



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

03-AMWTP-090

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

Dear Mr. Henschel:

CONTRACT NO. DE-AC 27-01RV14136 – INSPECTION REPORT A-03-AMWTP-RPPWTP-003 – ON-LOCATION INSPECTION REPORT FOR THE PERIOD JULY 11, 2003, THROUGH AUGUST 21, 2003

This letter forwards the results of the U.S. Department of Energy, Office of River Protection (ORP) review of Bechtel National, Inc. (BNI) construction performance of the Waste Treatment and Immobilization Plant (WTP) for the period July 11 through August 21, 2003. A summary of the inspection is documented in the enclosed inspection report.

Construction performance was good during this inspection period. BNI has taken appropriate actions to address low strength concrete cylinder breaks, identified during the inspection period, including performing a comprehensive root cause analysis. An inspection of the waste receipt tank fabrication subcontractor's temporary electrical equipment, used to fabricate the tanks, resulted in the identification of 39 National Electric Code violations. BNI should take action to improve oversight of subcontractor electrical safety performance. The Heating, Ventilation, and Air Conditioning (HVAC) subcontractor was found to be fully ready to begin fabrication of HVAC ductwork.

If you have any questions, please contact me, or your staff may call John Eschenberg, WTP Project Manager, (509) 376-3681.

Sincerely,

Roy J. Schepens
Manager

AMWTP:JWM

Enclosure

cc w/encl:
W. R. Spezialetti, BNI

U.S. DEPARTMENT OF ENERGY
Office of River Protection

INSPECTION: On-location Inspection Report for the Period July 11 through August 21, 2003

REPORT NO.: A-03-AMWTP-RPPWTP-003

FACILITY: Bechtel National, Inc.

LOCATION: 2435 Stevens Center
Richland, Washington 99352

DATES: July 11 through August 21, 2003

INSPECTORS: J. McCormick-Barger, Sr. Regulatory Technical Advisor, Inspection Lead
B. Harkins, ORP Facility Representative
S. Pfaff, ORP Facility Representative
M. Evarts, Team Member
J. Mohatt, Team Member
D. Wallace, Team Member
D. Frey, Team Member
D. Kirsch, Team Member

APPROVED BY: M. Thomas, Operations and Commissioning Team Leader
Office of the Assistant Manager for Waste Treatment and Immobilization
Plant (AMWTP)

EXECUTIVE SUMMARY

Introduction

During the period July 11 through August 21, 2003, the U.S. Department of Energy, Office of River Protection (ORP) Office of the Assistant Manager for Waste Treatment and Immobilization Plant (AMWTP) conducted inspections of important-to-safety (ITS) and non-ITS (Balance-of-Plant) activities of the construction of the Waste Treatment and Immobilization Plant (WTP). These inspections were documented on inspection notes and maintained electronically. There were 58 inspections of various construction activities summarized below. Copies of the inspection notes are available upon request. The inspection construction activities covered the following areas:

- Readiness of the Heating, Ventilation, and Air Conditioning (HVAC) subcontractor to fabricate ductwork
- Contractor Recovery Activities Associated with Low Strength Concrete
- Forms, Reinforcement Steel, and Embedded Steel Items and Associated Concrete Placements
- Fire Protection Piping System Work Activities
- Balance-of-Plant Construction Activities
- Industrial Health and Safety (IH&S)
- Previously Identified Assessment Follow-up Items

Significant Observations and Conclusion

- Thirty-nine National Electric Code (NEC) code violations were identified with Chicago Bridge and Iron (CB&I) temporary power distribution equipment located both at the Pretreatment Facility (PTF) and the tank fabrication facility. These violations represent poor subcontractor and Contractor electrical safety oversight. The Contractor/subcontractor was taking actions to correct these violations including immediately shutting down equipment with inappropriately sized supply breakers. (Inspection notes 003-21, 003-22, 003-33, and 003-48)
- ORP and the Contractor's Quality Assurance (QA) organization conducted a joint implementation review of the HVAC subcontractor's readiness to fabricate and install HVAC ductwork. Based on ORP's review of the Contractor's procurement documents, technical specifications, and design documents, and the subcontractor's implementing procedures, with one exception, ORP determined these Contractor/subcontractor

documents met authorization basis requirements, including specified codes and standards. Staff were appropriately trained and qualified, and ongoing fabrication work conformed to the requirements. The one exception regarded Contractor specifications referencing industry standard revisions not authorized by the Safety Requirements Document. The Contractor had previously identified and was working to address this deficiency. ORP concluded the Contractor had conducted a thorough implementation audit of this subcontractor.

