



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-AMWTP-001

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

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 - INSPECTION REPORT A-03-AMWTP-RPPWTP-006 – ON-LOCATION INSPECTION REPORT FOR THE PERIOD OCTOBER 30, 2003, THROUGH JANUARY 8, 2004

This letter forwards the results of the U.S. Department of Energy, Office of River Protection review of Bechtel National, Inc. (BNI) construction performance of the Waste Treatment and Immobilization Plant (WTP) for the period October 30, 2003, through January 8, 2004. One Finding was identified associated with the procurement of structural steel bolting material that has been installed in the field. You are requested to respond to the Finding as instructed in the Notice of Finding, Enclosure 1.

Construction performance was generally good during this inspection period. An evaluation of the actions BNI is taking to address rebar installation concerns discussed in the last inspection report indicates BNI is well on its way to addressing this important issue. BNI actions to strengthen its vendor inspection program were also good and should improve the procurement process. A summary of the inspection is documented in the inspection report, Enclosure 2.

If you have any questions, please contact me, or your staff may call Mike Thomas, Operations and Commissioning Team Leader, (509) 373-5014.

Sincerely,

Roy J. Schepens
Manager

AMWTP:JWM

Enclosures (2)

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

NOTICE OF FINDING

Standard 7, "Environment, Safety, Quality, and Health," of Contract DE-AC27-01RV14136, dated December 11, 2000, between Bechtel National, Inc. (the Contractor) and the U.S. Department of Energy (DOE), defined the Contractor's responsibilities under the Contract as they related to conventional non-radiological worker safety and health; radiological, nuclear, and process safety; environmental protection; and quality assurance.

Standard 7, Section (e)(2)(ii) of the Contract required the Contractor to comply with the specific nuclear regulations defined in the effective rules of the 10 Code of Federal Regulations (CFR) 800 series of nuclear requirements.

Title 10 of the CFR, Part 830, "Nuclear Safety Management," Subpart A, "Quality Assurance Requirements," required the Contractor to conduct work in accordance with the requirements of Subpart A and to develop a Quality Assurance (QA) Program that reflected the requirements of Subpart A.

The Contractor's QA Program was defined in 24590-WTP-QAM-QA-01-001, "Quality Assurance Manual," Rev. 4b, dated November 26, 2003 (QAM).

The Contractor's QAM Policy Q-05.1, "Instructions, Procedures, and Drawings," Section 3.1.1, states that "Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, and drawings of the type appropriate to the circumstances that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."

During the performance of an inspection of the Contractor's vendor inspection activities, from December 8 through 15, 2003, at the Contractor's Project Office, the following deficiencies were identified:

- a. Section 2 of material requisition 24590-QL-YZA-SS02-00002, Revision 7, referred to document 24590-WTP-3PD-SS01-00002, *Applicable Quality Program Requirements, Structural and Miscellaneous Steel*, Revision 4, which required Hirschfeld Steel Company to supply bolting material in accordance with NQA-1-89, *Quality Assurance Program Requirements for Nuclear Facilities*.

Contrary to the above requirement, the Contractor received and installed bolting material that had been purchased from a supplier that did not qualify their subcontractor to an NQA-1 program. (Finding A-03-AMWTP-RPPWTP-006-F05a.)

- b. The Surveillance Inspection Plan for Hirschfeld Steel Company material requisition 24590-QL-MRA-SS01-00002 required, in Step 6, the inspector to

witness hardness testing in accordance with material requisition Section 2 requirements. Section 2 referred to Specifications 24590-WTP-3PS-SS01-T0001, *Engineering Specification for the Purchase of Miscellaneous Steel*, Revision 1, and 24590-WTP-3PS-SS01-T0002, *Engineering Specification for Purchase of Structural Steel*, Revision 2. Specification 24590-WTP-3PS-SS01-T0001, Section 6.2.7, required “Five (5) bolts from each heat number for each shipment received by Seller will be tested for Hardness. In case any bolt does not meet hardness requirement of applicable specification, then 5 more bolts will be tested. If any bolt from the second group fails to meet the hardness requirement then bolts from that heat or lot will be rejected.” Specification 24590-WTP-3PS-SS01-T0002, required similar testing.

