



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-WTP-162

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-04-AMWTP-RPPWTP-002 – ON-LOCATION INSPECTION REPORT FOR THE PERIOD APRIL 16, 2004, THROUGH JUNE 30, 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 April 16, 2004, through June 30, 2004. Two Findings were identified. The first was associated with a National Electric Code (NEC) error on a permanent plant design drawing, and the second was due to the failure of the materials testing subcontractor to record initial concrete cure temperatures as required by ASTM Standard C-31-00. You are requested to respond to the Findings as instructed in the Notice of Finding, Enclosure 1.

Construction performance was generally good during this inspection period. For example, rebar installations, concrete production and placements, and preparation for installation of the Waste Feed Receipt Vessels were performed well during this period. However, based on the quality issues identified during an initial program review of your Heating, Ventilation, and Air Conditioning site erector, additional BNI management attention is warranted to ensure new subcontractors, who mobilize to the WTP, have effective quality assurance programs commensurate with the work they are directed to perform. 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

WTP:JWM

Enclosures (2)

cc w/encls:
R. Davis, BNI

NOTICE OF FINDING

Section C, 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.

Section C, subsection C7(f), *Application of National Design Codes and Standards*, require the Contractor to design and construct the Waste Treatment and Immobilization Plant (WTP) in accordance with the National Electric Code (NEC).

Standard 7, Section (d) of the Contract requires the Contractor to develop and implement an integrated, standards-based, safety management program to ensure radiological, nuclear, and process safety requirements are defined, implemented, and maintained. The Contractor is required to conduct work in accordance with the Contractor-developed and DOE-approved Safety Requirements Document (SRD).

During the performance of an inspection of the Contractor's construction of the WTP, from April 15 through June 30, 2004, at the WTP construction site, the following deficiencies were identified:

1. NEC Article 240-21(c) permits transformer secondary conductors to be connected to a transformer secondary without overcurrent protection at the secondary, as specified in (1) through (4) below:
 - (1) Protection by Primary Overcurrent Device;
 - (2) Transformer Secondary Conductors Not Over 10 ft. Long;
 - (3) Secondary Conductors Not Over 25 ft. Long; and
 - (4) Outside Secondary Conductors.

Contrary to the above, design drawing 24590-B87-E2-E53T-00002, *Switchgear Building 87 Above Ground Raceway Plan*, Revision 1, dated May 10, 2004, specified the secondary conductors from transformers MVE-XFMR-87031A and MVE-XFMR-87031B to 480-volt distribution panels LVE-PNL-87001A and LVE-PNL-87001B (600 amp main breaker) will exceed the 25-foot maximum tap rule required by Article 240-21 of the NEC.

Failure to reflect in design drawings applicable NEC requirements is considered a Finding against Section C, subsection C7(f) of the BNI Contract (A-04-AMWTP-RPPWTP-002-F03.)

2. SRD, Safety Criterion 4.1-2 specifies important-to-safety concrete be produced and installed in accordance with ACI 349-97, *Code Requirements for Nuclear Safety-Related Concrete Structures*. ACI 349-97 specifies ASTM Standard C-31-00, *Standard Practice for Making and Curing Concrete Test Specimens in the Field*, Year 2000. ASTM Standard C-31-00, paragraph 10.1.2 *Initial Curing*, states “Record the temperature using a maximum-minimum thermometer” (for the initial curing period [up to 48 hours].)

Contrary to the above, the material testing subcontractor was not recording initial cure temperatures as required by ASTM Standard C-31-00. This is considered a Finding for failure to comply with SRD, Safety Criterion 4.1-2 (Finding A-04-AMWTP-RPPWTP-002-F04.)

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 Findings above. The reply should include: (1) admission or denial of the Findings; (2) the reason for the Findings, 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 April 16, 2004, through
June 30, 2004

REPORT NO.: A-04-AMWTP-RPPWTP-002

FACILITY: Bechtel National, Inc. (BNI)

LOCATION: 2435 Stevens Center
Richland, Washington 99352

DATES: April 16, 2004, through June 30, 2004

INSPECTORS: J. McCormick-Barger, Construction Inspection Lead
J. Bruggeman, ORP Facility Representative
S. Pfaff, ORP Facility Representative
B. Harkins, ORP Facility Representative
M. Evarts, Team Member
T. Finucane, Team Member
D. Wallace, Team Member
R. Taylor, Team Member

