Analysis Produced for Plant Operations Management Software (POMS)*, closed on March 25, 2013
5. 24590-WTP-PIER-MGT-12-0758-B, Rev. 0, *Lack of Design and Requirements Documents for Plant Operations Management Software (POMS)*, closed on March 25, 2013
6. 24590-WTP-ACEF-OP-12-0002, *Apparent Cause Evaluation*, July 25, 2012
7. 24590-WTP-3DP-G06B-00001, *Material Requisition*, August 15, 2012
8. CCN-254161, *BNI Completion Date Modification for Finding 01 of Surveillance Report S-12-WSC-RPPWTP-002, Plant Operations Management System (POMS) Project Software Risk Assessment*, March 19, 2013
9. 24590-WTP-GPG-MGT-0023, Rev. 1A, *WTP Commissioning Phase Program Development*, March 26, 2013

Acronyms:

BNI Bechtel National, Inc.

CA Corrective Action

CAP Corrective Action Plan

EPCC Engineering, Procurement, Construction, and Commissioning

IHLW Immobilized High-Level Waste

ORP Office of River Protection

PIER Project Issues Evaluation Report

POMS Plant Operations Management System
PSRA Project Software Risk Assessment
QAM Quality Assurance Manual
SC Safety Class
SS Safety Significant
SSC Structure, System, and/or Component

Findings Identified in Surveillance S-12-WSC-RPPWTP-002:

Finding S-12-WSC-RPPWTP-002-F02: (Priority Level 2): BNI did not perform a hazards analysis to determine the potential effects of a POMS outage on SS and SC SSCs. BNI's rating of the consequences of a network outage as "medium" or "minor" was not supported.

Requirements:

The BNI contract (conformed through modification 269), Section C, Standard 7, part (d), required BNI to "develop and implement an integrated standards-based safety management program to ensure that radiological, nuclear, and process safety requirements are defined, implemented, and maintained" (page C-76).

Pursuant to the above, 24590-WTP-GPP-SQP-100, Rev. 00A, Acquisition and Management of Levels A, B, C, and D Software for EPCC, Section 5.3.1 stated the "Project Program Sponsor ensures that functional requirements for acquired software designated Level A, B, C, or D are identified and documented to facilitate evaluation and testing [and] ensures all software requirements related to a safety function are flagged as safety-implementing requirements."

The QAM, Section E.3.2.2.2.1, stated "Software grading shall determine the extent of application of the software engineering activities commensurate with the risk associated with the failure of the Software."

In addition, the QAM, Section E3.2.2.2.4.2 stated, "The appropriate quality practices, standards and conventions shall be applied to safety software to ensure the software performs its intended function and to mitigate the risk of failure of safety systems to acceptable and manageable levels."

Discussion:

Contrary to the above, BNI did not perform a hazards analysis to determine the potential effects of a POMS outage on SS and SC SSCs. BNI's rating of the consequences of a network outage as "medium" or "minor" was not supported. BNI failed to flag the need for a robust, practical strategy for mitigating the risk of POMS failure.

S-12-WSC-RPPWTP-002-F03 (Priority Level 2): No objective evidence could be found demonstrating planning, alternatives analysis, or development of a basis of design to underpin the POMS project.

Requirements:

Supplementing the above-cited contract requirement to ensure that radiological, nuclear, and process safety requirements are defined, implemented, and maintained, the following additional requirements apply:

- Section 4.1.2.1.1 of the QAM states, "Applicable design bases and other requirements necessary to assure adequate quality shall be included or referenced in documents for procurement of items and services."
- Federal Acquisition Regulations, section 10.001 (a) state, "Agencies must ensure that legitimate needs are identified and trade-offs evaluated to acquire items that meet those needs."

Discussion:

Contrary to the above, the surveillance team could not find any objective evidence demonstrating a disciplined planning process for meeting plant administrative software needs. No design basis was cited in POMS project documents, no statement of need was included in 24590-WTP-SWLCD-COPS-1 1-0002-01, Rev. 0, *Plant Operations Management System (POMS) Software, Life Cycle Documentation Volume 1:- Software Project Plan*, or other project documents, and the life cycle documentation did not have a discussion of alternatives.

Discussion of Area(s) Reviewed:

The approved Corrective Actions for the findings in surveillance report S-12-WSC-RPPWTP-002 were as follows:

Finding Number	BNI PIER (Project Issues Evaluation Report)	BNI Commitment	BNI evidence of completion
01	24590-WTP-PIER-MGT-12-0756-B	(Several actions to be addressed in subsequent closure surveillance. See Reference 8 above.)	
02	24590-WTP-PIER-MGT-12-0757-B	Produce a work planning document(s) for Plant Administrative Software that includes objective evidence that standard failure modes and risks, such as software or network outages, standard mitigation strategies, including alternate processes, and standard impact philosophies were applied.	The document(s) will be retrievable in InfoWorks.
03	24590-WTP-PIER-MGT-12-0758-B	Action 1) Produce a work planning document(s) for Plant Administrative Software that	The document(s) will be

		includes planning activities for all life cycle activities including a strategy for requirement traceability. The requirements will form the design basis for evaluating software applications on the market and those applications that need to be developed and provide objective evidence that requirements flowed throughout the software lifecycle.	retrievable in InfoWorks.
03	24590-WTP-PIER-MGT-12-0758-B	Action 2) Revise 24590-WTP-3DP-G06B-00001, <i>Material Requisitions</i> , to include Plant Administrative Software.	Issued procedure.

Overview of BNI's approach to resolving the underlying issues that caused the findings

BNI's initial action was to cancel the POMS project, and this mooted the issue of POMS being inadequate to meet the safety requirements of its intended use. Follow-on BNI actions were aimed at fixing the cause of the issues and reforming the software procurement process so that the same problems will not recur.

As the causal analysis of Reference 6 stated, the apparent cause of the three findings of S-12-WSC-RPPWTP-002 was, "Focus was on acquisition of work software that had been successfully used at other DOE operating facilities, rather than developing a planning document outlining programmatic requirements for plant administrative software. This resulted in insufficient documented evidence of software requirements." The surveillant agreed with BNI's conclusion. This underlying issue required far more than a simple revision to the Project Software Risk Assessment that was the symptom initially identified by ORP. Fixing the issue required BNI to put in place a planning system to underpin acquisition of plant administrative software systems, a significant and far-reaching effort.

BNI noted in Reference 6 and stated during an interview with the Commissioning Manager for Low-Activity Waste/Balance of Facilities/Analytical Laboratory and the Plant Operations Process Controls Integration Lead that processes for procuring other classes of software, namely EPCC software and plant installed software, were more mature than that for acquiring plant administrative software. The defects found by surveillance S-12-WSC-RPPWTP-002 in the POMS acquisition, were symptomatic of "growing pains" as WTP Plant Operations undertakes new activities as the dates for startup and commissioning approach. Nevertheless, BNI personnel stated the corrective actions undertaken by BNI to resolve the issues related to plant administrative software are expected to be applied to other software classes, strengthening software procurement overall.

Reference 6 stated that the extent of condition was limited to POMS (which was canceled), Laboratory Information Management Software (LIMS), and Plant Simulator Software. This assertion was not verified as part of this closure surveillance. BNI developed corrective actions

to check LIMS and simulator software project documentation for errors, including the Project Software Risk Assessments – key safety-related documents. These corrective actions were also not verified as part of this closure surveillance.

24590-WTP-PL-OP-13-0001, *Commissioning Information System Strategic Plan, Rev. 0* [Reference 2] was issued on March 25, 2013, to close F02 and F03, and it also supported corrective actions for F01. The Plan laid out a high-level vision for identifying and ensuring bidirectional traceability of “automation” requirements (“automation” being inclusive of plant administrative software) in a manner similar to the way contract, regulatory, and functional requirements are flowed into administrative programs. As explained by BNI personnel during an interview, the intent was to document requirements for software which would then support configuration management and compliance with the safety basis in the future as changes are made to WTP operational systems. BNI personnel stated that the vision was intended to help BNI determine whether commercial off-the-shelf products or proprietary systems developed elsewhere within URS or Bechtel Corporate can be adapted for use at WTP.

Reference 2 stated that the plan will first be implemented by Plant Engineering and Plant Administration, which will subsequently issue guides and procedures “to provide details necessary to produce records of the output proposed by this plan;” however, “it is anticipated that this plan will be absorbed and sponsored by WTP Project management” and was, therefore, written to be adopted eventually by all WTP project organizations. No timeline for this adoption was provided.

Issuance of Reference 2 was but one element of a suite of actions needed to fully address the findings in S-12-WSC-RPPWTP-002. The plan in Reference 2 was not implementable without a full set of procedures, and these had not been developed at the time of the surveillance. BNI personnel stated that additional actions will be completed as indicated in the CAP for finding F01, and that closing findings F02 and F03 was only a first step. CCN-254161 [Reference 8] listed additional actions, including development of procedures and guides, that BNI personnel stated will complete the new software acquisition planning system and will make it possible to close finding F01.

Finding F02 Action

To close this action, Reference 2 must satisfy BNI’s commitment. The table below breaks out the details:

Commitment text	Part of Reference 2 that met this commitment
Include planning activities for all life cycle activities	Section 1, Purpose
... including a strategy for requirement traceability	Section 5.3.1, Automation Requirements and Traceability
Requirements will form the design basis for evaluating software applications	Section 5.3.3, Information System Technical Review

This action was verified as closed.

Finding F03 Action 1

The PIER closure statement for this action stated the action was closed because the planning document, Reference 2, addressed the need to consider failure modes such as software or network outage when developing software requirements. However, failure modes were not specifically mentioned in Reference 2, nor were "standard mitigation strategies, including alternate processes and standard impact philosophies." It was, therefore, necessary to look further to determine where these elements enter the software acquisition process.

The first sentence of Reference 2's Section 5.3.1, titled "Automation Requirements and Traceability," was "Automation requirements are captured within an issued document for configuration management purposes and flowed by reference into the required SQPs documentation..." The word "requirements" was not broken down into specific types or classes; however, Section 3 sent the reader to 24590-WTP-GPG-MGT-0023, Rev. 1A, *WTP Commissioning Phase Program Development* [Reference 9], where more detail was provided. Reference 9 instructed project personnel who develop software requirements to provide, among other things:

- Identification of preliminary hazards and risks of software failure or data errors
- A description of the backup system that will be used if the software is unavailable
- A safety determination
- A determination of whether the software is waste acceptance impacting (this is relevant to finding F01)

Verification of finding F03 Action 1 closure, therefore, rested not upon BNI's primary commitment listed in the CAP, but on this referenced procedure, a second-tier document. On this basis, the Action was verified as closed.

Requirements definition was further detailed in Reference 3, which BNI had not yet issued but was made available to ORP in draft. Reference 3, Section 4.6, stated the (BNI) Environmental & Nuclear Safety Point of Contract for acquisition of a commissioning information (i.e. software) system "reviews the draft Project Software Risk Assessment (PSRA) to concur with the software safety determination," among other responsibilities. (Relevant to finding F01, Section 4.5 of Reference 3 stated that an Immobilized High-Level Waste Point of Contract also reviews the PSRA). If the issued version of Reference 3 is consistent with the draft, it will further support closure of Action 1 for finding F03.

Finding 03 Action 2

Revision number 24 of 24590-WTP-3DP-G06B-00001, *Material Requisitions*, completed August 15, 2012, incorporated Plant Administrative Software in section 3.2.2.2. This action was verified as closed.

Conclusion:

The surveillant verified the corrective actions for findings F02 and F03 identified in the surveillance report S-12-WSC-RPPWTP-002 were completed.

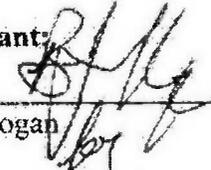
The actions reviewed above supported closure of finding F01 but were not by themselves sufficient to close F01, which will entail a significant effort that includes development of new procedures and guides. BNI delayed closure of finding F01 to September 16, 2013, [Reference 8].

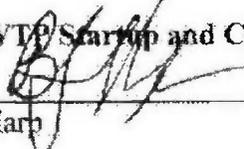
Findings and Observations:

No findings or observations were identified.

Personnel Interviewed:

1. Commissioning Manager for Low-Activity Waste/Balance of Facilities/Analytical Laboratory.
2. Plant Operations Process Controls Integration Lead

Lead Surveillant:  Date: 6/6/13
Pamela Logan

Director, WTP Startup and Commissioning Integration:  Date: 6/6/13
Ben Harp



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUL 22 2013

13-WTP-0118

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-WCD-RPPWTP-004 – APRIL 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

This letter transmits the results of the U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) review of Bechtel National, Inc.'s (BNI) construction performance at the WTP during April 2013. A summary of the surveillance activities is documented in the attached report.

Five Priority Level 3 findings and three Opportunity for Improvement (OFI) items were identified during this surveillance period. Priority Level 3 findings included: F01) BNI did not install the red light at the Radio Fire Alarm Reporter (RFAR) box located at Building 91 in accordance with design requirements; F02) BNI did not ensure a correctly sized equipment bonding jumper was installed in RFAR boxes as required by Article 250 of the National Electrical Code; F03) Existing "in service" RFAR street boxes installed at temporary buildings did not meet National Fire Protection Association 72 requirements to have a distinctive colored light installed above RFAR street boxes; F04) BNI did not list the Field Change Notice used for acceptance of RFAR box and red light at Chiller Compressor Building 82; and F05) Measuring and test equipment labeling had not been properly maintained.

No response is required for the Priority Level 3 findings or OFI items. The Priority Level 3 findings shall be entered into your corrective action management system and tracked until the identified issues are corrected.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-WTP-0118

-2-

JUL 22 2013

If you have any questions, please contact me, or you may contact Ken Wade, Director, WTP Construction Oversight and Assurance Division, (509) 373-8637.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:DAH

Attachment

cc w/attach:

D. E. Kammenzind, BNI
F. M. Russo, BNI
K. A. Smith, BNI
L. M. Weir, BNI
W. Walton, RL FIN
BNI Correspondence

Attachment
13-WTP-0118

Waste Treatment and Immobilization Plant (WTP) Construction
Oversight and Assurance Division (WCD) April 2013 Construction
Surveillance Summary Report S-13-WCD-RPPWTP-004

14 Pages (Including this Coversheet)

U.S. DEPARTMENT OF ENERGY
WASTE TREATMENT AND IMMOBILIZATION PLANT PROJECT

INSPECTION: Waste Treatment and Immobilization Plant (WTP) Construction Oversight
and Assurance Division (WCD) April 2013 Construction Surveillance
Summary Report

REPORT NO.: S-13-WCD-RPPWTP-004

INTEGRATED ASSESSMENT SCHEDULE (IAS) NUMBERS: (See Section VII of this report
for a listing of IAS numbers)

FACILITY: Bechtel National, Inc.; Waste Treatment and Immobilization Plant Project

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: April 1 through April 30, 2013

INSPECTORS: F. Hidden, Facility Representative
D. Hoffman, Facility Representative
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H. Taylor, Construction Cost & Schedule
*M. Evarts, Site Inspector
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*Subcontractor to Lucas Engineering and Management Services, Inc.
Supporting ORP-WTP

APPROVED BY: K. G. Wade, Director
WTP Construction Oversight and Assurance Division

WTP CONSTRUCTION OVERSIGHT AND ASSURANCE DIVISION APRIL 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

I. Introduction

During the period April 1 through April 30, 2013, the Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) conducted construction inspections of Important-To-Safety (ITS) and Non-ITS (Balance of Plant) activities during WTP construction. These inspections were documented in surveillance reports and maintained electronically. A total of 16 sub-tier surveillance reports were generated during the inspection period and have been summarized in Section II and III below. These sub-tier surveillance reports are available upon request. The Facility Representatives (FR) also documented 40 WTP construction activities in the Operational Awareness Database. These activities included 35 FR Activity Log Entries (used for logging notifications and other events). FR Activity Log Entries, involving events and medical reports, were communicated by Bechtel National, Inc. (BNI) to the on-call FR.

Five Priority Level 3 findings were identified during this assessment period; the findings included:

S-13-WCD-RPPWTP-004-F01 (Priority Level 3) – BNI did not install a red light at the RFAR Box located at Building 91 in accordance with design requirements. (Sub-Tier 004-08)

S-13-WCD-RPPWTP-004-F02 (Priority Level 3) – BNI did not ensure correctly sized equipment bonding jumpers were installed in RFAR boxes as required by Article 250 of the NEC. (Sub-Tier 004-08)

S-13-WCD-RPPWTP-004-F03 (Priority Level 3) – Existing “in service” RFAR street boxes installed at Temporary Buildings did not meet NFPA 72 requirements to have a distinctive colored light installed above RFAR street boxes. (Sub-Tier 004-08)

S-13-WCD-RPPWTP-004-F04 (Priority Level 3) – BNI did not list the Field Change Notice used for acceptance of the RFAR Box and red light at Chiller Compressor Building 82. (Sub-Tier 004-08)

S-13-WCD-RPPWTP-004-F05 (Priority Level 3) – Measuring and Test Equipment labeling had not been properly maintained. (Sub-Tier 004-12)

Sections II and III provide additional discussions of oversight activities and summary of findings, opportunity for improvement (OFI) items, and assessment follow-up items.

Section IV of this report discusses WCD identified emerging performance trends. There were no open emerging negative performance trends identified by WCD.

Section V of this report contains a listing of items opened, closed, and discussed during this period. There were five findings and three OFI items opened; three findings, one assessment follow-up item, and three OFI items were closed.

Section VI contains a summary listing of the 16 sub-tier surveillance reports written during this inspection period.

Section VII contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this assessment period.

II. Oversight Activities

Sub-Tier Surveillance Report Activity Conclusions

- BNI was observed performing and/or completing twelve pre-designated or field surveillance selected welded connections at the Low-Activity Waste Facility, (LAW), Balance of Facility (BOF), and High-Level Waste Facility (HLW) during the month of April, 2013. This included visual assessment of fit-up and final weld condition. Configuration and orientation of the items installed conformed to the drawings; welding met the specified criteria. BNI used correct materials and welded with the correct filler material using processes and personnel qualified in accordance with the applicable requirements. BNI's examination personnel had been trained and certified for the examination method used; inspection records reviewed were satisfactory. (Sub-Tier 004-01)
- Four hundred and eighty five weld and test records were reviewed during the month of April 2013. The records had been completed by various BNI Field Engineering or Quality Control personnel, and submitted to Project Document Control (PDC). Reviewed records conformed to the American Society of Mechanical Engineers B31.3 code requirements. (Sub-Tier 004-02)
- A review was performed of the pressure testing performed at the WTP site by BNI during the month of April 2013. The review found BNI performed testing in accordance with procedures, engineering specifications, and required codes and standards. Quality control and testing personnel had been trained and certified for the test methods used, and pertinent attributes of quality assurance documentation had been satisfactorily completed. (Sub-Tier 004-03)
- A follow up review was performed of BNI's actions taken to address occurrence reportable event; EM-RP--BNRP-RPPWTP-2013-0001, Hazardous Energy Work Performed Without Procedural Compliance. The review identified examples where BNI could improve the clarity of the Occurrence Report and better capture the corrective actions taken by BNI. OFI Item, **S-13-WCD-RPPWTP-004-001** was opened to document examples where the event description and corrective actions had not been concisely captured within the Project Issues and Evaluation Report (PIER) and Occurrence Report. The OFI was discussed with BNI and BNI revised the PIER and Occurrence Report during the surveillance

period. The revised reports were reviewed and determined to be concise and appropriate: Assessment Follow-up Item **S-13-WCD-RPPWTP-001-A01** and **OFI S-13-WCD-RPPWTP-004-001** were closed during the review period. (Sub-Tier 004-04)

- During the month of April, BNI was observed testing, placing, and consolidating concrete for three placements at the HLW: wall *HCC3118* at elevation (+) 37'-0", wall *HCC3111* at elevation (+) 37'-0", and wall *HCC3120A* at elevation (+) 37'-0". Concrete placement conformed to procedures, engineering specifications, and the relevant codes and standards. Concrete receipt activities were conducted in accordance with the applicable codes and standards. Quality control and testing personnel had been trained and certified for the examination and test methods used, and pertinent attributes of the quality assurance documentation had been completed. (Sub-Tier 004-05)
- A review was performed of BNI's installation of reinforcement, embedded items, and formwork for HLW concrete wall placement *HCC3118*. The review found all work had been done in an acceptable manner and in accordance with specifications, drawings, and the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and quality assurance documentation had been completed in a satisfactory manner. (Sub-Tier 004-06)
- A review was performed of Energy Solutions' (BNI subcontractor) installation of the base layer of castable refractory in LAW melter number two. The review included verification of the material used, process used to mix the material, observations of the material placement and observations of the independent inspectors oversight of the installation; the review determined the base layer of castable refractory had been installed per the requirements of castable refractory procedure *SP-5575-ME-0004*. (Sub-Tier 004-07)
- ORP-WTP's surveillance of Radio Fire Alarm Reporter (RFAR) Boxes installed at BOF Switchgear Building 91, Chiller Compressor Building 82, and Temporary Buildings T-01, T-05, & T-06 identified four findings and one OFI item. Three of the findings were opened and are awaiting BNI resolution, one finding was opened and closed based on the action taken by BNI during the surveillance period and the OFI item was opened and closed following discussions with BNI. Below is a summary of the findings and OFI item: (Sub-Tier 004-08)
 - **Finding: S-13-WCD-RPPWTP-004-F01 (Priority Level 3)** was opened to document BNI did not install the red light at the RFAR Box at Building 91 in accordance with the design height requirements.
 - **Finding: S-13-WCD-RPPWTP-004-F02 (Priority Level 3)** was opened to document BNI did not correctly size the equipment bonding jumpers at RFAR boxes per Article 250 of the NEC.

- **Finding: S-13-WCD-RPPWTP-004-F03 (Priority Level 3)** was opened to document existing "in service" RFAR street boxes installed at Temporary Buildings did not meet NFPA 72 requirement to have a distinctive colored light installed above the RFAR box.
- **Finding: S-13-WCD-RPPWTP-004-F04 (Priority Level 3)** was opened to document BNI did not list the Field Change Notice used for acceptance of the RFAR Box and red light at Chiller Compressor Building 82. BNI corrected the identified inspection records during the inspection period; **finding: S-13-WCD-RPPWTP-004-F04 (Priority Level 3)** was closed following the actions taken by BNI during the surveillance period.
- **Opportunity for Improvement: S-13-WCD-RPPWTP-004-O02** was opened to document lack of specific design requirement definitions in procedures for the separation of RFAR antennas from surrounding surfaces or obstructions. The OFI item was discussed with the Lead Electrical Field Engineer who indicated a Field Change Notice would be issued to clarify the requirements; **OFI S-13-WCD-RPPWTP-004-O02** was closed following the discussion with the Lead Electrical Field Engineer.
- A review was performed by ORP-WTP of the construction completion activities, management of open work-to-go activities, and overall progress of the WTP Chiller Compressor Plant. The review found BNI was effectively managing completion activities and was on pace to complete the remaining open items for the Chiller Compressor Plant by the end of June, 2013. No deficiencies were noted during the surveillance period. (Sub-Tier 004-09)
- Heating Ventilating and Air Conditioning (HVAC) testing was performed at the Low-Activity Waste Building (LAW) during the month of April. Testing included Inbleed L028 with associated ductwork, Inbleed L029 with associated ductwork, and flow element ports installed on previously tested systems or portions thereof. Components tested were subjected to requisite test pressures based on ductwork designators in the design drawings; test activities were conducted in accordance with requirements of the approved test procedure by properly trained personnel using currently calibrated test instrumentation; and test records attested to satisfactory results and were traceable to the items tested. (Sub-Tier 004-10)
- A review was performed on actions taken by BNI, as a result of finding **S-12-WCD-RPPWTP-010-F01 (Priority Level 3)** where an undersized power cable had been installed for Lighting Transformer LTE-XFMR-60035. BNI revised field sketches, replaced the 60-amp circuit breaker with a 30-amp circuit breaker, and provided Electrical Field Engineers training on the code requirements for sizing conductors, overcurrent protection, and transformer protection. Based on the review of actions taken; finding **S-12-WCD-RPPWTP-010-F01 (Priority Level 3)** is closed. (Sub-Tier 004-11)
- BNI was observed performing magnetic particle examination of a crane rail support weld at the HLW. The weldments observed were acceptable, and the size, type, configuration and orientation of the installed items conformed to the drawings. Examination was performed in accordance with BNI's approved procedure. BNI's examination personnel had been properly qualified and certified, and inspection records were legible, traceable to the individual

components, and attested to acceptability of the installed items. There were discrepancies, however, with the measuring and test equipment (M&TE) used. M&TE labeling indicated the calibration date and required re-calibration due date were not current; finding **S-13-WCD-RPPWTP-004-F05 (Priority Level 3)** was opened to document incorrect labeling. In addition, test reports did not comprehensively identify the M&TE used, hence, M&TE was not easily traceable to items for which it had been used; OFI **13-WCD-RPPWTP-004-003** was opened to document this improvement area. During the inspection period BNI initiated corrective action to resolve these issues by implementing a desk instruction requiring daily use checks for the equipment and for recording full identification of the M&TE on the pertinent test reports. Adequate information is now being included on any test reports generated the day testing is performed. Based on the actions taken by BNI during the surveillance period, finding **S-13-WCD-RPPWTP-004-F05 (Priority Level 3)** and OFI **S-13-WCD-RPPWTP-004-003** are closed. (Sub-Tier 004-12)

- BNI was observed testing, placing and consolidating concrete for the 2" thick floor placement at the LAW: floor slab (125E) for LVP Scrubber 00001 at elevation (+) 48'-0". Concrete placement conformed to procedures, engineering specifications, and the relevant codes and standards. Concrete receipt activities were conducted in accordance with the applicable codes and standards. Quality control and testing personnel had been trained and certified for the examination and test methods used, and pertinent attributes of the quality assurance documentation had been completed. Based on the review performed ORP-WTP concluded the placement of LAW floor slab 125E was accomplished properly. (Sub-Tier 004-13)
- A review was performed of BNI's maintenance of a crane (Crane 8) located within the LAW facility. Crane 8 had been turned over to construction for beneficial use in July of 2008 and was being maintained as an operational crane. The review included a comparison of the manufacture's maintenance requirements to the maintenance documented in Computerized Maintenance Management System and documented completion of past maintenance performed. The review determined BNI was performing adequate maintenance of the crane at acceptable intervals. (Sub-Tier 004-14)
- A review was performed of BNI's installation of high-intensity discharge floodlights on the west side of temporary building T-33. The review found the installation had been performed in accordance with National Electrical Code requirements and had been completed in a neat workman like manner. (Sub-Tier 004-15)
- A review of preservation maintenance activities on permanently installed equipment in the WTP Steam Plant (Building 85) was performed. The review determined the preservation maintenance activities on permanently installed equipment in the Steam Plant were consistent with Department of Energy (DOE) directives, WTP project processes, and vendor recommendations. (Sub-Tier 004-16)

Facility Representative (FR) Event and Safety Activities

- There were no Occurrence Reportable events in April 2013.
- There was one OSHA recordable injury during April 2013. The event occurred when a worker was taking measurements in a small space resulting in a strained back. The injury was required to be treated with prescription pain medication and resulted in work restrictions.
- BNI notified the on-call FR of 26 medical/first aid events during April 2013. BNI's notifications to the on call FR were timely and contained adequate detail.

III. Summary of Findings, Opportunity for Improvement Items, and Assessment Follow-up Items

A finding is defined as an individual item not meeting a committed requirement (e.g., contract, regulation, safety basis, Quality Assurance (QA) program, authorization basis document, procedure, or Standards/Requirements Identification Documents). Findings can be characterized as Priority Level 1, Priority Level 2, or Priority Level 3. WCD will follow-up on findings once BNI has completed necessary corrective actions to address the issues.

During this inspection period, the following findings were identified:

- **Finding S-13-WCD-RPPWTP-004-F01 (Priority Level 3)** –BNI did not install a red light at the RFAR Box located at Building 91 in accordance with design requirements.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(2), requires BNI to develop and implement a QA Program. BNI's DOE approve Quality Assurance Manual, Policy Q-03.1, *Design Control*, paragraph 3.1.2.1.1, required BNI's design to be defined, controlled, and verified.

Field Change Notice 24590-WTP-FC-E-12-0655 required the red light to be installed above the RFAR Box at a height between 9'-0" to 11'-0" above grade.

Discussion:

Contrary to above, BNI installed and accepted the red light at approximately 11'-5" above grade vice the required 9'-0" to 11'-0" at Building 91 (RFAR Box FDE-PNL-91911). BNI is tracking this issue in their corrective action program via Project Issues Evaluation Report 24590-WTP-PIER-MGT-13-0417 and Construction Deficiency Report 24590-WTP-CDR-CON-13-0376. (Sub-Tier 004-08)

- **Finding S-13-WCD-RPPWTP-004-F02 (Priority Level 3)** – BNI did not ensure correctly sized equipment bonding jumpers were installed in RFAR boxes as required by Article 250 of the NEC.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), requires BNI to develop a Basis of Design (BOD), and BOD Section 8.1.1.3 requires BNI to comply with the National Electrical Code (NEC).

NEC Article 250-148(a) requires a connection to be made between one or more equipment grounding conductors and a metal box.

NEC Article 250-102(d) requires the equipment bonding jumper on the load side of the service overcurrent devices to be sized, as a minimum, in accordance with the sizes listed in Table 250-122. Per Table 250-122, a 20-amp circuit breaker would require a #12 AWG bonding jumper.

Discussion:

Contrary to above, BNI did not install #12 AWG bonding jumpers between the equipment grounding conductors and the metal enclosures at RFAR Boxes FDE-PNL-91911 & FDE-PNL-82911. (Sub-Tier 004-08)

- **Finding S-13-WCD-RPPWTP-004-F03 (Priority Level 3)** – Existing “in service” RFAR street boxes installed at Temporary Buildings did not meet NFPA 72 requirements to have a distinctive colored light installed above RFAR street boxes.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), requires BNI to develop a Basis of Design (BOD), and BOD Section 13.2.5 requires BNI to comply with the National Fire Alarm Code (NFPA 72).

24590-WPT-RPT-CON-05-007 lists applicable NFPA codes and standards for construction activities involving non-permanent plant installations. NFPA 72 is listed (page 5) as one of the NFPA standards applicable to construction activities.

NFPA 72, Section 9.4.2.1.10, requires a location-designating light of distinctive color (Hanford site standard is red) to be installed over street boxes.

Discussion:

Contrary to above, the RFAR street boxes installed on Temporary Buildings (Main Construction Office T-01, PTF Craft Lunchroom T-05, and HLW Craft Lunchroom T-06) did not have red lights installed above the RFAR boxes. (Sub-Tier 004-08)

- **Finding S-13-WCD-RPPWTP-004-F04 (Priority Level 3)** – BNI did not list the Field Change Notice used for acceptance of an RFAR Box and red light at Chiller Compressor Building 82.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), requires BNI to develop and implement a QA Program. BNI's DOE approve Quality Assurance Manual, Policy Q-10.1, *Inspection*, paragraph 10.1.2.6.4, stated: Inspection records shall be established, maintained and identify (10.1.2.6.4.5) the inspection criteria, sampling plan, or reference documents (including revision levels) used to determine acceptance.

QAM, Policy Q-10.1.2.6.4, requires appropriate inspection records to be established, maintained, and identify the inspection criteria, sampling plan, or reference documents (including the revision levels) used to determine acceptance.

Construction Quality Control Program (24590-WTP-GPP-CON-7101), paragraph 3.4.9 requires inspection documentation to include (bullet 6) reference to the acceptance criteria, sampling plan, or reference documents (including the revision number and relevant approved change documents) used to determine the acceptance.

Discussion:

Contrary to above, SetRoute Card 24590-BOF-SEC-E-13-0005 and Inspection Record 24590-BOF-FDIR-CON-13-0005 did not list Field Change Notice 24590-WTP-FC-E-12-0655 for accepting the installation of RFAR Box FDE-PNL-82911 and associated red light. (Sub-Tier 004-08)

- **Finding S-13-WCD-RPPWTP-004-F05 (Priority Level 3)** – Measuring and Test Equipment labeling had not been properly maintained.

Requirement:

Contract No. DE-AC27-01RV14136, Section C, Standard 7(e)(3), requires BNI to establish and deliver a Quality Assurance Program. Section C, Standard 7(e)(3)(v) stipulates BNI is to utilize ASME NQA-1-2000 to achieve quality objectives.

ASME NQA-1-2000, Requirement 12, *Control of Measuring and Test Equipment*, Subarticle 302.3, requires equipment be suitably marked or otherwise identified to indicate calibration status. This requirement is reflected in BNI Procedure 24590-WTP-GPP-CON-7102.

Discussion:

Contrary to the above, calibration status labeling for magnetic particle test equipment (an alternating current electromagnetic yoke) had not been properly marked or otherwise identified to indicate current status. The yoke had been affixed with a label indicating date checked and date due for recheck but the date due for recheck had passed. (Sub-Tier 004-12)

Assessment Follow Up Items (AFI) are matters requiring further review because of a potential finding or problem, because contractor or ORP action is pending, or because needed information to determine compliance with requirements and/or acceptable performance was not available at the time of the assessment.

There were no AFIs during the April 2013

Opportunity for Improvement (OFI) items are observations that warrant attention but are not a direct noncompliance with a requirement:

- **OFI 13-WCD-RPPWTP-004-001** – Occurrence Report EM-RP--BNRP-RPPWTP-2013-0001 and Project Issues Evaluation Report 24590-WTP-PIER-MGT-13-0020-C had not provided sufficient detail to describe the event or provide adequate documentation of the actions taken to prevent a similar occurrence.

Discussion:

DOE Order 232.2, requires ORPS reports to be clearly and concisely written so the general reader can understand the basic who, what, when, where and how of the event and to include the corrective actions taken by the prime contractor. The order also requires the prime contractor to perform an analysis to understand and identify the causes (both individual and organizational) that contributed to the occurrence so those deficiencies can be addressed and corrected. BNI had not concisely described the event in the issued ORPS report and had not adequately documented all of the completed corrective actions in the associated Project Issues Evaluation Report. (Sub-Tier 004-04)

- **OFI S-13-WCD-RPPWTP-004-002** – BNI procedures did not document sufficient specific design requirement definition for the separation of RFAR antennas from surrounding surfaces or obstructions.

Discussion:

Drawing 24590-CM-HC4-JQ05-00001-T01-01-00001 required the antenna to be installed 12" to 18" from surrounding surface or obstructions; however, it was unclear whether the clearance requirement was from the antenna or the antenna sleeve. BNI's Lead Field Engineer discussed this requirement with Hanford Fire Department and determined the 12" requirement was measured from the bottom of the antenna not the bottom of the antenna sleeve. Based on this interpretation, the installations at Building 91 & 82 met design

requirements. BNI, however, agreed the applicable procedure should better define the antenna's separation requirements. (Sub-Tier 004-08)

- **OFI S-13-WCD-RPPWTP-004-003** – Comprehensive Measuring and Test Equipment identification would facilitate recall in the event M&TE was found to be out of calibration.

Discussion:

BNI's method for recording the measuring and test equipment used for Magnetic Particle Examination could be improved. A review of several inspection records, used for Magnetic Particle Examination, recorded inconsistent information on the M&TE used to perform the examination. Although one could use the information provided to research and determine the M&TE had been appropriately verified, the documentation did not consistently identify all measuring and test equipment used. (Sub-Tier 004-12)

IV. Emerging Construction Performance Trends

Prior to issuing this WCD oversight report, WCD reviewed past identified issues and current construction performance in an attempt to identify any emerging negative performance trends. No new trends were identified.

