



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

04-WTP-070

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-001 – ON-LOCATION INSPECTION REPORT FOR THE PERIOD JANUARY 9, 2004, THROUGH APRIL 15, 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 for the period January 9, 2004, through April 15, 2004. Two Findings were identified associated with the implementation of the suspect counterfeit item program and National Electric Code (NEC) errors on permanent plant design drawings. 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. BNI's construction management assessment program was well implemented and the actions taken to improve your subcontractor oversight program were noteworthy. Rework to address quality problems with the High Level Waste Submerged Bed Scrubber Condensate Receiver Vessel has been comprehensive. Nearly all construction activities observed during the inspection period were performed in accordance with your procedures, specifications, and authorization bases requirements. Permanent plant electrical drawing compliance with NEC requirements has been a recurring issue that requires management attention early on to preclude bigger problems as permanent plant electrical work at the site progresses. 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/encl:
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.

Standard 7, Section (e)(1)(ii) of the Contract required the Contractor to conform to the DOE regulatory program described in ORP M 440.1-2, *Industrial Health and Safety Oversight Plan for the Waste Treatment Plant Contractor*.

ORP M 440.1-2, Section 19 requires the Contractor to implement S/CI controls as part of the Contractor's Quality Assurance Program to the extent commensurate with the risks posed by the facility and ensure that the controls contribute to a hazard-free workplace."

Section C, subsection C7(f), *Application on 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.

During the performance of an inspection of the Contractor's construction of the WTP, from January 9 through April 15, 2004, at the WTP construction site, the following deficiencies were identified:

- 1.a. ORP M 440.1-2, Section 19a states "Management systems shall include: ... (2) Mechanisms to continually update information on S/CIs and associated suppliers; ... and (5) Maintaining current, accurate information on S/CIs and associated suppliers using all available sources and disseminating relevant information on S/CIs to field organizations and contractors."

Contrary to the above, the process for handling S/CI alerts and notices was undefined and ineffective. BNI's S/CI list was not up-to-date when compared to the DOE S/CI web site. BNI procedures did not define a process to ensure affected BNI personnel (Field Engineers, Buyers, QC Inspectors, etc.) or subcontractors received timely notifications of S/CI alerts/notices. An electrical supplier subcontractor's S/CI list had not been updated since it was submitted as part of their QA manual submittal in September 2003. Furthermore, the S/CI list submitted as part of their QA manual was not up-to-date when it was submitted (July 31, 2003), but was more or less a reiteration of the *Suspect/Counterfeit Items identified at DOE Facilities* document that was published in January 2001.

Personnel conducting receipt inspections of materials used at the WTP, did not know of a list of known S/CI parts. Some personnel indicated they used out-of-date S/CI training material as a referenced list of S/CI Parts. There was no

process available for personnel to keep their training materials up-to-date. No personnel conducting receipt inspections were found to be using a list of known S/CI parts.

Failure to define and implement a process for handling S/CI alerts and notices is considered an example of a Finding against the Contract requirement to implement ORP M 440.1-2, Section 19 (A-04-AMWTP-RPPWTP-001-F01a.)

- 1.b. ORP M 440.1-2, Section 19 states “Implement S/CI controls as part of the Contractor’s Quality Assurance Program to the extent commensurate with the risks posed by the facility and ensure that the controls contribute to a hazard-free workplace.” Section 19a states “Management systems shall include: ...(4) Identification and disposition of S/CIs in safety systems and applications that create potential hazards (safety systems are those systems, components, or structures whose failure could adversely affect the environment, safety, or health of the public or the health or safety of workers)”

Contrary to the above, BNI procedures did not require the inspection of construction safety equipment (fall harness, lifts, hoists, fork lifts, etc.). Although the DOE S/CI web site contained 8 S/CI bulletins which dealt with equipment that could affect personnel safety including man lifts and fork lifts, none of these S/CIs were on the BNI S/CI list.

Failure to include safety equipment in BNI’s S/CI program is considered an example of a Finding against the Contract requirement to implement ORP M 440.1-2, Section 19 (A-04-AMWTP-RPPWTP-001-F01b.)

- 1.c. ORP M 440.1-2, Section 19a states “Management systems shall include: ...(3) Control of the introduction and use of S/CIs through design, procurement, and inspection/maintenance.”