One assessment follow-up item (A-03-AMWTP-RPPWTP-003-A04) was assigned to track resolution of a concern regarding the adequacy of the HVAC As Low As Reasonably Achievable (ALARA) design. ORP identified a potential for radioactive crud traps in HVAC ductwork inside coupling connection joints for rectangular and circular ductwork. In addition, a design drawing identified a corner weld to join and seal the fabricated ductwork. The subcontractor had burned through the inside of several duct seal welds creating potential crud traps. These situations were brought to the attention of the Contractor's QA Manager with the request to demonstrate an ALARA analysis had been accomplished for the designed situations. (Inspection note 003-42)

- Reinforcement steel installations and other attributes associated with the concrete placements for the Low Activity Waste (LAW), High Level Waste (HLW), and PTF were performed in accordance with established procedures, specifications, and drawings. Qualified inspectors were performing Quality Control (QC) activities for this work, and QC activities were documented as required by procedures. (Inspection notes 003-07, 003-08, 003-10, 003-13, 003-16, 003-17, 003-18, 003-20, 003-27, 003-28, 003-29, 003-38, 003-54, 003-55, and 003-57)
- The Contractor has taken appropriate actions to address low strength concrete test results including stopping ITS placements, initiating a root cause analyses team, and developing data to justify a root cause determination and make appropriate recommendations. The Contractor's Investigation and Resolution Plan established adequate criteria for resuming full concrete production. Recommendations from the root cause analysis have yet to be finalized or put into action. (Inspection note 30)
- Calibration of the concrete cylinder break machines were checked and found to be in calibration, and observed cylinder breaks were conducted in accordance with applicable ASTM standards and the material testing subcontractor procedures. (Inspection notes 003-31, 003-39, 003-40, and 003-45)
- Rebar mechanical splices were properly tested and installed at the LAW-014 exterior wall in accordance with the applicable specifications. (Inspection notes 003-09 and 003-53)
- Several industrial health and safety inspections were conducted during the inspection period and included a general overview of site safety practices. These inspections also included focused reviews in the following areas: 1) structural steel installations;

2) tower crane footwalk and landing upgrades; 3) fall protection program; 4) O/E vehicle maintenance facility; and 5) PTF Pedestal Crane installation. With the exception of some minor deficiencies noted and promptly corrected, the Contractor was complying with the requirements of ORP M 440.1-2, *Industrial Hygiene and Safety Regulatory Plan for the Waste Treatment Contractor*. (Inspection notes 003-01, 003-46, and 003-47)

- The O/E vehicle maintenance facility was missing a main 400 amp disconnect switch. After bringing this NEC 2002, Article 225.33 violation to the Contractor's attention, the switch was added. (Inspection note 003-02)
- General Distribution Rack (GDR)-021 located east of the LAW was installed in accordance with the 2002 NEC. (Inspection note 003-03)
- Two NEC violations were identified with the temporary power used by the subcontractor at the simulator site. The Contractor discussed these issues with the subcontractor and the violations were corrected. (Inspection note 003-04)
- Reinforcement steel and embedded anchors for the Firewater Storage Tank, Demineralized Water Storage Tank, Domestic Water Storage Tank, Raw Water Tank, NLD Tank, and Process Service Water Day Tank foundations, and the cooling tower base slab were installed in accordance with the design and specifications. Concrete placement and testing for the Raw Water and NLD Tanks were conducted in accordance with applicable procedures and specifications. (Inspection notes 003-06, 003-11, 003-37, 003-50, and 003-56)
- Conduit, grounding cables, splices, and grounding configuration for portions of the PTF basemat (between columns 15 through 19, and AA through E) were installed in accordance with design and 1999 NEC requirements. (Inspection notes 003-014 and 003-15)
- Raw Water and Firewater System hydrostatic tests were conducted in accordance with the appropriate specification and procedure. (Inspection notes 003-19 and 003-32)
- The hydrostatic test of the Non-radioactive Liquid Waste line from the HLD pump house to station N.3,569.97/E.9,829.59 was conducted in accordance with appropriate procedures and specifications. (Inspection note 003-23)
- Opportunities for improvements were identified from observing the July 17, 2003, construction emergency drill, conducted at the PTF. Numerous examples of personnel and equipment pre-staging were identified, the simulated injured person was left alone for the first 14 minutes, and the process for directing the Hanford Fire Truck to the accident site and area control during the drill needed improvement. (Inspection note 003-24)