APPROVED BY: M. Thomas, Operations and Commissioning Team Leader
Waste Treatment and Immobilization Plant Project

INSPECTION REPORT

Introduction

During the period April 16, 2004, through June 30, 2004, the U.S. Department of Energy, (DOE), Office of River Protection (ORP), Waste Treatment and Immobilization Plant (WTP) Project conducted inspections of important-to-safety (ITS) and non-ITS (Balance-of-Plant) activities of the construction of the WTP. These inspections were documented on inspection notes and maintained electronically. There were 64 inspections of various construction activities summarized below. Copies of the inspection notes are available upon request.

Significant Observations and Conclusion

- Pretreatment Facility fire prevention and protection provisions were being adequately implemented. Two site-wide issues requiring follow-up were identified. Some flammable material cabinets had vent plugs installed and some did not. The cabinet manufacturer and National Fire Protection Association (NFPA) recommend the plugs be installed unless a ventilation system is installed. Follow-up of this issue will be tracked as assessment follow-up item A-04-AMWTP-RPPWTP-002-A01. During fueling activities, the site fuel truck was not bonded to the item being fueled. NFPA 77 Chapter 7 and NFPA 385 Chapter 6 indicate bonding may be required. Follow-up of this issue will be tracked as assessment follow-up item A-04-AMWTP-RPPWTP-002-A02. (Inspection note 002-17.)
- Design drawing 24590-B87-E2-E53T-00002, *Switchgear Building 87 Above Ground Raceway Plan*, Revision 1, dated May 10, 2004, specified the secondary conductors from transformers MVE-XFMR-87031A and MVE-XFMR-87031B to 480-volt distribution panels LVE-PNL-87001A and LVE-PNL-87001B (600 amp main breaker) will exceed the 25-foot maximum tap rule required by Article 240-21 of the NEC. Failure to reflect in design drawings applicable National Electric Code (NEC) requirements is considered a Finding (A-04-AMWTP-RPPWTP-002-F03). (Inspection note 002-27.)
- In addition to the Finding described above, the following NEC issues were identified during inspection of temporary and permanent electrical installations:
 - For the Switchgear Building 91: (1) The 200 amp disconnect equipment grounding conductor was not connected to the grounding electrode; (2) a grounding electrode conductor was connected to the equipment-grounding conductor in a junction box rather than the grounding electrode; and (3) #6 AWG tap conductors installed did not meet the one-third ampacity rating required in Article 24021(B)(2).
 - For the High Level Waste (HLW): Two existing temporary 25 KVA mini power centers were not grounded properly.

- For the Low Activity Waste (LAW): (1) Five grounding conductors were improperly installed -- one on the temporary power general distribution rack (GDR)-021, one on a new 100 amp panelboard, two on PDR-031, and one on the 25KVA mini load center associated with GDR-004; and (2) BNI installed the wrong sized cord on a 30 amp breaker.
- At the Simulator Building: (1) A bonding jumper was not installed as required; (2) an uninterruptible power supply (UPS) by-pass switch was not installed as required by its listing; and (3) transformer secondary conductors routed from the transformer to a panel exceeded the 25' maximum length.
- For Cooling Tower Building 83: Lightning protection was missing one required down conductor.

All but one of the exceptions were corrected in a timely manner; the Simulator Building UPS bypass switch correction will be tracked to closure by assessment follow-up item A-04-AMWTP-RPPWTP-002-A05. (Inspection notes 002-03, 002-04, 002-08, 002-10, 002-18, 002-19, 002-21, 002-23, 002-31, 002-35, 002-40, 002-46, 002-48, and 002-53.)