V. List of Inspection Items Opened and Closed

Opened: The following items were opened:

S-13-WCD-RPPWTP-004-F01 (Priority Level 3)	Finding	RFAR Red Light on Building 91 not installed per drawing. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-F02 (Priority Level 3)	Finding	RFAR boxes used improperly sized bonding jumpers. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-F03 (Priority Level 3)	Finding	In service RFAR street boxes did not have a red light as required by NFPA 72. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-F04 (Priority Level 3)	Finding	BNI did not list the Field Change Notice used to accept RFAR box at Building 82. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-F05 (Priority Level 3)	Finding	Measuring and Test Equipment labeling had not been properly maintained. (Sub-Tier 004-12)
S-13-WCD-RPPWTP-004-001	Opportunity for Improvement	Improvements could be made to ORPS report 2013-0001. (Sub-Tier 004-04)

S-13-WCD-RPPWTP-004-O02	Opportunity for Improvement	BNI procedures did not document sufficient RFAR design requirements for the location of RFAR antennas. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-O03	Opportunity for Improvement	M&TE identification would facilitate recall in the event M&TE was found to be out of calibration. (Sub-Tier 004-012)
Closed: The following items are closed:		
S-12-WCD-RPPWTP-010-F01 (Priority Level 3)	Finding	Undersized Temporary Power Feeder to Transformer LTE-XFMR-60035. (Sub-Tier 004-11)
S-13-WCD-RPPWTP-004-F04 (Priority Level 3)	Finding	BNI did not list the Field Change Notice used to accept RFAR box at Building 82. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-F05 (Priority Level 3)	Finding	Measuring and Test Equipment labeling had not been properly maintained. (Sub-Tier 004-12)
S-13-WCD-RPPWTP-001-A01	Assessment Follow-up Item	Failure to Follow a Prescribed Hazardous Energy Control Process – Occurrence Report 2013-0001. (Sub-Tier 004-04)
S-13-WCD-RPPWTP-004-O01	Opportunity for Improvement	Improvements could be made to ORPS report 2013-0001. (Sub-Tier 004-04)
S-13-WCD-RPPWTP-004-O02	Opportunity for Improvement	BNI procedures did not document sufficient RFAR design requirements for the location of RFAR antennas. (Sub-Tier 004-08)
S-13-WCD-RPPWTP-004-O03	Opportunity for Improvement	M&TE identification would facilitate recall in the event M&TE was found to be out of calibration. (Sub-Tier 004-012)

VI. List of Sub-Tier Surveillance Reports Issued During the Assessment Period

<u>Surveillance Report Number</u>	<u>Inspection Subject</u>
S-13-WCD-RPPWTP-004-01	12 weld inspections performed in April 2013
S-13-WCD-RPPWTP-004-02	485 completed records reviewed in April 2013
S-13-WCD-RPPWTP-004-03	Hydro Press Test Completed April 2013
S-13-WCD-RPPWTP-004-04	Follow up on ORPS 13-0001. Hazardous Energy Work performed without Procedural Compliance. Closed S-13-WCD-RPPWTP-001-A01 . Open and closed S-13-WCD-RPPWTP-004-O01
S-13-WCD-RPPWTP-004-05	Review HLW wall concrete placement
S-13-WCD-RPPWTP-004-06	Review of forms, rebar and embeds in HLW placement HCC3118
S-13-WCD-RPPWTP-004-07	Review of LAW refractory installation
S-13-WCD-RPPWTP-004-08	Review of RFAR Boxes: Opened S-13-WCD-RPPWTP-004-F01, F02, F03, F04 and O02 ; Closed S-13-WCD-RPPWTP-004-F04 and O02 .
S-13-WCD-RPPWTP-004-09	Chiller Compressor Plant Construction Status
S-13-WCD-RPPWTP-004-10	HVAC testing in LAW
S-13-WCD-RPPWTP-004-11	Closed S-12-WCD-RPPWTP-010-F01
S-13-WCD-RPPWTP-004-12	Review of magnetic particle examination of cranes rail support weldment in HLW. Opened and Closed 13-WCD-RPPWTP-004-F05 and O03
S-13-WCD-RPPWTP-004-13	Review of LAW SBS foundation placement
S-13-WCD-RPPWTP-004-14	Review of LAW Crane 8 maintenance
S-13-WCD-RPPWTP-004-15	Review of installation of high intensity flood lights on the west side of T-33
S-13-WCD-RPPWTP-004-16	Review of Steam Plant Equipment Maintenance

VII. Integrated Assessment Schedule Number Summary

Integrated Assessment Schedule ID Number	Sub-tiered Surveillance Number	Report Issued Date	Assessor	Description
142	S-13-WCD-RPPWTP-004-09	4/30/2013	Fred Hidden	Chiller Compressor Plant Construction Completion Status
153	S-13-WCD-RPPWTP-004-16	4/30/2013	Fred Hidden	Maintenance of LBL Plant Equipment
154	S-13-WCD-RPPWTP-004-14	04/24/2013	Doug Hoffman	Maintenance of LAW Crane 8
155	S-13-WCD-RPPWTP-004	See Cover Letter	Doug Hoffman	Construction Acceptance Inspections



OFFICE OF RIVER PROTECTION

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JUL 22 2013

13-WTP-0130

Mr. J. M. St. Julian
Project Manager
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2435 Stevens Center Place
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Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 -- TRANSMITTAL OF SURVEILLANCE REPORTS
S-13-WSC-RPPWTP-014 AND S-13-WSC-RPPWTP-015

This letter transmits the results of the subject U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP), Startup and Commissioning Integration, review of Bechtel National, Inc.'s startup performance at the WTP during April 2013, and surveillance of procedures: 24590-WTP-SU-GT-0002, *Continuity Scheme Checks*, and 24590-WTP-SU-GT-0001, *Insulation Resistance (Megger) Testing*. No findings, opportunities for improvement items, or assessment follow-up items were identified during the course of these surveillances.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ben Harp, Manager, WTP Startup and Commissioning Integration, at (509) 376-1462.


William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:CLS

Attachment

cc w/attach:
D. L. Collins, BNI
D. E. Kammenzind, BNI
W. W. Gay, URS
K. Wells, URS
BNI Correspondence

Attachment 1
13-WTP-0130
S-13-WSC-RPPWTP-014

Attachment 1

13-WTP-0130

SURVEILLANCE OF BECHTEL NATIONAL, INC. (BNI)
TEST PROCEDURE DEVELOPMENT

WSC Surveillance Report

S-13-WSC-RPPWTP-014

May 20, 2013

Pages 3 (including coversheet)

WSC Surveillance Report

Surveillance Report Number: S-13-WSC-RPPWTP-014

Division Performing the Surveillance: Waste Treatment and Immobilization Plant (WTP)
Startup and Commissioning Integration (WSC)

Integrated Assessment Schedule Number: 201

Title of Surveillance: Surveillance of Bechtel National, Inc. (BNI) Startup Test Procedure Development

Dates of Surveillance: May 20, 2013

Surveillance Lead: Jeff Daniels, GSSC support to WSC

SCOPE

This surveillance evaluated the flowdown of requirements from 24590-WTP-QAM-QA-06-001 Rev 12, *Quality Assurance Manual*, to 24590-WTP-SU-ADM-0005 Rev 0, *Test Procedure Development*, to the recently issued Generic Test Procedures for *Insulation Resistance (Megger) Testing* 24590-WTP-SU-GT-0001, Rev 4, and *Continuity Scheme Checks*, 24590-WTP-SU-GT-0002, Rev 3.

REQUIREMENTS REVIEWED

- No. DE-AC27-01RV14136 - *WTP Contract*
- 24590-WTP-QAM-QA-06-001 Rev 12, *Quality Assurance Manual*

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- 24590-WTP-SU-ADM-0005, Rev 0 *Test Procedure Development*
- 24590-WTP-SU-ADM-0006, Rev 0 *Conduct of Testing*
- 24590-WTP-CTST-GPG-0002, Rev 0 *Test Procedure Writer's Guide*
- 24590-WTP-SU-GT-0001, Rev 4 *Insulation Resistance (Megger) Testing*
- 24590-WTP-SU-GT-0002, Rev 3 *Continuity Scheme Checks*

DISCUSSION OF AREAS REVIEWED

The ORP-WTP surveillant reviewed the flowdown of requirements in 24590-WTP-QAM-QA-06-001 Rev 12, *Quality Assurance Manual*, specifically sections: Policy Q-05.1 Instructions, Procedures and Drawings, and Policy Q-11.1 Test Control. The surveillant observed that the requirements listed in the *Quality Assurance Manual* were adequately met in 24590-WTP-SU-ADM-0005, Rev 0 *Test Procedure Development*, 24590-WTP-SU-ADM-0006, Rev 0 *Conduct of Testing*, and 24590-WTP-CTST-GPG-0002, Rev 0 *Test Procedure Writer's Guide*.

The ORP surveillant reviewed the procedures; 24590-WTP-SU-GT-0002, Rev 3 *Continuity Scheme Checks* and 24590-WTP-SU-GT-0001, Rev 4 *Insulation Resistance (Megger) Testing*.

The surveillant evaluated the requirements from the Quality Assurance Manual, specifically Policy Q-05.1 Instructions, Procedures and Drawings and Policy Q-11.1 Test Control and concluded that both of the procedures met the requirements. The requirements listed under Q-05.1, that were assessed, pertain to the adequate level of detail for the complexity of the task, the identification of hazards and controls, and the specification of responsibilities and interfaces. The requirements listed under Q-11.1, that were met, pertain to characteristics to be tested and test methods to be specified, and the overall control of tests prior to and during construction installation.

The surveillant also reviewed changes to the Quality Assurance Manual since the previous surveillance on Test Procedure Development issued in July of 2012. The revisions to the Quality Assurance Manual resulted in no changes in requirements affecting test procedure development.

SUMMARY OF FINDINGS, OPPORTUNITY FOR IMPROVEMENT, ITEMS, OR ASSESSMENT FOLLOW-UP ITEMS

None.

CONCLUSION

- Surveillance of procedures; 24590-WTP-SU-GT-0002, Rev 3 *Continuity Scheme Checks*, and 24590-WTP-SU-GT-0001, Rev 4 *Insulation Resistance (Megger) Testing*, concluded that the procedures adequately met the requirements specified in 24590-WTP-QAM-QA-06-001 Rev 12, *Quality Assurance Manual*.

SIGNATURES

Assessor or Lead		Date: 7/8/13
Assessor:	Jeff Daniels	
WSC Startup		Date: 7/8/2013
Program Manager:	Robert Gilbert	

Attachment 2
13-WTP-0130
S-13-WSC-RPPWTP-015

Attachment 2

13-WTP-0130

**APRIL SURVEILLANCE OF COMPONENT AND SYSTEM TESTING – BALANCE OF
FACILITIES**

WSC Surveillance Report

April 1 through April 30, 2013

Pages 3 (including coversheet)

Report Number: S-13-WSC-RPPWTP-015
Organization: WTP Startup and Commissioning Integration
Integrated Assessment Schedule Number: 466
Title: April Surveillance of Component and System Testing – Balance of Facilities
Date(s): April 1 through April 30, 2013
Lead: Cecil Swarens

SCOPE

The U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (ORP-WTP) performed a surveillance of Bechtel National, Inc., (BNI) component testing in the Balance of Facilities (BOF).

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- 24590-WTP-SU-ADM-0006, *Conduct of Testing*, Rev. 2.
- 24590-WTP-SU-GT-0002 *Continuity/Scheme Checking*, Rev. 2.
- 24590-WTP-SU-GT-0001, *Megger Testing*, Rev. 2

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

During the surveillance of the component testing conducted by BNI Startup in BOF during March 2013, the ORP-WTP surveillant observed pretest briefings on April 24th 2013 that covered megger testing of CPE system and continuity checks following repairs to 3 MVE breakers.

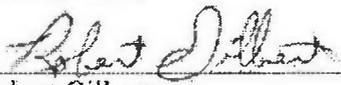
During the pretest briefs the surveillant observed the test engineers using the Pre-Test Briefing Form from 24590-WTP-SU-ADM-0006, Appendix D. The test engineers covered all items required as part of the checklist, and covered all areas in a depth that ensured all attendees were fully aware of the complete scope of work and all potential hazards that may be encountered during testing.

ORP-WTP previously identified issues concerning pretest briefs in Opportunity for Improvement S-12-WSC-RPPWTP-009-001, and as Assessment Follow-up Item (AFI) S-13-WSC-RPPWTP-003-A01. ORP-WTP will continue to follow progress made in this area to ensure consistent performance. ORP-WTP commends BNI Startup organization in making effective changes to their pretest briefs. These efforts should; decrease the risk of encountering issues during testing, ensure proper steps are taken if an issue arises and most importantly, provide greater safety during testing.

CONCLUSION

Surveillance of BOF component and system testing during April 2013 showed pretest brief preparations and briefings to meet the expectations outlined in BNI procedures and guidance. Control of testing, including communications, procedural control, and compliance, and now pretest briefs have shown great improvement the last two reporting periods from previous surveillances of startup testing.

SIGNATURES

Assessor or Lead		
Assessor:	<u></u>	Date: <u>7/8/2013</u>
	Cecil Swarens	
WSC Startup		
Program Manager:	<u></u>	Date: <u>7/8/2013</u>
	Robert Gilbert	



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99362

JUL 18 2013

13-WTP-0132

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RVI4136 -- SURVEILLANCE REPORT S-13-WED-RPPWTP-001, VERIFICATION OF CORRECTIVE ACTIONS COMPLETION FOR THE REVIEW OF HIGH-LEVEL WASTE LAG STORAGE AND FEED BLENDING VESSELS' MATERIAL REQUISITION READINESS CHECKLIST: PRIORITY LEVEL 2 FINDING S-11-WED-RPPWTP-019-F01

The U.S. Department of Energy, Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP), Engineering Division completed a second review for verification of Finding S-11-WED-RPPWTP-019-F01 corrective actions completion. ORP considers Finding S-11-WED-RPPWTP-019-F01 closed based on the review documented in the attached surveillance.

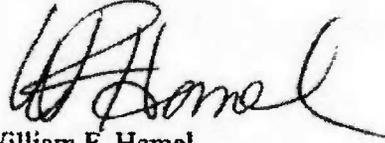
The action taken herein is considered to be within the scope of work of the existing contract and does not authorize Bechtel National, Inc. (BNI) to incur any additional costs (either direct or indirect) or delay delivery to the Government. If BNI considers that carrying out this action will increase contract/project costs or delay of delivery, BNI shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, BNI shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-WTP-0123

-2-

JUL 18 2013

If you have any questions, please contact me, or you may contact Garth Reed, Acting Director,
WTP Engineering Division, (509) 376-2626.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:IAB

Attachment

cc w/attach:
BNI Correspondence

Attachment
13-WTP-0132
S-13-WED-RPPWTP-001

Attachment
13-WTP-0132

**Verification of Corrective Actions Completion for the Priority Level 2 Finding S-11-WED-
RPPWTP-019-F01**

WED Surveillance Report

May 6, 2013

Pages 6 (Including Coversheet)

WED Surveillance Report

Surveillance Report Number: S-13-WED-RPPWTP-001

Division Performing the Surveillance: Waste Treatment and Immobilization Plant
Engineering Division (WED)

Integrated Assessment Schedule Number: 411

Title of Surveillance: Verification of Corrective Actions Completion for the Priority Level 2
Finding S-11-WED-RPPWTP-019-F01

Contractor: Bechtel National, Inc. (BNI)

Dates of Surveillance: May 6th, 2013

Surveillance Lead: Ivan Bolanos, General Engineer, WED

Scope:

This surveillance report documents a follow-up review of completed corrective actions to address Finding S-11-WED-RPPWTP-019-F01. This is the second closure verification surveillance performed for this Finding. The first closure verification surveillance number is S-12-WED-RPPWTP-013.

Documents Reviewed:

- CCN: 251849, BNI letter from R.W. Bradford to S. L. Samuelson, DOE-WTP, "Verification of Corrective Actions Completion for Finding S- 11-WED-RPPWTP-019-F01," dated December 4, 2012
- 12-WTP-0165, CCN: 248501 DOE-WTP letter from D. L. Noyes to R. W. Bradford, BNI, "Surveillance Report S-12-WED-RPP WTP-013, Verification of Corrective Actions Completion for Finding S- 11-WED-RPPWTP-019-F01," dated May 18, 2012
- 24590-WTP-GPG-M-042, Rev. 8, Material Requisition Process
- 24590-WTP-PIER-MGT-11-0583-B, Rev. 1, MRRC Design Verification Question Improper Response
- CCN: 248548, "Documentation for PIER 11-0583-B, Action #3," dated November 27, 2012
- CCN: 248549, "Documentation for PIER 11-0583-B, Action #10," dated November 27, 2012

Discussion of Areas Reviewed

Original Finding

Finding S-11-WED-RPPWTP-019-F01 was originally cited in July 2011, and it stated: "Questions 1.15, regarding design verification completion, in Material Requisition Readiness Checklist 24590-WTP-MRRC-ENG-09-0023, was not answered properly; the answer contradicted the current design verification status in the Design Verification Matrix for vessels HLP-VSL-00027A, HLP-VSL-00027B, HLP-VSL-00028, and HLP-VLS-00022."

A number of Bechtel National, Inc. (BNI) corrective actions to address the finding above were found to be incomplete during the U. S. Department of Energy (DOE), Office of River Protection, Waste Treatment and Immobilization Plant (ORP-WTP) initial closure verification surveillance (S-12-WED-RPPWTP-013) and the finding could not be closed. In order to address the noncompliance condition, BNI resubmitted objective evidence of corrective action completion for ORP-WTP review, as documented in the following sections (BNI's corrective action 1 was verified during the initial surveillance is not addressed in this report):

BNI Action 2 as stated in the Approved CAP

To address the cause related to completing the Material Requisition Readiness Checklist (MRRC) form entries for design verification, in coordination with process assurance and system engineers, update the MRRC form to clarify Responsible Engineer (RE) expectations in the Design Verification (DV) section (Questions 1.15 - 1.18). Issue a corresponding revision to 24590-WTP-GPG-M-042, Material Requisition Process, Revision 7, which provides guidance regarding preparation of MRRCs.

Evidence of Completion as stated in the Approved CAP

Issuance of the updated MRRC form and 24590-WTP-GPG-M-042, Material Requisition Process.

Evidence of Completion Evaluation

BNI updated guide 24590-WTP-GPG-M-042, Material Requisition Process, to Revision 8 to clarify the RE expectations when filling out the DV section of the MRRC form. Section 5.7 of the guide now states:

"Response to the MRRC's DV related questions are to be coordinated with the applicable Functional Lead or designee, to ensure all relevant and up to date information is considered, since the design verification matrix (DVM) may not always reflect recent changes in design or DV status.

"The response to the MRRC section 1 question, "Is the DV complete for the Scope of Work?" is focused on the current issued DVM, unless discussion with the Functional Lead indicates that the DVM is not current or there are pending changes. Answer the MRRC section 1 question as:

- YES, if the DV for the specific structure, system, or component (SSC) is identified as complete on the applicable DVM, unless discussions with the Functional Lead indicate otherwise.
- NO, if the DVM indicates that DV is not complete, if there is any outstanding DV, or if discussion with the Functional Lead indicates that DV is not complete. Include an appropriate justification for moving the procurement forward if the strategy is to proceed with the procurement. Appropriate justification includes information obtained from discussions with the Functional Lead, review of the associated DVR and action tracking system (ATS) items to determine the extent of DV completed, and the significance and status of open items."

This action is considered complete in accordance with the ORP-WTP approved Corrective Action Plan (CAP).

BNI Action 3 as stated in the Approved CAP

To address the cause related to resumption of the on-hold procurement, BNI will evaluate opportunities to either develop a version of the MRRC applicable only to Material Requisition (MR) revisions, or more clearly define, via procedure or guide expectations, how the MRRC is expected to be filled out in support of an MR revision.

Evidence of Completion as stated in the Approved CAP

Correspondence Control Number (CCN) documenting evaluation results and addition of actions to the Project Issue Evaluation Report (PIER) to implement the evaluation results, as appropriate. Procedure, guide and/or MRRC form will be revised as per recommendations.

Evidence of Completion Evaluation

BNI issued CCN: 248548 and concluded that a new version of the MRRC form will be established to deal with MR revisions only. BNI developed a draft version of the form and submitted to the Engineering Process Assurance group for implementation in a revision to the MR procedure 24590-WTP-3DP-G06B-00001.

ORP-WTP reviewed revision 25A of the MR procedure and confirmed that form 24590-ENG-F00114, Material Requisition Readiness Checklist (MRRC) Post-Award MR Revision was included in Exhibit C of the procedure.

This action is considered complete in accordance with the ORP-WTP approved CAP.

BNI Action 4 as stated in the Approved CAP

To identify the extent of condition, a review of MRRCs issued since Revision 17 of the form will be completed to determine if others have answered question 1.15 incorrectly.

Evidence of Completion as stated in the Approved CAP

Documentation of investigation results (CCN or PIER attachment). Revise and reissue MRRCs as required by investigation results. Based on the results of the evaluation, additional actions may be added to the PIER (24590-WTP-PIER-MGT-11-0583-B).

Evidence of Completion Evaluation

BNI completed PIER 24590-WTP-PIER-MGT-11-0583-B including an attachment titled "Action 04 Extent Review." The attachment is a matrix that lists the MRRCs issued since Revision 17 of the MRRC form and provides a set of criteria to determine the adequacy of the response to MRRC question 1.15. However, some of the actions taken based on the investigation results required clarification to establish alignment between the MRRC DV status and the Design Verification Matrix (DVM) as shown in the following example:

- The revised version of 24590-WTP-MRRC-E-11-0003, Rev. 1 answered yes to the design verification completeness question 1.15. Based on Design Verification Report (DVR) 24590-PTF-DVR-E-04-0001, Rev 2, it appears that the MRRC response to the DV status question was adequate at the time. However, there is an open Action Tracking System (ATS) item (24590-WTP-ATS-QAIS-09-1105) on this DVR to modify it to address design changes. In the key documents section, the DVR does not specifically identify a Low Voltage Electrical (LVE) Transformer sizing calculation, it only cites a Medium Voltage Electrical (MVE) sizing calculation. The revised electrical systems and components DVM indicates that design verification for transformers (LVE-XFMR-10103 to -10112 and others) is on hold.

This action is considered complete in accordance with the ORP-WTP approved CAP.

BNI Action 5 as stated in the Approved CAP

To address the cause related to a questioning attitude, this finding will be addressed in a Lessons Learned from PIERs entry in the monthly Engineering Nuclear Safety and Quality (ENSQ) presentation.

Evidence of Completion as stated in the Approved CAP

CCN documenting the ENSQ presentation that contains the required content.

Evidence of Completion Evaluation

ORP reviewed CCN: 248549 and confirmed that lessons learned regarding finding were included in the Engineering Nuclear Safety and Quality October 2011, presentation.

This action is considered complete in accordance with the ORP-WTP approved CAP.

Conclusion

Finding S-11-WED-RPPWTP-019-F01 is considered closed. However, there are actions/issues that need to be addressed before LVE equipment design verification is complete, including:

1) Open action tracking system on the electrical equipment DVR to modify it to address design changes, 2) The electrical equipment DVR does not specifically identify an LVE Transformer sizing calculation, it only cites an MVE sizing calculation (the ORP concern was about LVE equipment DV status), and 3) The revised electrical systems and components DVM indicates that design verification for LVE transformers and other equipment cited in the original surveillance (S-11-WED-RPPWTP-019) is on hold.

Surveillance Lead: _____

Date: _____

**WTP Engineering
Division Director:** _____

Date: _____



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

OCT 10 2013

13-WTP-0212

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – S-13-WCD-RPPWTP-008 – AUGUST 2013
CONSTRUCTION OVERSIGHT DIVISION LEVEL 2 ASSESSMENT SUMMARY REPORT

This letter transmits the results of the U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) review of Bechtel National, Inc.'s (BNI) construction performance at the WTP during August 2013. A summary of the Level 2 assessment activities is documented in the attached report.

One Priority Level 3 finding, two Opportunities for Improvement (OFI), and six Assessment Follow-up Items (AFI) were identified during the assessment period. The Priority Level 3 finding was written to document megger testing observed at the Analytical Laboratory was not being performed adequately, and conflicting and confusing requirements in BNI procedures and specifications related to the testing. A summary of the finding, OFIs, and AFIs is provided in Section III of the attached report.

No response is required for the Priority Level 3 finding, OFIs, or AFIs. The Priority Level 3 finding shall be entered into BNI's Project Issues Evaluation Report (PIER) system and tracked until the identified issues are corrected. The Priority Level 3 finding should be evaluated to determine if a cause and/or extent evaluation is necessary; the need to perform the cause and/or extent determination should be documented in the PIER associated with the finding. A WCD review of BNI's actions, including the need to perform a cause and extent evaluation, will be performed when all actions are completed. To ensure WCD comments are fully understood, the PIER owner should review the issued subtiered assessment report and discuss the issue with the originating assessor.

Mr. J.M. St. Julian
13-WTP-0212

-2-

OCT 10 2013

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, - "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ken Wade, Division Director, WCD, (509) 373-8637.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:DAH

Attachment

cc w/attach:

D. E. Kammenzind, BNI
M. G. McCullough, BNI
K. A. Smith, BNI
L. M. Weir, BNI
W. Walton, RL FIN
BNI Correspondence

Attachment
13-WTP-0212
S-13-WCD-RPPWTP-008

Attachment
13-WTP-0212

**Waste Treatment and Immobilization Plant Construction Oversight and Assurance
Division August 2013 Construction Level 2 Assessment Summary Report
S-13-WCD-RPPWTP-008**

14 pages (including coversheet)

U.S. DEPARTMENT OF ENERGY WASTE TREATMENT AND IMMOBILIZATION
PLANT PROJECT

INSPECTION: Waste Treatment and Immobilization Plant Construction
Oversight and Assurance Division August 2013 Construction
Level 2 Assessment Summary Report S-13-WCD-RPPWTP-008

REPORT NUMBER: S-13-WCD-RPPWTP-008

ORGANIZATION: WTP Construction Oversight and Assurance Division

IAS NUMBER: See Section VII

FACILITY: Bechtel National, Inc.; Waste Treatment and Immobilization Plant
Project

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: August 1 through August 31, 2013

TEAM MEMBERS: F. Hidden, Facility Representative
D. Hoffman, Facility Representative
P. Schroder, Facility Representative
M. Evarts, Site Inspector (Lucas Engineering)
W. Meloy, Site Inspector (Lucas Engineering)
R. Taylor, Site Inspector (Lucas Engineering)
D. Wallace, Site Inspector (Lucas Engineering)

APPROVED BY: Ken Wade, Director
WTP Construction Oversight and Assurance Division

**WASTE TREATMENT AND IMMOBILIZATION PLANT CONSTRUCTION
OVERSIGHT AND ASSURANCE DIVISION AUGUST 2013 CONSTRUCTION
LEVEL 2 ASSESSMENT SUMMARY REPORT**

I. Introduction

During the period August 1 through August 31, 2013, the U.S. Department of Energy (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) conducted assessments of important-to-safety and non-important-to-safety (Balance of Plant) construction activities at WTP. The WCD assessment team documented their efforts in 20 subtiered Level 2 assessment reports, which are maintained electronically and available upon request. During the assessment period, facility representatives also documented 34 WTP construction activities in the Operational Awareness Database. These activities included 25 facility representative activity log entries (used for logging notifications and other events) involving event reports and medical reports that were communicated by Bechtel National, Inc. (BNI) to the on-call facility representative.

One finding was identified during this assessment period:

Finding S-13-WCD-RPPWTP-008-F01 (Priority Level 3, Doug Hoffman): BNI had not clearly documented megger testing requirements in procedures and specifications, and WCD observed megger testing at the Analytical Laboratory being performed in an unacceptable manner. (Subtier 008-09)

The remainder of this summary report is outlined as follows:

- Sections II and III provide additional discussions of oversight activities and summaries of findings, opportunities for improvement (OFI), and assessment followup items (AFI).
- Section IV of this report is reserved for WCD identified emerging performance trends. However, WCD identified no open emerging negative performance trends during the assessment period.
- Section V of this report lists items opened and closed during this period. WCD opened one finding, two OFIs, and six AFIs during the assessment period, and closed two findings, one OFI, and two AFIs during the assessment period.
- Section VI contains a summary list of the 20 subtier assessment report conclusions written during this assessment period.
- Section VII contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this assessment period.

II. Oversight Activities

Subtier Assessment Report Activity Conclusions

- WCD site inspectors observed BNI performing and/or completing 14 predesignated or field surveillance-selected welded connections at the Balance of Facilities (BOF), Low-Activity Waste Facility, and High-Level Waste (HLW) Facility during August 2013. This included visual assessment of fitup and final weld condition. WCD site inspectors concluded the configuration and orientation of the installed items conformed to the drawings, and welding met the criteria specified in ASME B31.3 or AWS D1.1, as applicable. The inspectors also determined that BNI used the correct materials, and welded with the correct filler material, using properly qualified processes and personnel. BNI's examination personnel had been trained and certified for the examination method used, and inspection records reviewed were satisfactory. (Subtier 008-01)
- WCD site inspectors reviewed a total of 485 weld and test records during August 2013. The records had been completed by various BNI Field Engineering or Quality Control personnel, and submitted to Project Document Control. WCD site inspectors determined the reviewed records conformed to ASME B31.3 code requirements. (Subtier 008-02)
- WCD reviewed pressure testing performed at the WTP site during August 2013. The reviewer concluded that BNI performed testing in accordance with procedures, engineering specifications, and required codes and standards. Quality control and testing personnel had been trained and certified for the test methods used, and pertinent attributes of quality assurance documentation had been satisfactorily completed. (Subtier 008-03)
- On June 24, 2013, an iron worker injured his left arm while moving rebar by hand. Because surgery was required to correct the damage, BNI declared the event an Occurrence Reporting and Processing System (ORPS)-reportable occurrence (EM-RP--BNRP-RPPWTP-2013-0008). WCD opened AFI S-13-WCD-RPPWTP-008-A01 to track the corrective actions developed by BNI to preclude a recurrence of a similar event. (Subtier 008-04)
- WCD performed a review of the BOF Ammonia Reagent System to determine if the pressure relief valve lines, as designed, would adequately perform their intended safety function. The review found the discharges from the vessel and vaporizer's safety-related pressure relief valves were routed to a safe location away from operators, and were sized to not impede flow from the pressure relief valves at their design flow rates meeting the requirements of the design feature. (Subtier 008-05)
- WCD performed a review of the actions taken to close Project Issues Evaluation Report (PIER) 24590-WTP-PIER-MGT-13-0575-D tracking BNI's assessment of whether the equipment grounding conductor feeding Main Construction Office Building T-1, panelboard L1.2 was required to be upsized in accordance with the 1999 *National Electrical Code*. The review found BNI had adequately documented a voltage drop calculation in the PIER showing the voltage drop was less than that which would require

upsizing the equipment grounding conductor. The reviewer closed AFI S-13-WCD-RPPWTP-003-A03 based on this review. (Subtier 008-06)

- WCD observed BNI installing reinforcement, embedded items, and formwork for HLW Facility concrete wall placement HCC3118A. BNI completed work in an acceptable manner and in accordance with specifications, drawings, and the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and quality assurance documentation had been completed in a satisfactory manner. (Subtier 008-07)
- WCD observed BNI testing, placing, and consolidating concrete for four placements at the HLW Facility during the month of August. These included: (1) Placement HCC3118A, (2) Placement HCC3118 Pour Back, (3) Placement HCC3120, and (4) Placement HCC3117 Pour Back. All placements were wall sections at the (+) 37 ft elevation. Concrete placement conformed to procedures, engineering specifications, and relevant codes and standards. BNI conducted concrete receipt activities in accordance with the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and pertinent attributes of the quality assurance documentation had been completed and were acceptable. (Subtier 008-08)
- The WCD site inspector witnessed insulation resistance (megger) testing on the 600-volt cables installed at Analytical Laboratory and performed a review of BNI's design requirements for performing the test. The reviewer opened **Finding S-13-WCD-RPPWTP-008-F01** (Priority Level 3, Doug Hoffman) to document BNI's process for identifying the test requirements, performing the insulation resistance test, and documenting test results was less than adequate for validating acceptance. (Subtier 008-09)
- On December 10, 2012, a pipefitter injured his left knee while picking up an electrical extension cord. Because surgery was required to correct the damage, BNI declared the event an ORPS-reportable occurrence (EM-RP-BNRP-RPPWTP-2013-0009). The WCD reviewer opened AFI S-13-WCD-RPPWTP-008-A02 to track BNI-developed corrective actions. (Subtier 008-10)
- WCD performed an assessment on the turned over portion of the Cathodic Protection System (CPE). The assessment included a review of associated procedures, a spot check review of round sheets, CPE readings, and two system walkdowns. The reviewed portion of the CPE had been energized and periodic readings had been performed in accordance with 24590-BOF-EQ-CPE-00024, *Electrical Cathodic Protection Rectifier Power and Monitoring Plan*. (Subtier 008-11)
- WCD conducted an adequacy review of BNI's structural steel installation program to determine conformance with ANSI/AISC N690, *Specification for the Design Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities*; AISC 348, *Specification for Structural Joints Using ASTM A325 or A490 Bolts*; AISC 316 M016-89, *Manual of Steel Construction: Allowable Stress Design*; and project specifications. Specific areas reviewed included structural welding, bolted connection

assembly, erection tolerance, and nondestructive examination. The reviewer concluded BNI's primary controlling procedure, in concert with drawings and supporting procedures, complied with the specified requirements. BNI had installed components in a manner consistent with national standards and project specifications. Requisite inspections were performed by qualified personnel, and inspection records attested to satisfactory installation and were traceable to the items inspected. (Subtier 008-12)

- WCD and the ORP Radiological Control Program Manager performed a review of radiography operations at the WTP site during August 2013. BNI recently completed actions associated with Recurring Occurrence Report EM-RP--BNRP-RPPWTP-2011-0027; the review evaluated whether the present radiography subcontractor (Northwest Inspection Services) had incorporated the corrective actions and lessons learned from previous radiography occurrences. Based on the activities reviewed, Northwest Inspection Services had established processes to incorporate the corrective actions and lessons learned from the previous radiography events. However, a spot check review of radiography activities identified the following five potential areas of improvement: (1) Participation in construction management daily coordination meetings, (2) subcontractor attendance at safety meetings, (3) establishment of adequate radiation barriers, (4) conflicting radiography maps, and (5) documentation of corrected radiological deficiencies. These five examples were collectively identified as **OFI 13-WCD-RPPWTP-008-002**. (Subtier 008-13)
- WCD performed a review of the actions taken by BNI to prevent a recurrence of an event similar to ORPS event EM-RP--BNRP-RPPWTP-2012-0022, "Mobile Crane Struck Overhead Safety Clearance Line." The reviewer found BNI had taken adequate corrective actions and had appropriately documented the actions in 24590-WTP-PIER-MGT-12-1141. The reviewer closed **AFI S-12-WCD-RPPWTP-009-A02** based on this review. (Subtier 008-14)
- WCD performed a review of the actions taken by BNI in response to Finding S-12-WCD-RPPWTP-011-F02, which documented that BNI had not adequately completed the actions taken to address ORPS event EM-RP--BNRP-RPPWTP-2011-0016, "Hand Rail Falls from Vendor Truck During Delivery." Specifically, the action to brief delivery drivers who arrive at the WTP construction site without stopping at the Material Handling Facility had not been put in place. The review found BNI had adequately developed, documented, and completed actions that should ensure drivers arriving directly at the WTP are properly briefed on the hazards associated with unstrapping loads following transport. Based on this review, the reviewer closed **Finding S-12-WCD-RPPWTP-011-F02**. (Subtier 008-15)
- WCD reviewed BNI actions taken to prevent a recurrence of an event similar to ORPS event EM-RP--BNRP-RPPWTP-2011-0024, "Electricians Violated Requirements of a Work Package." The review found BNI had identified necessary process changes in 24590-WTP-PIER-MGT-11-1092-B, and documented the implementation of the process changes in 24590-WTP-PIER-MGT-12-1000-D. Based on this review, the reviewer closed **Finding S-12-WCD-RPPWTP-007-F02** (Priority Level 3). (Subtier 008-16)

- On August 27, 2013, a WTP site security officer entered a red barricaded area without prior authorization. Because overhead work was in progress within the barricaded area, BNI declared the event to be a reportable occurrence (EM-RP--BNRP-RPPWTP-2013-0012). The reviewer opened **AFI S-13-WCD-RPPWTP-008-A03** to track BNI corrective actions. (Subtier 008-17)
- On August 28, 2013, a chain fall assembly became detached from a nylon sling and dropped approximately 20 feet. The chain fall assembly landed within close proximity (< 3 feet) of two workers but no personnel were injured as a result of the event. BNI declared the event to be a reportable occurrence (EM-RP--BNRP-RPPWTP-2013-0013). The reviewer opened **AFI S-13-WCD-RPPWTP-008-A04** to track BNI corrective actions developed to preclude a recurrence of a similar event. (Subtier 008-18)
- On August 12, 2013, workers performed a mechanical installation from a scissor lift positioned in the path of a construction bridge crane without signing into the lockout tagout (LOTO) securing the crane. BNI reviewed the event and determined the LOTO process did not require the workers to be signed into a LOTO. BNI declared the event occurrence reportable as a management concern that did not fall into another category and initiated EM-RP--BNRP-RPPWTP-2013-0010. The reviewer opened **AFI S-13-WCD-RPPWTP-008-A05** to follow up on BNI actions taken to address the event. During a review of the event, the facility representative determined that BNI could have improved the event investigation process by conducting a fact-finding or critique meeting. The event involved several BNI organizations; a fact-finding or critique meeting would have helped the event investigator collect the facts and enable all organizations, including BNI management and the DOE, to understand the event. The reviewer opened **OFI S-13-WCD-RPPWTP-008-001** to document the OFI. The reviewer discussed the OFI with the BNI construction ORPS coordinator and BNI Construction Site Superintendent and subsequently closed the OFI. (Subtier 008-19)
- On July 31, 2013, workers modified a circuit in Temporary Building 46 using a single-point LOTO. When the work was complete, a worker noted that the panel indicated the modified circuit shared a neutral with another circuit. The shared neutral could have exposed workers to uncontrolled hazardous energy. BNI properly declared the event ORPS reportable. WCD opened **AFI S-13-WCD-RPPWTP-008-A06** to prompt a WCD review of the actions taken by BNI. (Subtier 008-20)

Facility Representative Review of Events, Injuries, and Safety Activities

There were six ORPS-reportable events in August 2013:

- EM-RP--BNRP-RPPWTP-2013-0008: Occupational injury – Iron worker who injured arm moving rebar requires surgery.
- EM-RP--BNRP-RPPWTP-2013-0009: Occupational injury – Pipefitter who injured knee when unplugging golf cart requires surgery.
- EM-RP--BNRP-RPPWTP-2013-0010: Management concern – LOTO gap allowing Affected Employees to work in path of moving/rotating equipment.

- EM-RP--BNRP-RPPWTP-2013-0011: Management concern – T-46 shared neutral.
- EM-RP--BNRP-RPPWTP-2013-0012: Management concern – Unauthorized worker enters a red barricaded area.
- EM-RP--BNRP-RPPWTP-2013-0013: Near miss – Chain fall lands near workers.

There were no Occupational Safety and Health Administration (OSHA) recordable injuries during August 2013.

BNI reported 27 medical/first aid events during August 2013.

BNI's notifications to the on-call facility representative of the injuries treated with first aid, construction events, and ORPS-reportable events were timely and contained adequate detail.

III. Summary of Findings, Opportunities for Improvement, and Assessment Followup Items

A finding is defined as an individual item not meeting a committed requirement (e.g., contract, regulation, safety basis, Quality Assurance Program, authorization basis document, procedure, or Standards/Requirements Identification Documents). Findings can be characterized as Priority Level 1, Priority Level 2, or Priority Level 3. WCD will follow up on all findings when BNI has completed necessary corrective actions to address the issues.

OFIs are observations that warrant attention, but are not a direct noncompliance with a requirement.

AFIs are matters requiring further review because of a potential finding or problem, because contractor or ORP action is pending, or because needed information to determine compliance with requirements and/or acceptable performance was not available at the time of the assessment.

During this assessment period, WCD identified one finding, two OFIs, and six AFIs.