Contrary to the requirements of the Quality Assurance Manual, Policy Q-5.1, Section 3.1.1, the Contractor’s specifications failed to include or reference appropriate quantitative or qualitative acceptance criteria for the minimum and maximum acceptable values of A490 and A325 bolt hardness. (Finding A-03-AMWTP-RPPWTP-006-F05b.)

- c. ASTM A490M-03, *Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric)*, Table 3, required a minimum hardness of Rockwell C 33 for bolts of length less than 3 times the bolt diameter.

Section 2 of the Purchase Order referred to Specifications 24590-WTP-3PS-SS01-T0001, *Engineering Specification for the Purchase of Miscellaneous Steel*, Revision 1, and 24590-WTP-3PS-SS01-T0002, *Engineering Specification for Purchase of Structural Steel*, Revision 2. Specification 24590-WTP-3PS-SS01-T0001, Section 6.2.7, required testing as described in paragraph b above.

Contrary to the above requirement, as of December 11, 2003, supplier Inspection Report 24590-QL-YQA-SS01-20032, dated October 31, 2003, included hardness test results for certain A490 high strength bolts (Piece Mark 29025BT18, Type/Size/Grade TC 1 1/8”-7 x 2 3/4” A490, Lot/Heat Number 73141/299089) that did not conform to specification ASTM A490M-03, or any other acceptable testing criteria. The hardness acceptance criteria specified in the vendor inspection report for bolts of length under 3 times the bolt diameter (3 3/8”) was 33 minimum and 39 maximum. The hardness test results, for five bolts tested, were 25, 25, 26, 29, and 27, respectively. The results failed to conform to the specified acceptance criteria. The supplier failed to have another sample of the bolts tested and failed to identify the nonconforming test results. The nonconforming bolts had been shipped to the Waste Treatment and Immobilization Plan job site. (Finding A-03-AMWTP-RPPWTP-006-F05c.)

The above examples are considered an inspection Finding against QAM Policy Q-05.1, for failure to either have or follow documented instructions, procedures, and drawings of

the type appropriate to the circumstances that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.

The Manager, Office of River Protection requests the Contractor provide, within 30 days of the date of the cover letter that transmitted this Notice, a reply to the Finding above. The reply should include: (1) admission or denial of the Finding, (2) the reason for the Finding, if admitted, and if denied, the reason why; (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further Findings, and (5) the date when full compliance with the applicable commitments in your authorization bases will be achieved. Where good cause is shown, consideration will be given to extending the requested response time.

U.S. DEPARTMENT OF ENERGY
Office of River Protection

INSPECTION: On-location Inspection Report for the Period October 30, 2003, through January 8, 2004

REPORT NO.: A-03-AMWTP-RPPWTP-006

FACILITY: Bechtel National, Inc.

LOCATION: 2435 Stevens Center
Richland, Washington 99352

DATES: October 30, 2003, through January 8, 2004

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

INSPECTION REPORT

Introduction

During the period October 30, 2003, through January 8, 2004, the U.S. Department of Energy, (DOE), Office of River Protection 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. These inspections were documented on inspection notes and maintained electronically. There were 60 inspections of various construction activities summarized below. Copies of the inspection notes are available upon request. The inspection construction activities covered the following areas:

- Forms, reinforcement steel, and embedded steel items and associated concrete placements
- Bolted connections associated with Low Activity Waste (LAW) structural steel
- Special Protective Coating installations
- Hydrostatic testing of installed piping
- Balance-of-Plant construction activities
- Industrial Health and Safety including rigging and hoisting
- Electrical equipment, including conduit and race way, installations
- Vendor Inspection Program
- Site winterization and cold weather concrete production preparations
- Review of satellite waste accumulation areas
- Follow-up on two construction incidents
- Follow-up on previously identified Assessment Follow-up Items

Significant Observations and Conclusion

- To address self-identified rebar deficiencies, Bechtel National, Inc. (BNI) conducted a root cause analysis of these issues and implemented a number of immediate and long-term corrective actions. Immediate actions included conducting training sessions to reinforce expectations regarding rebar installations, requiring second inspections by both field engineering and quality control of rebar sites prior to allowing concrete placements

to occur, and implementing a Quality Assurance rebar oversight function. DOE inspectors assessed the effectiveness of implementation of these corrective actions and determined the actions taken were resulting in good field engineering and quality control oversight of rebar installations. In addition, independent DOE inspections of a large number of rebar placements confirmed rebar configurations complied with design and engineering specification requirements including welding requirements. (Inspection notes 006-08, 006-09, 006-11, 006-12, 006-14, 006-16, 006-17, 006-19, 006-22, 006-31, 006-33, 006-34, 006-41, 006-43, 006-46, 006-53, 006-54, and 006-58.)