- The material testing subcontractor was not recording initial cure temperatures required by American Society of Testing and Materials (ASTM) Standard C-31-00, *Standard Practice for Making and Curing Concrete Specimens in the Field*, Year 2002. This is considered a Finding for failure to comply with ASTM Standard C-31-00, required by ACI 349 specified in Safety Requirements Document (SRD), Safety Criterion 4.1-2 (Finding A-04-AMWTP-RPPWTP-002-F04). (Inspection note 002-42.)
- ORP conducted observations of BNI Field Engineering and Quality Control staff inspections of rebar placements and performed independent inspections of a number of rebar placements confirming rebar configurations complied with design and engineering specification requirements including welding requirements. In addition, ORP observed the placement and testing of concrete and determined concrete was being batched, placed, consolidated, tested, and monitored in accordance with engineering specifications, procedures, and Safety Requirement Document requirements. No deficiencies were identified. (Inspection notes 002-01, 002-06, 002-14, 002-15, 002-26, 002-38, and 002-51.)
- BNI implemented adequate concrete procedures, controls, and equipment to ensure concrete placed during hot weather will have sufficient strength and durability to satisfy intended service requirements. (Inspection note 002-13.)
- As the subcontractor was completing construction of the Simulator Building, ORP conducted a number of inspections of the facility and observed testing activities to ensure the facility was being built in accordance with design requirements, engineering specifications, and NEC and NFPA requirements. With the exception of the electrical

issues described above, no deficiencies were identified. (Inspection notes 002-02 and 002-59.)

- Four of the 12 corrective actions associated with Non-compliance Tracking System (NTS) report 2003-0003, “Concrete Works Issues,” were completed and reviewed by ORP. The remaining corrective actions will be completed and reviewed during the next inspection period. (Inspection notes 002-11 and 002-50.)
- BNI and Chicago Bridge and Iron (CB&I) had detailed confined space entry procedures which provided effective confined space entry controls. Also, site confined space training was adequate for the current construction activities. Observations of permit-required and non-permit required confined space entries indicated satisfactory compliance to procedures. However, several instances of incomplete documentation associated with entries were identified. These instances were discussed with BNI and CB&I project personnel who committed to improve confined space entry documentation. (Inspection notes 002-12, and 002-34.)
- BNI’s performance objectives, measures, and comments program was well-structured with appropriate depth and breadth of scope. (Inspection note 002-05.)
- With one exception, BNI was installing attachments, structural steel, and hangers in the Pretreatment (PT) Facility in accordance with engineering specifications and construction procedures. In two cases, hanger clamps were being installed without first removing primer paint from the structural steel or the galvanized hanger clamp prior to welding. BNI took prompt action to address this issue. The design included installing stainless steel pipe in direct contact with a structural steel beam (with only a primer coat of paint between them). This issue was discussed with the DOE ORP Director of Engineering, who agreed to discuss this issue with the Contractor. Follow-up of this issue will be tracked as Technical Oversight of Black Cell Design Adequacy Open Item # 10, CARS Task Item 6763 Subtask 8 (BNI RITS # 24590-WTP-RITS-QAIS-04-201). (Inspection notes 002-07, 002-09, 002-32 and 002-58.)
- BNI purchased, welded, and inspected piping in the south tunnel of the PT Facility building and northeast corner of the LAW building in accordance with the applicable engineering specifications, procedures, and regulatory requirements. In addition, BNI’s first automatic field weld of piping at the PT Facility south tunnel was in accordance with site procedures and ASME B31.3. (Inspection notes 002-24, 002-56, 002-61 and 002-63.)
- BNI’s air monitoring program met industrial health and safety requirements and was being implemented in accordance with program procedures and requirements. (Inspection note 002-16.)
- CB&I welded and cleaned the interior and exterior of the Waste Feed Receipt Vessels, in accordance with the applicable engineering specifications and approved design drawings.

(Inspection notes 002-20, 002-25, 002-33 and 002-44.)

- BNI adequately prepared, transported, and placed the skirt rings for the LAW vitrification feed receipt vessels located in the PT Facility in a safe manner in accordance with the applicable requirements. (Inspection note 002-41.)
- BNI adequately performed and documented crane testing for the Demag CC2800 in preparation for eventual placement of the Waste Feed Receipt Vessels in the PT Facility. (Inspection note 002-22.)
- Hydrostatic testing of portions of the underground 3” Process Service Water line, 6” Demineralized Water line, 3” Non-Radioactive Liquid Waste line, and 8” and 12” Firewater Service lines, and Building 87 and 91 sprinkler systems was conducted in accordance with the appropriate specification and procedure. (Inspection notes 002-28, 002-29, 002-37, 002-39, 002-45, 002-54, 002-55 and 002-64.)
- From a detailed program review of installation of important-to-safety (ITS) and balance-of-plant (BOP) heating, ventilation, and air conditioning (HVAC) duct and duct supports, a number of issues were identified with subcontractor quality assurance procedures and performance requiring action by BNI and the subcontractor to address. These issues included calibration and deficiency report records not being stored as quality records; failure to address lost or damaged calibration equipment in procedures; failure of the measuring and test equipment (M&TE) log to include specific information regarding the components M&TE affected; failure of receiving inspection procedures to specifically require quality assurance inspectors to inspect ITS material; failure of procedures to address the full scope of potential suspect/counterfeit material; failure to record monthly weld rod oven temperatures; inadequate documentation regarding maintenance of welder qualifications, and American Society for Nondestructive Testing (ASNT) Level III involvement in certification of non-destructive examination (NDE) testing personnel and NDE procedure approval; nonconforming items or activities procedures inappropriately allowing immediate repair of nonconforming items without generating a deficiency report; and failure of procedures to specify who is to record or verify material heat numbers on installation records.