Summary of Finding:

- **S-13-WCD-RPPWTP-008-F01 (Priority Level 3, Doug Hoffman):** BNI had not clearly documented megger testing requirements in procedures and specifications; and WCD observed megger testing at the Analytical Laboratory being performed in an unacceptable manner.

Requirements:

- Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), required BNI to develop a Basis of Design (BOD).
- BOD Section 1.8 requires BNI to comply with its Quality Assurance Manual (QAM).
- QAM Policy Q-11.1.2.1.2 requires characteristics to be tested and test methods to be employed shall be specified.
- QAM Policy Q-11.1.2.1.3 requires test results to be documented, conform with test requirements and acceptance criteria shall be evaluated.

- 24590-WTP-3PS-E00X-T0004, *Engineering Specification for Installation of Cables*, paragraph 5.4.2 requires all test results to be documented. Paragraph 5.4.3 lists requirements and acceptance values for insulation resistance tests.
- 24590-WTP-GPP-CON-3317, *DC High Potential, Megger & Continuity Testing*, paragraph 5.3.1 requires the responsible field engineer (RFE) to ensure permanent plant wiring is megger tested using the Cable Continuity/Megger Data Sheet and process in Appendix 2 and paragraph 5.7.5 requires the RFE to ensure the Cable Continuity/Megger Test Data Sheets are submitted to PDC.

Discussion: Contrary to the noted requirements, BNI's process for performing and documenting insulation resistance (megger) testing on 600-volt cables observed in the Analytical Laboratory was less than adequate. The Electrical Cable Installation Procedure, 24590-WTP-3PS-E00X-T0004, 24590-WTP-GPP-CON-3317, and Cable Continuity/Megger Test Data Sheet contained conflicting requirements; including:

1. Proper test setup – testing phase to phase and phase to ground/neutral versus phase to any nearby earth ground.
2. Test duration hold time – minimum one minute versus maximum one minute or until reading is stabilized.
3. Requirement for documenting “test results” – Cable Continuity/Megger Data sheets versus SetRoute cards.
4. Testing observed in the field did not comply with BNI's specifications or installation procedure. In addition, the test procedure did not contain sufficient detail for craft to perform the test adequately. (Subtier 08-09)

Summary of Assessment Followup Items:

- **S-13-WCD-RPPWTP-008-A01 (Paul Schroder):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0008, Iron Worker Injured While Lifting Rebar.

Discussion: An iron worker injured his left his left arm while moving a bundle of rebar on June 24, 2013. Initially, the event was recorded as an OSHA injury in accordance with 29 CFR 1904.7(b)(5) because medical treatment beyond first aid (i.e., prescription medication) had been administered. The injury was subsequently reevaluated and determined that surgery was required to correct the damage making this event occurrence reportable (EM-RP--BNRP-RPPWTP-2013-0008). The worker underwent surgery on July 23, 2013. ORP-WTP followup is required to review the occurrence report and ensure adequate corrective actions have been taken by BNI. (Subtier 08-04)

- **S-13-WCD-RPPWTP-008-A02 (Paul Schroder):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0009, Knee Injury Required Surgery.

Discussion: A pipefitter struck his left knee on the bumper of a golf cart on December 10, 2012. The WTP site medical initially treated the injury with normal first aid and the pipefitter was allowed to return to work. A subsequent evaluation by the pipefitter's personal medical provider determined that surgery was needed to repair the

damaged knee. The surgery was performed on May 13, 2013, making this event occurrence reportable (EM-RP--BNRP-RPPWTP-2013-0009). ORP-WTP followup is required to review the occurrence report and ensure BNI takes adequate corrective actions.

- **S-13-WCD-RPPWTP-008-A03 (Paul Schroder):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0012, Unauthorized Worker Entered Red Barricaded Area.

Discussion: On August 27, 2013, a WTP Site Security Officer entered a red barricaded area without prior authorization. Because potential overhead hazards existed within the barricaded area, BNI declared the event to be a reportable occurrence (EM-RP--BNRP-RPPWTP-2013-0012). ORP-WTP followup is required to review the occurrence report and ensure BNI takes adequate corrective actions.

- **S-13-WCD-RPPWTP-008-A04 (Paul Schroder):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0013, "Near Miss: Chain Fall Dropped at HLW Facility."

Discussion: On August 28, 2013, a chain fall assembly became detached from a nylon sling and fell approximately 20 feet. The chain fall assembly landed within close proximity (< 3 feet) of two workers but no personnel were injured as a result of the event. BNI declared this event occurrence reportable (EM-RP--BNRP-RPPWTP-2013-0013) and initiated an investigation. ORP-WTP followup is required to ensure BNI takes adequate corrective actions.

- **S-13-WCD-RPPWTP-008-A05 (Doug Hoffman):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0010, BNI's LOTO process did not ensure workers, working from an elevated scissor lift in the path of a construction bridge crane, were signed into a LOTO securing the crane.

Discussion: On August 12, BNI authorized a work package that included a work activity placing two employees in an elevated scissor lift in the travel path of a construction bridge crane without signing onto the LOTO associated with the work. BNI determined there was a gap in the LOTO process allowing workers to work near or in the path of moving equipment without being signed into a LOTO. ORP-WTP followup is required to ensure BNI takes adequate corrective actions.

- **S-13-WCD-RPPWTP-008-A06 (Doug Hoffman):** Followup to ORPS EM-RP--BNRP-RPPWTP-2013-0011, "Label indicating a shared neutral was discovered after work was completed."

Discussion: On July 31, 2013, workers modified a circuit in Temporary Building 46 using a single point LOTO. Following the completion of work, a worker noted that the panel indicated the circuit modified shared a neutral with another circuit. The shared neutral could have exposed workers to uncontrolled hazardous energy. BNI properly declared the event ORPS reportable. The reviewer opened this AFI to prompt a WCD review of BNI actions taken as a result of the event.

Summary of Opportunities for Improvement:

- **S-13-WCD-RPPWTP-008-001 (Doug Hoffman):** A fact-finding meeting would have improved the shared understanding of ORPS event EM-RP--BNRP-RPPWTP-2013-0010.

Discussion: BNI did not use a fact-finding or critique meeting as part of the event investigation. Because the event crossed many organizational lines, one meeting used to collect a chronological sequence of events would have been beneficial to the shared understanding of the event. (Subtier 008-19)

- **13-WCD-RPPWTP-008-002 (Paul Schroder):** Potential improvements related to the planning and setup of radiography activities.

Discussion: The facility representative identified five OFI areas related to the planning and setup of radiography. Improvement areas included: (1) Participation in construction management daily coordination meetings, (2) subcontractor attendance at safety meetings, (3) establishment of adequate radiation barriers, (4) conflicting radiography maps, and (5) documentation of corrected radiological deficiencies. (Subtier 008-13)

IV. Emerging Construction Performance Trends

The WCD assessment team reviewed previously identified issues and current construction performance to identify any emerging negative performance trends before issuing this report. No new trends were identified in this assessment period.

V. List of Inspection Items Opened and Closed

Table 1. Opened and Closed Inspection Items.

Number	Finding, OFI, or AFI	Description
Opened Inspection Items		
S-13-WCD-RPPWTP-008-F01 (Priority Level 3; Doug Hoffman)	Finding	Conflicting requirements in megger specifications and procedures, and testing less than adequate (Subtier 008-09)
S-13-WCD-RPPWTP-008-001 (Doug Hoffman)	OFI	Event investigation of ORPS EM-RP--BNRP-RPPWTP-2013-0010 could have been improved by conducting a fact finding (Subtier 008-19)
S-13-WCD-RPPWTP-008-002 (Paul Schroder)	OFI	Improvements could be made in the performance of radiography (Subtier 008-13)
S-13-WCD-RPPWTP-008-A01 (Paul Schroder)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0008: Injury – Iron worker injured lifting rebar requires surgery (Subtier 008-04)
S-13-WCD-RPPWTP-008-A02 (Paul Schroder)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0009: Injury – Pipefitter knee injury requires surgery (Subtier 008-10)

Table 1. Opened and Closed Inspection Items.

Number	Finding, OFI, or AFI	Description
S-13-WCD-RPPWTP-008-A03 (Paul Schroder)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0012: Management Concern -- Security officer crosses red barricade (Subtier 008-17)
S-13-WCD-RPPWTP-008-A04 (Paul Schroder)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0013: Near Miss -- Chain fall lands near workers (Subtier 008-18)
S-13-WCD-RPPWTP-008-A05 (Doug Hoffman)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0010: Management Concern -- LOTO gap identified (Subtier 008-19)
S-13-WCD-RPPWTP-008-A06 (Doug Hoffman)	AFI	Followup on ORPS EM-RP--BNRP-RPPWTP-2013-0011: Management Concern -- Potential shared neutral found following work (Subtier 008-20)
Closed Inspection Items		
S-12-WCD-RPPWTP-007-F02	Finding	Inadequate actions taken to close Occurrence Report EM-RP--BNRP-RPPWTP-2011-0024 (Subtier 08-16)
S-12-WCD-RPPWTP-009-A02	AFI	Documented Occurrence Report EM-RP--BNRP-RPPWTP-2012-0022, "Mobile Crane Struck Overhead Safety Clearance Line" (Subtier 08-14)
S-12-WCD-RPPWTP-011-F02	Finding	Corrective actions for verbal briefings to delivery drivers not performed (Subtier 08-15)
S-13-WCD-RPPWTP-003-A03	AFI	The grounding conductor in panelboard L1.2 was not sized similarly to feeder conductors (Subtier 08-06)
S-13-WCD-RPPWTP-008-001	OFI	Event investigation of ORPS 2013-10 could have been improved by conducting a fact finding (Subtier 008-19)

AFI = assessment followup item.
OFI = opportunity for improvement.

VI. List of Subtier Assessment Reports Issued During the Assessment Period

Table 2. Subtier Assessment Reports Issued During Assessment Period.

Subtier Assessment Report No.	Inspection Subject
S-13-WCD-RPPWTP-008-01	14 weld assessments performed in August 2013
S-13-WCD-RPPWTP-008-02	485 completed records reviewed in August 2013
S-13-WCD-RPPWTP-008-03	Pressure testing observed in August 2013
S-13-WCD-RPPWTP-008-04	Iron worker injury requires surgery and becomes ORPS reportable (EM-RP--BNRP-RPPWTP-2013-0008) Opened AFI S-13-WCD-RPPWTP-008-A01
S-13-WCD-RPPWTP-008-05	BOF design feature review, routing of ammonia relief valve discharges

Table 2. Subtier Assessment Reports Issued During Assessment Period.

Subtier Assessment Report No.	Inspection Subject
S-13-WCD-RPPWTP-008-06	Followup on BNI's actions to address S-13-WCD-RPPWTP-003-A03 Closed S-13-WCD-RPPWTP-003-A03
S-13-WCD-RPPWTP-008-07	Review of HLW reinforcement, embedded items and formwork for HLW wall HCC3118A
S-13-WCD-RPPWTP-008-08	HLW concrete placement HCC3118A, HCC3118 pour back, HCC3120 and HCC3117 pour back
S-13-WCD-RPPWTP-008-09	Observation of megger testing at Building 87 Opened S-13-WCD-RPPWTP-008-F01
S-13-WCD-RPPWTP-008-10	Pipefitter's knee injury requires surgery and becomes ORPS reportable (EM-RP--BNRP-RPPWTP-2013-0009) Opened S-13-WCD-RPPWTP-008-A02
S-13-WCD-RPPWTP-008-11	Review of Cathodic Protection System
S-13-WCD-RPPWTP-008-12	Review of Structural Steel Installation Program
S-13-WCD-RPPWTP-008-13	Review of radiography Opened S-13-WCD-RPPWTP-008-O02
S-13-WCD-RPPWTP-008-14	Review of ORPS EM-RP--BNRP-RPPWTP-2012-0022 Closed AFI 12-WCD-RPPWTP-009-A02
S-13-WCD-RPPWTP-008-15	Review of Finding 12-WCD-RPPWTP-011-F02 -- Outstanding actions to address ORPS EM-RP--BNRP-RPPWTP-2011-0016 where handrails fell from a trailer during unloading were not adequately completed Closed 12-WCD-RPPWTP-011-F02
S-13-WCD-RPPWTP-008-16	Review of actions taken to address 12-WCD-RPPWTP-007-F02 -- Actions taken to preclude recurrence of and event similar to ORPS EM-RP--BNRP-RPPWTP-2011-0024 had not been implemented Closed 12-WCD-RPPWTP-007-F02
S-13-WCD-RPPWTP-008-17	Documentation of ORPS EM-RP--BNRP-RPPWTP-2013-0012 -- Security officer enters red barricade Opened 13-WCD-RPPWTP-008-A03
S-13-WCD-RPPWTP-008-18	Documentation of ORPS EM-RP--BNRP-RPPWTP-2013-0013 -- Chain falls and lands near worker Opened 13-WCD-RPPWTP-008-A04
S-13-WCD-RPPWTP-008-19	Documentation of ORPS EM-RP--BNRP-RPPWTP-2013-0010 -- LOTO gap results in workers in path of crane not signed into LOTO Opened 13-WCD-RPPWTP-008-A05 Opened and Closed OFI 13-WCD-RPPWTP-008-O01
S-13-WCD-RPPWTP-008-20	Documentation of ORPS EM-RP--BNRP-RPPWTP-2013-0011 -- Potential shared neutral identified in Building 46 after work complete Opened 13-WCD-RPPWTP-008-A06

Table 2. Subtier Assessment Reports Issued During Assessment Period.

Subtier Assessment Report No.	Inspection Subject
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AFI = assessment followup item.
BOF = Balance of Facilities.
HLW = High-Level Waste (Facility).

LOTO = lockout/tagout.
OFI = opportunity for improvement.
ORPS = Occurrence Reporting and Processing System.

VII. Integrated Assessment Schedule Number Summary

Table 3. Integrated Assessment Schedule Number Summary.

IAS No.	Subtier Assessment Number	Report Issued Date	Assessor	Description
171	S-13-WCD-RPPWTP-008-13	8/21/13	Paul Schroder	OSHA - Radiography
178	S-13-WCD-RPPWTP-008-12	08/26/13	Bill Meloy	Structural Steel Installation Program Review
180	S-13-WCD-RPPWTP-008	See cover letter	Doug Hoffman	Construction Acceptance Inspections
181	S-13-WCD-RPPWTP-008-11	08/21/13	Paul Schroder	Cathodic Protection
182	S-13-WCD-RPPWTP-008-05	08/07/13	Fred Hidden	BOF Design Feature

BOF = Balance of Facilities.
IAS = Integrated Assessment Schedule.



OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

AUG 26 2013

13-WTP-0153

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – SURVEILLANCE REPORT S-13-WCD-RPPWTP-006 – JUNE 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

This letter transmits the results of the U.S. Department of Energy (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) review of Bechtel National, Inc.'s (BNI) construction performance at the WTP during June 2013. A summary of the surveillance activities is documented in the attached report.

Three Priority Level 3 findings, two opportunity for improvement items, and four assessment follow-up items were identified during the surveillance period. The Priority Level 3 findings were written to document: 1) BNI had installed an un-fused welding receptacle when a fused welding receptacle was called out in the approved design; 2) BNI had not bonded non-metallic welding receptacles to their associated raceways, as required by the National Electrical Code (NEC); and 3) An issued BNI design document that had not properly protected two roll-up door motors, as required by the NEC. A summary of the findings, opportunity for improvement items, and assessment follow-up items are provided in Section III of the attachment report.

No response is required for the Priority Level 3 findings, opportunity for improvement items or assessment follow-up items. The Priority Level 3 findings shall be entered into BNI's Project Issues Evaluation Report (PIER) system and tracked until the identified issues are corrected. Priority Level 3 findings should be evaluated to determine if a cause and/or extent evaluation is necessary; the need to perform the cause and/or extent determination should be documented in PIERs associated with the DOE findings. A WCD review of BNI's actions, including the need to perform a cause and extent evaluation, will be performed when all actions are completed. To ensure WCD issues are fully understood, PIER owners should typically review the issued sub-tiered assessment report and discuss the issue with the originating assessor.

Mr. J.M. St. Julian
13-WTP-0153

-2-

AUG 26 2013

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ken Wade, Director, WTP Construction Oversight and Assurance Division, (509) 373-8637.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP: DAH

Attachment

cc w/attach:
D. E. Kammenzind, BNI
M. G. McCullough, BNI
K. A. Smith, BNI
L. M. Weir, BNI
W. Walton, RL FIN
BNI Correspondence

Attachment
13-WTP-0153
S-13-WCD-RPPWTP-006

Attachment
13-WTP-0153

Waste Treatment and Immobilization Plant (WTP) Construction
Oversight and Assurance Division (WCD) June 2013 Construction
Surveillance Summary Report S-13-WCD-RPPWTP-006

15 Pages (Including this Coversheet)

U.S. DEPARTMENT OF ENERGY
WASTE TREATMENT AND IMMOBILIZATION PLANT PROJECT

INSPECTION: Waste Treatment and Immobilization Plant (WTP) Construction Oversight
and Assurance Division (WCD) June 2013 Construction Surveillance
Summary Report

REPORT NO.: S-13-WCD-RPPWTP-006

INTEGRATED ASSESSMENT SCHEDULE (IAS) NUMBERS: (See Section VII of this report
for a listing of IAS numbers)

FACILITY: Bechtel National, Inc.; Waste Treatment and Immobilization Plant Project

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: June 1 through June 30, 2013

INSPECTORS: F. Hidden, Facility Representative
D. Hoffman, Facility Representative
P. Schroder, Facility Representative
H. Taylor, Construction Cost & Schedule
*M. Evarts, Site Inspector
*W. Meloy, Site Inspector
*R. Taylor, Site Inspector
*D. Wallace, Site Inspector

*Subcontractor to Lucas Engineering and Management Services, Inc.
Supporting ORP

APPROVED BY: K. G. Wade, Director
WTP Construction Oversight and Assurance Division

WTP CONSTRUCTION OVERSIGHT AND ASSURANCE DIVISION JUNE 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

I. Introduction

During the period June 1 through June 30, 2013, the U.S. Department of Energy, Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) conducted construction inspections of Important-To-Safety (ITS) and Non-ITS (Balance of Plant) activities during WTP construction. These inspections were documented in sub-tiered surveillance reports and maintained electronically. A total of 18 sub-tier surveillance reports were generated during the inspection period and have been summarized in Section II and III below. These sub-tier surveillance reports are available upon request. The Facility Representatives (FR) also documented 24 WTP construction activities in the Operational Awareness Database. These activities included 19 FR Activity Log Entries (used for logging notifications and other events). FR Activity Log Entries, involving event reports and medical reports, were communicated by Bechtel National, Inc. (BNI) to the on-call FR.

Three findings were identified during this assessment period including:

Finding S-13-WCD-RPPWTP-006-F01 (Priority Level 3; Doug Hoffman): BNI installed a non-fused welding receptacle, LVE-RCPT-6002, at the Analytical Laboratory (LAB) vice the fused receptacle called out by design documents. (Sub-Tier 006-11)

Finding S-13-WCD-RPPWTP-006-F02 (Priority Level 3; Doug Hoffman): BNI had not correctly bonded rigid metal conduit to its associated non-metallic weld receptacle enclosures per the National Electrical Code (NEC) requirements. (Sub-Tier 006-11)

Finding S-13-WCD-RPPWTP-006-F03 (Priority Level 3; Doug Hoffman): BNI issued design documents with incorrectly sized (per NEC requirements) overcurrent protection devices, for two Overhead Coiling Doors in the LAB. (Sub-Tier 006-17)

Sections II and III provide additional discussions of oversight activities and summary of findings, opportunity for improvement items, and assessment follow-up items.

Section IV of this report discusses WCD identified emerging performance trends. There were no open emerging negative performance trends identified by WCD during the surveillance period.

Section V of this report contains a listing of items opened, closed, and discussed during this period. There were three findings, two Opportunities for Improvement Items (OFI) and four Assessment Follow-up Items (AFI) opened; five AFIs, two OFIs, and one finding were closed during the surveillance period.

Section VI contains a summary listing of the 18 sub-tier surveillance reports written during this inspection period.

Section VII contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this inspection period.

II. Oversight Activities

Sub-Tier Surveillance Report Activity Conclusions

- During June 2013 ORP observed BNI performing and/or completing twelve welded connections at the Low-Activity Waste (LAW) Facility and High-Level Waste (HLW) Facility. Observations included visual assessment of fit-up, visual assessment of final weld condition, and review of radiographic film. Configuration and orientation of the items observed conformed to design drawings and welding met the specified criteria as referenced in American Society of Mechanical Engineers (ASME) B31.3. BNI was found to have used correct materials and welded with the correct filler material; using processes and personnel qualified in accordance with ASME B31.3. The review found BNI's examination personnel had been properly trained and certified for the examination methods used. All inspection records reviewed were satisfactory. (Sub-Tier 006-01)
- WCD reviewed a total of 413 weld and test records during the month of June 2013. The records had been completed by various BNI Field Engineering or Quality Control personnel, and submitted to Project Document Control. Reviewed records conformed to the ASME B31.3 code requirements. (Sub-Tier 006-02)
- WCD witnessed BNI performing pressure testing at the WTP site during the month of June 2013. BNI performed testing in accordance with procedures, engineering specifications, and required codes and standards. Quality control and testing personnel were trained and certified for the test methods used, and pertinent attributes of quality assurance documentation had been satisfactorily completed. (Sub-Tier 006-03)
- WCD performed a follow-up review of BNI's actions taken to address occurrence reportable event EM-RP--BNRP-RPPWTP-2012-0002, *Electricians Installed a Frequency Control Box to a Temporary Panel without Guarded Terminals*. The review found BNI had adequately documented the event within the Occurrence Report and had developed and completed adequate actions to prevent recurrence. AFI S-12-WCD-RPPWTP-001-A02 was closed based upon this review. (Sub-Tier 006-04)
- WCD performed a follow-up review of BNI's actions taken to address occurrence reportable event EM-RP--BNRP-RPPWTP-2012-0028, *Employee Received Broken Bone after Rolling Heavy Pallet Jack onto Right Foot*. The review found BNI had adequately documented the event within the Occurrence Report and had completed adequate actions to prevent a similar occurrence. AFI S-12-WCD-RPPWTP-011-A03 was closed based on this review. (Sub-Tier 006-05)

- During routine radiological surveys performed at the WTP, Radiation Control Technicians found contaminated bird nesting material on the east side of the HLW facility. Occurrence report EM-RP--BNRP-RPPWTP-2013-0005 was initiated by BNI to document the event; WCD opened AFI S-13-WCD-RPPWTP-006-A01; (Doug Hoffman) to prompt a review of the corrective actions taken by BNI as a result of the event. (Sub-Tier 006-06)
- The Office of Health Safety and Security (HSS) and WCD reviewed selected aspects of construction quality indicators. HSS reviewed installed structural steel bolting, hydrostatic/pneumatic pressure testing activities, contractor management assessment reports, contractor self-assessment reports, and nonconformance reports performed during 2013. HSS did not express any concerns with what was observed or identify any significant issues. (Sub-Tier 006-07)
- On June 10, 2013, two subcontractor employees were in the process of modifying a loaded plywood box in the HLW Facility using a telescopic forklift to elevate the box. While the box was being modified the box fell from the forklift tines approximately 4' to the floor. No personnel were injured. BNI declared the event to be reportable occurrence EM-RP--BNRP-RPPWTP-2013-0004; AFI S-13-WCD-RPPWTP-006-A02 was opened to track the corrective actions developed by BNI to preclude occurrence of a similar event. (Sub-Tier 006-08)
- A review was performed on actions taken by BNI, as a result of finding S-09-WCD-RPPWTP-097-F06 (Priority Level 3) where the LAB Process Vacuum Skid had one example where it did not meet the separation requirements for power and signal conductors as described in BNI's Specifications and one example where the skid did not meet the grounding requirements as described in the NEC. BNI performed and accepted re-worked per final disposition of Construction Deficiency Report 24590-WTP-CDR-CON-10-0200 bringing the Vacuum Skid into compliance with the specification and the NEC. Based on the review of actions taken; finding S-09-WCD-RPPWTP-097-F06 (Priority Level 3) is closed. (Sub-Tier 006-09)
- WCD performed a review of the actions taken by BNI to address occurrence reportable event EM-RP--BNRP-RPPWTP-2012-0021, when electricians performing maintenance on roll-up doors installed in Building 91 [Balance of Facilities Switchgear building] discovered the subcontractor provided wiring did not match the wiring configuration design or panel schedule. The review found BNI had taken adequate actions to correct the issue and prevent a future recurrences. AFI S-12-WCD-RPPWTP-009-A01 was closed, and OFI S-13-WCD-RPPWTP-006-O01; (Doug Hoffman) was opened to identify BNI could have better correlated cause codes in the PIER and occurrence report. OFI S-13-WCD-RPPWTP-006-O01; (Doug Hoffman) was closed when BNI made on-the-spot corrections to address the mismatched cause codes. (Sub-Tier 006-10)

- WCD performed a review of welding receptacles installed and accepted in the LAB. The review found: 1) BNI had installed an un-fused welding receptacle when the issued design called for a fused receptacle; Priority Level 3 finding **S-13-WCD-RPPWTP-006-F01; (Doug Hoffman)** was opened to document the non-conformance (this finding is similar to Finding S-10-WCD-RPPWTP-002-F07 documented in surveillance report S-10-WCD-RPPWTP-002-33); 2) In three instances BNI failed to bond the metal conduit in a non-metallic box as required by the NEC; Priority Level 3 finding **S-13-WCD-RPPWTP-006-F02; (Doug Hoffman)** was opened to document the non-conformances (this finding is similar to finding S-10-WCD-RPPWTP-007-F03 documented in surveillance report S-10-WCD-RPPWTP-007-36); 3) Several more examples were identified where BNI failed to annotate the acceptance criteria on the inspection record as required by NQA-1 and construction procedure 24590-WTP-GPP-CON-7101, which is already being tracked by Priority Level 2 finding S-13-WCD-RPPWTP-003-F02. The identified issues were discussed with BNI Field Engineering; Construction Deficiency Report 24590-WTP-CDR-CON-13-0524 and Project Issues Evaluation Report (PIER) 24590-WTP-PIER-MGT-13-0692-C were opened by BNI to document and address these issues. (Sub-Tier 006-11)
- WCD performed a general surveillance of the pipe laydown areas around the WTP construction site. The review found BNI was doing monthly surveillances as required by their procedures; however, ORP noted a small number of pipe caps missing or damaged, and several pipe spools which had become dislodged from their dunnage. An OFI was opened to identify BNI could expand the scope of the monthly surveillances to include outlying areas and areas where construction has been halted. OFI **S-13-WCD-RPPWTP-006-002; (Doug Hoffman)** was opened and discussed with BNI's Field Quality Control Manager who committed to perform more detailed monthly surveillances. BNI captured the issues identified by the surveillance in report 24590-WTP-SV-MATL-13-034. OFI **S-13-WCD-RPPWTP-006-002; (Doug Hoffman)** was closed following the discussion with the Field Quality Control Manager. (Sub-Tier 006-12)
- WCD performed a scheduled LAW design feature review. The design feature selected was the Q orifice installed within the Plant Service Air system. The orifice was designed to limit the amount of hydrogen purge air introduced into the LAW process vessels and thereby into the secondary melter off gas system. The review found BNI had identified several inconsistencies in the system description and a questionable value had been used as a bounding value in 24590-LAW-M4C-LOP-00001, *LAW Melter Offgas System Design Basis Flowsheets* for purge air. AFI **S-13-WCD-RPPWTP-006-A04; (Doug Hoffman)** was opened to allow BNI additional time to evaluate the system description and calculation, and make any needed corrections. (Sub-Tier 006-13)
- WCD performed a review of BNI's Confined Space program; including the changes made to the program and other actions taken as a result of Occurrence Reportable (ORPS) event 2012-0018. The FR determined the actions taken by BNI were adequate to prevent a similar occurrence and BNI's processes were being appropriately followed by BNI safety assurance personnel and confined space supervisors. AFI **S-12-WCD-RPPWTP-008-A04** was closed based on this review. (Sub-Tier 006-14)

- During the month of June, WCD observed BNI testing, placing, and consolidating concrete for one placement at the HLW Facility: Wall HCC3105 at elevation (+) 37'-0." Concrete placement conformed to procedures, engineering specifications, and the relevant codes and standards. Concrete receipt activities were conducted in accordance with the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and pertinent attributes of the quality assurance documentation had been completed. (Sub-Tier 006-15)
- WCD performed a review of the actions taken by BNI to address ORPS event EM-RP--BNRP-RPPWTP-2012-0023, where Personal Protective Equipment (PPE) to protect workers from potential arc flash hazards during Safe Condition Checks was incorrectly selected on two separate occasions. The review found BNI had taken adequate actions and had adequately documented those actions in PIER 12-1156; AFI S-12-WCD-RPPWTP-009-A03 was closed based on the review. (Sub-Tier 006-16)
- WCD performed a review of BNI's installation of Motor Control Centers in the LAB. This review identified one AFI with several examples where discrepancies existed between the design documents or between design documents and the electrical equipment and one finding where design engineering incorrectly sized the overcurrent protection for two Overhead Coiling Doors. AFI S-13-WCD-RPPWTP-006-A03; (Doug Hoffman) was opened to track BNI's correction of inconsistencies between the Motor Control Centers and design documents. Priority Level 3 finding S-13-WCD-RPPWTP-006-F03; (Doug Hoffman) was opened to identify BNI's design documents that did not meet NEC requirements when sizing the overcurrent protection for two Overhead Coiling Doors. (Sub-Tier 006-17)
- WCD performed a review of how BNI provided feedback via lessons learned to meet the requirements of Integrated Safety Management System (ISMS) Core Function #5 – *Provide Feedback*. During the review a pre-job briefing was observed to determine what methods were used to incorporate lessons learned from complex-wide work activities. The review found BNI had adequately incorporated lessons learned from complex-wide work activities into the work package and briefing, satisfying ISMS Core Function #5. (Sub-Tier 006-18)

Facility Representative (FR) Event and Safety Activities

- There were two ORPS events in June 2013: 1) Contamination was found in swallow droppings on the east side of the HLW facility and in other areas; and 2) A box loaded with metal shims being modified by workers fell from a forklift; both events were properly categorized and reported to the on-call FR in a timely manner.
- There was one Occupational Safety and Health Administration (OSHA) recordable injury during June 2013. The event occurred when an iron worker lifted a 200 pound bundle of rebar with a partner. The worker strained his forearm, received prescription medication, and was assigned restricted work activities.
- BNI notified the on-call FR of 12 medical/first aid events during June 2013. BNI's notifications to the on-call FR were timely and contained adequate detail.

III. Summary of Findings, Opportunity for Improvement Items, and Assessment Follow-up Items

A finding is defined as an individual item not meeting a committed requirement (e.g., contract, regulation, safety basis, Quality Assurance program, authorization basis document, procedure, or Standards/Requirements Identification Documents). Findings can be characterized as Priority Level 1, Priority Level 2, or Priority Level 3. WCD will follow-up on findings once BNI has completed necessary corrective actions to address the issues.

During this inspection period, the following findings were identified:

Summary of Findings:

- **Finding S-13-WCD-RPPWTP-006-F01 (Priority Level 3; Doug Hoffman):** BNI installed a non-fused welding receptacle, LVE-RCPT-6002, at the LAB vice the fused receptacle called out by design documents.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), required BNI to develop a Basis of Design (BOD), and BOD Section 1.8 required BNI to comply with its *Quality Assurance Manual (QAM)*.

QAM Policy Q-05.1, Section 5.1.2, required activities affecting items and services to be prescribed by and performed in accordance with documented instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed results have been satisfactorily attained.

Drawing 24590-LAB-E2-E53T-00011 requires the welding receptacle to be in accordance with drawing 24590-WTP-E9-50-00216, detail 36.

Detail 36 required the welding receptacles to be "Appleton, ASR Non-metallic Interlocked Receptacle, 600 VAC, 60A, fused, Catalog Number ASR6034F."

BOD Section 8.1.1.3 required BNI to comply with *National Electrical Code (NEC)*.

NEC Article 210-21(b)(1) states: "A single receptacle installed on an individual branch circuit shall have an ampere rating of not less that of the branch circuit."

Discussion:

Contrary to the above, BNI installed and accepted a non-fused welding receptacle vice the fused receptacle called out by the drawing detail. Additionally Field Engineering did not note the completed installation was not compliant with the NEC requirement to provide the non-fused receptacle with appropriately sized overcurrent protection.

- **Finding S-13-WCD-RPPWTP-006-F02 (Priority Level 3; Doug Hoffman):** BNI had not correctly bonded rigid metal conduit to their associated non-metallic weld receptacle enclosures per NEC requirements.

Requirement:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), required BNI to develop a BOD.

BOD Section 8.1.1.3 required BNI to comply with *National Electrical Code* (NEC).

NEC Article 300-10 required metal raceways, cable armor, and other metal enclosures for conductors to be metallically joined together into a continuous electric conductor and be connected to all boxes, fittings, and cabinets so as to provide effective electrical continuity.

NEC Article 370-3 allows nonmetallic boxes to be permitted only with open wiring on insulators, concealed knob-and-tube wiring, cabled wiring methods with entirely nonmetallic sheaths, flexible cords, and nonmetallic raceways. *Exception No. 1: Where internal bonding means are provided between all entries, nonmetallic boxes shall be permitted to be used with metal raceways or metal-armored cables.*

Discussion:

Contrary to the above, the metal conduits installed to the three non-metallic weld receptacle enclosures were not bonded to the equipment grounding conductor terminal bar, which serves as the enclosure's internal bonding means.

- **Finding S-13-WCD-RPPWTP-006-F03 (Priority Level 3; Doug Hoffman):** BNI issued design documents with incorrectly sized overcurrent protection, per NEC requirements, for two Overhead Coiling Doors in the LAB.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), requires BNI to develop a BOD, and BOD Section 8.1.1.3 requires BNI to comply with the NEC.

NEC, Article 430-52 requires a protective device to have a rating or setting not exceeding the value calculated according to the values given in Table 430-52 -- *Maximum Rating or Setting of Motor Branch-Circuit, Short Circuit, and Ground-Fault Protective Devices.*

Table 430-152 states a 0.5 HP motor (1.1 full load amperage) requires a 15 amp inverse time circuit breaker ($250\% \times 1.1 = 2.75$) or a 3 amp or 6 amp fuse depending if it is non-time delay or time-delay fuses ($\text{non-time delay } 300\% \times 1.1 = 3.3$ or $\text{time-delay } 175\% \times 1.1 = 1.925$).

Discussion:

Contrary to the above, BNI installed 20 amp circuit breakers in Motor Control Center LVE-MCC-60002 compartment 5B (LVE-SW-00605 Overhead Coiling door A-0160-3) and compartment 7FL (LVE-SW-00601 Overhead Coiling door A-0135-2) as required by 24590-LAB-EC-LVE-00002 (*Motor Control Center Schedule LVE-MCC-60002*) vice a 15 amp circuit breaker (next standard size rating protective device) required by the NEC.

AFI Items are matters requiring further review because of a potential finding or problem, because contractor or ORP action is pending, or because needed information to determine compliance with requirements and/or acceptable performance was not available at the time of the assessment.

- **S-13-WCD-RPPWTP-006-A01 (Doug Hoffman):** Follow-up on ORPS Event EM-RP--BNRP-RPPWTP-2013-0005, *Requested Radiological Readings Find Beta/Gamma Readings in Bird Excrement and Nesting Material.*

Discussion:

During routine radiological surveys being performed on Wednesday, June 05, 2013, WTP Radiation Control Technicians found elevated beta/gamma radiation levels in muddy nesting material on the east side of the HLW facility; ORP follow-up action is necessary to evaluate the actions taken by BNI as a result of this event.

- **S-13-WCD-RPPWTP-006-A02 (Doug Hoffman):** ORPS 13-0001, Box Dropped from Forklift

Discussion:

On June 10, 2013, two Chicago Bridge and Iron employees were in the process of modifying a plywood box at the HLW Facility while it was being held by a telescopic forklift. The load within the plywood box shifted causing the box to fall from the forklift. BNI declared this event occurrence reportable (EM-RP--BNRP-RPPWTP-2013-0004) and initiated an investigation. ORP follow-up is required to ensure adequate corrective actions are taken by BNI.

- **S-13-WCD-RPPWTP-006-A03 (Doug Hoffman):** Labeling and inconsistencies were identified in BNI design documents associated with Motor Control Centers in the LAB.

Discussion:

During review of Motor Control Centers being installed in the LAB, WCD identified labeling errors, drawings that had not been properly updated, and physical issues with as-installed configuration. Since the installation was still in process and BNI's normal review process should identify these errors during this review process, WCD will perform a follow up to ensure they are appropriately addressed.

- **S-13-WCD-RPPWTP-006-A04 (Doug Hoffman):** Additional time was needed to allow BNI to correct self-identified issues and evaluate bounding hydrogen purge rates associated with the Test Acceptance Criteria contained in the Plant Service Air System Description.

Discussion:

BNI identified the need to revise the Plant Service Air System Description. The FR additionally questioned the value used in 24590-LAW-M4C-LOP-00001, *LAW Melter Offgas System Design Basis Flowsheets* for bounding conditions of hydrogen purge air introduced during bounding conditions. Additional time was needed to allow BNI to evaluate and correct, if necessary, the PSA system description and melter offgas flow sheets.

OFI items are observations that warrant attention, but are not a direct noncompliance with a requirement:

- **S-13-WCD-RPPWTP-006-001 (Doug Hoffman):** The Cause Code in ORPS report EM-RP--BNRP-RPPWTP-2012-0021 was inconsistent with the Cause Code documented in the associated PIER (12-1131) and Apparent Cause determination (ACEF-CON-12-0031).

Discussion:

The FR observed the Cause Code was reported as A4B1C04 (Management Problem, Management Methods LTA, Management Follow-up, or Monitoring of Activities did not Identify Problems) in the ORPS report and Event Investigation, and A1B4C03 in the PIER and Apparent Cause Analysis. Cause Code A1B4C03 - Design/Engineering Problem; Design Verification/Installation LTA; Independent Inspection of Design/Installation LTA, is deemed more appropriate for this event. Upon communication of the discrepancies, BNI implemented revisions to the documents to make them consistent – no further action or review is necessary.