- BNI had taken adequate steps to prepare the site for winter weather. BNI also had adequate concrete procedures, controls, and equipment in place in terms of production, placement, curing, and protection for cold weather concrete. (Inspection notes 006-01 and 006-30.)
- With three exceptions, results of several inspections of temporary electrical installations indicated BNI was conforming to the 2002 National Electric Code (NEC). The exceptions were: 1) two examples of NEC violations associated with temporary power for the Combo Shop which were immediately addressed; 2) an inappropriate splice on grounding electrode conductors associated with the Patriot Fire Protection Fabrication Shop (splices were in the process of being corrected at the end of the inspection period) and; 3) wrong sized grounding conductors on temporary power distribution units at the Switchgear Building 87 (these conductors were replaced with correctly sized conductors). (Inspection notes 006-04, 006-10, 006-15, 006-37, 006-38, 006-56, and 006-57.)
- Portions of the Non-Radioactive Liquid Waste Line, Chilled Water Line, Process Service Water Line, and Demineralization Water line were hydrostatically tested in accordance with the appropriate specification and procedure. (Inspection notes 006-18, 006-32, 006-40, 006-52, and 006-55.)
- The stainless steel liners associated with the Pretreatment Facility (PTF) west PV Pit tank ring and the north and south tunnels were installed in accordance with the design and authorization basis requirements. (Inspection notes 006-05 and 006-44.)
- Structural steel bolting in the LAW was being installed and inspected in accordance with design requirements. (Inspection note 006-13.)
- BNI had adequate specifications and an oversight program of the coating subcontractor to ensure pre-surface preparation, surface preparation, coating application, and inspection and documentation for special coating work was being performed in accordance with applicable codes and standards. (Inspection note 006-23.)
- Rigging, hoisting, and placing large PTF and High Level Waste tanks were conducted in a safe manner in accordance with site procedures and industrial health and safety requirements. (Inspection notes 006-24 and 006-27.)

- Several examples of permanent plant electrical drawings specifying wrong sized conductors were identified. At the time of identification of these deficiencies, the Contractor was in the process of addressing similar issues identified in Inspection Report A-03-AMWTP-RPPWTP-005. Those corrective actions included performing a 100% review of all currently issued electrical drawings. Follow-up of these new items will be tracked as Follow-up Item A-03-AMWTP-RPPWTP-006-A01. (Inspection note 006-28.)
- The Non-radioactive liquid (NLD) tank was being fabricated in accordance with the design requirements. However, some non-essential variables, required by ASME Section IX, Paragraph QW-2000.1, were not addressed in the welding procedures (WPS). The Contractor required the sub-contractor to address all the non-essential variables on their WPSs and resubmit them for approval. Corrective actions to address this item will be tracked as follow up item A-03-AMWTP-RPPWTP-006-A02. (Inspection note 006-29.)
- During a joint review by DOE and BNI, of a portion of the batch plant subcontractor's electrical equipment, to determine compliance with NEC requirements, 16 examples of temporary power NEC violations were identified. BNI was taking actions to have these and any other issues addressed at the batch plant. Follow-up on NEC violations identified at Batch Plant #2 and #1 will be tracked as Inspection Follow-up Item A-03-AMWTP-RPPWTP-006-A03 and A-03-AMWTP-RPPWTP-006-A04, respectively. (Inspection notes 006-35 and 006-36.)
- BNI was meeting the generation requirements for satellite waste accumulation areas. (Inspection note 006-39.)
- The two wash rings associated with waste feed receipt vessel FRP-V-00002A and 2B were fabricated and installed in accordance with the design drawings. (Inspection note 006-42.)
- At the beginning of the vendor inspection program review, BNI provided a summary of actions they were taking to strengthen this program. These actions included adding staff, implementing a new vendor inspection manual, hiring an experienced manager, and emphasizing new management expectations regarding inspection planning, execution, and documentation. DOE determined the actions planned and being implemented should substantially strengthen the vendor inspection program. DOE determined the new vendor inspection program met authorization basis requirements and the vendor inspectors were well qualified. Some weaknesses were identified in the documentation of prior inspections regarding identifying acceptance criteria and drawings or other documents used. Also, reports were not always being issued in a timely manner. The actions discussed above to improve the vendor inspection program should address these weaknesses. (Inspection note 006-47.)
- During the vendor inspection program review, DOE identified three examples of a Finding for failure to have or follow procedures regarding: a) procuring and installing structural steel bolting material from vendors who did not obtain them from an NQA-1