Because HVAC installations had only just begun and were limited to BOP components, these issues were generally programmatic and easily remedied. BNI and the subcontractor took immediate action to address these issues. Although BNI had performed assessments of the subcontractor’s offsite fabrication work, an onsite assessment of HVAC installation work had not yet been performed. BNI needs to be more proactive in overseeing new subcontractors prior to or just after mobilization to the WTP site to ensure construction activities conform to Contract and Authorization Basis requirements to preclude potential costly rework and schedule delays. (Inspection note 002-30.)

- The respiratory protection programs used by BNI, CB&I, and F. D. Thomas were effective in protecting workers from exposures above the limits for toxic vapors and particulates. (Inspection note 002-36.)
- BNI Industrial Hygiene team was well trained and capable of using the available passive ambient air analyses systems in the pursuit of worker protection. (Inspection note 002-49.)
- Examples of workers not wearing hearing protection when using circular saws were identified and discussed with site safety personnel. BNI took action to discuss with workers the need to wear hearing protection when noise levels from tools or equipment cause difficulty in voice communications between two individuals at a distance of 3 feet. (Inspection note 002-52.)
- Based on a detailed independent “fresh-eyes” Industrial Health and Safety program review, BNI’s safety program was determined to comply with 29 CFR 1926 requirements. (Inspection note 002-57.)
- BNI Lockout/Tagout program was being satisfactorily implemented across the construction site with a few exceptions. The procedure was straightforward, log books of active lockout/tagouts were in good order, and it was easy to determine from training records which workers were trained on the process. Some lock-out devices were not installed correctly. Also, surveillance of the lockout/tagout program did not include field observation of all active lockouts/tagouts. (Inspection note 002-62.)

List of Assessment Items Opened, Closed, and Discussed

Opened

A-04-AMWTP-RPPWTP-002-A01	Assessment Follow-up Item	Follow-up on Contractor actions to address vent plug configuration in flammable material cabinets. (Inspection note 002-17.)
A-04-AMWTP-RPPWTP-002-A02	Assessment Follow-up Item	Follow-up on Contractor actions to address bonding of fueling trucks to items being fueled. (Inspection note 002-17.)
A-04-AMWTP-RPPWTP-002-F03	Finding	Follow-up on Contractor actions to address Switchgear Building 87 design drawings that result in secondary conductors of panel LVE-PNL-87001B and possibly LVE-PNL-87001A exceeding the NEC 25' maximum length requirement. (Inspection note 002-27.)
A-04-AMWTP-RPPWTP-002-F04	Finding	Follow-up on Contractor actions to address QISI not recording initial cure temperatures as required by ACI 349/ASTM C-31-00 (SRD Criterion 4.1-2). (Inspection note 002-42.)
A-04-AMWTP-RPPWTP-002-A05	Assessment Follow-up Item	Follow-up on Contractor actions to address Simulator Building UPS bypass switch not being installed per listing. (Inspection note 002-31.)

Closed

A-03-OSR-RPPWTP-006-A07	Assessment Follow-up Item	Follow-up on Contractor efforts to resolve NEC noncompliances associated with the Site Electrical Distribution Duct Bank. (Inspection note 002-47.)
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 002-43.)

A-04-AMWTP-RPPWTP-001-A04	Assessment Follow-up Item	Follow-up on Contractor actions to address concerns with installation of temporary concrete anchors. (Inspection note 002-60.)
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Discussed

None