- **S-13-WCD-RPPWTP-006-002 (Doug Hoffman):** BNI could increase the area of coverage during the monthly storage surveillances to assure a more representative sample of pipe caps and field stored pipe is reviewed.

Discussion:

In general, BNI is doing an acceptable job performing monthly storage surveillances, and is identifying missing caps and pipe spools not stored properly on dunnage; however, there is an opportunity for improvement for BNI to expand the scope of the surveillance to include outlying areas and areas where active construction is not being performed.

IV. Emerging Construction Performance Trends

Prior to issuing this WCD oversight report, WCD reviewed past identified issues and current construction performance in an attempt to identify any emerging negative performance trends. No new trends were identified.

V. List of Inspection Items Opened and Closed

Opened: The following items were opened:

S-13-WCD-RPPWTP-006-F01 (Priority Level 3; Doug Hoffman)	Finding	LAB design called out fused welding receptacle; un-fused installed and accepted by field engineering. (Sub-Tier 006-11)
S-13-WCD-RPPWTP-006-F02 (Priority Level 3; Doug Hoffman)	Finding	Non-metallic welding receptacles in LAB were not bonded to associated raceways as required by the NEC. (Sub-Tier 006-11)
S-13-WCD-RPPWTP-006-F03 (Priority Level 3; Doug Hoffman)	Finding	Issued LAB MCC design specified overcurrent protection in excess of that allowed by the NEC. (Sub-Tier 006-17)
S-13-WCD-RPPWTP-006-O01 (Doug Hoffman)	Opportunity for Improvement	Cause codes in PIER and ORPS report could correlate better. (Sub-Tier 006-10)
S-13-WCD-RPPWTP-006-O02 (Doug Hoffman)	Opportunity for Improvement	Improvements could be made how BNI conducts monthly reviews of pipe spools stored outdoors at the WTP site. (Sub-Tier 006-12)
S-13-WCD-RPPWTP-006-A01 (Doug Hoffman)	Assessment Follow-up	Perform follow up review of actions taken by BNI to address ORPS 13-005; contaminated bird droppings (Sub-Tier 006-06)
S-13-WCD-RPPWTP-006-A02 (Doug Hoffman)	Assessment Follow-up	Perform follow up review of actions taken by BNI to address ORPS 13-006; box dropped from fork lift. (Sub-Tier 006-08)
S-13-WCD-RPPWTP-006-A03 (Doug Hoffman)	Assessment Follow-up	Perform follow up review of BNI actions to address self-identified inconsistencies with LAB MCCs and design documents. (Sub-Tier 006-17)
S-13-WCD-RPPWTP-006-A04 (Doug Hoffman)	Assessment Follow-up	Perform follow up on review of BNI actions to address self-identified errors in the LAW PDSA and calculations associated with the LAW PSA orifice. (Sub-Tier 006-13)

Closed: The following items were closed during the assessment period:

S-12-WCD-RPPWTP-001-A02	Assessment Follow-up	Electricians Installed a Frequency Control Box to a Temporary Panel Without Guarded Terminals – Occurrence Report 2012-0002. (Sub-Tier 06-04)
S-12-WCD-RPPWTP-011-A03	Assessment Follow-up	Employee Received Broken Bone After Rolling Heavy Pallet Jack Onto Right Foot – Occurrence Report 2012-0028. (Sub-Tier 06-05)
S-09-WCD-RPPWTP-097-F06 (Priority Level 3)	Finding	Two examples of electrical issues with the (LAB) Process Vacuum Skid at the Material Handling Facility. (Sub-Tier 006-09)
S-12-WCD-RPPWTP-008-A04	Assessment Follow-up	Documented Occurrence Report EM-RP--BNRP-RPPWTP-2012-0018, Worker entered confined space that had not been ventilated or sampled. (Sub-Tier 006-14)
S-12-WCD-RPPWTP-009-A03	Assessment Follow-up	Documented Occurrence Report EM-RP--BNRP-RPPWTP-2012-0023, Field Engineer Uses Wrong Process to Determine Arc Flash Hazard. (Sub-Tier 006-16)
S-12-WCD-RPPWTP-009-A01	Assessment Follow-up	Documented Occurrence Report EM-RP--BNRP-RPPWTP-2012-0021, Electrical Configuration Issue WTP Building 91. (Sub-Tier 006-10)
S-13-WCD-RPPWTP-006-001 (Doug Hoffman)	Opportunity for Improvement	Cause codes in PIER and ORPS report could correlate better. (Sub-Tier 006-10)
S-13-WCD-RPPWTP-006-002 (Doug Hoffman)	Opportunity for Improvement	Improvements could be made on how BNI conducts monthly reviews of pipe spools stored outdoors at the WTP site. (Sub-Tier 006-12)

VI. List of Sub-Tier Surveillance Reports Issued During the Assessment Period

<u>Surveillance Report Number</u>	<u>Inspection Subject</u>
S-13-WCD-RPPWTP-006-01	12 weld inspections performed in June 2013
S-13-WCD-RPPWTP-006-02	413 completed records reviewed in June 2013
S-13-WCD-RPPWTP-006-03	3 pressure tests observed in June 2013
S-13-WCD-RPPWTP-006-04	Closure of ORPS 12-02 – Unguarded terminals resulting in exposure to hazardous energy. Closed S-12-WCD-RPPWTP-001-A02
S-13-WCD-RPPWTP-006-05	Closure of ORPS 12-028 – Pallet jack lands on foot, broken bones in foot. Closed S-12-WCD-RPPWTP-011-A03
S-13-WCD-RPPWTP-006-06	Documentation of ORPS 13-05 Beta/Gamma bird contamination. Opened S-13-WCD-RPPWTP-006-A01
S-13-WCD-RPPWTP-006-07	Documentation of HSS Review
S-13-WCD-RPPWTP-006-08	Documentation of ORPS 13-06, Wooden box dropped from forklift. Opened S-13-WCD-RPPWTP-006-A02
S-13-WCD-RPPWTP-006-09	Review of BNI's actions taken to address LAB vacuum skid not meeting NEC requirements. Closed S-09-WCD-RPPWTP-097-F06
S-13-WCD-RPPWTP-006-10	Closure of ORPS 12-21 - LOTO issue associated with roll up doors in Building 91. Closed S-12-WCD-RPPWTP-009-A01, Open and closed S-13-WCD-RPPWTP-006-O01
S-13-WCD-RPPWTP-006-11	Review of LAB welding receptacles. Opened S-13-WCD-RPPWTP-006-F01 & F02
S-13-WCD-RPPWTP-006-12	Review of outdoor piping spool storage at WTP. Opened and Closed S-13-WCD-RPPWTP-006-O02
S-13-WCD-RPPWTP-006-13	Review of LAW design feature PSA orifice. Opened S-13-WCD-RPPWTP-006-A04.
S-13-WCD-RPPWTP-006-14	OSHA Confined Space Review, Closure of ORPS 12-18, Confined Space Violation. Closed S-12-WCD-RPPWTP-008-A04
S-13-WCD-RPPWTP-006-15	HLW Concrete Placement
S-13-WCD-RPPWTP-006-16	Closure of ORPS 12-23 – Wrong PPE for arc flash protection. Closed S-12-WCD-RPPWTP-009-A03
S-13-WCD-RPPWTP-006-17	Review of LAB Motor Control Centers. Opened S-13-WCD-RPPWTP-006-F03 and A03
S-13-WCD-RPPWTP-006-18	ISMS, Feedback and Improvement

VII. Integrated Assessment Schedule Number Summary

Integrated Assessment Schedule ID Number	Sub-tiered Surveillance Number	Report Issued Date	Assessor	Description
165	S-13-WCD-RPPWTP-006-18	06/26/2013	Fred Hidden	ISMS – Feedback and Improvement
168	S-13-WCD-RPPWTP-006-14	6/24/2013	Doug Hoffman	OSHA – Confined Space
169	S-13-WCD-RPPWTP-006	See Cover Letter	Doug Hoffman	Construction Acceptance Inspections
172	S-13-WCD-RPPWTP-006-13	6/19/13	Doug Hoffman	LAW – Design Feature; PSA orifice



OFFICE OF RIVER PROTECTION

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AUG - 7 2013

13-WTP-0158

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Mr. St. Julian:

**CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF ASSESSMENT REPORT
S-13-WSC-RPPWTP-007**

This letter transmits the results of the subject U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP) Startup and Commissioning Integration review of Bechtel National, Inc.'s startup performance at the WTP during April 2013. No findings, opportunities for improvements, or assessment follow-up items were identified in the course of this assessment.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7**, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ben Harp, Manager, WTP Startup and Commissioning Integration, at (509) 376-1462.


William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:CLS

Attachment

cc w/attach:
D. L. Collins, BNI
D. E. Kammenzind, BNI
M. G. McCullough, BNI
W.W. Gay, URS
K. Wells, URS
BNI Correspondence

Attachment
13-WTP-0158
S-13-WSC-RPPWTP-007

Attachment
13-WTP-0158
**JUNE ASSESSMENT OF COMPONENT AND SYSTEM TESTING – BALANCE OF
FACILITIES**

WSC Assessment Report
June 1 through June 30, 2013
Pages 3 (including coversheet)

Report Number: S-13-WSC-RPPWTP-007
Organization: WTP Startup and Commissioning Integration
Integrated Assessment Schedule Number: 466
Title: June Assessment of Component and System Testing – Balance of Facilities
Date(s): June 1 through June 30, 2013
Lead: Cecil Swarens

SCOPE

The U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (ORP-WTP) performed an assessment of Bechtel National, Inc., (BNI) component testing in the Balance of Facilities (BOF).

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED:

- 24590-WTP-SU-ADM-0006, *Conduct of Testing*, Rev. 2.
- 24590-WTP-SU-GT-0002, *Continuity/Scheme Checking*, Rev. 2.
- 24590-WTP-SU-GT-0001, *Megger Testing*, Rev. 2.
- 24590-FSW-STP-0002, *Building 91 Fire Protection Header Flush (FDE-B-02)*, Rev 1.

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED:

During assessment of the component testing conducted by BNI Startup in BOF during June 2013, the ORP-WTP assessor observed pretest briefings on June 6th 2013 that covered megger testing of FDE system equipment in Building 87 and June 26th that covered fire protection header flush in Building 91 with subsequent testing of the header flush observed on June 27th.

During the pretest briefs, the assessor observed the test engineers using the Pre-Test Briefing form from 24590-WTP-SU-ADM-0006, Appendix D. The test engineers covered all items required as part of the checklist, and covered all areas in a depth that ensured all attendees were fully aware of the complete scope of work and all potential hazards that may be encountered during testing.

During performance of testing, the assessor observed the test director showing appropriate control of testing, including control of communications, procedural control, control of the test site concerning personnel and equipment safety, and control and identification of test acceptance criteria.

ORP-WTP previously identified issues concerning pretest briefs and test control in Opportunity for Improvement items S-12-WSC-RPPWTP-009-001, 009-002, 009-005, and 009-006, and in Assessment Follow-up Item (AFI) S-13-WSC-RPPWTP-003-A01. ORP-WTP will continue to follow progress made in these areas to ensure consistent performance as testing rates increase. ORP-WTP again commends BNI Startup organization in making effective changes to their pretest briefs and control of testing. These efforts should; decrease the risk of encountering issues during testing, ensure proper steps are taken if an issue arises, and most importantly, provide greater safety during testing.

CONCLUSION

Assessment of BOF component and system testing during June 2013 showed pretest brief preparations, briefings, and control of testing to meet the expectations outlined in BNI procedures and guidance, and showed continued improvement. Control of testing, including communications, procedural control and compliance, and pretest briefs have shown great improvement during the last three reporting periods from previous surveillances of startup testing.

SIGNATURES

Assessor or Lead		
Assessor:		Date: 8/1/2013
	Cecil Swarens	
WSC Startup		
Program Manager:		Date: 8/1/2013
	Robert Gilbert	



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

SEP 11 2013

13-WTP-0173

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF SURVEILLANCE REPORT S-13-WED-RPPWTP-011, VERIFICATION OF CORRECTIVE ACTION COMPLETION FOR REVIEW OF SYSTEM DESCRIPTIONS

In July 2013, the U.S. Department of Energy, Office of River Protection (ORP), Waste Treatment and Immobilization Plant Project (WTP) performed an assessment to verify that Bechtel National, Inc. (BNI) completed corrective actions to close a finding associated with a previous ORP surveillance (S-12-WED-RPPWTP-021) with the same title. This letter transmits the subject assessment report documenting ORP's evaluation and conclusions. As stated in the attached report, the corrective actions to close the associated finding were verified as complete and acceptable to close the finding. No other findings, opportunities for improvement, or additional followup items were identified in this assessment.

This transmittal is provided for information and no actions are required by BNI.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled **52.243-7, -- "Notification of Changes."** Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-WTP-0173

-2-

SEP 11 2013

If you have any questions, please contact me, or you may contact Garth R. Reed, Acting Division Director, WTP Engineering Division, (509) 376-2626.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:MLR

Attachment

cc w/attach:
BNI Correspondence

Attachment

13-WTP-0173

Verification of Corrective Action Completion for Review of System Descriptions

WED Surveillance Report

July 2013

4 pages (including coversheet)

Report Number: S-13-WED-RPPWTP-011
Organization: Waste Treatment and Immobilization Plant Engineering
Division
**Integrated Assessment
Schedule Number:** 508
Title: Verification of Corrective Action Completion for Review of
System Descriptions
Date: July 2013
Lead: Mark Ramsay, Safety Systems Oversight, WED
Team Members: None

SCOPE

The U.S. Department of Energy, Office of River Protection (ORP), Waste Treatment and Immobilization Plant Engineering Division (WED) reviewed Bechtel National, Inc. (BNI) corrective actions taken to close the Level 2 Finding S-12-WED-RPPWTP-021-F01 from Surveillance S-12-WED-RPPWTP-021, dated July 2012. This finding is stated below.

REQUIREMENTS REVIEWED

The WED assessor reviewed actions identified in BNI Project Issues Evaluation Report (PIER) 24590-WTP-PIER-MGT-13-0102-C Rev. 0, which ORP had accepted as commitments from BNI (CCN: 255289, "Response to Finding from DOE-WTP Surveillance S-12-WED-RPPWTP-021, Verification of Correction Action Completion for Review of System Descriptions") to close the finding. Finding S-12-WED-RPPWTP-021-F01 included the following text:

BNI's response to finding S-11-WED-RPPWTP-024-F01 stated the requirements in its Hazards Analysis procedure correctly stated the need to use System Descriptions (SD) and committed to revise 24590-WTP-GPG-SANA-002, Integrated Safety Management, to more accurately describe the role of SDs in the safety analysis process. However, the action completed by BNI for Finding S-11-WED-RPPWTP-024-F01, restated in PIER 24590-WTP-PIER-MGT-11-1050-C, reduced a requirement regarding the use of SDs. Furthermore BNI eventually eliminated the SD use requirement from the Hazards Analysis procedure and Integrated Safety Management guide, and from the follow on Hazard Analysis Handbook.

In 24590-WTP-PIER-MGT-13-0102-C, Rev. 0, BNI identified the following actions required to close this finding:

“Brief [BNI] E&NS staff on Finding, relevant history, causes, and corrective actions. Objective evidence to support action closure is expected to be completed attendance rosters(s) showing that >80% of E&NS staff has received briefing.”

“Update hazards analysis procedure (24590-WTP-GPP-RANS-NS-0005) to identify system and process description documents as necessary information to support hazards analysis. Objective evidence to support closure is expected to be and approved and issued revision of the cited procedure highlighting the changes that were made to address the Finding described in this PIER.”

“Update hazards analysis guide (24590-WTP-GPG-RANS-NS-0002) to identify system and process description documents as necessary information to support hazards analysis. Objective evidence to support closure is expected to be and approved and issued revision of the cited guide highlighting the changes that were made to address the Finding described in this PIER.”

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- S-12-WED-RPPWTP-021
- 24590-WTP-PIER-MGT-13-0102-C, Rev. 0
- Briefing presentation given to BNI Engineering and Nuclear Safety (E&NS) staff by the E&NS Deputy Manager on April 10, 2013
- Attendance roster for BNI briefing
- 24590-WTP-GPP-RANS-NS-0005, *Hazard Analysis Procedure*, Rev. 1
- 24590-WTP-GPG-RANS-NS-0002, *Hazard Analysis Handbook*, Rev. 2

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

The three required actions described in the referenced PIER were evaluated for completion. The objective evidence as listed above was examined and found to be adequate and acceptable as verification of the referenced completed actions.

SUMMARY OF FINDINGS, OPPORTUNITY FOR IMPROVEMENT ITEMS, OR ASSESSMENT FOLLOWUP ITEMS

No findings, opportunity for improvement items, or assessment followup items were identified.

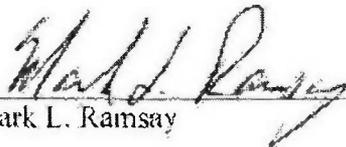
CONCLUSION

Based on a review of the items noted above, BNI has adequately implemented corrective actions to address Finding S-12-WED-RPPWTP-021-F01. Finding S-12-WED-RPPWTP-021-F01 is therefore considered resolved and closed.

SIGNATURES

Assessor or Lead

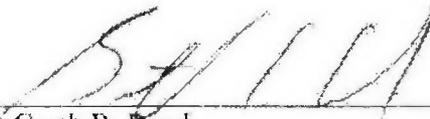
Assessor:


Mark L. Ramsay

Date:

9/5/13

**Assessor's Manager,
Division Director, or
Supervisor:**


Garth R. Reed

Date:

9/4/13



OFFICE OF RIVER PROTECTION

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SEP 11 2013

13-WTP-0176

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 -- SURVEILLANCE REPORT S-13-WCD-RPPWTP-007 -- JULY 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

This letter transmits the results of the U.S. Department of Energy (DOE), Office of River Protection, Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) review of Bechtel National, Inc.'s (BNI) construction performance at the WTP during July 2013. A summary of the surveillance activities is documented in the attached report.

One Priority Level 3 finding, one opportunity for improvement item, and two assessment follow-up items were identified during the surveillance period. The Priority Level 3 finding was for BNI not documenting a DOE identified deficiency in the appropriate deficiency report and subsequently energizing the deficient equipment for testing prior to correcting the deficiency. A summary of the finding, opportunity for improvement item, and assessment follow-up items is provided in Section III of the attachment report.

No response is required for the Priority Level 3 finding, opportunity for improvement item or assessment follow-up items. The Priority Level 3 finding shall be entered into BNI's Project Issues Evaluation Report (PIER) system and tracked until the identified issues are corrected. The Priority Level 3 finding should be evaluated to determine if a cause and/or extent evaluation is necessary; the need to perform the cause and/or extent determination should be documented in the PIER associated with the finding. A WCD review of BNI's actions, including the need to perform a cause and extent evaluation, will be performed when all actions are completed. To ensure WCD issues are fully understood, the PIER owner should review the issued sub-tiered assessment report and discuss the issue with the originating assessor.

Mr. J.M. St. Julian
13-WTP-0176

-2-

SEP 11 2013

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ken Wade, Director, WCD, (509) 373-8637.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:DAH

Attachment

cc w/attach:

D. E. Kammenzind, BNI
M. G. McCullough, BNI
K. A. Smith, BNI
L. M. Weir, BNI
W. Walton, RL FIN
BNI Correspondence

Attachment
13-WTP-0176
S-13-WCD-RPPWTP-007

Attachment
13-WTP-0176

Waste Treatment and Immobilization Plant (WTP) Construction
Oversight and Assurance Division (WCD) July 2013 Construction
Surveillance Summary Report S-13-WCD-RPPWTP-007

11 Pages (Including this Coversheet)

U.S. DEPARTMENT OF ENERGY
WASTE TREATMENT AND IMMOBILIZATION PLANT PROJECT

INSPECTION: Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) July 2013 Construction Surveillance Summary Report

REPORT NO.: S-13-WCD-RPPWTP-007

INTEGRATED ASSESSMENT SCHEDULE (IAS) NUMBERS: (See Section VII of this report for a listing of IAS numbers)

FACILITY: Bechtel National, Inc.; Waste Treatment and Immobilization Plant Project

LOCATION: 2435 Stevens Center Place
Richland, Washington 99354

DATES: July 1 through July 31, 2013

ASSESSORS: F. Hidden, Facility Representative
D. Hoffman, Facility Representative
P. Schroder, Facility Representative
H. Taylor, Construction Cost & Schedule
*M. Evarts, Site Inspector
*W. Meloy, Site Inspector
*R. Taylor, Site Inspector
*D. Wallace, Site Inspector

*Subcontractor to Lucas Engineering and Management Services, Inc.
Supporting ORP-WTP

APPROVED BY: Ken Wade, Director
WTP Construction Oversight and Assurance Division

WTP CONSTRUCTION OVERSIGHT AND ASSURANCE DIVISION JULY 2013 CONSTRUCTION SURVEILLANCE SUMMARY REPORT

I. Introduction

During the period July 1 through July 31, 2013, the U.S. Department of Energy (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Construction Oversight and Assurance Division (WCD) conducted construction inspections of Important-To-Safety (ITS) and Non-ITS (Balance of Plant) activities during WTP construction. These inspections were documented in sub-tiered surveillance reports and maintained electronically. A total of 14 sub-tier assessment reports were generated during the inspection period and have been summarized in Sections II and III below. These sub-tier assessment reports are available upon request. The Facility Representatives (FR) also documented 36 WTP construction activities in the Operational Awareness Database. These activities included 31 FR Activity Log Entries (used for logging notifications and other events). FR Activity Log Entries, involving event reports and medical reports, were communicated by Bechtel National, Inc. (BNI) to the on-call FR.

One finding was identified during this assessment period:

Finding: S-13-WCD-RPPWTP-007-F01 (Priority Level 3, Doug Hoffman) – BNI did not follow their process for identifying, reporting, and controlling nonconforming conditions. (Sub-Tier 007-04)

Sections II and III provide additional discussions of oversight activities and summary of findings, Opportunity for Improvement Items (OFI), and Assessment Follow-Up Items (AFI).

Section IV of this report discusses WCD identified emerging performance trends. There were no open emerging negative performance trends identified by WCD during the surveillance period.

Section V of this report contains a listing of items opened and closed during this period. There was one finding, one opportunity for improvement item, and two AFIs opened; one AFI, two OFIs, and one finding were closed during the surveillance period.

Section VI contains a summary listing of the 14 sub-tier surveillance reports written during this inspection period.

Section VII contains a summary listing of the ORP Integrated Assessment Schedule numbers associated with oversight performed during this inspection period.

II. Oversight Activities

Sub-Tier Surveillance Report Activity Conclusions

- WCD observed BNI performing and/or completing eighteen pre-designated or field surveillance selected welded connections at the Balance of Facilities, Low-Activity Waste Facility, and High-Level Waste (HLW) Facility during July 2013. This included visual assessment of fit-up, root pass, and final weld condition or review of radiographic film. Configuration and orientation of the items installed conformed to the drawings; welding met the specified criteria as referenced in American Society of Mechanical Engineers (ASME) B 31.3. BNI was found to have used correct materials and welded with the correct filler material; using processes and personnel qualified in accordance with ASME B31.3. BNI's examination personnel had been trained and certified for the examination method used; inspection records reviewed were satisfactory. (Sub-Tier 007-01)
- A total of 1022 weld and test records were reviewed by WCD during July 2013. The records had been completed by various BNI Field Engineering or Quality Control personnel, and submitted to Project Document Control. Reviewed records conformed to the ASME B31.3 code requirements. (Sub-Tier 007-02)
- WCD reviewed pressure testing performed at the WTP site during July 2013. The review found BNI performed testing in accordance with procedures, engineering specifications, and required codes and standards. Quality control and testing personnel had been trained and certified for the test methods used, and pertinent attributes of quality assurance documentation had been satisfactorily completed. (Sub-Tier 007-03)
- In July WCD witnessed fire alarm testing performed in Building 91 by National Institute for Certification in Engineering Technologies certified technician/inspector and BNI electricians. During the test it was identified that BNI had not issued a deficiency report for a previously identified DOE finding pertaining to an undersized bonding jumper in the building's RFAR box; as a result the deficiency had not been added to the turnover/startup punchlist and the RFAR system was energized for testing prior to correcting the undersized bonding jumper. Finding: **S-13-WCD-RPPWTP-007-F01 (Priority Level 3, Doug Hoffman)** was opened to document BNI did not follow their process for identifying, reporting, and controlling nonconforming conditions. During testing it was unclear how the testing complied with BNI requirements to be considered an acceptance test; AFI **S-13-WCD-RPPWTP-007-A01 (Doug Hoffman)** was opened to allow BNI time to determine the division of responsibilities for Construction, Startup, and Engineering for the performance of the fire alarm acceptance testing. (Sub-Tier 007-04)
- A review was performed of BNI's process to plan, control, and execute open excavation work at the WTP construction sight. The review found excavations at the WTP construction site were in compliance with Occupational Safety and Health Administration (OSHA) and BNI requirements with only minor exceptions. The exceptions identified by the FR were promptly corrected by BNI during the inspection period. The exceptions were documented as

an OFI **S-13-WCD-RPPWTP-007-001 (Paul Schröder)**. OFI **S-13-WCD-RPPWTP-007-001** was closed following BNI's correction of the items identified. (Sub-Tier 007-05)

- A follow-up review was performed of BNI's actions taken to address occurrence reportable event EM-RP--BNRP-RPPWTP-2012-0025, *Carpenter received arm injury requiring treatment above first-aid*. The review found BNI had adequately documented the event within Occurrence Report EM-RP--BNRP-RPPWTP-2012-0025, and had developed and completed adequate corrective actions to prevent recurrence. Assessment Follow-up Item **S-12-WCD-RPPWTP-001-A04** has been closed based upon this review. (Sub-Tier 007-06)
- WCD observed BNI testing, placing, and consolidating concrete for three placements at the HLW during July 2013. These included; (1) Placement *HCC2138A* for a shield lid support wall and curbing in the Melter Cell #1 Crane Maintenance and Decon Areas at elevation (+) 23'-0," (2) Placement *HCC3105* for a wall at elevation (+)37'-0," and (3) Placement *HCC3121* for a wall at the (+)37'-0" elevation. Concrete placement conformed to procedures, engineering specifications, and the relevant codes and standards. Concrete receipt activities were conducted in accordance with the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and pertinent attributes of the quality assurance documentation had been completed. (Sub-Tier 007-07)
- On June 30, 2013, a non-manual employee traveling in a golf cart collided with a parked flatbed trailer. No personnel were injured. BNI declared the event to be a reportable occurrence (EM-RP--BNRP-RPPWTP-2013-0007); Assessment Follow-up Item **S-13-WCD-RPPWTP-007-A02 (Paul Schroder)** was opened to track the corrective actions developed by BNI to preclude a recurrence of a similar event. (Sub-Tier 007-08)
- WCD reviewed the BNI Fall Protection program to evaluate how equipment usage, inspections, and training were being implemented at the WTP construction site; and concluded the BNI Fall Protection program was compliant with OSHA requirements, and the minor deficiencies identified were corrected during the assessment period. (Sub-Tier 007-09)
- WCD reviewed BNI fabricated Motor Control Center (MCC)-010 intended for construction power at the HLW. The review found the MCC was appropriately designed and assembled in accordance with the 2002 edition of the National Electrical Code and was built in a workman like manner. (Sub-Tier 007-10)
- WCD performed a scheduled surveillance of a design feature within the Analytical Laboratory (LAB) to determine if the requirements contained within Section 5.6 of the *Preliminary Documented Safety Analysis to Support Construction Authorization; Lab Facility Specific Information* (24590-WTP-PSAR-ESH-01-002-06) had been met. Subsection 5.6.9 of the PDSA, required partitions to segregate transient combustibles within the hotcell. The observed hotcell laboratory had been divided into 14 smaller areas using partitions and the trolley pathways had been covered. The observed configuration provided adequate

segregation of transient combustible materials as required by Section 5.6.9 of 24590-WTP-PSAR-ESH-01-002-06. (Sub-Tier 007-11)

- WCD performed a review of the actions taken by BNI, as a result of Finding **S-13-WCD-RPPWTP-004-F01 (Priority Level 3)** where BNI had not installed Building 91's RFA red light in accordance with design height requirements. BNI's Construction Deficiency Report (CDR) final disposition was "Use As Is" and the CDR revised the design drawing to reflect the new mounting height of 9 to 12 feet above final grade. Based on the review of actions taken; Finding **S-13-WCD-RPPWTP-004-F01 (Priority Level 3)** is closed. (Sub-Tier 007-12)
- WCD observed BNI install reinforcement, embedded items, and formwork for HLW concrete wall placement HCC3121. Work was completed in an acceptable manner and in accordance with specifications, drawings, and the applicable codes and standards. Quality control personnel had been trained and certified for the examination methods used, and quality assurance documentation had been completed in a satisfactory manner. (Sub-Tier 007-13)
- A review of completed actions was performed, in response to OFI **S-12-WCD-RPPWTP-010-O01** which suggested BNI could improve how Integrated Safety Management System (ISMS) applies to startup and commissioning activities and how ISMS principles are incorporated in startup and commissioning documents. The review determined that although not documented in the Project Issues Evaluation Report, changes had been made to the overarching ISMS document (24590-WTP-ISMSD-01-001 Revision 10, *WTP Project Integrated Safety Management System*). Additionally, BNI had evaluated 24590-WTP-CTST-GPG-002, *Test Procedure Writers Guide* and 24590-WTP-CTST-ADM-0005, *Test Procedure Development* but determined no action was necessary to improve either document in regards to ISMS principles; OFI **S-12-WCD-RPPWTP-010-O01** was closed based on the review. (Sub-Tier 007-14)

Facility Representative (FR) Review of Events, Injuries, and Safety Activities

- There was one Occurrence Reportable (ORPS) events in July 2013: EM-RP--BNRP-RPPWTP-2013-0007 – A distracted driver crashes golf cart into a parked flatbed trailer.
- There were no OSHA recordable injuries during July 2013.
- BNI notified the on-call FR of 24 medical/first aid events during July 2013.
- BNI's notifications to the on call FR of the ORPS event was timely and contained adequate detail. On several occasions reported first aids contained minimal detail and required additional FR interaction to adequately understand the nature of the reported injury and/or the mechanism causing the injury. Additional information was provided when requested by the on call FR.

III. Summary of Findings, Opportunity for Improvement Items, and Assessment Follow-up Items

A finding is defined as an individual item not meeting a committed requirement (e.g., contract, regulation, safety basis, Quality Assurance program, authorization basis document, procedure, or Standards/Requirements Identification Documents). Findings can be characterized as Priority Level 1, Priority Level 2, or Priority Level 3. WCD will follow-up on all findings when BNI has completed necessary corrective actions to address the issues.

During this inspection period, the following finding was identified:

Summary of Finding:

- **Finding: S-13-WCD-RPPWTP-007-F01 (Priority Level 3, Doug Hoffman)** – BNI did not follow their process for identifying, reporting, and controlling nonconforming conditions.

Requirements:

Contract No. DE-AC27-01RV14136, Section C, Standard 3(b)(2), required BNI to develop a Basis of Design (BOD).

BOD Section 1.8 requires BNI to comply with its *Quality Assurance Manual* (QAM).

QAM Policy Q-15.1, Section 15.1.2.1.1 requires items that do not conform to specified requirements be controlled to prevent inadvertent installation or use.

24590-WTP-GPP-MGT-044 defines the requirements for identifying, reporting, controlling, dispositioning, and documenting nonconforming conditions at the Hanford Tank Waste Treatment and Immobilization Plant (WTP). Section 5.1.1 requires WTP personnel to initiate NCRs/CDRs identifying the nonconforming condition when they are identified.

Discussion:

Contrary to above, BNI did not capture the undersized bonding jumper (DOE Finding in S-13-WCD-RPPWTP-004-F02) in an appropriate deficiency report. As a result, the deficient condition was not corrected prior to the system being energized for testing.

AFIs are matters requiring further review because of a potential finding or problem, because contractor or ORP action is pending, or because needed information to determine compliance with requirements and/or acceptable performance was not available at the time of the assessment.

- **Assessment Follow-up Item: S-13-WCD-RPPWTP-007-A01 (Doug Hoffman)** – Additional time is needed to allow BNI to determine the appropriate division of responsibilities for the development, approval, performance, and oversight of fire alarm acceptance testing amongst BNI Engineering, Construction, and Startup organizations.

Discussion:

Several dissimilarities were identified between the approved fire alarm test procedure and BNI's Conduct of Testing Procedure; it was unclear, within the BNI organization, which group had ownership/responsibilities for conducting the test (Construction, Startup, and/or Engineering). BNI was in the process of determining the appropriate authority and had scheduled a meeting with WCD August 14, 2013, to communicate the responsibilities for developing, reviewing, approving, controlling, and conducting future fire alarm acceptance testing.

- **S-13-WCD-RPPWTP-007-A02 (Paul Schroder)** – Follow-up to ORPS 13-0007, Golf Cart Collision Event.

Discussion:

On June 30, 2013, a non-manual employee traveling in a golf cart collided with a parked flatbed trailer. BNI declared this event occurrence reportable (EM-RP--BNRP-RPPWTP-2013-0007) and initiated an investigation. ORP follow-up is required to ensure adequate corrective actions have been taken by BNI.

OFI items are observations that warrant attention, but are not a direct noncompliance with a requirement:

- **13-WCD-RPPWTP-007-O01 (Paul Schroder)** - Several examples where improvement could be made were observed within excavation areas.

Discussion:

The FR identified OFIs related to the control and identification of hazards within excavation areas. For example, the edge of one excavation area had eroded as a result of rain water; excess material had been left near the edge of a second excavation area; and signage within a few of the observed excavation areas had not been maintained. Each example was discussed with BNI management and corrective actions were completed to improve each area during the assessment period. The observed examples were collectively documented as an OFI rather

than a finding, because no personnel were observed within the subject excavation areas and each issue was promptly addressed by BNI.

IV. Emerging Construction Performance Trends

Prior to issuing this WCD oversight report, WCD reviewed previously identified issues and current construction performance in an attempt to identify any emerging negative performance trends. No new trends were identified.

V. List of Inspection Items Opened and Closed

Opened: The following items were opened:

S-13-WCD-RPPWTP-007-F01 (Priority Level 3; Doug Hoffman)	Finding	BNI did not follow their process for identifying, reporting, and controlling nonconforming conditions. (Sub-Tier 007-04)
S-13-WCD-RPPWTP-007-O01 (Paul Schroder)	Opportunity for Improvement	Several examples where improvement could be made were observed within excavation areas. (Sub-Tier 007-05)
S-13-WCD-RPPWTP-007-A01 (Doug Hoffman)	Assessment Follow-up	Additional time is needed to allow BNI to determine the appropriate division of responsibilities for fire alarm acceptance testing. (Sub-Tier 007-04)
S-13-WCD-RPPWTP-007-A02 (Paul Schroder)	Assessment Follow-up	Follow-up to ORPS 13-0007, Golf Cart Collision Event. (Sub-Tier 007-08)

Closed: The following items were closed during the assessment period:

S-12-WCD-RPPWTP-011-A04	Assessment Follow-up	Carpenter received arm injury requiring treatment beyond first-aid. (Sub-Tier 07-06)
S-13-WCD-RPPWTP-007-O01	Opportunity for Improvement	Several examples where improvement could be made were observed within excavation areas. (Sub-Tier 007-05)
S-13-WCD-RPPWTP-004-F01 (Priority Level 3)	Finding	RFAR Red Light on Building 91 not installed per drawing. (Sub-Tier

007-12)

S-12-WCD-RPPWTP-010-001

Opportunity for Improvement
Improvement by Incorporating ISMS into Test Procedure Writers Guide & Development. (Sub-Tier 007-14)

VI. List of Sub-Tier Surveillance Reports Issued During the Assessment Period

Surveillance Report Number	Inspection Subject
S-13-WCD-RPPWTP-007-01	18 weld inspections performed in July 2013
S-13-WCD-RPPWTP-007-02	1022 completed records reviewed in July 2013
S-13-WCD-RPPWTP-007-03	Pressure testing observed in July 2013
S-13-WCD-RPPWTP-007-04	Observed Fire Alarm Testing in Bld 91; Opened S-13-WCD-RPPWTP-007-A01 & F01
S-13-WCD-RPPWTP-007-05	Review of OSHA Excavations; Opened and Closed S-13-WCD-RPPWTP-007-001
S-13-WCD-RPPWTP-007-06	Review of actions taken for ORPS 2012-25; Closed S-12-WCD-RPPWTP-011-A04
S-13-WCD-RPPWTP-007-07	HLW Concrete Placement
S-13-WCD-RPPWTP-007-08	Document ORPS 2013-07 - Golf Cart Accident; Opened S-13-WCD-RPPWTP-007-A02
S-13-WCD-RPPWTP-007-09	Review of OSHA Fall Protection
S-13-WCD-RPPWTP-007-10	Review of construction of MCC-010
S-13-WCD-RPPWTP-007-11	LAB Design Feature Review; Hotcell partitions
S-13-WCD-RPPWTP-007-12	Review of actions taken to address RFAR antenna not installed per design; Closed S-13-WCD-RPPWTP-004-F01
S-13-WCD-RPPWTP-007-13	Review of HLW wall HCC3121
S-13-WCD-RPPWTP-007-14	Follow-up on ISMS OFI; Closed S-12-WCD-RPPWTP-010-001

VII. Integrated Assessment Schedule Number Summary

Integrated Assessment Schedule ID Number	Sub-tiered Surveillance Number	Report Issued Date	Assessor	Description
174	S-13-WCD-RPPWTP-007	See Cover Letter	Doug Hoffman	Construction Acceptance Inspections
175	S-13-WCD-RPPWTP-007-09	7/30/13	Fred Hidden	OSHA Fall Protection
176	S-13-WCD-RPPWTP-007-05	7/09/13	Paul Schroder	OSHA Excavations



OFFICE OF RIVER PROTECTION

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OCT 31 2013

13-WTP-0204

Mr. J. M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF ASSESSMENT REPORT S-13-WPD-RPPWTP-005, WTP ANALYTICAL LABORATORY CRITICAL AND NEAR CRITICAL PATHS

In June and July 2013, the U.S. Department of Energy, Office of River Protection (ORP), WTP project reviewed the Bechtel National, Inc. (BNI) critical path and near critical paths for the Analytical Laboratory. This letter transmits the subject assessment report documenting ORP's review. Two Priority Level 3 findings were identified during the assessment and are document and in the attached assessment report.