- Quality Control (QC) inspections were being conducted in accordance with the requirements of the Quality Assurance Manual; however, deficiencies identified during in process QC inspections were not required to be documented or trended to determine performance weaknesses. (Inspection note 003-25)
- Radiographic examination of PTF drainpipe welds was conducted in accordance with the Contractor's radiation safety program. (Inspection note 003-26)
- 30" ductile iron supply and return cooling water pipe, located at the northeast side of the PTF, was being installed and backfilled in accordance with design documents and other applicable requirements. (Inspection note 003-43)
- Initially CB&I was not installing anchor bolts, used to install grillage for stainless steel liners in the HLW Drain Vessel Pit and Overflow Vessel Pit, in accordance with their procedures. CB&I subsequently revised their procedures to reflect the as-installed configuration. (Inspection note 003-05)

List of Assessment Items Opened, Closed, and Discussed

Opened

A-03-AMWTP-RPPWTP-003-A01	Assessment Follow-up Item	Follow-up on Contractor's actions to address CB&I NEC Code violations at the south center side of the PTF. (Inspection note 003-21)
A-03-AMWTP-RPPWTP-003-A02	Assessment Follow-up Item	Follow-up on Contractor's actions to address CB&I NEC Code violations at the north center site of the PTF. (Inspection note 003-22)
A-03-AMWTP-RPPWTP-003-A03	Assessment Follow-up Item	Follow-up on Contractor's actions to address CB&I NEC Code violations at the tank fabrication facility. (Inspection note 003-33)
A-03-AMWTP-RPPWTP-003-A04	Assessment Follow-up Item	Follow-up on Contractor's actions to address ALARA concern regarding HVAC design. (Inspection note 003-42)
A-03-AMWTP-RPPWTP-003-A05	Assessment Follow-up Item	Follow-up on Contractor's actions to address CB&I NEC Code violations at the tank fabrication facility. (Inspection note 003-48)
A-03-AMWTP-RPPWTP-003-A06	Assessment Follow-up Item	Follow-up on Contractor's actions to address GDR-001 (located near O/E Maintenance Facility) grounding conductor NEC Code violation. (Inspection note 003-34)

Closed

A-03-AMWTP-RPPWTP-002-A06	Assessment Follow-up Item	Follow-up on Contractor's actions to address issues regarding Fuel Dispensing Station panelboard branch circuit breaker noncompliances. (Inspection note 003-41)
A-03-AMWTP-RPPWTP-001-F01	Finding	Failure of CB&I to document fit-up inspections. (Inspection note 003-36)

A-03-OSR-RPPWTP-008-F02	Finding	Failure of CB&I to perform fit-up inspections during fabrication of the Waste Feed Receipt Tanks in accordance with CB&I procedures. (Inspection note 003-36)
A-03-OSR-RPPWTP-008-F03	Finding	Failure to include welding verification documents for the shear studs used in fabrication of door liners HDH-LINER-00043 and HEH-LINER-00046. (Inspection note 003-35)
A-03-OSR-RPPWTP-010-F01b	Finding	Failure to install reinforcement steel (Placement LAW-0009) in accordance with drawings (missing two rebar). (Inspection note 003-49)
A-03-OSR-RPPWTP-010-F01c	Finding	Failure to bend number 9 rebar in LAW in accordance with procedure (did not preheat bar). (Inspection note 003-49)
A-03-OSR-RPPWTP-010-F01d	Finding	Failure to complete pour cards in accordance with procedures. (Inspection note 003-58)
A-03-OSR-RPPWTP-010-A04	Assessment Follow-up Item	Follow-up on Contractor's actions to address issues regarding fall protection required by 29 CFR subpart M. (Inspection note 003-46)
A-03-AMWTP-RPPWTP-001-F02	Finding	Failure to splice PTF rebar in accordance with specification or drawing (out-of-plane splice). (Inspection note 003-49)
A-03-AMWTP-RPPWTP-001-F03	Finding	Failure to perform an indirect butt splice weld in accordance with a qualified procedure and a qualified welder. (Inspection note 003-51)
A-03-AMWTP-RPPWTP-001-A06	Assessment Follow-up Item	Follow-up on Contractor's actions to address panelboard clearance issues concerning electrical service to the T28 building. (Inspection note 003-12)

Partial Closure

A-03-AMWTP-RPPWTP-002-A04	Assessment Follow-up Item	Follow-up on Contractor's actions to address issues regarding tower crane elevator control panel. (Inspection notes 003-44 and 003-52)
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