qualified supplier; (b) failure of engineering specifications to properly specify acceptance criteria for minimum and maximum acceptable values of A490 and A325 bolt hardness; and (c) accepting testing in vendor inspection reports that did not meet the stated acceptance criteria. BNI issued a nonconformance report and was taking actions to address these issues. Follow-up for these examples of a Finding will be tracked as Finding A-03-AMWTP-RPPWTP-006-F05. (Inspection Note 006-47.)

- BNI conducted a thorough review of a 36" diameter iron pipe cap that failed during hydrostatic testing. The result of a failure analysis, being conducted by the cap supplier on the cap, was pending. (Inspection note 006-59.)
- BNI was formulating corrective actions to address a snow plow incident where power lines were damaged. (Inspection note 006-60.)

- List of Assessment Items Opened, Closed, and Discussed

Opened

A-03-AMWTP-RPPWTP-006-A01	Assessment Follow-up Item	Follow-up on Contractor actions to resolve electrical issue regarding switchgear building design drawings calling out undersized equipment grounding conductors (not sized correctly per NEC.) (Inspection note 006-28.)
A-03-AMWTP-RPPWTP-006-A02	Assessment Follow-up Item	Follow-up on Contractor actions to resolve NLD tank fabricator welding procedures not addressing some non required essential variables. (Inspection note 006-29.)
A-03-AMWTP-RPPWTP-006-A03	Assessment Follow-up Item	Follow-up on Contractor actions to resolve Batch Plant #2 temporary power NEC violations. (Inspection note 006-35.)
A-03-AMWTP-RPPWTP-006-A04	Assessment Follow-up Item	Follow-up on Contractor actions to resolve Batch Plant #1 temporary power NEC violations. (Inspection note 006-36.)
A-03-AMWTP-RPPWTP-006-F05	Finding	Three examples of a Finding regarding failure to have or follow procedures when procuring structural steel bolting material. (Inspection note 006-47.)

Closed

A-03-AMWTP-RPPWTP-002-A04	Assessment Follow-up Item	Follow-up on Contractor actions to address Tower Crane Elevator Electrical Issues. (Inspection note 006-20.)
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 006-45.)
A-03-AMWTP-RPPWTP-003-A02	Assessment Follow-up Item	Follow-up on Contractor actions to address CB&I NEC violations at the north center site of the PTF. (Inspection note 006-49.)

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 notes 006-02 and 006-51.)
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 notes 006-07 and 006-50.)
A-03-AMWTP-RPPWTP-004-A01	Assessment Follow-up Item	Follow-up on Contractor actions to resolve an NEC violation regarding CB&I mobile office service conductors passing under the structure. (Inspection note 006-25.)
A-03-AMWTP-RPPWTP-004-A02	Assessment Follow-up Item	Follow-up on Contractor actions to address an NEC violation regarding not having a disconnect within 30' of the Apollo mobile office. (Inspection note 006-26.)
A-03-AMWTP-RPPWTP-005-A01	Assessment Follow-up Item	Follow-up on Contractor actions to resolve NEC issues regarding the need for ground fault and lock-out protection on breakers associated with O&E shop tank heaters. (Inspection notes 006-03 and 006-48.)
A-03-AMWTP-RPPWTP-005-A03	Assessment Follow-up Item	Follow-up on Contractor actions to resolve issue with Simulator Building nonmetallic conduit rising above the floor (contrary to specification). (Inspection note 006-21.)

Partial Closure

A-03-OSR-RPPWTP-006-A07	Assessment Follow-up Item	Follow-up on Contractor's actions to resolve NEC noncompliance associated with the site electrical distribution duct bank (Items A07c and d). (Inspection note 006-6.)
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