No response is required to the Priority Level 3 findings. The Priority Level 3 findings shall be entered into BNI's Project Issues Evaluation Report (PIER) system and tracked until the identified issues are corrected. The Priority Level 3 findings should be evaluated to determine if a cause and/or extent evaluation is necessary; the need to perform the cause and/or extent determination should be documented in the PIER associated with the finding. A WTP Project Controls Division (WPD) review of BNI's actions, including the need to perform a cause and extent evaluation, will be performed when all actions are completed. To ensure WPD issues are fully understood, the PIER owner should review the issue assessment report and discuss the issue with the originating assessor.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J. M. St. Julian
13-WTP-0204

-2-

OCT 31 2013

If you have any questions, please contact me, or you may contact Dennis Brown, Director WTP Project Controls Division, (509) 376-4441.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:MLR

Attachment

cc w/attach:
BNI Correspondence

Attachment

13-WTP-0204

ANALYTICAL LABORATORY CRITICAL AND NEAR-CRITICAL PATHS

WPD Surveillance Report

June 2, 2013, and July 9, 2013

4 pages (including coversheet)

Assessment Report Number: S-13-WPD-RPPWTP-005
Division Performing Assessment: WTP Project Controls Division
Integrated Assessment Schedule Number: 514
Title: Analytical Laboratory Critical and Near-Critical Paths
Date(s): June 2, 2013, and July 9, 2013
Lead: Robert Haskell, GSSC
Team Members: Susan Vargas, GSSC
William Riker, Project Controls Officer

SCOPE

During the monthend schedule analysis of the Hanford Tank Waste Treatment and Immobilization Plant (WTP) Analytical Laboratory (LAB), the U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (ORP-WTP) Project Controls Division (WPD) staff reviewed the Bechtel National, Inc. (BNI) critical path and near-critical path activities for final construction completion. This assessment report documents the assessment team's activities and open items at the conclusion of the assessment period.

The assessment team performed reviews to confirm the adequacy and accuracy of critical path and near-critical path activities leading up to final construction completion of the LAB. In addition, the team compared the critical path and near-critical paths against the prior month critical and near-critical paths to identify and evaluate any significant changes. Only the issues specifically related to the portion of the schedule under review are provided in this assessment. To assist with awareness of schedule updates and issue resolutions, the assessment team attended associated BNI meetings and status briefings.

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- Primavera P6 March 2013 Month End Current Schedule Update
- Primavera P6 April 2013 Month End Current Schedule Update
- Primavera P6 May 2013 Month End Current Schedule Update.

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

Analytical Laboratory Near-Critical Paths (April 2013): The assessment team reviewed the LAB near-critical paths (those with less than 60 days of float) based on the April 2013 monthend schedule update, and compared them against the near-critical paths for the prior month to identify and evaluate changes. In the prior month (March 2013), there were five near-critical paths that were not associated with subcontracts. The assessment team noted that in the current

month (April 2013), the only near-critical path was associated with subcontracts. A further comparison of the total float values for the construction and Environmental and Nuclear Safety (E&NS) activities between the prior month and current month showed a significant increase, with most increasing by several hundred days.

Analytical Laboratory Critical Path (May 2013): The assessment team reviewed the LAB critical path based on the May 2013 monthend schedule update, and compared it against the critical path for the prior month to identify and evaluate changes. The assessment team noted that the critical path had changed, and was being driven by an artificially imposed constrained start date for the fabrication of the stack discharge monitoring equipment cabinets. In addition the factory acceptance testing had been combined with the fabrication activity, thus providing less detail for the critical path work.

SUMMARY OF FINDINGS, OPPORTUNITIES FOR IMPROVEMENT, OR ASSESSMENT FOLLOWUP ITEMS

The team identified the following two Priority Level 3 findings associated with this assessment:

- **S-13-WPD-RPPWTP-514-F01 (Priority Level 3, Bob Haskell):** The total float values for most of the (April 2013) LAB construction activities were excessive, causing the credibility of the schedule, including the critical path, to be in question.

Requirement: Procedure 24590-WTP-GPP-GAB-421, *Project Schedules*, Section 3.2, Level 4 Detail paragraph, states, "The Level 4 Detail Schedule is a logically integrated life cycle plan with the ability to calculate each facility's and the total project critical path."

Discussion: Contrary to the requirement, the assessment team concluded that the missing construction logic tie causing the excessive total float values invalidated the critical path for the LAB facility final construction completion.

Note: This finding has been satisfactorily addressed; the logic error causing the inaccurate total float calculations was corrected with the May 2013 monthend schedule update file.

- **S-13-WPD-RPPWTP-514-F02 (Priority Level 3, Bob Haskell):** Having a driving constrained start date and insufficient detail of the work invalidated the LAB facility final construction completion critical path.

Requirement: Procedure 24590-WTP-GPP-GAB-421, Section 3.2, Level 4 Detail paragraph, states, "The Level 4 Detail Schedule is a logically integrated life cycle plan with the ability to calculate each facility's and the total project critical path."

Discussion: Contrary to the requirement, the assessment team concluded that the inadequacy in the logic (constrained start date) and the lack of detail of the work for the LAB final construction critical path negate the credibility of the critical path.

CONCLUSION

A review was performed by ORP-WTP to confirm the adequacy and accuracy of the critical path and near-critical path activities leading up to the final construction completion of the LAB. The assessment team reviewed BNI's LAB current schedule, and identified two findings that put the credibility of the schedule in question and put the final construction completion date at risk. As previously noted, BNI has corrected finding S-13-WPD-RPPWTP-514-F01, and ORP-WTP has confirmed the correction was acceptable.

SIGNATURES

Assessor or Lead
Assessor:

Robert J. Haskell

Date: 9-24-13

Assessor's Manager,
Division Director, or
Supervisor:

Dennis M. Brennan

Date: 9/24/2013



OFFICE OF RIVER PROTECTION

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NOV - 5 2013

13-NSD-0038

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 - ASSESSMENT OF THE PRETREATMENT FACILITY (PTF) VESSEL VENT PROCESS/VESSEL VENT EXHAUST SYSTEM (PVP/PVV) CAUSTIC SCRUBBER (S-14-NSD-RPPWTP-001)

This letter transmits the attached U.S. Department of Energy, Office of River Protection, Nuclear Safety Division assessment report S-14-NSD-RPPWTP-001. This assessment reviewed the PTF caustic scrubber unit in the PVP/PVV. One opportunity for improvement (OFI) involving the need to perform a complete hazard and consequence analysis of the scrubber unit's function to remove highly radioactive particles was identified.

The assessment team noted that Bechtel National, Inc. (BNI) has identified issues on the caustic scrubber and therefore the assessment report only documented a different issue should the PVP/PVV exhaust be directed to the C5 system. The team is concerned that the single point failure of the scrubber unit will overwhelm the safety-class C5 ventilation system's capacity to remove radioactive particles. This OFI is intended to provide BNI with this issue for evaluation in future PTF hazard analysis of the caustic scrubber unit.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J.M. St. Julian
13-NSD-0038

-2-

NOV - 5 2013

If you have any questions, please contact me, or your staff may contact Victor L. Callahan, Director, Nuclear Safety Division, (509) 373-9880.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

NSD:KC

Attachment

cc w/attach:

D. M. Gutowski, DNFSB

R. G. Quirk, DNFSB

BNI Correspondence

Attachment
to
13-NSD-0038

U.S. Department of Energy, Office of River Protection
Level 2 Assessment
S-14-NSD-RPPWTP-001
Assessment of Bechtel National, Inc.'s Caustic Scrubber Unit in the
Pretreatment Facility Vessel Vent Process/Vessel Vent Exhaust System

(total number of pages, 12)

U.S. Department of Energy
Office of River Protection

Assessment Report Number: S-14-NSD-RPPWTP-001

Division Performing the Assessment: Nuclear Safety Division

Integrated Assessment Schedule Number: IAS ID 14160

Title of Assessment: Assessment of Bechtel National, Inc.'s Caustic Scrubber Unit in the Pretreatment Facility Vessel Vent/Process Vessel Vent Exhaust System

Dates of Assessment: October 7 to October 18, 2013

Assessment Lead: Ko Chen, Assessment Team Leader, Nuclear Safety Division, U.S. Department of Energy, Office of River Protection

Team Member(s) (if any): Donald H. Alexander, Physical Chemist, Waste Treatment and Immobilization Plant Start-Up, Commissioning and Integration, U.S. Department of Energy, Office of River Protection

Scope: The purpose of this Level 2 assessment was to evaluate the Pretreatment Facility (PTF) Pretreatment Vessel Vent Processing (PVP) and Pretreatment Vessel Vent Exhaust (PVV) system caustic scrubber unit's ability to meet its safety functions and functional requirements as stated in 24590-WTP-PSAR-ESH-01-002-02, *Preliminary Documented Safety Analysis to Support Construction Authorization (PDSA)* for removing radioactive solid particles entrained in the PVP/PVV exhaust and mitigating chemical hazards caused by the presence of nitrogen oxides (NO_x), consisting of nitric oxide (NO), nitrogen dioxide (NO₂), and nitrous oxide (N₂O). Prolonged exposure or high concentrations of NO_x gases that form fine particulates are potentially fatal to facility and co-located workers, and to the public. Radioactive particulate buildup or plugging in the packed column could potentially lead to hydrogen gas build-up. Another objective of this assessment was to examine Bechtel National, Inc. (BNI) self-identified actions to resolve the caustic scrubber-related design and safety requirements.

Requirements Reviewed:

The authorization and design basis requirements cited throughout this surveillance report are found in the following BNI documents:

- Authorization Basis Documents Reviewed:
 - 24590-WTP-PSAR-ESH-01-002-02, 2012, *Preliminary Documented Safety Analysis (PDSA) to Support Construction Authorization*, PTF Specific Information, Rev. 04Y, November 20.
 - 24590-PTF-JCDPI-ENS-11-0001, *Justification for Continued Design, Procurement, and Installation (JCDPI)*, Rev. 0¹, “Design and Procurement of PVP/PVV Equipment in Advance of Testing Completion and Hazards Analysis.”

The following documents and drawings were reviewed during this surveillance:

- Design Basis Documents and Drawings Reviewed:
 - 24590-PTF-3YD-PVV-00001, 2012, “System Description for the Pretreatment Vessel Vent Exhaust System (PVV),” Rev. 1, BNI, Richland, Washington.
 - 24590-PTF-3YD-PVP-00001, 2012, “System Description for the Pretreatment Vessel Vent Processing System (PVP),” Rev. 2, BNI, Richland, Washington.
 - 24590-PTF-M4C-V11T-00016, 2011, “NOx Concentration to PVP-SCB-00002,” Rev. A, BNI, Richland, Washington, September 27.
 - CCN: 226321, 2011, “Response to the DOE Concerns with PTF Process Vessel Vent (PVP/PVV) System Redesign Progress.” (external letter to D.E. Knutson, U.S. Department of Energy [DOE], Office of River Protection [ORP]) from R.W. Bradford, BNI, Richland, Washington, April 21.
 - CCN: 256329, 2013, “PVP/PVV Hazards Analysis Action Items,” June.
 - 24590-PTF-M6-PVP-00017001, 2008, “Drawing – Pretreatment Vessel Vent Process System Caustic Scrubber PVP-SCB-00002,” Rev. 0, BNI, Richland, Washington, October.
 - 24590-PTF-M6-PVP-00017002, 2008, “Drawing – Pretreatment Vessel Vent process System Caustic Scrubber PVP-Bulge-00001,” Rev. 0, BNI, Richland, Washington, October.
 - 24590-PTF-M6-PVP-00017003, 2008, “Drawing – Pretreatment Vessel Vent Process System Caustic Scrubber to PVP-Bulge-00014,” Rev. 0, BNI, Richland, Washington, October.

¹ ORP letter from D.E. Knutson and S. Charboneau to F.M. Russo, BNI, “Approval of Justification for Continued Design, Procurement, and Installation (JCDPI) for the Design and Procurement of PVP/PVV Equipment in Advance of Testing Completion and Hazards Analysis,” 11-NSD-070, dated September 20, 2011.

- 24590-QL-POA-MKAS-00002-02-00009, 2005, "Drawing – Pretreatment Vessel Vent Caustic Scrubber Details," Rev. 00B, BNI, Richland, Washington, August 2.
- 24590-WTP-MSOW-ENG-13-0002, 2013, "PVV/PVP System Authorization Basis Management Suspension of Work (AB MSOW)," BNI, Richland, Washington, July 18.
- 24590-WTP-PIER-MGT-12-1079-D, 2012, "PTF Single Point Equipment Failure Potential, Corrosion and Operability Concerns," Rev. 0, BNI, Richland, Washington, August 29.

Discussion of Area(s) or Activities Reviewed:

Assessment Report Details:

The U.S. Department of Energy, Office of River Protection (ORP) Nuclear Safety Division conducted a Level 2 assessment of the caustic scrubber unit of the PTF PVP/PVV system to evaluate whether the unit provides sufficient assurance that the safety functions and functional requirements will perform as stated in the PDSA. The caustic scrubber unit is designed to remove some highly radioactive solid particles to reduce filter loading on the PVP/PVV high efficiency mist eliminators (HEME) and high efficiency particulate air (HEPA) filters. The unit is also designed to mitigate chemical hazards by removing NOx gases present in the PVV exhaust. Prolonged exposure or high concentrations of NOx gases that form fine particulates are potentially fatal to facility and co-located workers, and to the public. Radioactive particulate buildup or plugging in the packed column could potentially lead to hydrogen gas build-up. Independently, BNI has self-identified engineering and operational vulnerabilities with the present design of the caustic scrubber:

- 24590-WTP-PIER-MGT-12-1079-D, 2012, "PTF Single Point Equipment Failure Potential, Corrosion and Operability Concerns," Rev. 0, Project Issue Evaluation Report (PIER), August 29.
- 24590-WTP-MSOW-ENG-13-0002, 2013, "PVV/PVP System Authorization Basis Management Suspension of Work (AB MSOW)," July 18.

The ORP and BNI reviews agreed on several key points:

1. Caustic scrubber represents a potential single failure point in the PVP offgas system given that the scrubber is located in the ground level black cell (room P0104)
2. Potential failure mode during the 40 year life due to corrosion
3. Potential failure mode during the 40 year life due to packed column plugging/fouling.

This assessment report provides additional discussion and consideration for evaluation in future BNI hazards analyses of the caustic scrubber and PVP system.

Summary Overview of PTF PVP/PVV Operations

The design objective for the caustic scrubber unit is to remove radioactive solid particulates and aerosols entrained in the PVP/PVV exhaust and to reduce/remove NO_x/acid gases.

Exhaust gases from the headspaces of PTF process vessels flow into a vent exhaust collection header and flow upwards through the caustic scrubber packed bed in contact with a mild caustic scrubbing liquid (5 M) flowing downward through the packed bed into a sump vessel. Part of the NO_x and acid gases react with the caustic to form sodium salts. The caustic scrubber unit is co-located in a black cell with ultrafiltration vessels UFP-VSL-0002A/B on the south side of the PTF (ground level in room P0104). The engineering design consists of only a single packed bed/caustic scrubber vessel and it, therefore, represents a potential for single-point failure. The packed bed consists of numerous steel plates and interwoven mesh packed in a column. The present design does not provide the capability of servicing or replacing this packed bed in the event plugging occurs.

The PVP/PVV is designed to provide primary confinement and filtration of aerosols generated from process vessels that could result in radiological and chemical consequences to facility workers, co-located workers, and the public during normal and accidental conditions. The PVP/PVV interfaces with various process vessels in the waste feed receipt system, waste feed evaporation process system, treated low-activity waste (LAW) evaporation process system, treated LAW concentrate storage process system, high-level waste (HLW) lag storage and feed blending system, ultrafiltration process system, cesium ion exchange process system, cesium nitric acid recovery process system, cesium resin addition process system, spent resin recovery process system, spent resin collection and dewatering process system, plant wash and disposal system, radioactive liquid waste disposal system, sodium hydroxide reagent system, and the demineralized water system.

The safety function of the PVP/PVV is to provide the vent path for forced/passive air purge and generated hydrogen from the headspace of vessels to allow removal of solid particulates, gases, liquid droplets, and mist through the pretreatment process vent flow. Figure 1 provides vertical and cross sections of the PTF vessel vent caustic scrubber.

The PVP/PVV consists of the following major elements:

- Forced/passive air purge supply
- Confinement piping system into a vent exhaust collection header
- Caustic scrubber
- HEMEs
- HEPA filters
- Volatile organic compounds (VOC) oxidizer unit
- Carbon bed adsorbers
- Exhaust fans
- Vent stack.

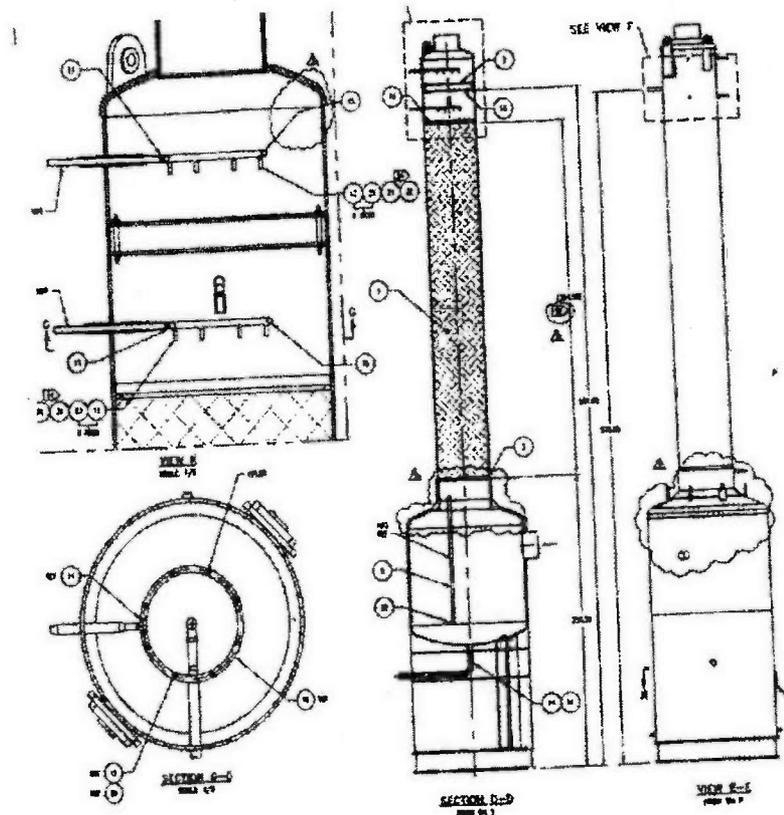


Figure 1. Pretreatment Facility Vessel Vent Caustic Scrubber Details (copied from 24590-PTF-3YD-PVP-00001).

As shown in Figure 2, the vent gases from process vessels are pulled through the major elements of PVP/PVV by the exhaust fans in the following order:

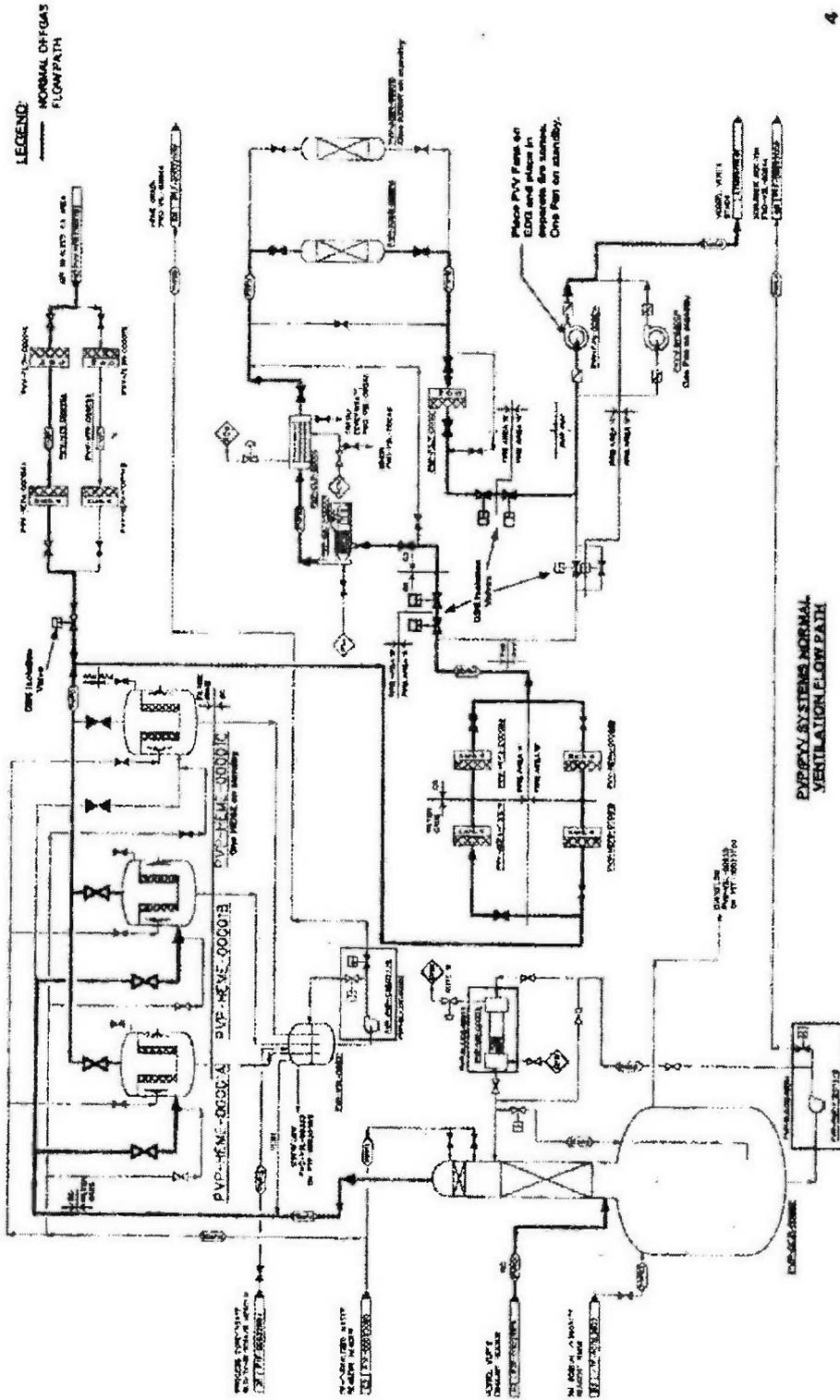
1. Vessel head space
2. Confinement piping
3. Caustic scrubber unit
4. HEMEs
5. HEPAs
6. VOC oxidizer units
7. Carbon bed adsorbers.

The vent gases are eventually released through the pretreatment building exhaust stack.

Portions of the PVP/PVV are currently classified as safety class (SC) and seismic category (SC)-I in the PDSA, due to the unmitigated dose consequences of a hydrogen explosion in process vessels. Specifically, the PVP/PVV confinement piping system, HEMEs, HEPA filters, HEPA differential pressure alarm, and exhaust fans are all classified as SC/SC-I.

Figure 2. Flow Diagram of Pretreatment Vessel Vent Processing and Pretreatment Vessel Vent Exhaust.

Pretreatment PVP/PVV Normal Ops Flow Diagram



4

Removal of Aerosols

The PVP/PVV vent gas stream flows into the caustic scrubber vessel and then flows upward through a packed bed where a contact scrubbing liquid (caustic solution) flows down the packed bed (Figure 2) to remove aerosols.

The scrubbing liquid is collected in the caustic scrubber vessel (PVP-SCB-00002) below the packed bed section as shown on Figure 2. Fresh sodium hydroxide solution (5 M) is added intermittently to the scrubber unit from the sodium hydroxide reagent system to control the pH of the recirculating scrubber liquid. Demineralized water is also added through the top of the packed unit into the scrubber vessel to control the pH of the scrubbing liquid. Spent scrubbing solution is intermittently transferred to plant wash vessel (PWD-VSL-00044).

The vessel vent scrubber recirculation pumps (PVP-PMP-00001 A/B) circulate the scrubbing liquid solution from the bottom of the scrubber vessel through the vessel vent scrubbing liquid cooler (PVP-HX-0002) to both the top of the packed bed section, and directly to the scrubber vessel to provide adequate mixing in the scrubber vessel. The vessel vent scrubbing liquid cooler is cooled by chilled water, which removes the heat generated from the neutralization reaction of NO_x/acid gases in contact with the sodium hydroxide.

Collection of radioactive aerosols is key to this assessment of the caustic scrubber and the PVP system. The BNI PIER (24590-WTP-PIER-MGT-12-1079-D) recommends that aerosol entrainment coefficients be "obtained from aerosol testing into upper tier documentation and Aerosol calculation (PDSA, ECCN, or revision to SLA Calculation, etc.). Example- overblow accident (vessel specific), normal purge etc...Revise 24590-PTF-M4C-M11T-00001 to include the finalized/agreed aerosol entrainment value/coefficients for accidents...Provide aerosol loading predictions, which are based on new Rev. C of 24590-PTF-M4C-M11T-00001 to scrubber vendor for impacts to operation associated with new entrainment data from testing." It is worth noting that the PIER recommendation for obtaining aerosol entrainment coefficients from aerosol testing will not provide bounding values for use in nuclear safety analyses because these tests were conducted for normal operating flow conditions.

Removal of Nitrogen Oxide Gases

Prolonged exposure or high concentrations of NO_x gases that form fine particulates are potentially fatal to workers and the public. One of the safety functions of the caustic scrubber unit is to mitigate the chemical hazards caused by potential release of NO_x gases. The NO_x/acid gases contained in the vent gases of the process vessels react with the dilute sodium hydroxide in the scrubbing liquid of the caustic scrubber to form sodium salts. Hanford wastes have large quantities of nitrates and nitrites that serve as the source of most of the NO_x gases released from chemical processing of the waste. The generation of NO_x gases in the Waste Treatment and Immobilization Plant (WTP) comes primarily from two sources. The primary source of NO_x gases occurs during the caustic leaching (heating of UFP-VSL-0002A/B to less than 185°F) of aluminum hydroxide in the ultrafiltration process vessels. The second source of NO_x comes from radiolytic heat due to elution of high concentrations of cesium-137 by nitric acid additions in the cesium ion exchange process system. The eluted cesium, in the form of a salt solution, is collected in the cesium nitric acid recovery evaporator and is transferred to the HLW processing

vessels, which also operate at elevated temperatures where increased liberation of NO_x gases is also expected. This is documented in WTP-RPT-027 (PNWD-3201), *Thermal and Radiolytic Gas Generation from Washed AN-102 Sludge*. Even so, the PTF is not expected to produce appreciable quantities of NO_x gases due to moderate-to-low operating temperatures in the majority of the process vessels.

Assessment Results

The caustic scrubber represents a potential single point failure in the PTF PVP/PVV design because an upset condition such as high recirculating liquid downward flow flooding the packed bed could block the upward PVP/PVV vent gas in the bed. This was also independently identified by BNI engineering in the PIER (24590-WTP-PIER-MGT-12-1079-D). If the PVP/PVV exhaust is blocked, the PTF operation will be negatively affected and the caustic scrubber unit would be inaccessible for any maintenance work since it is located in the black cell. The blocked PVP/PVV exhaust is redirected to the C5 ventilation system, potentially overloading the C5 HEPA filters. Given recent evaluations of spray release as documented by the Contractor (24590-WTP-RPT-221-222, "Final Large Scale SLT report and Final Small Scale SLT Report") the current C5 system is already near or beyond its ability to mitigate the spray leak release alone.

In the event that the caustic scrubber should fail, the vented gases and particulates from process vessels would be diverted to the C5 ventilation system. However, the C5 ventilation system is not equipped with a caustic scrubber or HEMEs that could remove entrained moisture, NO_x, and aerosols nor does it have the capacity to handle additional ventilation loads from PVP/PVV exhaust in addition to other accident conditions such as spray leaks and vessel spills. The entrained moisture in the PVP/PVV exhaust could damage the HEPA filters of the C5 system since C5 system is not provided with HEMEs to remove moisture. Therefore, the review team determined that this is a serious safety concern since the caustic scrubber represents a single point failure. This concern is compounded since the back-up C5 ventilation pathway is neither designed to remove NO_x nor to handle additional solids loading from the PVP/PVV exhaust.

As described in the PDSA, the purpose of the caustic scrubber unit is to reduce radioactive solid particles entrained in the PVP/PVV vent gas steam in order to reduce the overall radioactive particulate loading on PVP/PVV HEMEs and HEPA filters. The contractor estimated that solid particles ranging from 1 to 22 microns were entrained in the PVP/PVV exhaust as documented in its calculation, 24590-PTF-M4C-M11T-00001, "PVP/PVV Aerosols." However, the process of removing highly radioactive aerosols by the scrubber unit is not currently accounted for by the contractor in estimating the radiological loading on PVP/PVV HEMEs and HEPA filters. No hazard analysis has been performed to evaluate the potential failure of the caustic scrubber to remove radioactive solid particles in either the PDSA or the contractor's preliminary PVP/PVV hazards analysis (CCN: 256329, "PVP/PVV Hazards Analysis Action Items List"). Other than the scrubber vessel (PVP-SCB-00002) being classified as SC-II in the current PDSA, the safety classification of other components of the scrubber unit (e.g., recirculation pump, recirculation liquid cooler, packed bed, etc.) is unclear and needs to be explicit.

Most of the entrained solid particles in the PVP/PVV exhaust will originate from the five non-Newtonian vessels in the PTF (HLP-VSL-00028, HLP-VSL-00027 A/B, and

UFP-VSL-00002 A/B) during normal operation. However, during the accidental condition of pulse jet mixer overblow and air sparger overblows, the entrained radioactive particles could come from all process vessels in the PTF. During the operation, solid particles are expected to be entrained in the recirculating solution through the packed bed. However, it cannot be ruled out that some solid particles will be accumulated in the bottom of the caustic scrubber vessel (PVP-SCB-00002) and create potentially hazardous conditions since the accumulated particles will only be pumped out intermittently to the plant wash and disposal system vessel (PWD-VSL-00044). Hazardous conditions such as nuclear criticality and hydrogen generation have yet to be addressed and ruled out. Other unanalyzed hazardous events include the rupture of the caustic scrubber vessel (PVP-SCB-00002), which could spill the accumulated radioactive solids to the cell floor. A number of vessel failure mechanisms were identified during this assessment and independently by the PIER including:

1. Failure due to corrosion of welds on packing/support grids
2. Fouling/plugging of the caustic scrubber by particulates/aerosols
3. Fouling of mist eliminator
4. Seismic
5. Operating under off-specification chemistry.

In addition, BNI identified a safety basis issue with the PVP/PVV system regarding increased aerosol loading or with multiple over blows from the vessel pulse jet mixers in 24590-WTP-MSOW-MGT-11-0003, *Management Suspension of Work (MSOW)*. Based on the above discussion, the review team concludes that a complete hazard and consequence analysis for the removal of radioactive aerosols by the scrubber unit is required. The contractor's hazards analysis must identify and analyze all possible hazards with regard to the removal process of highly radioactive solid particles. The analysis must account for the defined safety function and safety classification for each component in the scrubber system including the packed bed, recirculation pump, scrubbing liquid cooler, and scrubbing liquid vessel. The analysis must identify required controls to allow the scrubber unit to perform under normal and accidental conditions. The results of the hazards analysis could further demonstrate whether the current design of the scrubber unit can meet its safety function, particularly given that the scrubber unit represents a single point failure within a black cell.

The second design objective for the caustic scrubber unit is to absorb NO_x/acid gases contained in the vent gases from process vessels. NO_x gases, consisting of principally NO₂ and NO, are potentially fatal to facility and co-located workers, and to the public.

At present, the PDSA identifies the caustic scrubber unit as the only identified system, structure, and component in the PVP/PVV designed to mitigate the chemical hazards (NO_x gases) from vent gases of process vessels. Based on the contractor's hazards analysis handbook (24590-WTP-GPG-RANS-NS-0002, *Hazards Analysis Handbook*), the chemical dose standards listed in Table 1 shall be applied to protect the public and workers from WTP chemical hazards.

Table 1. Chemical Consequence Ranges to Protect the Public and Workers.

Receptor	Consequence Range	Chemical
Public	High	> PAC-2
	Moderate	< PAC-2 and > PAC-1
	Low	< PAC-1
Co-located Worker	High	> PAC-3
	Moderate	< PAC-3 and > PAC-2
	Low	< PAC-2
Facility Worker	High	> PAC-3
	Low	< PAC-3

< = less than.
> = greater than.
PAC = protective action criteria.

The protective action criteria (PAC) values are based on acute exposure guideline level, or emergency response planning guide, or temporary exposure limit values.

Based on DOE-HDBK-1046-2008, *Temporary Emergency Exposure Limits for Chemicals: Methods and Practice*, the PAC values for NO and NO₂ are shown in Table 2.

Table 2. Protective Action Criteria Values for Nitric Oxide and Nitrogen Dioxide.

Receptor	NO		NO ₂	
	PAC-2	16 ppm	PAC-2	13 ppm
Public	PAC-2	16 ppm	PAC-2	13 ppm
Co-located Workers	PAC-3	66 ppm	PAC-3	26 ppm
Facility Workers	PAC-3	66 ppm	PAC-3	26 ppm

NO = nitric oxide.
NO₂ = nitrogen dioxide.
PAC = protective action criteria.
ppm = parts per million.

The contractor has performed a preliminary estimation of the amount of NO_x gas generation (24590-PTF-M4C-V11T-00016, "NO_x Concentration to PVP-SCB-00002") in the vent gas stream from process vessels. The calculation shows that the NO_x concentration is within the range of 99 to 114 ppm during normal operations at a temperature range of 100°F to 200°F, which is bounding for the normal operating temperature range of 105°F to 134°F. However, to be conservative, the design of the caustic scrubber unit assumes a 200 ppm NO_x concentration. The contractor indicates that a more accurate estimation of NO_x gases in the PVP/PVV vent gas stream will be performed in the future. The contractor further indicates that the final estimation of NO_x concentration is expected to be much less than 200 ppm based on their preliminary evaluation of sources of NO_x generation from various process vessels.

Using the conservative estimate of 200 ppm NO_x concentration as a basis, the review team estimates the unmitigated chemical consequence of NO_x release (ground release and without any

mitigation by the caustic scrubber unit) from PVP/PVV vent gas stream to be approximately 0.5 ppm to coworkers and probably undetectable to the public. Since the calculated unmitigated chemical consequences of NO_x gases for both co-located workers and the public are well below the threshold values of PAC-3 and PAC-2, the surveillance team concludes that there is likely no need for any further mitigation of NO_x gases to protect co-located workers and the public if NO_x concentration in routine operations and in off-normal occurrences is less than 200 ppm in the PVP/PVV vent gas stream.

Likewise for facility workers, the release of NO_x is not a concern since the caustic scrubber unit is located in the black cell (ground level in room P0104). PVP/PVV equipment located downstream of the caustic scrubber such as the HEMEs and HEPA filters are located in the filter cave that is designated as R5/C5, the highest rating based on dose rate and surface/airborne contamination.

While the VOC oxidizer and the carbon bed adsorbers are located in a C3 area, they are switched off from PVP/PVV flow whenever any accident occurs and the PVP/PVV vent flow continues to exit through the building stack without any interruption. It should be noted that PVP/PVV piping system, HEMEs, and HEPA filters are all classified as SC and SC-I based on the consideration of radiological consequences. Thus, the PVV/PVP is designed to operate under both normal and accident conditions. The uninterrupted release of PVP/PVV vent gases precludes chemical exposure to facility workers.

Based on the discussion above, the review team concludes that current caustic scrubber unit design provides sufficient protection to workers and the public from the exposure to toxic NO_x gases.

However, there is total lack of discussion in the PDSA with regards to the safety function of the unit to remove radioactive particles. Further, the review team is concerned that the PVP/PVV exhaust could be redirected to the C5 system due to the failure of the scrubber unit. This upset could overwhelm the ability of the current C5 system to mitigate all exhausted gases and entrained particles from process vessels, pipe leaks, vessels spill, and other potential sources. Since some of the issues discussed in the assessment were self-identified by the contractor, the team determined that the need for a complete hazard analysis to identify all hazards associated with operation of caustic scrubber is an opportunity for improvement (OFI) (S-14-NSD-RPPWTP-001-001). The basis for the OFI includes the following:

- Lack of a complete hazard and consequence analysis to identify all hazards for the scrubber unit to remove highly radioactive solid particles
- Lack of an evaluation to demonstrate that the C5 system is wholly capable of mitigating additional filter loading from the PVP/PVV exhaust when the exhaust is blocked and redirected to the C5 system due to the failure of the caustic scrubber unit.

Summary of Findings, Opportunity for Improvements, or Assessment Follow-Up Items:

OFI S-14-NSD-RPPWTP-001-001; (Ko Chen): The need for a complete hazard and consequence analysis for the PVP/PVV caustic scrubber unit for its safety function of removing highly radioactive solid particles entrained in the PVP/PVV exhaust and the need of an

evaluation to demonstrate that the C5 system is wholly capable of mitigating additional filter loading when the PVP/PVV exhaust is blocked and redirected to the C5 system due to the failure of the caustic scrubber unit.

Discussion:

Based on its assessment, the assessment team determined that a complete hazard and consequence analysis of the caustic scrubber unit to remove highly radioactive particles needs to be performed by the contractor to demonstrate whether the current design of the scrubber unit can meet its safety functions to remove highly radioactive solid particles in the PVP/PVV exhaust, especially given that it represents a single point of failure.

Conclusion:

The Level 2 assessment identified one OFI (S-14-NSD-RPPWTP-001-001). Based on current existing information, the review team concludes that a complete hazard and accident analysis of the scrubber unit's function to remove highly radioactive particles needs to be performed to demonstrate whether the current design of the caustic scrubber unit can meet its safety function. In summary, the review team is concerned that the single point failure of the caustic scrubber will overwhelm the C5 ventilation system's capacity to remove radioactive particulates.

Level 2 Assessment Team Lead:

Donald A. Beckford

Date:

11/6/13

Division Director:

Victor J. Callahan

Date:

11-6-13



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13-WSC-0018

OCT 22 2013

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF ASSESSMENT REPORT
S-13-WSC-RPPWTP-016

This letter transmits the results of the subject U.S. Department of Energy, Office of River Protection, Waste Treatment and Immobilization Plant (WTP), Startup and Commissioning Integration review of Bechtel National, Inc.'s test results packages for selected testing performed in Building 87 from December 2012 to June 2013. Two Opportunities for Improvement (OFI) items were identified in the course of this assessment. Summaries of the surveillance activities and the two OFIs are documented in the attached reports. No response to these items is required.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

If you have any questions, please contact me, or you may contact Ben Harp, Manager, WTP Startup and Commissioning Integration, at (509) 376-1462.

William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:CLS

Attachment

cc w/attach:
D. L. Collins, BNI
D. E. Kammenzind, BNI
M.G. McCullough, BNI
W.W. Gay, URS
K. Wells, URS
BNI Correspondence

Attachment
to
13-WSC-0018

S-13-WSC-RPPWTP-016
BUILDING 87 TEST RESULTS REVIEW AND APPROVAL
WSC Level 2 Assessment Report
September 12, 2013
4 pages (including coversheet)

Assessment Report Number: S-13-WSC-RPPWTP-016
Division Performing Assessment: WSC
Integrated Assessment Schedule Number: 203
Title: Test results review and approval, Building 87
Date: September 12, 2013
Lead: Cecil Swarens
Team Members: NA

SCOPE

This Level 2 assessment reviewed the test results packages for selected testing performed in Building 87 from December 2012 to June 2013.

REQUIREMENTS REVIEWED

- 24590-WTP-SU-ADM-006, *Conduct of Testing*
- 24590-WTP-SU-ADM-008, *Test Results Review and Approval.*

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- 24590-BOF-FSW-TRP-0008, *Building 87 Water Supply Piping Flush Functional Test Results (FDE-B-01)*
- 24590-BOF-FSW-TRP-0009, *Building 87 Fire Protection Header Flush Results (FDE-B-01)*
- 24590-BOF-FDE-TRP-0001, *Test Results Package for BOF FDE-B-01 Generic Test Data*
- 24590-BOF-FDE-TRP-0002, *Test Results Package for Startup Test Instruction to Troubleshoot and correct Deficiency Scope in 24590-BOF-SFR-FDE-0001*
- 24590-BOF-CPS-TRP-0005, *Test Results Package for Generic Component Tests (CPE-B-03).*

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

Each of the selected test result packages were reviewed for compliance with requirements of Bechtel National, Inc. (BNI) procedures 24590-WTP-SU-ADM-006 and 24590-WTP-SU-ADM-008, as well as the effectiveness of the completed test results packages in conveying complete and satisfactory completion of testing.

SUMMARY OF FINDINGS, OPPORTUNITIES FOR IMPROVEMENT, OR ASSESSMENT FOLLOWUP ITEMS

- **S-13-WSC-RPPWTP-016-001 (Cecil Swarens):** Many test data and chronological test log entries are difficult to read due to lineouts and corrections.

Discussion: During the review of selected test results packages for completed testing in Building 87, the assessor found many data entries and test log entries difficult to read due to numerous and sometimes multiple lineouts and corrections. More care could be given to ensure accuracy prior to making these data and log entries.

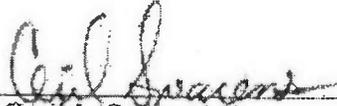
- **S-13-WSC-RPPWTP-16-002 (Cecil Swarens):** Test requirements blocks of generic procedure datasheets did not consistently contain measurable test requirements.

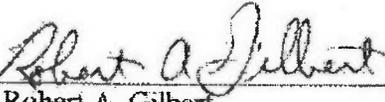
Discussion: The review of test result packages from selected testing in Building 87 showed that in most cases, the test requirements block of the generic procedures datasheets did not contain measurable test requirements against which the test could be declared satisfactory or failed. Examples observed include "General" or "Circuits operate as designed." These examples do not provide clear information as to what constitutes satisfactory completion or failure of the test. More clear requirements could include "No specific test requirements have been identified in manufacturer's documentation or design documents. Therefore, the general requirements of the generic test procedure shall be used in accordance with section 8 of the procedure;" or "Circuits shall show continuity (low resistance) when circuits are closed and no continuity (very high resistance) when circuits are open." In each case, the test engineer has specified what to use as the basis for satisfactory completion of testing or failure.

CONCLUSION

The test results packages reviewed were found to meet the requirements of BNI procedures 24590-WTP-SU-ADM-006 and 24590-WTP-SU-ADM-008, and complete and satisfactory completion of testing. However, opportunities for improvements were identified in the areas of test requirement statements and the care taken in completing the datasheets and test logs.

SIGNATURES

Assessor or Lead
Assessor:  **Date:** 10/2/13
Cecil L. Swarens

Startup Program
Manager:  **Date:** 10/3/2013
Robert A. Gilbert



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NOV 20 2013

13-WTP-0252

Mr. J.M. St. Julian
Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
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Dear Mr. St. Julian:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF SURVEILLANCE REPORT S-13-WED-RPPWTP-011 - REVIEW OF THE MAY 2013, STRUCTURAL PEER REVIEW TEAM (SPRT) REPORT

This letter provides the results of the U.S. Department of Energy (DOE), Office of River Protection, Waste Treatment and Immobilization Plant (WTP) Engineering Division (WED) review of the May 2013 SPRT report of the independent confirmation of WTP structural design. Attached are copies of the subject surveillance report and the May 2013 SPRT report.

The May 2013 SPRT review resulted in 27 comments. WTP characterized the comments as 27 opportunities for improvement (OFI). A formal response to these OFIs is not required. However, Bechtel National, Inc. (BNI) is requested to review, and as appropriate, address these items to support a future SPRT follow-up review.

The action taken herein is considered to be within the scope of work of the existing contract and does not authorize the Contractor to incur any additional costs (either direct or indirect) or delay delivery to the Government. If the Contractor considers that carrying out this action will increase contract/project costs or delay of delivery, the Contractor shall promptly notify the Contracting Officer orally, confirming and explaining the notification in writing within ten (10) calendar days, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, -- "Notification of Changes." Following submission of the written notice of impacts, the Contractor shall await further direction from the Contracting Officer.

Mr. J.M. St. Julian
13-WTP-0252

-2-

NOV 20 2013

If you have any questions, please contact me, or your staff may contact Ken Wade, Acting Director, WTP Engineering Division, (509) 376-2477.



William F. Hamel
Assistant Manager, Federal Project Director
Waste Treatment and Immobilization Plant

WTP:RMV

Attachments

cc w/attach:

M. Axup, BNI

J. Booth, BNI

D. Kammenzind, BNI

BNI Correspondence

Attachment 1
13-WTP-0252
S-13-WED-RPPWTP-011

Attachment 1
13-WTP-0252
REVIEW OF MAY 2013 STRUCTURAL PEER REVIEW TEAM REPORT
WED Assessment Report
October 2013
16 pages (including coversheet)

WED Assessment Report

Assessment Report Number: S-13-WED-RPPWTP-011
Division Performing Assessment: Waste Treatment and Immobilization Plant Engineering Division
Integrated Assessment Schedule Number: 451
Title: Review of May 2013 Structural Peer Review Team Report
Date(s): October 2013
Lead: Raman Venkata, WED Safety Systems Oversight Structural Engineer
Attachment: May 2013 Structural Peer Review Team Report

SCOPE

This assessment report documents the Waste Treatment and Immobilization Plant (WTP) Engineering Division (WED) review of the May 28 to May 31, 2013, independent Structural Peer Review Team (SPRT) report issued October 3, 2013. This report contains WED characterization of the comments contained in the SPRT report in accordance with Desk Instruction MGT-PM-DI-03, *Conduct of Engineering Oversight*, and Implementing Procedure TRS-OA-IP-01, *Integrated Assessment Process*.

REQUIREMENTS REVIEWED

- 24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document*, Rev. 7
- 24590-WTP-DB-ENG-01-001, *Basis of Design*, Rev. 1Q
- DOE-STD-1020-1994, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*.

RECORDS/DESIGN/INSTALLATION DOCUMENTS REVIEWED

- Drawings: 24590-LAW-S0-S15T-00002, Rev. 25; 24590-LAW-S0-S15T-00011, Rev. 5; 24590-LAW-S0-S15T-00012, Rev. 3; 24590-LAW-S0-S15T-00014, Rev. 6; 24590-LAW-S0-S15T-00015, Rev. 2; 24590-LAW-S1-S15T-00005, Rev. 1; 24590-LAW-S1-S15T-00035, Rev. 1; 24590-LAW-S1-S15T-00043, Rev. 4; 24590-LAW-S1-S15T-00045, Rev. 3; 24590-LAW-S1-S15T-00046, Rev. 1; 24590-LAW-S1-S15T-00047, Rev. 2; 24590-LAW-S1-S15T-00048, Rev. 1; 24590-LAW-S1-S15T-00049, Rev. 2; 24590-PTF-DD-S13T-00065, Rev. 6; 24590-PTF-DD-S13T-00066, Rev. 13; 24590-PTF-DD-S13T-00067, Rev. 10; 24590-PTF-DD-S13T-00068, Rev. 9; 24590-PTF-DD-S13T-00069, Rev. 2; 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040,

Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; 24590-PTF-S1-S15T-00510, Rev. 1; 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040, Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; and 24590-PTF-S1-S15T-00510, Rev. 1.

- Calculations 24590-LAW-SSC-S15T-00057, Rev. 0; 24590-PTF-SSC-S15T-00075, Rev. 0; 24590-PTF-SSC-S15T-00360, Rev. A; 24590-PTF-SSC-S15T-00365, Rev. A; and 24590-WTP-DC-ST-01-001, Rev. 13
- May 2013 SPRT Report, dated October 3, 2013.

DISCUSSION OF AREAS OR ACTIVITIES REVIEWED

U.S. Department of Energy (DOE) policy requires DOE facilities, such as the WTP, to be designed, constructed, and operated so workers, the general public, and the environment are protected from the impacts of natural phenomenal hazards on DOE facilities. Key considerations include earthquake design and evaluation criteria prescribed in DOE-STD-1020-94. The application of natural phenomena hazard (NPH) design requirements to structures, systems, and components (SSC) are based on the life safety or the safety classifications of the SSC as established by safety analysis focused on:

- Providing a safe work environment
- Protecting against property loss and damage
- Maintaining operation of essential facilities
- Protecting against exposure to hazardous materials during and after occurrences of natural phenomena events.

The purpose of the SPRT is to confirm the Bechtel National, Inc. (BNI) structural design process effectively implements authorization basis and other applicable technical requirements for the design activity under review, to ensure long-term safety, integrity, functionality/operability, and optimal life-cycle cost of WTP structural related SSCs.

The May 2013 SPRT included a review of facility structural steel drawings, calculations, design criteria, and design guides associated with structural design specific to the following:

1. Defense Nuclear Facilities Safety Board (DNFSB) issues and comments and responses to issues that have been transmitted to the DNFSB by BNI for the DOE Office of River Protection (ORP) since January 2011.
2. SPRT site visit to review general progress, emergency turbine generator (ETG) location, Analytical Laboratory (Lab) heating, ventilation, and air conditioning (HVAC) CSV duct, High-Level Waste (HLW) Facility platform
3. Review the Low-Activity Waste (LAW) Facility multi-commodity racks

4. Pretreatment (PT) Facility black cell liner
5. PT hot cell equipment frames
6. Review the transfer function comparison developed by the project for the Subtraction vs. Direct Method
7. Update the SPRT on the status of Lab HVAC C5V duct design/story drift issue, including HVAC seismic anchor motion
8. Discuss the resolution of PT/HLW crane rail girder design comments from October 2012 review
 - Review the crane bracket weld to embed, including distribution of vertical shear to flange welds
 - Discuss PT hot cell embed lamellar tearing issues
 - Discuss design issues with embed plates having Nelson D2L deformed bars
9. Review responses to past SPRT open comments
 - Discuss SPRT thinking on Project Issue Evaluation report (PIER) 12-0011, Action 6, related to DOE-STD-1020-94 peer-review requirements
 - Discuss resolution of PIER 12-1189 related to use of In-Structure Response Spectra (ISRS) curves
10. Discuss ETG building design
 - Update for on-power seismic design
11. Discuss HLW platform connection details
12. Review ashfall criteria revision
13. Review Design Criteria Revision 13 update.

As a result of the review, the SPRT made 27 new observations, which are provided in Attachment A of the SPRT report. A number of responses were presented to resolve previous SPRT comments and responses for seven comments were closed. In addition, the SPRT's review of draft calculation 24590-HLW-S0C-S15T-00236, Rev. 1, resolved the subtraction method issue for HLW Facility to the satisfaction of the SPRT.

A summary of the results of the review follows.

1. SPRT site visit to review general progress, ETG location, Lab HVAC C5V duct, HLW platform

The SPRT participated in a site visit to review overall progress and status of construction. Specific attention was paid to the location of the ETG Building. In addition, the SPRT reviewed the Lab HVAC C5V duct and associated installed expansion joints and the designed location of the HLW platform. Details of the SPRT's observations from the site visit are incorporated into the specific items discussed below.

2. Review the LAW multi-commodity racks

The SPRT held discussions with the project regarding the LAW multi-commodity racks, after which the SPRT reviewed calculations and drawings for typical designs provided by the project. Based on this review, the SPRT developed 15 comments and questions, which are included in Attachment A of the SPRT report.

3. PT black cell liner

The SPRT held discussions with project personnel regarding the PT black cell liner, after which the SPRT reviewed calculations and drawings for typical designs provided by the project. Based on this review, the SPRT developed three comments and/or questions, which are included in Attachment A of the SPRT report.

4. PT hot cell equipment frames

The SPRT held discussions with the project regarding the PT hot cell equipment, after which the SPRT reviewed calculations and drawings for typical designs that were provided by the project. Based on this review, the SPRT developed seven comments and questions, which are included in Attachment A of the SPRT report.

5. Review the transfer function comparison developed by the project for the subtraction vs. direct method

The project provided comparisons of transfer functions in draft calculation 24590-HLW-S0C-S15T-00236, Rev. 1, as requested by the SPRT during the April 30 to May 1, 2012, SPRT meeting. The SPRT has reviewed the associated calculations and concurs that the use of the subtraction method does not have a significant effect on the computed results for the HLW Facility. This revision of the calculation addresses the path forward described in Topic 3 of the *Structural Peer Review Team Report of WTP Structures, Systems and Components*, dated August 20, 2012.

6. Update the SPRT on the status of Lab HVAC C5V duct design/story drift issue, including HVAC seismic anchor motion

The SPRT held previous discussions with the project team regarding PIER 24590-WTP-PIER-12-0814-B related to incorporating story drift displacements into the design of the Lab HVAC C5V duct design. BNI has retrofitted the C5V duct system with expansion joints accommodate building drifts that were not considered as part of the original duct design. BNI engineers indicated that the controlling code provisions indicated that the ducts may be subject to local buckling due to the imposed (≈ 3 in.) seismic drift.

The SPRT previously indicated that, given the magnitude of lateral drifts and displacement controlled duct loading, local buckling would likely result in a wrinkle or crinkle in the stainless steel duct shell. Neither response would lead to loss of duct operability even though the code stress limits would be exceeded. The SPRT further indicated that the expansion joints added to the system typically are less reliable than the duct itself and have larger life-cycle costs than the duct. It appeared to the SPRT that this may be an instance where reliability is reduced and costs increased to meet a "conservative" code criterion when the original configuration may have met the

performance goal. The SPRT recommended implementing a waiver system to allow code exceedances in limited cases where fully justified.

Further discussion on this topic in the May 2013 SPRT meeting indicated that the Lab HVAC expansion joints now are installed. For future uses WED discussed using seismic experience database information and the SPRT recommended that the project have the Equipment Qualification PRT group (George Rawls) review the Seismic Qualification Utility Group (SQUG) qualification guidelines to assess whether the construction of the ductwork in question was consistent with the experience database. In addition, SBRT and the project discussed analysis methods to qualify the ducts. The analyses would have to consider nonlinear material behavior and nonlinear geometry (P-Delta) effects with the goal to demonstrate that the duct stays open (functional) during the displacement event. The discussion also addressed the need to implement some kind of waiver system to allow flexibility when strict adherence to design rules causes decisions that increase total risk. (The SPRT has made this comment before).

The project provided the SPRT with a list of Seismic Category III C5 duct and associated seismic parameters that will require evaluation for multi-level support displacement due to drift. The SPRT requested an opinion from George Rawls as to whether this would fall under the experience data gathered by the Electric Power Research Institute (EPRI) in Report 1016125, *Experience Based Seismic Equipment Qualification*, and Report 1007896, *Seismic Evaluation Guidelines for HVAC Duct and Damper Systems*. The peak ground acceleration for WTP Performance Category 2 structures is 0.6 g. The building in question is primarily a braced frame steel building with some concrete shear wall in the basement and a few shear walls at the first floor (ground level).

Table 1. Duct Tech Data.

Duct Size	Length	Pressure Class	Thickness
6 in. Ø	16 ft	B-3-*/M-1-C (± 56-in. WG)	304L 16 gauge
12 in. Ø	183 ft	B-3-*/M-1-C (± 56-in. WG)	304L 12 gauge
16 in. Ø	24 ft	A-1-F/L-1-A (± 15.25-in. to 20-in. WG)	304L 12 gauge
18 in. Ø	8 ft	B-3-E/J-1-C (± 10.25-in. to 15-in. WG)	304L 12 gauge
60 in. Ø	299 ft	B-3-A/J-1-C (± 10.25-in. to 15-in. WG)	304L 12 gauge
16 in. × 24 in.	12 ft	A-1-F/L-1-A (± 15.25-in. to 20-in. WG)	304L 12 gauge
14 in. × 20 in.	55 ft	B-3-E/J-1-C (± 10.25-in. to 15-in. WG)	304L 12 gauge

In addition, the project requested an opinion as to whether cable tray (raceway) would also fall into the category of distribution systems that are fundamentally unaffected by multi-level support displacement due to drift.

The SPRT forwarded the provided information to George Rawls with a request for his assessment. His assessment is included in Attachment E of the SPRT report. In summary, duct failures have been observed in past seismic events. As a result, evaluation of ductwork for differential displacements is required. More detailed discussion is provided in Attachment E.

7. Discuss the resolution of PT/HLW crane rail girder design comments from October 2012 review

- Crane bracket weld to embed including distribution of vertical shear to flange welds
- PT hot cell embed lamellar tearing issues
- Embed plates having Nelson D2L deformed bars

The SPRT held discussions with the project team regarding the October 2012 review comments that were based on the SPRT's review of the PT/HLW crane rail girder design. The project indicated that the calculation is being revised to address comments from the October 2012 SPRT summary report. Specific discussions regarding the previous comments resulted in the following:

- a. *Welds to embedment plates.* BNI agrees that welds for shear forces should be limited to welds in the direction of the shear forces. BNI will recalculate weld forces based on this basic assumption. This issue appears to be of generic concern.
- b. *Welds to embedment plate are controlling factor for capacity.* Comment from October 2012 meeting recommended that the project reconsider whether the capacity for an assemblage that will be inaccessible should be controlled by the size of the fillet weld. No additional discussion was held regarding this topic.
- c. *Use of back plate and embedment plate adequacy for HLW melter case overhead mast power manipulator.* BNI agreed to review and reissue calculations as necessary. The review will include evaluating the embedment plate.
- d. *Potential for laminar tearing of embedment plates.* BNI agreed to have a metallurgist provide a written opinion on the potential for laminar tearing, especially in the region of the top weld of the crane rail support brackets.
- e. *Nelson D2L deformed bar anchors.* The use of Nelson D2L deformed bars for the embed plate anchor is an issue. BNI agreed to develop a case study demonstrating that the embedded bars are fully developed with 60 percent of the ACI 318 development expression.
- f. *Vertical seismic loads.* The cranes have high vertical accelerations and restraints on one side of the rail. The vertical restraints for the crane are not addressed. This component of design should be included in the evaluation.
- g. *Additional topics*
 - Fy will not be used in the crane bracket design
 - Based on the discussions held with the project, it appears that there is a generic issue with computing shear capacity ($0.4 F_y t_w$) for the design of welds to A36 plates.

The items noted in 7a through 7g represent clarifications to the review comments from the October 2012 review and are not included in Appendix A of the SPRT report.

8. Review responses to past SPRT open comments

- Discuss SPRT thinking on PIER 12-0011, Action 6 related to DOE-STD-1020-1994 peer-review requirements
- Discuss resolution of PIER 12-1189 related to use of ISRS curves.

PIER 12-0011, Action 6

Discussions were held with the SPRT regarding Action 6 of PIER 12-0011. The SPRT concurs that DOE-STD-1020-1994 contains requirements for peer review. It is the SPRT's experience that peer reviews of calculations are performed by groups external to the performing group and most often come from external organizations.

The decision on procedures and processes required to meet the requirements of DOE-STD-1020 should be a management responsibility, coordinated with the appropriate Quality Assurance personnel, and should flow to appropriate project (and Quality Assurance) procedures and processes. Due to the makeup and experience of the SPRT, the effectiveness of the WTP peer review process is not an appropriate topic for the SPRT to review and should be referred to the appropriate Quality Assurance group for evaluation.

PIER 12-1189

Comments on the existing control building are moot because the design for the control building will be changed. Thus the comments related to CCN 252553 (PIER 12-1189, PIER 12-1261) that are currently included in Attachment D of this report should be closed.¹

9. Discuss ETG Building design

- On-power seismic design

BNI (Thomas Ma) provided a progress report on the status of the generator design. The SPRT has two issues:

- a. The vibration loads to the building need to be fully considered in the building design. Note that the turbine does not have an isolated foundation. The SPRT recommends getting formal building input from vendor and use that input in the design.
- b. The vendor wants to use transfer functions and evaluate the generator design using a frequency domain approach. DOE and the SPRT agree that approach can yield correct results if properly implemented. However, most of the analysis details have not been developed and there is nothing substantial to review at this time.

¹ Observations S-12-WED-RPPWTP-015-001, S-12-WED-RPPWTP-015-002, S-12-WED-RPPWTP-015-003, and S-12-WED-RPPWTP-027-004.

10. Discuss HLW Vitrification Facility structural HEPA filter support details

The SPRT held additional discussions with the project related to comments made during the October 2012 SPRT meeting. BNI is currently updating the analysis and revising the connection calculations. Two items that BNI needs to address in their revised calculations are:

- a. *Fillet welds to A36 plate.* Fillet welds to A36 plate will be governed by $0.4 F_y t_w$ ($0.4 \times 36,000 \times \text{weld size}$). The revised calculations will reflect this controlling condition. This is a generic issue with calculation of weld capacity.
- b. *Welds resisting shear load.* BNI agreed to revise calculations to reflect using fillet welds parallel to the direction of applied load (shear is resisted only by welds to portions of members resisting shear) to resist shear.

The SPRT notes that there are roughly eight or nine complete load transfers (critical welds) required to develop this connection design. It is the SPRT's opinion that this is a poor design, even if BNI is successful in demonstrating that this design meets the minimum code requirements. Furthermore, it is the SPRT's opinion that this connection will be less reliable than the more direct girder-to-column connection that should have been used.

11. Review ashfall criteria revision

Discussions related to the revision of the ashfall criteria continued in the meeting from previous meetings. The discussions resulted in the following path forward. The SPRT noted that the proposed ashfall loads have a 10,000-year return period and the structural design criteria (SDC) specifies the same criteria as live load. At a minimum, it is the SPRT's opinion that ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic. Note that this will require a change to the SDC. The SPRT suggested/concurred with the following:

- a. Use mass scaling to get ash drift heights
- b. Use reduced wind velocity for ash drift heights because ashfall is not a storm event like snow
- c. Reduce the commodity load allowance if necessary
- d. The WTP civil structural architectural discipline position should be documented in an engineering study or report.

In addition, ORP should convolve the ashfall hazard with typical gravity load building fragilities and determine the appropriate ashfall return period to achieve the DOE-STD-1020-1994 performance goal. The SPRT believes that using a 10,000-year return period and treating the ashfall load as a live load has a performance goal that is significantly smaller than the remaining NPH loads.

Pursuant to the meeting the SPRT has reviewed Calculation 24590-WTP-SOC-S15T-00033, Rev. 0, and understands how BNI is treating the ash drift loading. The SPRT

deems the approach developed appropriate given the current state of the art. The SPRT also agrees with BNI conclusions that the snow drift loading is limiting compared to the ash drift load. However, it is the SPRT's opinion that the calculation is overly conservative in combining 23 psf (APE = E-4) of ash load with the full roof live load for Performance Category 3 structures, and this is a comment for the criteria document. The SPRT suggest that the 23 psf ash loading be accepted for the WTP Project unless the current criteria indicates modifications are required to the existing structures.

The current approach is sufficient to close the two comments from the SPRT October 2012 meeting related to HNF-SD-GN-ER-501, *Natural Phenomena Hazards*, Rev. 2.

12. Review Design Criteria Revision 13 update

The SPRT has reviewed Rev. 13 of the Design Criteria and has one comment. The proposed ashfall loads have a 10,000-year return period and the SDC specifies the same criteria as live load. At a minimum, the ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic. This comment is included in Attachment A of the SPRT report.

SUMMARY OF FINDINGS, OPPORTUNITIES FOR IMPROVEMENT, OR ASSESSMENT FOLLOWUP ITEMS

Reference Information for Opportunities for Improvement S-13-WED-RPPWTP-011-001 through S-13-WED-RPPWTP-011-015:

Document No. /Title: LAW Multi-commodity supports between Elevations +48 to +68

Calculation 24590-LAW-SSC-S15T-00057, Rev. 0; Drawings 24590-LAW-S0-S15T-00002, Rev. 25; 24590-LAW-S0-S15T-00011, Rev. 5; 24590-LAW-S0-S15T-00012, Rev. 3; 24590-LAW-S0-S15T-00014, Rev. 6; 24590-LAW-S0-S15T-00015, Rev. 2; 24590-LAW-S1-S15T-00005, Rev. 1; 24590-LAW-S1-S15T-00035, Rev. 1; 24590-LAW-S1-S15T-00043, Rev. 4; 24590-LAW-S1-S15T-00045, Rev. 3; 24590-LAW-S1-S15T-00046, Rev. 1; 24590-LAW-S1-S15T-00047, Rev. 2; 24590-LAW-S1-S15T-00048, Rev. 1; and 24590-LAW-S1-S15T-00049, Rev. 2.

- **OFI S-13-WED-RPPWTP-011-001:**

Refer to Calculation 24590-LAW-SSC-S15T-00057, page 22, and Drawing 24590-LAW-S1-S15T-00045. The unbraced length for a W18 x 46 is 8.33 ft. Beam G3-G4 at elevation +48 ft in drawing 24590-LAW-S1-S15T-00045 appears to have an unbraced length of roughly 16.2 ft. Please identify where the unbraced lengths shown on the drawings are considered.

- **OFI S-13-WED-RPPWTP-011-002:**

In drawing 24590-LAW-S1-S15T-00045 there is bracing between GL E.6-3 and E-4 that resists NS lateral loads. Please identify where the vertical bracing is called out that transfers NS lateral loads to the floor on the west side of this bracing.

In the lateral load analysis on Page 30 of Calculation 24590-LAW-SSC-S15T-00057, where is the dead load of the platform considered?

- **OFI S-13-WED-RPPWTP-011-003:**

Drawings 24590-S1-S15T-00047 through -00049 show additional racks at elevations 56 ft 6 in. and 61 ft. Where is the weight of these racks and their contents considered in the lateral load analysis?

- **OFI S-13-WED-RPPWTP-011-004:**

Where is the lateral support for the racks between column lines 2 and 3 in Drawing 24590-LAW-S1-S15T-00045?

Where are the brace loads from Drawings 24590-LAW-S1-S15T-00045 into the minor axis of columns J7, J8, and J9 considered?

- **OFI S-13-WED-RPPWTP-011-005:**

Similarly, where are the brace loads from Drawing 24590-LAW-S1-S15T-00045 into the minor axis of columns A8, A10, B8, and B10 considered?

- **OFI S-13-WED-RPPWTP-011-006:**

Where is Figure 6 that is referenced on Page 31 of Calculation 24590-LAW-SSC-S15T-00057?

- **OFI S-13-WED-RPPWTP-011-007:**

Where is the lateral and longitudinal load path for the hung platform shown on Page 6 of Calculation 24590-LAW-SSC-S15T-00057?

Reference Information for Opportunities for Improvement S-13-WED-RPPWTP-011-008 through S-13-WED-RPPWTP-003-010:

Drawing 24590-LAW-S1-S15T-00049 shows racks that are supported above the elevation 59 ft 6 in. racks on posts. See also Section J on Drawing 24590-LAW-S1-S15T-00043. Where are the lateral and longitudinal loads for these members considered?

- **OFI S-13-WED-RPPWTP-011-011:**

Page 27 of the referenced calculation mentions a Veirendeel truss member. Where is the analysis for a Veirendeel truss?

Is the intent of Section A on Drawing 24590-LAW-S1-S15T-00043 to act like a Veirendeel truss as mentioned on Page 27 of the calculation?

- **OFI S-13-WED-RPPWTP-011-012:**

Where the major and minor axis bending moments are from Section A on Drawing 24590-LAW-S1-S15T-00043 considered on the W18 support beam?

- **OFI S-13-WED-RPPWTP-011-013:**

A K factor of 2 is used for a W8 post that appears to be cantilevered off a W18 support beam. Please identify why a K factor of 2 is more appropriate than the American Institute of Steel Construction (AISC)-recommend value of 2.1 for cantilever columns.

- **OFI S-13-WED-RPPWTP-011-014 & 15:**

ECCN 24590-LAW-SSE-S15T-00106 evaluates the W18 × 46 girders for weak axis bending moments of 1-in. kip, major axis bending moments of 3-in. kip, and a torsional moment of 1-in. kip. What is the purpose of this calculation and is it appropriate to modify the calculation to account for such a small incremental load?

Reference Information for Opportunities for Improvement S-13-WED-RPPWTP-011-016 through S-13-WED-RPPWTP-011-017:

Document No. /Title: Qualification of Stainless Steel Liner for PT Black Cells, Non-Black Cells, and Filter Cave:

Calculation 24590-PTF-SSC-S15T-00075; Drawings 24590-PTF-DD-S13T-00065, Rev. 6; 24590-PTF-DD-S13T-00066, Rev. 13; 24590-PTF-DD-S13T-00067, Rev. 10; 24590-PTF-DD-S13T-00068, Rev. 9; 24590-PTF-DD-S13T-00069, Rev. 2

- **OFI S-13-WED-RPPWTP-011-016:**

This calculation uses AISC M016-89 for the design of Type 304L stainless steel. Type 304L stainless steel is not approved for use by AISC M016-89. Please obtain an appropriate code for the design of stainless steel.

- **OFI S-13-WED-RPPWTP-011-017:**

The calculation uses a minimum yield strength based on mill cert reports instead of the minimum specified yield strength required by AISC.

The basis document for DOE-STD-1020, UCRL-CR-111478, takes credit for the difference between a design based on the minimum specified yield strength and the actual yield strength. Basing a design on the actual yield strength, reduces the code specified margin, and may not meet the DOE-STD-1020 performance goals.

Note: This issue is also addressed by NRC Information Notice 2012-17 dated 9/6/2012 titled "*Inappropriate Use of Certified Material Test Report Yield Stress and Age-Hardened Concrete Compressive Strength in Design Calculations.*"

Please use material strengths that are consistent with the code of record for the stainless steel components.

Note that some material codes, such as ASCE 8-02 for stainless steel, allow the use of 90-percent exceedance test data for design strength. The use of code -llowed test data is consistent with DOE-STD-1020.

The basis document for the 0.024-inch corrosion allowance SPRT report Reference 9.10, (Calcs 24590-WTP-M0C-50-00004 and Rev. E and ECCN 24590-WTP-M0E-50-00012)

appears to address wear in systems with moving fluids/slurries. The section on corrosion allowance specifies a range on chemistries that can yield corrosion rates significantly larger than the 0.024-inch corrosion allowance used in the calculation. The link between the liner corrosion environment and the referenced corrosion allowance is not clear.

• **OFI S-13-WED-RPPWTP-003-O18:**

Please provide an unambiguous liner specific corrosion allowance that considers the full range of postulated leaked material chemistries, environments, and flow rates, including stagnant flow. Please base the liner design on this corrosion allowance.

Reference Information for Opportunities for Improvement S-13-WED-RPPWTP-003-O19 and S-13-WED-RPPWTP-003-O25:

Document No. /Title: PT Hot Cell Equipment Platforms for Vertical Pumps:

Calculation 24590-PTF-SSC-S15T-00360, Rev. A; Drawings 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040, Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; and 24590-PTF-S1-S15T-00510, Rev. 1.

• **OFI S-13-WED-RPPWTP-003-O19:**

The frequency calculation in Appendix A assumes that the pump mass is uniformly distributed to each of the five support beams. Please provide a technical basis for this assumed mass distribution or demonstrate that the actual mass distribution yields the same results.

• **OFI S-13-WED-RPPWTP-011-O20:**

The frequency calculation does not consider rocking of the pump on the equipment platform. Rocking modes often dominate the response of tall-narrow equipment similar to these pumps. Please provide a technical basis for omitting the rocking mode or provide an analysis that considers the rocking mode.

• **OFI S-13-WED-RPPWTP-011-O21:**

On page B6 the weld strength per unit length is based on $0.3 \times F_{tw} \times 0.707 \text{ tw}$ and $0.4 F_y t_{\text{plate}}$; where F_{tw} is the nominal tensile strength of the weld, tw is the fillet weld leg size, F_y is the nominal tensile strength of the plate, and t_{plate} is the plate thickness. The $0.4 F_y t_{\text{plate}}$ check is incorrect and should be $0.4 F_y tw$, not the plate thickness. While this criteria may not control the A572 plate in this specific calculation, the SPRT has observed this same error in other calculations with A36 plates where the $0.4 F_y tw$ does limit the weld strength. Please identify full extent of this error (i.e., buildings, calculations) and develop a plan to ensure that the welding is adequate.

• **OFI S-13-WED-RPPWTP-011-O22:**

The load development in Appendix C is confusing. Please clarify if the 60 percent seismic response reduction on page C3 is an implementation of the ASCE 4 100-40-40

rule. If this is so then please explain why an absolute summation of reactions (page C4) is used.

- **OFI S-13-WED-RPPWTP-011-O23:**

The weld design beginning on page C6 has a $D/C=0.92$. This calculation appears to overstate the overturning load acting on individual welds by using a two-step method to obtain the weld loads. Distributing the loads directly to welds on each of the four corners in one step will provide a more accurate load distribution. What is the actual demand to capacity ratio for this component?

- **OFI S-13-WED-RPPWTP-011-O24:**

The beam flange is welded to the base plate with 16 inches of $\frac{1}{2}$ -in. fillet weld. Rough SPRT hand calculations suggest that bending of the beam flange may limit the force that can be transmitted to the $\frac{1}{2}$ -in. fillet weld. Please provide a technical basis for the load transfer between the beam web and the $\frac{1}{2}$ -in. fillet weld.

- **OFI S-13-WED-RPPWTP-011-O25:**

This calculation contains an analysis of the equipment loads transmitted to individual base plates. Where is the analysis that verifies that these loads are less than the anchor capacity?

This calculation contains an analysis of the equipment loads transmitted to individual base plates. Where is the analysis that verifies that these loads are less than the anchor capacity?

Reference Information for Opportunities for Improvement S-13-WED-RPPWTP-011-O26:

Document No. /Title: Design of Surface Mounted Plates for Support of PT Hot Cell Equipment Platforms:

Calculation 24590-PTF-SSC-S15T-00365, Rev. A; Drawings 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040, Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; and 24590-PTF-S1-S15T-00510, Rev. 1.

- **OFI S-13-WED-RPPWTP-011-O26:**

Note: Attachment A of the SPRT report deals with plates for PT hot cell equipment platforms covered by Calculation 24590-PTF-SSC-S15T-0365, so only the part of Calculation 24590-PTF-SSC-S15T-0360 related to Calculation -0365 was reviewed.

The model analyzed is shown on Sheet A-2 and consists of the 2-in. plate with four anchors to concrete near the four corners. Spacing of bolts is 23 in. in one direction, 16 in. in the other direction. The sketch on A-2 suggests the load is applied by a 10-in.-long weld attachment near one corner. The analysis that follows seems to utilize the four anchor bolts to share the load. However, at the bottom of sheet A-4 the term Ψ_1 is taken as 1.0 with $e'n$ equal to zero. This suggests the load is applied at the centroid of the bolt

group, not near on corner as illustrated on Sheet A-2. It appears from the calculation that the four anchors are sharing to resist tension uplift with no eccentricity in the applied load. The calculation concludes with a tension and shear D/C of 0.99. This does not appear to be correct and it appears some anchors are overstressed.

The SPRT understands that these anchors are on construction drawings at the end of the 00360 calculation, specifically Drawings 24590-PTF-P1-P23T-00037 through -00041 plus 24590-PTF-S1-S15T-00501 through -00505 and -00510. In those drawings we see no plates of the dimensions analyzed in Attachment A of Calculation -00365. We see plates with four anchors on 9-ft-long plates. We see plates with 8 to 10 anchors up to 11 ft long. BNI should explain how the design of these plates corresponds with the drawings provided. It may be the four bolts at one end of these long plates matches Calculation -00365 Attachment A, but the sharing of the uplift by four anchors is still in question.

• **OFI S-13-WED-RPPWTP-011-027:**

Document No. /Title: Structural Design Criteria:
24590-WTP-DC-ST-01-001, Rev. 13

The proposed ashfall loads have a 10,000-year return period and the SDC specifies the same criteria as live load. At a minimum the ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic.

CONCLUSION

WTP project staff gave presentations to the SPRT related to the analysis and design of the LAW multi-commodity racks, PT black cell liner, PT hot cell equipment frames, HLW Structural Analysis for Soil Structure Interaction (SASSI) analyses, Lab HVAC C5V duct design, PT/HLW crane rail girder, HLW platform connection details, the ETG Building, adoption of updated ashfall criteria, and the updated structural design criteria. The SPRT also visited the construction site. The meetings also included discussions aimed at addressing existing open SPRT observations. Draft responses to a number of SPRT open items were presented and an acceptable resolution was developed for seven of the open items. In addition, resolution of the subtraction method issue for HLW has been achieved with the issue of Calculation 24590-HLW-S0C-S15T-00236, Rev. 1. Comments and questions were developed by the SPRT based on review of the documents provided at the meeting and discussions held with the project team. These comments and questions are included in Attachment A of the SPRT report.

A potentially significant generic issue has been identified with the approach that the project has used those results in incorrect design of fillet welds. This approach has been implemented dating back to the beginning of the project. The two basic errors in design are: (1) all fillet welds within a connection are used to resist shear whereas shear should only be resisted by welds connecting portions of the sections that resist shear; and (2) for E70 fillet welds to grade A36 plate, the strength of the weld to the plate will govern capacity. BNI has been using the plate thickness

rather than the fillet weld size in their calculations. The fillet weld designs implemented for the entire project should be reviewed to identify these calculation errors and determine if retrofits are required.

SIGNATURES

Assessor or Lead

Assessor:

Raman A. Vaidya

Date:

11/07/2013

**Assessor's Manager,
Division Director, or
Supervisor:**

[Signature]

Date:

11/7/13

Attachment 2
13-WTP-0252

**ORP Structural Peer Review Team Report of WTP
Structures, Systems and Components
May 28 – 31, 2013
Hanford Review Meeting
Pages 30 (Including Coversheet)**

**ORP Structural Peer Review Team Report of WTP
Structures, Systems and Components
May 28 – 31, 2013
Hanford Review Meeting**

October 3, 2013

Team Lead:



**Thomas Houston, Chair, ORP
Structural Peer Review Team**

Team Members:

**Loring Wyllie, Degenkolb Engineers
Greg Mertz, ORP Consultant
Thomas Houston, ORP Consultant**

ORP Structural Peer Review Team Report of WTP Structures, Systems and Components, May 28 – 31, 2013, Hanford Review Meeting

Summary -- The DOE Office of River Protection initiated an in-process review of current documentation at the various stages of the design, procurement and construction process for WTP SSC's. The May review focused on:

- DNFSB issues and comments and responses to issues that have been transmitted to the DNFSB by BNI for DOE since January 2011.
- LAW Multi-Commodity Racks
- PT Black Cell Liner
- PT Hot Cell Equipment Frames
- Transfer Function Comparison - Subtraction vs. Direct Method
- Status of Lab HVAC C5V Duct Design/Story Drift Issue including HVAC Seismic Anchor Motion (SAM)
- PT / HLW Crane Rail Girder Design Comments from Oct 2012 Review
 - Crane Bracket Weld to Embed - Distribution of Vertical Shear to Flange Welds
 - PT Hot Cell Embed Lamellar Tearing Issues
 - Embed Plates with Nelson D2L Deformed Bars
- Review Responses to Past PRT Open Comments
 - DOE 1020 Peer Review Requirements - PIER 12-0011, Action 06
 - ISRS Curves - PIER 12-1189
 - Other Open Issues from Previous Meetings
- Site Visit
 - ETG Location
 - Lab HVAC C5V Duct
 - HLW Platform
- ETG Building Design
 - OnPower Seismic Design Update
- HLW Platform Connection Details
- Ashfall Criteria Revision
- Design Criteria Revision 13 Update
 - Other Open Issues from Previous Meetings

As a result of the review, twenty-seven (27) new observations were made and are provided in Attachment A. A number of responses were presented to previous PRT comments and responses for seven (7) comments were closed. In addition, the PRT's review of draft calculation 24590-HLW-S0C-S15T-00236, Rev. 1 resolves the subtraction method issue for HLW to the satisfaction of the PRT.

1.0 BACKGROUND

The DOE Office of River Protection initiated an independent and ongoing structural peer review of the structural design and analysis for the safety class and safety significant WTP building in 2003. The peer review team meets periodically and this report is a summary of the reviews conducted during the meetings held on May 28 - 31, 2013.

2.0 PURPOSE, SCOPE AND APPROACH

2.1 Purpose

The purpose the Structural PRT reviews is to provide independent confirmation that the structural design as reflected in the procedures, criteria, guidance, analyses, calculations and drawings are in conformance with DOE Orders and Standards for the safety class assigned to the building structures.

2.2 Scope

The ORP Structural Peer Review Team (PRT) and ORP identified the following objectives for the May 28 - 31, 2013 reviews:

1. DNFSB issues and comments and responses to issues that have been transmitted to the DNFSB by BNI for DOE since January 2011.
2. PRT site visit Site Visit to review: General progress, ETG Location, Lab HVAC C5V Duct, HLW Platform
3. Review the LAW Multi-Commodity Racks
4. PT Black Cell Liner
5. PT Hot Cell Equipment Frames
6. Review the Transfer Function Comparison developed by the project for the Subtraction vs. Direct Method
7. Update the PRT on the status of Lab HVAC C5V Duct Design/Story Drift Issue including HVAC Seismic Anchor Motion (SAM)
8. Discuss the resolution of PT / HLW Crane Rail Girder Design comments from Oct 2012 Review
 - o Review the Crane Bracket Weld to Embed including distribution of vertical shear to flange welds
 - o Discuss PT Hot Cell Embed Lamellar Tearing Issues
 - o Discuss design issues with Embed Plates having Nelson D2L Deformed Bars
9. Review responses to past PRT Open Comments
 - o Discuss PRT thinking on PIER 12-0011, Action 06 related to DOE 1020 Peer Review Requirements
 - o Discuss resolution of PIER 12-1189 related to use of ISRS Curves
10. Discuss ETG Building Design
 - o Update for OnPower Seismic Design
11. Discuss HLW Platform Connection Details
12. Review Ashfall Criteria Revision
13. Review Design Criteria Revision 13 Update

2.3 Approach

The approach consisted of a series of presentations and discussions pertaining to the objectives identified in Section 2.2 given by BNI project personnel.

The primary BNI participants in the discussion were Mark Axup, Jim Booth, Thomas Ma, and Phil Theriault, for ongoing work.

3.0 RESULTS

The review conducted on May 28 - 31 was as outlined in the Attached meeting Agenda (Attachment B). As a result of the review of the scope described in 2.2, Twenty-six (26) assessment follow up items (AFI) were identified and are provided in Attachment A. A number of responses were presented to previous PRT comments and responses for seven (7) comments were closed as discussed in the following items in this section:

- Closure to 5 comments: Item 8 (*PIER 12-0011, Action 06*, Observations: S-12-WED-RPPWTP-015-001, S-12-WED-RPPWTP-015-002, S-12-WED-RPPWTP-015-003, S-12-WED-RPPWTP-027-004).
- Closure to 2 comments: Item 11 (two comments from the PRT October 2012 meeting related to HNF-SD-GN-ER-501, Rev. 2.)

In addition, resolution of the subtraction method issue for HLW will be achieved to with the issue of draft calculation 24590-HLW-S0C-S15T-00236, Rev. 1 (discussed in item 5 below).

It should be noted that summaries of PRT Questions and Responses provided by the project for the October 17-19, 2012 meeting are included in Attachment C for HLW and Attachment D for PT for reference. These summaries were current as of October 2012 but have not been updated to reflect the current status. It is requested that the status of Question Responses be updated to support the next PRT meeting.

A summary of the results of the review follows.

1. PRT site visit Site Visit to review: General progress, ETG Location, Lab HVAC C5V Duct, HLW Platform

The PRT participated in a site visit to review overall progress and status of construction. Specific attention was paid to the location of the Emergency Turbine Generator Building (ETG). Additionally, the PRT reviewed the Lab HVAC C5V Duct and associated installed expansion joints and the designed location of the HLW platform. Details of the PRT's observations from the site visit are incorporated into the specific items discussed below.

2. Review the LAW Multi-Commodity Racks

Discussions regarding the LAW Multi-Commodity Racks were held with the project after which calculations and drawings for typical designs that were provided by the project were reviewed by the PRT. Based on the PRT review of the calculations and drawings a number of comments and questions (15) were developed by the PRT. These comments and questions are included in Attachment A.

3. PT Black Cell Liner

Discussions regarding the PT Black Cell Liner were held with the project after which calculations and drawings for typical designs that were provided by the project were reviewed by the PRT. Based on the PRT review of the calculations and drawings a number of comments and questions (3) were developed by the PRT. These comments and questions are included in Attachment A.

4. PT Hot Cell Equipment Frames

Discussions regarding the PT Hot Cell Equipment Frames were held with the project after which calculations and drawings for typical designs that were provided by the project were reviewed by the PRT. Based on the PRT review of the calculations and drawings a number of comments and questions (7) were developed by the PRT. These comments and questions are included in Attachment A.

5. Review the Transfer Function Comparison developed by the project for the Subtraction vs. Direct Method

Comparisons of transfer functions were provided by the project in draft calculation 24590-HLW-S0C-S15T-00236, Rev. 1 as requested by the PRT during the April 30 – May 1, 2012 PRT meeting. The PRT has reviewed the associated calculations and concur with the conclusion that the use of the subtraction method does not have a significant affect on the computed results for the HLW bldg. This revision of the calculation addresses the path forward described in Topic 3 of the ORP Structural Peer Review Team Report of WTP Structures, Systems and Components dated August 20, 2012.

6. **Update the PRT on the status of Lab HVAC C5V Duct Design/Story Drift Issue including HVAC Seismic Anchor Motion (SAM)**

Prior discussions have been held with the project team regarding PIER 24590-WTP-PIER-12-0814-B related to incorporating story drift displacements into the design of the Lab HVAC C5V duct design. A retrofit has been implemented to insert expansion joints into the C5V duct system to accommodate building drifts that were not considered as part of the original duct design. BNI engineers indicated that the controlling code provisions indicated that the ducts may be subject to local buckling due to the imposed ($\approx 3''$) seismic drift.

The PRT has indicated previously that given the magnitude of lateral drifts and displacement controlled duct loading, local buckling would likely result in a wrinkle/crinkle in the stainless steel duct shell. Neither response would lead to loss of duct operability even though the code stress limits have been exceeded. The PRT further indicated that the expansion joints added to the system are typically less reliable than the duct itself and have larger life cycle costs than the duct. It appears to the PRT that this may be an instance where reliability is reduced and costs increased to meet a "conservative" code criterion when the original configuration may have met the performance goal. The PRT recommended implementing a waiver system to allow code exceedances in limited cases where fully justified.

Further discussion was held on this topic in the May 2013 PRT meeting. This discussion indicated that the status is that the lab HVAC expansion joints are installed. For future uses we discussed using seismic experience data base information and the PRT recommended that the project have the Equipment PRT group (George Rawls) review the SQUG qualification guidelines to assess whether the construction of the ductwork in question is consistent with the experience database. Additionally, analysis methods to qualify the ducts were discussed. The analyses would have to consider nonlinear material behavior and nonlinear geometry (P-Delta) effects with the goal to demonstrate that the duct stays open (functional) during the displacement event. The need to implement some kind of waiver system to allow flexibility when strict adherence to design rules cause decisions which increase total risk (we have made this comment before) was also discussed.

Pursuant to the meeting a list of C5 duct that is SC-III and associated seismic parameters were provided that will require evaluation for multi-level support displacement due to drift with the request to solicit an opinion from George Rawls as to whether this would fall under the experience data gathered by EPRI in Report 1016125 (Experience Based Seismic Equipment Qualification) and Report 1007896 (Seismic Evaluation Guidelines for HVAC Duct and Damper Systems). The Peak Ground Acceleration for WTP, PC-2 structures is 0.6g. The building in question is primarily a braced frame steel building with some concrete shear wall in the basement and a few shear walls at the first floor (ground level).

Duct Size	Length	Pressure Class	Thickness
6"Ø	16 feet	B-3-*/M-1-C ($\pm 56''$ WG)	304L 16 gauge
12"Ø	183 feet	B-3-*/M-1-C ($\pm 56''$ WG)	304L 12 gauge
16"Ø	24 feet	A-1-F/L-1-A ($\pm 15.25''$ to 20" WG)	304L 12 gauge
18"Ø	8 feet	B-3-E/J-1-C ($\pm 10.25''$ to 15" WG)	304L 12 gauge
60"Ø	299 Feet	B-3-A/J-1-C ($\pm 10.25''$ to 15" WG)	304L 12 gauge
16" x 24"	12 feet	A-1-F/L-1-A ($\pm 15.25''$ to 20" WG)	304L 12 gauge
14" x 20"	55 feet	B-3-E/J-1-C ($\pm 10.25''$ to 15" WG)	304L 12 gauge

Additionally, the project requested an opinion as to whether cable tray (raceway) would also fall into the category of distribution systems which are fundamentally unaffected by multi-level support displacement due to drift.

The Structural PRT forwarded the provided information to George Rawls with a request for his assessment. His assessment is included in Attachment E. In summary, duct failures have been observed in past seismic events. As a result, evaluation of ductwork for differential displacements is required. More detailed discussion is provided in Attachment E.

7. **Discuss the resolution of PT / HLW Crane Rail Girder Design comments from Oct 2012 Review**
 - o **Crane Bracket Weld to Embed including distribution of vertical shear to flange welds**
 - o **PT Hot Cell Embed Lamellar Tearing Issues**
 - o **Embed Plates having Nelson D2L Deformed Bars**

Discussions were held with the project team regarding the October 2012 review comments that were based on the PRT's review of the PT/HLW Crane Rail Girder Design. As a result of these discussions, the project agreed that the calculation is being revised to address the comments included in the October 2012 PRT summary report. Specific discussions regarding the previous comments resulted in the following;

1. *Welds to embedment plates.* BNI agrees that welds for shear forces should be limited to welds in the direction of the shear forces. BNI will recalculate weld forces based on this basic assumption. This issue appears to be of generic concern.
2. *Welds to embedment plate are controlling factor for capacity.* Comment from October 2012 meeting recommended that the project reconsider whether the capacity for an assemblage that will be inaccessible should be controlled by the size of the fillet weld. No additional discussion was held regarding this topic.
3. *Use of back plate and embedment plate adequacy for HLW Melter Case Overhead Mast Power Manipulator.* BNI agreed to review and reissue calculation as necessary. The review will include evaluating the embedment plate.
4. *Potential for laminar tearing of embedment plates.* BNI agreed to have a metallurgist provide a written opinion on the potential for laminar tearing, especially in the region of the top weld of the crane rail support brackets.
5. *Nelson D2L deformed bar anchors.* The use of Nelson D2L deformed bars for the embed plate anchor is an issue. BNI agreed to develop a case study demonstrating that the embedded bars are fully developed with 60% of the ACI 318 development expression.
6. *Vertical seismic loads.* The cranes have high vertical accelerations and restraints on one side of the rail. The vertical restraints for the crane are not addressed. This component of design should be included in the evaluation.
7. *Additional topics*
 - o F_u will not be used in the crane bracket design
 - o Based on the discussions held with the project, it appears that there is a generic issue with computing shear capacity ($0.4 F_y t_w$) for the design of welds to A36 plates.

The items noted above represent clarifications to the review comments from the October 2012 review and are not included in Appendix A of this report.

8. **Review responses to past PRT Open Comments**
 - o **Discuss PRT thinking on PIER 12-0011, Action 06 related to DOE 1020 Peer Review Requirements**
 - o **Discuss resolution of PIER 12-1189 related to use of ISRS Curves**

PIER 12-0011, Action 06

Discussions were held with the PRT regarding Action 06 of PIER 12-0011. The PRT concurs that DOE-STD-1020 contains requirements for Peer Review. It is the PRT's

experience that peer reviews of calculations are performed by groups external to the performing group and most often come from external organizations.

The decision on procedures and processes required to meet the requirements of DOE-STD-1020 should be a management responsibility, coordinated with the appropriate Quality Assurance personnel, and should flow to appropriate project (and QA) procedures and processes. Due to the makeup and experience of the PRT, the effectiveness of the WTP peer review process is not an appropriate topic for the PRT to review and should be referred to the appropriate Quality Assurance group for evaluation.

PIER 12-1189

Comments on the existing control building are moot because the design for the control building will be changed. Thus the comments related to CCN 252553* (PIER 12-1189, PIER 12-1261) that are currently included in Attachment D of this report should be closed.

*Observations: S-12-WED-RPPWTP-015-001, S-12-WED-RPPWTP-015-002, S-12-WED-RPPWTP-015-003, S-12-WED-RPPWTP-027-004

9. Discuss ETG Building Design

o **OnPower Seismic Design**

BNI (Thomas Ma) provided a progress report on the status of the generator design. The PRT has two issues.

- 1) The vibration loads to the building need to be fully considered in the building design. Note that the turbine does not have an isolated foundation. The PRT recommends getting formal building input from vendor and use that input in the design.
- 2) The vendor wants to use transfer functions and evaluate the generator design using a frequency domain approach. We agree that approach can yield correct results if properly implemented. However, most of the analysis details have not been developed and there is nothing substantial to review at this time.

10. Discuss HLW Vitrification Building Structural HEPA Filter Support Details

Additional discussions related to comments made during the October 2012 PRT meeting were held with the project. BNI is currently updating the analysis and revising the connection calculations. Two items that BNI needs to address in their revised calculations are:

- *Fillet welds to A36 plate.* Fillet welds to A36 plate will be governed by $0.4 F_y t_w$ ($0.4 \times 36000 \times \text{weld size}$). The revised calculations will reflect this controlling condition. This is a generic issue with calculation of weld capacity.
- *Welds resisting shear load.* BNI agreed to revise calculations to reflect using fillet welds parallel to the direction of applied load (shear is resisted only by welds to portions of members resisting shear) to resist shear.

The PRT notes that there are roughly 8 or 9 complete load transfers (critical welds) required to develop this connection design. It is the PRT's opinion that this is a poor design, even if BNI is successful in demonstrating that this design meets the minimum code requirements. Furthermore, it is the PRT's opinion that this connection will be less reliable than the more direct girder to column connection that should have been used.

11. Review Ashfall Criteria Revision

Discussions related to the revision of the ashfall criteria continued in the meeting from previous meetings. The discussions resulted in the following path forward. The PRT noted that the proposed ashfall loads have a 10,000 year return period and the SDC specifies the same criteria as live load. At a

minimum it is the PRT's opinion that ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic. Note that this will require a change to the SDC. The PRT suggested/concurred with the following

- Use mass scaling to get ash drift heights
- Use reduced wind velocity for ash drift heights because ash-fall is not a storm event like snow.
- Reduce the commodity load allowance if necessary.
- The WTP CSA position should be documented in a white paper

In addition, the DOE ORP should convolve the ashfall hazard with typical gravity load building fragilities and determine the appropriate ashfall return period to achieve the DOE-STD-1020 performance goal. The PRT believes that using a 10,000 year return period and treating the ashfall load as a live load has a performance goal that is significantly smaller than the remaining NPH loads.

Pursuant to the meeting the PRT has reviewed Calculation 24590-WTP-S0C-S15T-00033 Rev 0 and understand how Bechtel is treating the ash drift loading. The approach developed is appropriate given the current state of the art. We also agree with their conclusions that the snow drift loading is limiting compared to the ash drift load. However, it is the PRT's opinion that the calculation is overly conservative in combining 23 psf (APE=E-4) of ash load with the full roof live load for PC-3 structures, and this is a comment for the criteria document. The PRT suggest that the 23 psf ash loading be accepted for the WTP project unless the current criteria indicates modifications are required to the existing structures.

The current approach is sufficient to close the two comments from the PRT October 2012 meeting related to HNF-SD-GN-ER-501, Rev. 2.

12. Review Design Criteria Revision 13 Update

The PRT has reviewed Revision 13 of the Design Criteria and has one comment. The proposed ashfall loads have a 10,000 year return period and the SDC specifies the same criteria as live load. At a minimum the ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic. This comment is included in Attachment A.

4.0 CONCLUSIONS

Presentations were made by the project related to the analysis and design of the LAW Multi-Commodity Racks, PT Black Cell Liner, PT Hot Cell Equipment Frames, HLW SASSI analyses, Lab HVAC C5V duct design, PT/HLW Crane Rail Girder, HLW Platform Connection Details, the Emergency Turbine Generator Building, adoption of updated ash-fall criteria, and the updated Structural Design Criteria. In addition, the PRT visited the construction site. The meetings also included discussions aimed at addressing existing open PRT observations. Draft responses to a number of PRT open items were presented and an acceptable resolution was developed for seven (7) of the open items. In addition, resolution of the subtraction method issue for HLW has been achieved with the issue of calculation 24590-HLW-S0C-S15T-00236, Rev. 1. Comments and questions were developed by the PRT based on review of the documents provided at the meeting and discussions held with the project team. These comments and questions are included in Attachment A.

A potentially significant generic issue has been identified with the approach that the project has used that results in incorrect design of fillet welds. This approach has been implemented dating back to the beginning of the project. The two basis errors in design are; 1) all fillet welds within a connection are used to resist shear whereas shear should only be resisted by welds connecting portions of the sections

that resist shear, and 2) for E70 fillet welds to grade A36 plate, the strength of the weld to the plate will govern capacity. BNI has been using the plate thickness rather than the fillet weld size in their calculations. The fillet weld designs implemented for the entire project should be reviewed to identify these calculation errors and determine if retrofits are required.

5.0 REFERENCES

1. Calculation 24590-LAW-SSC-S15T-00057, Rev. 0, *Multi-Commodity Supports El +48 to +68*
 1. 24590-LAW-S0-S15T-00002, Rev. 25, *GENERAL STEEL NOTES*
 2. 24590-LAW-S0-S15T-00011, Rev. 5, *STRUCTURAL STANDARDS STEEL DETAILS*
 3. 24590-LAW-S0-S15T-00012, Rev. 3, *STRUCTURAL STANDARDS STEEL DETAILS*
 4. 24590-LAW-S0-S15T-00013, Rev. 9, *STRUCTURAL STANDARDS STEEL DETAILS*
 5. 24590-LAW-S0-S15T-00014, Rev. 6, *STRUCTURAL STANDARDS STEEL DETAILS*
 6. 24590-LAW-S0-S15T-00015, Rev. 2, *STRUCTURAL STANDARDS STEEL DETAILS*
 7. 24590-LAW-S1-S15T-00005, Rev. 1, *MULTI-COMMODITY SUPPORTS AND PLATFORM KEY PLAN El +48*
 8. 24590-LAW-S1-S15T-00032, Rev. 3, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El -21 (LOWER LEVEL ZONE 2)*
 9. 24590-LAW-S1-S15T-00035, Rev. 1, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +3, ZONE 1*
 10. 24590-LAW-S1-S15T-00043, Rev. 4, *MULTI-COMMODITY SUPPORTS DETAILS*
 11. 24590-LAW-S1-S15T-00045, Rev. 3, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +48, MAIN LEVEL ZONE 1*
 12. 24590-LAW-S1-S15T-00046, Rev. 1, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +48, MAIN LEVEL ZONE 2*
 13. 24590-LAW-S1-S15T-00047, Rev. 2, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +48, LOWER LEVEL ZONE 1*
 14. 24590-LAW-S1-S15T-00048, Rev. 1, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +48, LOWER LEVEL ZONE 2*
 15. 24590-LAW-S1-S15T-00049, Rev. 2, *MULTI-COMMODITY SUPPORTS FRAMING PLAN El +48, UPPER LEVEL ZONE 1*
2. Requirement Revision, 24590-WTP-SE-ENS-10-0078, Rev. 1, *C5 Liquid Confinement in the PT facility*
3. Calculation 24590-PTF-SSC-S15T-00075, Rev. B, *Qualification of Stainless Steel Liner Plate for the PT Building*
 1. 24590-PTF-DD-S13T-00065, Rev. 6, *LINERS, EL 0, BASE MAT SH 1*
 2. 24590-PTF-DD-S13T-00066, Rev. 13, *LINERS, EL 0, BASE MAT SH 2*
 3. 24590-PTF-DD-S13T-00067, Rev. 10, *LINERS SECTION AND DETAILS, SH 1*
 4. 24590-PTF-DD-S13T-00068, Rev. 9, *LINERS SECTION AND DETAILS, SH 2*
 5. 24590-PTF-DD-S13T-00069, Rev. 2, *LINERS SECTION AND DETAILS, SH 3*
4. Calculation 24590-PTF-M0C-50-00004, Rev. E, *Wear Allowance for WTP Waste Slurry Systems*
5. Calculation 24590-PTF-SSC-S15T-00360, Rev. A, *PT Hot Cell Equipment Platforms for Vertical Pumps*
 1. 24590-PTF-P1-P23T-00037, Rev. 1, *PTF-HOT CELL EQUIPMENT LOCATION, PLAN AT EL 0, COL 4-9, E-H*
 2. 24590-PTF-P1-P23T-00038, Rev. 2, *PTF-HOT CELL EQUIPMENT LOCATION, PLAN AT EL 0, COL 9-13, E-H*
 3. 24590-PTF-P1-P23T-00039, Rev. 1, *PTF-HOT CELL EQUIPMENT LOCATION, PLAN AT EL 0, COL 13-17, E-H*
 4. 24590-PTF-P1-P23T-00040, Rev. 1, *PTF-HOT CELL EQUIPMENT LOCATION, PLAN AT EL 0, COL 17-21, E-H*
 5. 24590-PTF-P1-P23T-00041, Rev. 0, *PTF-HOT CELL EQUIPMENT LOCATION, PLAN AT EL 0, COL 21-24, E-H*
 6. 24590-PTF-S1-S15T-00501, Rev. 1, *HOT CELL EQUIPMENT SUPPORT, KEY PLAN SH 1*
 7. 24590-PTF-S1-S15T-00502, Rev. 1, *HOT CELL EQUIPMENT SUPPORT, KEY PLAN SH 2*
 8. 24590-PTF-S1-S15T-00503, Rev. 1, *HOT CELL EQUIPMENT SUPPORT, KEY PLAN SH 3*
 9. 24590-PTF-S1-S15T-00504, Rev. 1, *HOT CELL EQUIPMENT SUPPORTS, PLANS AND SECTIONS*
 10. 24590-PTF-S1-S15T-00505, Rev. 1, *HOT CELL EQUIPMENT SUPPORTS, PLANS AND SECTIONS*

11. 24590-PTF-S1-S15T-00510, Rev. 1
6. Calculations 24590-HLW-S0C-S15T-00236, Rev. 1, *Comparison of SASSI SSI Analysis Using Direct Method and Subtraction Method*
7. 24590-PTF-SSC-S15T-00032, Rev. A, Calc Ref. Sheet 52
8. 24590-HLW-SSC-S15T-00055, Rev. A, Calc Ref. Sheet 10
9. 24590-HLW-SSC-S15T-00114, Rev. A, Calc Ref. Sheet 54
10. 24590-HLW-SSC-S15T-00129, Rev. A, Calc Ref. Sheet 85
11. 24590-HLW-SSC-S15T-00130, Rev. A, Calc Ref. Sheet 56
12. CCN 222678 – e-mail Mark Platt to Randolph Schreiner, Feb. 13, 2012 *PIER MGT-12-0011*
13. CCN 222680 - e-mail Ron Benedict to Randolph Schreiner, Feb. 29, 2012 *ECP Response to PIER 12-0011-D, Rev. 0*
14. 24590-WTP-GPG-ENG-0103, Rev. 7, *Equipment Seismic Qualification*
15. 24590-WTP-RPT-CSA-10-001, Rev. 0, *Documentation of DOE 1020-94 Independent Peer Review of CSA Designs for WTP*
16. 24590-WTP-PIER-MGT-09-1066-D *DOE 1020 Independent Peer Review of BNI Seismic Qualification of SSC's*
17. 24590-WTP-PIER-MGT-12-0011-D *DOE-STD-1020 Independent Peer Review*
18. 24590-WTP-PIER-MGT-12-0175-D w/ Att. A & B *Response to PIER 12-0011 Progress To-Date*
19. 24590-WTP-PIER-MGT-12-1189-C
20. 24590-WTP-PIER-MGT-12-1261-C
21. 24590-WTP-PIER-MGT-10-1278-B
22. 24590-PTF-S0E-S15T-00038 (ECCN to PT Bldg ISRS Calculation)
23. 24590-PTF-S0E-S15T-00039 (ECCN to PT Control Bldg ISRS Calculation)
24. 24590-HLW-S0E-S15T-00134 (ECCN to HLW Bldg ISRS Calculation)
25. 24590-WTP-DC-ST-01-001, Rev. 13, *Structural Design Criteria*
26. 24590-WTP-RPT-M-09-006, Rev. 0, *Use of Room EEQ Data for Seismic Qualification*
27. 24590-WTP-PIER-MGT-09-1179-C, Rev. 0, *Inconsistencies in the Definition of Abnormal Conditions*
28. EPRI Report 1016125, *Experience Based Seismic Equipment Qualification*
29. EPRI Report 1007896, *Seismic Evaluation Guidelines for HVAC Duct and Damper Systems*
30. PIER 24590-WTP-PIER-12-0814-B
31. ORP Structural Peer Review Team Report of WTP Structures, Systems and Components, October 17-19, 2012, March 04, 2013.
32. ORP Structural Peer Review Team Report of WTP Structures, Systems and Components, April 30- May 1, 2012, August 20, 2012

Attachment A - Observations

Observations – A matter requiring further review because of a potential finding or problem, because specific contractor or ORP action is pending, or because additional information was not available at the time of the assessment.

Document No./Title: LAW Multi-commodity supports between Elevations +48 to +68 Calculation 24590-LAW-SSC-S15T-00057; Drawings 24590-LAW-S0-S15T-00002, Rev. 25; 24590-LAW-S0-S15T-00011, Rev. 5; 24590-LAW-S0-S15T-00012, Rev. 3; 24590-LAW-S0-S15T-00014, Rev. 6; 24590-LAW-S0-S15T-00015, Rev. 2; 24590-LAW-S1-S15T-00005, Rev. 1; 24590-LAW-S1-S15T-00035, Rev. 1; 24590-LAW-S1-S15T-00043, Rev. 4; 24590-LAW-S1-S15T-00045, Rev. 3; 24590-LAW-S1-S15T-00046, Rev. 1; 24590-LAW-S1-S15T-00047, Rev. 2; 24590-LAW-S1-S15T-00048, Rev. 1; 24590-LAW-S1-S15T-00049, Rev. 2			Rev: 0	Document Date: 8/25/2004 (calculation)
Reviewer: ORP Structural Review Team: Greg Mertz				
Item	Section	Page	Comment	
1.	Calc., Dwg.	22 00045	The unbraced length for a W18x46 is 8.33 feet. Beam G3-G4 at elevation +48 in drawing S1-S15T-00045 appears to have an unbraced length of roughly 16.2 feet. Please identify where the unbraced lengths shown on the drawings are considered.	
2.	Dwg	00045	In drawing 24590-LAW-S1-S15T-00045 there is bracing between GL E.6-3 and E-4 that resists NS lateral loads. Please identify where the vertical bracing is called out that transfers NS lateral loads to the floor on the west side of this bracing.	
3.	Calc.	30	In the lateral load analysis on Page 30 of the calculation, where is the dead load of the platform considered?	
4.	Dwg	00047 - 00049	Drawings -S1-S15T-00047 through -00049 show additional racks at Elevations 56'-6" and 61'. Where is the weight of these racks and their contents considered in the lateral load analysis?	
5.	Dwg.	00045	Where is the lateral support for the racks between column lines 2 and 3 in Drawing -S1-S15T-00045?	
6.	Dwg.	00045	Where are the brace loads from Drawings -S1-S15T-00045 into the minor axis of columns J7, J8 and J9 considered?	
7.	Dwg.	00045	Similarly, where are the brace loads from Drawings -S1-S15T-00045 into the minor axis of columns A8, A10, B8 and B10 considered?	
8.	Calc.	31	Where is Figure 6 that is referenced on Page 31 of the calculation?	
9.	Calc.	6	Where is the lateral and longitudinal load path for the hung platform shown on Page 6 of the calculation?	
10.	Dwg.	00049 00043	Drawing -S1-S15T-00049 shows racks that are supported above the Elevation 59'-6" racks on posts. See also Section J on Drawing -S1-S15T-00043. Where are the lateral and longitudinal loads for these members considered?	

Document No./Title: LAW Multi-commodity supports between Elevations +48 to +68 (continued)			Rev: 0	Document Date: 8/25/2004 (calculation)
Reviewer: ORP Structural Review Team: Greg Mertz				
Item	Section	Page	Comment	
11.	Calc.	27	Page 27 of the calculation mentions a Veirendeel truss member. Where is the analysis for a Veirendeel truss?	
12.	Calc. Dwg.	27 00043	Is the intent of Section A on Drawing -S1-S15T-00043 to act like a Veirendeel truss as mentioned on Page 27 of the calculation?	
13.	Dwg.	00043	Where are the major and minor axis bending moments from Section A on Drawing -S1-S15T-00043 considered on the W18 support beam?	
14.	Calc.	Gen.	A K factor of 2 is used for a W8 post that appears to be cantilevered off a W18 support beam. Please identify why a K factor of 2 is more appropriate than the AISC recommend value of 2.1 for cantilever columns.	
15.	Calc.	Gen.	ECCN 24590-LAW-SSE-S15T-00106 evaluates the W18x46 girders for weak axis bending moments of 1 in-kip, major axis bending moments of 3 in-kip and a torsional moment of 1 in-kip. What is the purpose of this ECCN and is it appropriate to modify the calculation to account for such a small incremental load?	

Document No./Title: Qualification of Stainless Steel Liner for PT Black Cells, Non-Black Cells, and Filter Cave:			Rev: B	Document Date: 10/29/2012 (calculation)
Calculation 24590-PTF-SSC-S15T-00075; Drawings 24590-PTF-DD-S13T-00065, Rev. 6; 24590-PTF-DD-S13T-00066, Rev. 13; 24590-PTF-DD-S13T-00067, Rev. 10; 24590-PTF-DD-S13T-00068, Rev. 9; 24590-PTF-DD-S13T-00069, Rev. 2				
Reviewer: ORP Structural Review Team: Greg Mertz				
Item	Section	Page	Comment	
1.	Calc.	Gen.	This calculation uses AISC M016-89 for the design of Type 304L stainless steel. Type 304L stainless steel is not approved for use by AISC M016-89. Please obtain an appropriate code for the design of stainless steel.	
2.	Calc.	Gen.	<p>The calculation uses a minimum yield strength based on mill cert reports instead of the minimum specified yield strength required by AISC.</p> <p>The basis document for DOE-STD-1020, UCRL-CR-111478, takes credit for the difference between a design based on the minimum specified yield strength and the actual yield strength. Basing a design on the actual yield strength, reduces the code specified margin, and may not meet the DOE-STD-1020 performance goals.</p> <p>Note: This issue is also addressed by NRC Information Notice 2012-17 dated 9/6/2012 titled "Inappropriate Use of Certified Material Test Report Yield Stress and Age-Hardened Concrete Compressive Strength in Design Calculations."</p> <p>Please use material strengths that are consistent with the code of record for the stainless steel components.</p> <p>Note that some material codes, such as ASCE 8-02 for stainless steel, allow the use of 90% exceedance test data for design strength. The use of code allowed test data is consistent with DOE-STD-1020.</p>	
3.	Calc.	Gen.	<p>The basis document for the 0.024 inch corrosion allowance Ref 9.10,(Calcs 24590-WTP-M0C-50-00004 and Rev E and ECCN 24590-WTP-M0E-50-00012) appear to address wear in systems with moving fluids/slurries. The section on corrosion allowance specifies a range on chemistries that can yield corrosion rates significantly larger than the 0.024 inch corrosion allowance used in the calculation. The link between the liner corrosion environment and the referenced corrosion allowance is not clear.</p> <p>Please provide an unambiguous liner specific corrosion allowance that considers the full range of postulated leaked material chemistries, environments and flow rates, including stagnant flow. Please base the liner design on this corrosion allowance.</p>	

Document No./Title: PT Hot Cell Equipment Platforms for Vertical Pumps:		Rev:	Document Date:
Calculation 24590-PTF-SSC-S15T-00360; Drawings 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040, Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; 24590-PTF-S1-S15T-00510, Rev. 1		A	4/13/2011
Reviewer: ORP Structural Review Team: Greg Mertz			
Item	Section	Page	Comment
1	Calc.	App.A	The frequency calculation in Appendix A assumes that the pump mass is uniformly distributed to each of the 5 support beams. Please provide a technical basis for this assumed mass distribution or demonstrate that the actual mass distribution yields the same results.
2.	Calc.	App.A	The frequency calculation does not consider rocking of the pump on the equipment platform. Rocking modes often dominate the response of tall-narrow equipment similar to these pumps. Please provide a technical basis for omitting the rocking mode or provide an analysis that considers the rocking mode.
3.	Calc.	B6	On page B6 the weld strength per unit length is based on $0.3 \times F_{tw} \times 0.707 t_w$ and $0.4 F_y t_{plate}$; where F_{tw} is the nominal tensile strength of the weld, t_w is the fillet weld leg size, F_y is the nominal tensile strength of the plate, and t_{plate} is the plate thickness. The $0.4 F_y t_{plate}$ check is incorrect and should be $0.4 F_y t_w$, not the plate thickness. While this criteria may not control the A572 plate in this specific calculation, the PRT has observed this same error in other calculations with A36 plates where the $0.4 F_y t_w$ does limit the weld strength. Please identify full extent of this error, i.e. buildings, calculations and develop a plan to ensure that the welding is adequate.
4.	Calc.	C3,C4	The load development in Appendix C is confusing. Please clarify if the 60% seismic response reduction on page C3 is an implementation of the ASCE 4 100-40-40 rule. If this is so then please explain why an absolute summation of reactions (page C4) is used.
5.	Calc.	C6	The weld design beginning on page C6 has a D/C=0.92. This calculation appears to overstate the overturning load acting on individual welds by using a two step method to obtain the weld loads. Distributing the loads directly to welds on each of the four corners in one step will provide a more accurate load distribution. What is the actual demand to capacity ratio for this component?
6.	Calc.	C6	The beam flange is welded to the base plate with 16 inches of 1/2" fillet weld. Rough PRT hand calculations suggest that bending of the beam flange may limit the force that can be transmitted to the 1/2 inch fillet weld. Please provide a technical basis for the load transfer between the beam web and the 1/2 inch fillet weld.
7.	Calc.	Gen.	This calculation contains an analysis of the equipment loads transmitted to individual base plates. Where is the analysis that verifies that these loads are less than the anchor capacity?

Document No./Title: Design of Surface Mounted Plates for Support of PT Hot Cell Equipment Platforms: Calculation 24590-PTF-SSC-S15T-00365; Drawings 24590-PTF-P1-P23T-00037, Rev. 1; 24590-PTF-P1-P23T-00038, Rev. 2; 24590-PTF-P1-P23T-00039, Rev. 1; 24590-PTF-P1-P23T-00040, Rev. 1; 24590-PTF-P1-P23T-00041, Rev. 0; 24590-PTF-S1-S15T-00501, Rev. 1; 24590-PTF-S1-S15T-00502, Rev. 1; 24590-PTF-S1-S15T-00503, Rev. 1; 24590-PTF-S1-S15T-00504, Rev. 1; 24590-PTF-S1-S15T-00510, Rev. 1			Rev: A	Document Date: 4/13/2011
Reviewer: ORP Structural Review Team: Loring Wylie				
Item	Section	Page	Comment	
1	Attach.A	A-2	<p>Note: Attachment A deals with plates for PT Hot Cell Equipment Platforms covered by Calc. 24590-PTF-SSC-S15T-0365, so only the part of Calc. 24590-PTF-SSC-S15T-0360 related to Calc. 0365 was reviewed.</p> <p>The model analyzed is shown on Sheet A-2 and consists of the 2 inch plate with 4 anchors to concrete near the four corners. Spacing of bolts is 23 inches in one direction, 16 inches in other direction. The sketch on A-2 suggests the load is applied by a 10 inch long weld attachment near one corner. The analysis that follows seems to utilize the four anchor bolts to share the load. However, at the bottom of sheet A-4 the term Ψ_1 is taken as 1.0 with e'_n equal to zero. This suggests the load is applied at the centroid of the bolt group, not near on corner as illustrated on Sheet A-2. It appears from the calculation that the four anchors are sharing to resist tension uplift with no eccentricity in the applied load. The calculation concludes with a tension and shear D/C of 0.99. This does not appear to be correct and it appears some anchors are overstressed.</p> <p>We understand that these anchors are on construction drawings at the end of the 00360 calculation, specifically Drawings 24590-PTF-P1-P23T-00037 through 00041 plus 24590-PTF-S1-S15T-00501 through 00505 plus 00510. In those drawings we see no plates of the dimensions analyzed in Attachment A of Calculation 00365. We see plates with four anchors on 9 foot long plates. We see plates with 8 to 10 anchors up to 11 feet long. BNI should explain how the design of these plates corresponds with the drawings provided. It may be the four bolts at one end of these long plates matches calc 00365 Attachment A, but the sharing of the uplift by four anchors is still in question.</p>	

Document No./Title: Structural Design Criteria: 24590-WTP-DC-ST-01-001, Rev. 13			Rev: 13	Document Date: 12/20/2011
Reviewer: ORP Structural Review Team: Greg Mertz, Loring Wylie, Tom Houston				
Item	Section	Page	Comment	
1.		Gen.	The proposed ashfall loads have a 10,000 year return period and the SDC specifies the same criteria as live load. At a minimum the ashfall loading should be considered as an upset loading and be evaluated using the same stress criteria as other upset loads, such as seismic.	

Attachment B – May 28 - 31, 2013 Meeting Agenda

**STRUCTURAL QUARTERLY PRT REVIEW-AGENDA
DOE-Waste Treatment Plant - Richland Office Visit
May 28-31, 2013**

Location, Date, (Time): Richland Bechtel Office, (MPF, D-216)
May 28-31, 2013

Subject: Waste Treatment Plant (WTP)
Status of Richland Structural Design

DOE POCs: Raman Venkata, DOE
Tom Houston, DOE PRT
Greg Mertz, DOE PRT
Loring Wyllie, DOE PRT

WTP - Leads/POCs: Jim Booth (Structural - LBL)
Mark Axup (Structural - PTF)
Phil Thériault (Structural - HLW)

Tuesday, May 28, 2013 - Morning (MPF, D-216)

- 8:30 - Safety Share and Opening remarks (Raman Venkata)
- 9:00 - 10:00 LAW Multi-Commodity Racks (Jim Booth)
 - Calculations
24590-LAW-SSC-S15T-00057, Rev. 0
 - Drawings
24590-LAW-S0-S15T-00002, Rev. 25
24590-LAW-S0-S15T-00011, Rev. 5
24590-LAW-S0-S15T-00012, Rev. 3
24590-LAW-S0-S15T-00014, Rev. 6
24590-LAW-S0-S15T-00015, Rev. 2
24590-LAW-S1-S15T-00005, Rev. 1
24590-LAW-S1-S15T-00035, Rev. 1
24590-LAW-S1-S15T-00043, Rev. 4
24590-LAW-S1-S15T-00045, Rev. 3
24590-LAW-S1-S15T-00046, Rev. 1
24590-LAW-S1-S15T-00047, Rev. 2
24590-LAW-S1-S15T-00048, Rev. 1
24590-LAW-S1-S15T-00049, Rev. 2
- 10:00 - 10:30 PT Black Cell Liner (Axup)
 - Requirement Revision
24590-WTP-SE-ENS-10-0078, Rev. 1
 - Calculations
24590-PTF-SSC-S15T-00075, Rev. B
 - Drawings
24590-PTF-DD-S13T-00065, Rev. 6
24590-PTF-DD-S13T-00066, Rev. 13
24590-PTF-DD-S13T-00067, Rev. 10
24590-PTF-DD-S13T-00068, Rev. 9
24590-PTF-DD-S13T-00069, Rev. 2
- 10:30 - 11:00 PT Hot Cell Equipment Frames (Axup)
 - Calculations
24590-PTF-SSC-S15T-00360, Rev. A

o Drawings

- 24590-PTF-P1-P23T-00037, Rev. 1
- 24590-PTF-P1-P23T-00038, Rev. 2
- 24590-PTF-P1-P23T-00039, Rev. 1
- 24590-PTF-P1-P23T-00040, Rev. 1
- 24590-PTF-P1-P23T-00041, Rev. 0
- 24590-PTF-S1-S15T-00501, Rev. 1
- 24590-PTF-S1-S15T-00502, Rev. 1
- 24590-PTF-S1-S15T-00503, Rev. 1
- 24590-PTF-S1-S15T-00504, Rev. 1
- 24590-PTF-S1-S15T-00510, Rev. 1

* 11:00 - 12:00 Transfer Function Comparison - Subtraction vs. Direct Method (Thériault)

o Calculations

- 24590-HLW-S0C-S15T-00236, Rev. 1

12:00 - Lunch

Tuesday, May 28, 2013 - Afternoon (MPF, D-216)

* 1:00 - 2:00 - Status of Lab HVAC CSV Duct Design/Story Drift Issue (Booth)

o Design / Construction Update - HVAC Seismic Anchor Motion (SAM)

* 2:00 - 3:30 - PT / HLW Crane Rail Girder Design Comments from Oct 2012 Review (Axup / Thériault)

o Crane Bracket Weld to Embed - Distribution of Vertical Shear to Flange Welds

- 24590-PTF-SSC-S15T-00032, Rev. A, Calc Ref. Sheet 52
- 24590-HLW-SSC-S15T-00055, Rev. A, Calc Ref. Sheet 10
- 24590-HLW-SSC-S15T-00114, Rev. A, Calc Ref. Sheet 54
- 24590-HLW-SSC-S15T-00129, Rev. A, Calc Ref. Sheet 85
- 24590-HLW-SSC-S15T-00130, Rev. A, Calc Ref. Sheet 56

o PT Hot Cell Embed Lamellar Tearing Issues

o Embed Plates with Nelson D2L Deformed Bars

* 3:30-4:30 Review Responses to Past PRT Open Comments (Booth/Axup/Thériault)

o DOE 1020 Peer Review Requirements - PIER 12-0011, Action 06

o Documents (Booth)

CCN 222678 - Mark Platt e-mail

CCN 222680 - Ron Benedict e-mail

24590-WTP-GPG-ENG-0103, Rev. 7, Equipment Seismic Qualification

24590-WTP-RPT-CSA-10-001, Rev. 0, Documentation of DOE 1020-94 Independent Peer Review of CSA Designs

24590-WTP-PIER-MGT-09-1066-D

24590-WTP-PIER-MGT-09-1179-C

24590-WTP-PIER-MGT-12-0011-D

24590-WTP-PIER-MGT-12-0175-D w/ Att. A & B

o ISRS Curves - PIER 12-1189

24590-WTP-PIER-MGT-12-1189-C

o Other Open Issues from Previous Meetings

24590-WTP-PIER-MGT-12-1261-C

24590-WTP-PIER-MGT-10-1278-B

24590-PTF-S0E-S15T-00038 (ECCN to PT Bldg ISRS Calculation)

24590-PTF-S0E-S15T-00039 (ECCN to PT Control Bldg ISRS Calculation)

24590-HLW-S0E-S15T-00134 (ECCN to HLW Bldg ISRS Calculation)

Wednesday, May 29, 2013 - Morning (Site Field Trip)

* 7:30 -7:35 Pre-Travel Meeting - Main Parking Lot (Booth/Axup/Thériault/Venkata/PRT Members)

* 8:00 - 11:30 - Site Visit (Booth/Thériault)

o ETG Location

- Lab HVAC C5V Duct
- HLW Platform
- 12:00 - Lunch

Wednesday, May 29, 2013 - Afternoon (MPF, D-216)

- 1:00 - 2:00 - HLW Platform Connection Details (Thériault)
 - Calculations
 - Drawings
- 2:00 -3:00 ETG Building Design (Booth) (Video Conference - MPF A-201)
 - OnPower Seismic Design Update
- 3:00 -4:00 Ashfall Criteria Revision (Booth/Axup/Thériault)
 - Drift Requirements
 - Potential Impacts
- 4:00-4:30 Design Criteria Revision 13 Update (Booth)
 - Other Open Issues from Previous Meetings
 - Documents

24590-WTP-DC-ST-01-001, Rev. 13
 24590-WTP-RPT-M-09-006, Rev. 0
 24590-WTP-PIER-MGT-09-1179-C, Rev. 0

Thursday, May 30, 2013 - Afternoon (MPF, D-216)

- 7:30 - PRT Review Time and on Call Requests

Friday, May 31, 2013 - Afternoon (MPF, D-216)

- 2:00 - Exit Briefing (Raman Venkata/Tom Houston)

Attachment C – PT PRT Question Responses

PRT Question Responses

HLW Facility CSA
DOE - Waste Treatment Plate – Richland Office Visit
October 17-19, 2012

Draft responses to 4 PRT questions

1. October 2009 – CCN 212773 – 1
2. December 2011 – CCN 246425 – 3

1. October 2009 – CCN 212773 – OVERSIGHT REPORT, A-09-WED-AMWTP-RPT-011, WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP) STRUCTURAL PEER REVIEW TEAM (SPRT) OVERSIGHT REPORT – DECEMBER 2009

1. **ORP-RPT-2009-A005** – (ATS 10-0386 Action 01) the following observations were made by the PRT in review of calculation 24590-HLW-SSC-S15T-00231 – *Horizontal Bracing Connection Design for HLW Building Steel Framing between EL 72'-0" and the Roof.*

2. December 2011–CCN 246425 – SURVEILLANCE REPORT S-12-WED-RPPWTP-015 – REVIEW OF THE DECEMBER 2011, STRUCTURAL PEER REVIEW TEAM REPORT (SPRT)

1. **15-O02** – (PIER 12-0547 Action 01) the following observations were made by the PRT in review of calculations 24590-HLW-S0C-S15T-00234 – *Design of HLW Structural Platform HP-0401 @ El. 58'-0"*.
2. **15-O02** – (PIER 12-0547 Action 02) the following observations were made by the PRT in review of calculations 24590-HLW-S0C-S15T-00234 – *Design of HLW Structural Platform HP-0401 @ El. 58'-0"*.
3. **15-O02** – (PIER 12-0547 Action 03) the following observations were made by the PRT in review of calculations 24590-HLW-S0C-S15T-00234 – *Design of HLW Structural Platform HP-0401 @ El. 58'-0"*.

Calculation – 24590-HLW-SSC-S15T-00231, Rev A

- 1) For the connections in Section 7.2, 7.3, 7.4, 7.15, 7.17 and 7.18, the calculations in this part connect the diagonal brace to a gusset that connects the web of two steel beams adjacent to the beam column connection. Where is the adequacy of the beam to column connection verified to be adequate for the additional horizontal load from the diagonal brace?

BNI Response: ECCNs 24590-HLW-SSE-S15T-00429 and 24590-HLW-SSE-S15T-00430 have been issued to address the ORP-RPT-2009-A005 comment. These ECCNs verify the adequacy of the beam to column connection. ECCN 00429 reviews the loading used for the connection check, ECCN 00430 does the connection design to column flange.

Calculation – 24590-HLW-S0C-S15T-00234, Rev A

- 1) The supports to columns on grid line 1 at grid lines D, E, F and G had a W12 extension of the W24x104 beams welded to a vertical 1 inch plate which welds to a HSS 12x12 inch to be

nearly 2 feet long which welds to another vertical 1 inch plate which is welded with ½ inch bars to a vertical HSS 8x8 inch tube to the column below. Most of these details are shown on DCN-24590-HLW-SSN-S15T-0396. The W12 extension is welded with full penetration flange welds and the D/C for that connection is 0.70 (Sheet K-55 of Calculation 24590-HLW-S0C-S15T-0234). The ¼ inch fillet welds of the HSS welds appeared light and not included in the calculation. All welds need to be verified for adequacy. Provide calculations for SPRT review. This is a gravity load issue and it would be preferred to have the W24 extend to the top of the HSS 8x8 column extension. The SPRT recognizes that some of this has been installed already.

BNI Response: Engineering calculation change notice 24590-HLW-SSE-S15T-00229 designs these ¼" fillet welds. ECCN 229 was issued on 6/3/11, four months before the calculation. Thus, assumed applied loading was used at the HSS12x12 & 1" plate location (PA = 5k, PL = 5k, and PV = 5k where PA = Fx, PV = Fy, and PL = Fz). Section H.2 envelopes all plate and HSS connection welds, of which the maximum D/C ratio is equal to 0.74, but again, this is for the assumed loading. Also, it must be noted that these HSS/plate/brace/bar systems were installed prior to installation of the platform designed in the calculation.

Engineering calculation change notice 24590-HLW-SSE-S15T-00230 designs these ¼" fillet welds with the updated loads from calculation 24590-HLW-S0C-S15T-00234. Section H.7.1 checks the connection between the HSS12x12 & 1" plate. Loading used is Fx = 8.1 k, Fy = 25.5 k, Fz = 6.8 k, Mx = 0 k-ft., My = 11.1 k-ft., and Mz = 50 k-ft. which are the actual applied loads from the calculation. The maximum D/C ratio as calculated for design of this connection using a ¼" fillet weld is 0.95. Section H.7.2 checks the connection between the HSS8x8 & 1" plate. Loading used is Fx = 5.1 k, Fy = 12.7 k, Fz = 5.3 k, Mx = 0 k-ft., My = 8.8 k-ft., and Mz = 50.2 k-ft. which are the actual applied loads from the calculation if not slightly more conservative. The maximum D/C ratio as calculated for design of this connection using a ¼" fillet weld is 0.97.

- 2) The steel diagonal bracing in the platform consists of 6x6 inch angles. Some of these angles are starred on plan and have a 3-1 1/8 inch bolt connection (G/00205) vs. a 2 - 7/8 inch bolt connection for the remainder. These are based on forces from the GTStrudl model but the logic of the bracing system is unclear as weak way beam bending is required to complete the load path of this horizontal diaphragm. The sensitivity of the model needed to be reviewed to determine the provision of heavier connection, typically.

BNI Response: The horizontal diaphragm load path is such that the loads from the braces travel down through the columns and into the "kickers" below. Beam bending in its weak axis is not affected. Geometry of this path can be seen in drawings 24590-HLW-S1-S15T-00175, 24590-HLW-S1-S15T-00205, and Sheet 7 of calculation 24590-HLW-S0C-S15T-00234. These "kicker" members and their connections are designed for this additional bracing load as shown on Sheets K-32 thru K-43 of the calculation. The D/C ratio of these "kickers" are equal to 0.59 and 0.49 for the L4x4x1/2 and HSS6x6x1/2 members respectively as shown on Sheet 8 of the calculation. Calculation 24590-HLW-S0C-S15T-00234 designed its members based on stiffness rather than load (See the Methodology in Section 5, i.e., the Dynamic Run is performed prior to the Static Run). The platform is SC-I and it must be rigidly designed to support the equipment on it. All bracing members have a D/C ratio less than or equal to 0.49 per Sheet 8 of the calculation.

Sheets E-2 through E-7 visually depicts the member and node numbers. In accordance with drawing 24590-HLW-S1-S15T-00175, the member numbers for the starred angles are 322, 324, 327, 328, 330, 331, 333, and 334. Sheets J-34 thru J-40 show the end forces for each member. Of the eight starred members, the maximum enveloping forces are: Fx = 37.2 k, Fy = 0.4 k, Fz = 0.4 k, Mx = 0 k-ft., My =

0 k-ft., and $M_z = 0$ k-ft. Sheets K-44 thru K-48 design the L6x6 Horizontal Bracing using (3) 1 1/8" A325 SC bolts with standard holes. The previously stated loads are used. All limit states pass with a maximum D/C ratio of 0.93 which pertains to the allowable shear in the bolts.

Of the remaining sixteen members, 321, 323, 325, 326, 329, 332, 335, 336, 337, 338, 339, 340, 341, 342, 343, and 344, the maximum enveloping forces from Sheets J-34 thru J-40 are: $F_x = 12.9$ k, $F_y = 0.4$ k, $F_z = 0.4$ k, $M_x = 0$ k-ft., $M_y = 0$ k-ft., and $M_z = 0$ k-ft. Sheets K-49 thru K-54 design the L6x6 Horizontal Bracing using (2) 7/8" A325 SC bolts with standard holes. The loads used ($F_x = 12.6$ k, $F_y = 0.3$ k, $F_z = 0.3$ k) are incorrect. The vector sum used is 12.61 kips whereas the correct vector sum should be 12.91 kips. This is an increase of approximately 2.4 percent. All limit states pass with a maximum D/C ratio of 0.62 which pertains to the allowable shear in the bolts. An increase of the maximum bounding D/C ratio by 2.4 percent results in a D/C ratio equal to 0.63 which is still less than or equal to 1.0 as defined as the design acceptance capacity margin in Section 5 of the calculation.

- 3) The calculations did not give D/C ratios for each member, just that it "Passed" the Mathcad check. It is recommended that the W24x55 north-south beams that resist seismic diaphragm weak axis bending be checked using only 1/2 of the weak axis capacity (top half of beam) since the angle bracing is 4 inches below the top of the W24.

BNI Response: Sheet 8 of calculation 24590-HLW-S0C-S15T-00234, Rev. A, summarizes the maximum D/C ratio for all North-South Girder W24x55's (G-2). This maximum D/C ratio is 0.44. Each individual G-2 member (125, 126, 127, 128, 129, 130, 132, 133, 134, 135, 186, 187, 188, 189, 190, 191, 194, 195, 196, 197, 213, 214, 215, 216, 217, 221, 222, 223, 267, 269, 272, and 274) is checked via the GTStrudl ASD9 design code check on Sheets H-44 and H-45. The individual D/C ratios vary from 0.096 to 0.435.

24590-WTP-PIER-MGT-12-0547-C Action 03 proposes all G-2 members that resist seismic diaphragm weak axis bending be checked using only half of their weak axis capacity since the angle bracing is just 4 inches below the top of the girder. The GTStrudl ASD9 design code check is based upon member properties from AISC13 (Sheet G-6), which includes weak axis and strong axis capacities. To simply double the maximum D/C ratio found for all G-2 member design code checks would in essence be halving both the weak axis and the strong axis capacities. This is conservative.

The conservative D/C ratio of 0.88 (0.44×2) still maintains an acceptable D/C ratio margin as stated on Sheet 5 of the calculation, which defines acceptability as being equal to or less than 1.0.

Open HLW PRT Question

Summary

The High Level Waste Facility CSA has 6 open PRT Questions

1. June 2006 – CCN 171984 – 7

1. June 2006 – CCN 171984 –

1. **Question #18** – (ATS 08-0209 Action 01) the following observations were made by the PRT in review of calculation 24590-HLW-SSC-S15T-00133 – *Melter 1 Decontamination Crane Runway.*

BNI Response: Forecast 05/01/2013 (Next SPRT meeting)

2. **Question #18** – (ATS 08-0209 Action 03) the following observations were made by the PRT in review of calculation 24590-HLW-SSC-S15T-00133 – *Melter 1 Decontamination Crane Runway.* – Review all other calculation with the same condition

BNI Response: Forecast 09/01/2014 (Based on current scheduled task)

3. **Question #21** – (ATS 08-0211 Action 01) the following observations were made by the PRT in review of calculation 24590-HLW-SSC-S15T-00074 – *Lower Canister Handling Crane Runway.*

BNI Response: Forecast 05/01/2013 (Next SPRT meeting)

4. **Question #22** – (ATS 08-0212 Action 11) the following observations were made by the PRT in review of calculation 24590-HLW-S0C-S15T-00025 – *Structural Model with Equipment Seismic Loads*

BNI Response: Forecast 09/01/2014 (Based on current scheduled task)

5. **Question #23** – (ATS 08-0212 Action 12) the following observations were made by the PRT in review of calculation 24590-HLW-S0C-S15T-00025 – *Structural Model with Equipment Seismic Loads*

BNI Response: Forecast 09/01/2014 (Based on current scheduled task)

6. **Question #26** – (ATS 08-0212 Action 13) the following observations were made by the PRT in review of calculation 24590-HLW-S0C-S15T-00025 – *Structural Model with Equipment Seismic Loads*

BNI Response: Forecast 09/01/2014 (Based on current scheduled task)

7. **Question #27** – (ATS 08-0212 Action 14) the following observations were made by the PRT in review of calculation 24590-HLW-S0C-S15T-00025 – *Structural Model with Equipment Seismic Loads*

BNI Response: Forecast 09/01/2014 (Based on current scheduled task)

Attachment D PRT PT Question Responses

PT Facility CSA DOE - Waste Treatment Plate - Richland Office Visit October 17-19, 2012

PT Facility - Outstanding issues

At the May 2012 meeting, (9) unresolved PT comments were addressed with formal BNI responses provided to the PRT. The (9) comments were:

1. **55-006 - Observation 06 (PIER 12-0073-D) PTF Utility Pipe Racks - Closed**
2. **55-007 - Observation 07 (PIER 12-0074-C) - Utility Pipe Racks - Closed**
3. **53-003 - Observation 03 (PIER 11-1279) Utility Pipe Racks in Room P-0410 - Closed**
4. **16-001 - Observation 01 (PIER 11-0527-C Action 01) - Shield Door Vendor Calculations**

PRT Assessment to May 2012 Review: We do not see in this revised calculation where BNI has addressed my primary concern. Our primary concern is the load path from guide rail through the double 14 x 10 x 3/8 inch tubes to the plates welded to inserts in the wall. This load path involves weak way bending in the 3/8 inch sides of the tubes, which we believe may be overstressed.

First, looking at Appendix D, Load Distribution on Guide Rail. A 1 kip load is applied but no results are provided. How far does the load spread out to where it is attached to the double tube column? Also, are these plates or pieces of steel continuous full height or are they in pieces? This would affect their ability to distribute the load.

Then Appendix H, Modified FEM of Door Assembly with Welded Column, which is new from previous reviews was reviewed. This looks like the model requested. But when the stresses reported in the double HSS 14 x 10 x 3/8 on sheets 366 and 367 are reviewed, BNI never checks out of plane flexure in the 3/8 inch walls of the tubes. Table H 4-3 indicates that the load on the column is about 24 kips. See the attached calculation (CCN 252553, Attachment C, page 19). Assuming the 24 kips is resisted by a 3 foot column height, the weak way bending stress in the 3/8 inch wall of the tube is about 95 ksi using simple assumptions which may not be conservative. If the 24 kip load is resisted in two locations, then the bending stress is 47.5 ksi, which is the yield strength of the tube.

I believe BNI needs to address this load path as described above. The results are probably in the computer models but not reported nor checked.

5. **10-002 - Observation 02 (PIER 11-0069-D Action 01) - A-10-WED-RPPWTP-010-002 - Cut rebar - Closed**
6. **10-003 - Observation 03 (PIER 11-0069-D Action 02)- A-10-WED-RPPWTP-010-003 - Cut Rebar - Closed**
7. **2 - Question # 2 (ATS 08-0202) - Closed**
8. **4 - Question # 4 (ATS 08-0204) - Closed**
9. **5 - Question # 5 (ATS 08-0205) - Closed**

Of the (9) comments addressed, (8) were closed upon receipt of CCN 252553, WED Surveillance Report S-12-WED-RPPWTP-015.

The PT Facility still has (6) remaining unresolved comments to be addressed TBD. These are:

1. **15-001 - Observation 01 (PIER 12-0546) - Pretreatment Facility Annex conservative design**

Ref: Drawing - 24590-PTF-DG-S13T-01004

Item 1 - The PTF Annex appeared to have an overly conservative design in many aspects. It is essentially a two-story office building. The Second Floor contains a 12 inch slab which is acceptable, as future needs may change. But the 4 foot thick base mat foundation thickened to 6 feet at the perimeter seemed excessive. The steel anchor bolts with four to eight 1-3/4 inch diameter high strength anchor bolts seemed excessive. Of greater concern was the details on drawing 24590-PTF-DG-S13T-01004 with 6-#7 horizontal hairpins and 4-#7 vertical hairpins to develop the strength of the anchor bolts. Explain how concrete will be

placed around these anchor bolts. An approach is to limit the horizontal hairpins to conditions where applied shear is towards the edge and vertical hairpins to be replaced with a larger plate deep in the concrete.

Ref: Drawing - 24590-PTF-SS-S15T-01017

Item 2 - Details 3, 4, and 5 showed an optional shape for the gusset plates that creates a re-entrant corner that can be a weakness. One method is to provide a 90 degree gusset to beam geometry.

Item 3 - Also on this sheet, the reference to Plate 1 and Plate 2 were apparently plate thicknesses from the calculation. These notations should be clarified.

Item 4 - The 2 inch thick gusset plate seemed very heavy for this two story building. Yet the maximum D/C ratios ranged from 0.84 to 0.97, which seemed very high for such a small building.

Ref: Drawing - 24590-PTF-SS-S15T-01002

Item 5 - The column below at grid CC-18.4 was not shown, nor referenced in beam to column connections.

2. **15-004 - Observation 04 (PIER 12-0549) - Pretreatment Facility Annex sliding**

Ref: Calculation 24590-PTF-SSC-S15T-00207, "Structural Analysis and Steel Design for the Pretreatment Facility Annex Building":

Item 1 - Page 331 of calculation: This section of the calculation addresses the factor of safety against sliding caused by seismic loading. In order to attain a factor of safety that exceeds the minimum required value of 1.1, the calculation takes credit for both passive soil pressure on the faces of the foundation slab and friction between the mat and the supporting soil. However, in the direction toward the PT building, there is a seismic gap and thus no soil along this face. Therefore, no passive pressure can be developed along this face to resist the sliding loads. Recommend the stability of the structure be re-assessed, recognizing the presence of the seismic gap between the structures.

3. **09-A16 - Item 16 (ATS 10-0392) - ORP-RPT-2009-A016 - Response Spectra**

Issue ECCN to calculation 24590-PTF-SOC-S15T-00022 to address PRT Item #16:
ORP-RPT-2009-A016

Inspection of the response spectra show that there is a lot of response in the high frequency regions of the spectra, for example the spectra on page C-49, where the 5% damped spectra is greater than 4g between about 9 Hz and 15 Hz. There are several similar spectra at other locations. This could be a problem in equipment qualification, particularly for functionality and possibly some structural qualification problems. Suggest that a conclusion be included to discuss this potential qualification issue in Section 8 of the report.

Items 4 thru 7, transmitted via CCN 252553 (9/27/12), resulting from the May 2012 review.

4. **Observation S-12-WED-RPPWTP-015-001 (PIER 12-1189)** -The Pretreatment Control Building SSI analysis was updated and the updated ISRS were compared to the previous spectra. Discussions with project engineers indicated the updated spectra are used for equipment qualification only when the spectra are judged to be substantially larger than existing spectra. Some of the earlier revision spectra are not updated, even though the updated spectra may be larger. Thus, an unspecified portion of the equipment margin may have been taken by the updated spectra. Additionally, the equipment engineers are not aware this margin may be degraded.
5. **Observation S-12-WED-RPPWTP-015-002 (PIER 12-1189)**: The original issue of the SSI calculation was performed by a different group (location) than the group who prepared the revision to the calculation. There appeared to be reluctance by the group that revised the calculation to take full ownership of the design product as was evidenced in the checking process.
6. **Observation S-12-WED-RPPWTP-015-003 (PIER 12-1189)**: The PRT performed a brief review of changes to the PTF Control Building. The base mat was increased to 4 feet, equipment bases changed, and two columns were added to stiffen the Mezzanine floor framing. The structural model is contained in Calculation No. 24590-PTF-SOC-S15T-00020, Rev. B. It was noted the structural steel to support the roof and Mezzanine will not be designed until 2013. Calculation 00020 had modeled the steel as either composite or partially composite as summarized in Table 5.1. The PRT noted the steel beams must be designed consistent with these assumptions or the structural model will need to be re-run consistent with the design. There was not an assumption requiring verification in the calculation to track the analysis assumptions used in developing the SSI model, which includes assuming composite and partial composite action of the roof are actually incorporated into the design of the roof.
7. **Observation S-12-WED-RPPWTP-027-004 (PIER 12-1261)**: The process used for selection and updating In-Structure Response Spectra (ISRS) may be eroding an un-quantified portion of the equipment margin.

Discussion:

The Pretreatment Control Building SSI analysis (Calculation 24590-PTF-S0C-S15T-00022) was revised and the new ISRS were compared to the previous spectra. The comment as stated by the EQPRT was as follows:

"Discussions with project engineers indicated that the existing spectra, used for equipment qualification, are only revised to the new spectra when the new spectra are judged to be substantially larger than existing spectra. Some of the existing in-structure spectra are not updated, even though the new spectra are larger. Thus, an un-quantified portion of the equipment margin may have been lost to the new spectra. Additionally, the equipment engineers are not aware that the margin may be degraded."

"The EQPRT recommends that additional evaluation be performed to quantify the maximum effect that the potential increase in seismic input could have on the equipment margins for seismic design loads. Additional investigation is also needed to determine if the equipment in other buildings could have lower than reported seismic margins because of revisions to ISRS."

There is an existing PIER (12-0069D) that identifies concerns with the selection of appropriate ISRS for use in equipment seismic qualification. In both the Structural and Equipment PRT review discussions during the week of April 30 through May 4 that involved seismic qualification of Trentec doors, additional evidence of potential problems with the process used for selection of ISRS were identified. The ISRS selected for use in the door qualifications do not in all cases bound the ISRS at the actual location of the doors.

The EQPRT further stated:

"A review of the Equipment Seismic Qualification Guide indicates a generic concern in that there is no cross discipline check to ensure that the location of the ISRS provided by CSA correlates to the equipment attachment locations. The scheduled response date to PIER 12-0069D is March 2013. The delay in addressing this generic concern exposes DOE to a significant risk of unneeded modifications to equipment. The EQPRT recommends that this item be given higher priority for resolution."

Attachment E -- Review of Seismic Evaluation Guidelines for HVAC Systems for Differential Displacement

DIFFERENTIAL DISPLACEMENT IN HVAC SYSTEMS

A review of EPRI Report 1007896, *Seismic Evaluation Guidelines for HVAC Duct and Damper Systems*, (Reference 1) for the application of experience data related to differential displacement hazards and the use of flexible bellows is provided. The pertinent sections of the report are attached below. The experience data documented in the referenced EPRI report clearly points to cases where damage from seismic differential displacement has occurred in duct systems. There are specific experience data indicating that there can be excessive leakage or failures for duct systems without sufficient flexibility at spans experiencing differential displacement. Specific criteria are therefore provided in the Screening and Evaluation Work Sheets (SEWS) requiring evaluation to determine that the duct work is able to accommodate differential displacements. The criteria resulting from the experience data has specific concerns related to the type of joint used in the duct system. Duct with runs consisting of slip joints are a specific concern. There is also data indicating that detailed reviews are needed where the duct system is connected to flexibly mounted heavy equipment because of seismic differential displacement concerns. The EPRI report indicates that the effects of seismic differential displacement should be evaluated using the stress criteria in Section 4 of the EPRI report. The seismic experience data cautions the use of flexible bellows to resolve seismic differential displacement concerns. The report states, "*Bellows are typically not designed to resist any large differential motions imposed by the earthquake*". The SEWS require that flexible bellows be evaluated to accommodate motions from seismic events. There are also specific cases of damage to flexible bellows in seismic events. If flexible bellows are used to resolve seismic differential motion, detail qualification of the joint is required and this qualification report should be reviewed by the Mechanical Peer Review Team.

Reference

1. Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896, Final Report, December 2006

EPRI TECHNICAL REPORT 1007896, SEISMIC EVALUATION GUIDELINES FOR HVAC DUCT AND DAMPER SYSTEMS

DIFFERENTIAL DISPLACEMENT

3.2.3 DUCT JOINTS

HVAC joints should be visually inspected to verify their structural integrity. Joints (including connected tees and elbows) that are observed to be loose, incomplete, corroded, or otherwise suspect (such as those repaired with duct tape or fiberglass, or missing rivets, screws, etc.) should be reviewed in detail. Seismic experience data have shown that such joints are often the point of excessive leakage or failure of HVAC systems in an earthquake. A corroded riveted duct joint failed at the Caxton Paper Mill as a result of the 1987 New Zealand earthquake (see Appendix A, Section A.2.1). In addition, HVAC without pressure boundary requirements and with runs consisting of slip joints without pocket locks, rivets or screws should be reviewed to assure that the differential displacement between the two

adjoining ducts due to seismic loading will not cause joint separation. Figure 3-1 shows different SMACNA duct joints as described in Reference [4] to aid in identifying slip-type joints.

3.2.6 FLEXIBLY MOUNTED HEAVY EQUIPMENT

HVAC systems often have heavy pieces of mechanical equipment mounted in-line with the duct. Examples include fans, coolers, dryers, dampers with motor operators, and blowers. Earthquake experience data have shown that large pieces of equipment mounted in-line on flexible supports (e.g., without lateral and longitudinal bracing) can damage the duct from excessive displacement during an earthquake. This occurred at the Watkins-Johnson Plant during the 1989 Loma Prieta earthquake (Figure A-23 of Appendix A). Mechanical equipment should be investigated to determine if the joints connecting the equipment to the duct are sufficiently flexible to accommodate any expected swinging of the equipment during a seismic event. Potential interactions between swinging mechanical equipment and the HVAC duct or other safety related equipment should also be investigated (see Section 3.4).

Heavy equipment with connected HVAC duct may be floor-mounted on vibration isolation pads. Earthquake experience data have shown examples of excessive leakage and failures of such HVAC systems due to insufficient restraint of this equipment. Excessive leakage and failures have been caused by floor-mounted equipment falling off their isolation pads and damaging attached ducts in the process. Figure A-19 in Appendix A shows one such failure where a flexible bellows was torn due to the motion of an attached fan on vibration isolation mounts. The SQUG GIP [1] provides guidelines for seismic verification of HVAC equipment such as fans (axial and centrifugal), air handlers and chillers. Heavy equipment that is flexibly supported or on vibration isolation pads should be evaluated separately using the SQUG GIP or identified as outliers for further evaluation.

3.4.3 DIFFERENTIAL DISPLACEMENT HAZARDS

Ducts spanning from one structure to another should be checked to assure that they can accommodate any relative movement of the structures. Experience data indicate there can be excessive leakage or failures for duct systems without sufficient flexibility at spans experiencing differential displacement [3]. If this condition is identified, stress criteria established in Section 4 of this report should be used.

B.5 CAVEATS FOR DAMPERS

DMPRS/BS Caveat 3 - Sufficient Slack and Flexibility of Attached Lines. Sufficient slack and flexibility should be present in attached lines (e.g., air tubing, electrical conduit) to preclude a line breach due to differential seismic displacement of the equipment and the line's nearest support. Also, for damper positioners with independent supports (i.e., not mounted integrally on the duct) the effect of differential displacement on the actuator (with actuator defined as the rod)

FLEXIBLE BELLOWS

3.5.3 FLEXIBLE BELLOWS

Flexible bellows connecting HVAC duct to in-line equipment may become damaged if they do not have enough slack to accommodate differential motion between the equipment and the duct. Bellows are typically not designed to resist any large differential motions imposed by the earthquake. If

reasonable estimates of bellows flexibility cannot be determined by judging the available slack in the as-installed configuration, then manufacturer's data should be reviewed.