Contrary to the above, an electrical supplier subcontractor’s BNI approved QC manual (24590-CM-POA-E000-00003-01-22, Rev. 00A) required inspection of only important-to-safety (ITS) items to verify they did not “exhibit indications attributed to potential suspect/counterfeit items.”

The failure to require or perform inspections on non-ITS permanent plant items is considered an example of a Finding against the Contract requirement to implement ORP M 440.1-2, Section 19 (A-04-AMWTP-RPPWTP-001-F01c.)

- 1.d. ORP M 440.1-2, Section 19a states “Management systems shall include: ...(3) Control of the introduction and use of S/CIs through design, procurement, and inspection/maintenance.”

Contrary to the above, several Material Receiving Instructions (MRIs) (both ITS and non-ITS items) were found by the inspector with no receiving inspection requirements for S/CI parts. Although section 3.7 of the BNI procedure (24590-WTP-GPP-CON-7110, Rev 1, *Material Receiving Instruction*) tasks field engineering with preparing the MRI/MAP including deciding the item inspection attributes, no instruction was given to field engineering on deciding which items require S/CI inspection and which items can skip the inspection. For example, the procedure did not require the field engineer to verify the item was not identified on the list of known S/CI parts as a criterion for not requiring an S/CI inspection.

Failure to consistently implement S/CI inspections of permanent plant items is considered an example of a Finding against the Contract requirement to implement ORP M 440.1-2, Section 19 (A-04-AMWTP-RPPWTP-001-F01d.)

The four examples described above collectively are considered a Finding for failure to adequately implement the S/CI controls required by ORP M 440.1-2, *Industrial Health and Safety Oversight Plan for the Waste Treatment Plant Contractor* (A-04-AMWTP-RPPWTP-001-F01.)

2. NEC Article 250-96 requires metal raceways, cable trays, enclosures, frames, fittings, and other metal non-current-carrying parts that are to serve as grounding conductors, with or without the use of supplementary equipment grounding conductors, to be effectively bonded where necessary to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them. Article 250-102(d) requires the equipment bonding jumper on the load side of the service overcurrent devices to be sized in accordance with the sizes listed in Table 250-122.

Contrary to the above, drawing 24590-WTP-E0-GRE-00002, Detail G10 required a 2/0 AWG copper ground cable for 3" and larger conduit. 2/0 bonding jumpers were partially installed on the above conduits. 250 kcmil bonding jumpers are required by the Table 250-122 based off the 2000-amp overcurrent protection device specified for conductors associated with the conduit.

Failure to implement the NEC code requirements in design drawings is considered a Finding against Section C, subsection C7(f) of the BNI Contract (A-04-AMWTP-001-F02.)

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 January 9, 2004 through
April 15, 2004

REPORT NO.: A-04-AMWTP-RPPWTP-001

FACILITY: Bechtel National, Inc. (BNI)

LOCATION: 2435 Stevens Center
Richland, Washington 99352

DATES: January 9, 2004, through April 15, 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
J. Mohatt, Team Member
D. Wallace, Team Member

APPROVED BY: M. Thomas, Operations and Commissioning Team Leader
Office of Waste Treatment and Immobilization Plant (WTP)

INSPECTION REPORT

Introduction

During the period January 9, 2004, through April 15, 2004, the U.S. Department of Energy, (DOE), Office of River Protection (ORP), Office of Waste Treatment and Immobilization Plant (WTP) 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 96 inspections of various construction activities summarized below. Copies of the inspection notes are available upon request.

Significant Observations and Conclusion

- A Finding was identified as a result of a review of Bechtel National Inc.'s (BNI) Suspect Counterfeit Item (S/CI) program. The Finding (A-04-AMWTP-RPPWTP-001-F01) concerned four examples of failure to adequately implement the S/CI controls required by ORP M 440.1-2, *Industrial Health and Safety Oversight Plan for the Waste Treatment Plant Contractor*, specifically (a) the process for handling S/CI alerts and notices was undefined and ineffective; (b) safety equipment used in construction was not required to receive an S/CI inspection; (c) a subcontractor was not required to perform inspections on non-ITS permanent plant items; and (d) permanent plant items were not consistently receiving S/CI inspections. (Inspection note 001-53.)
- ORP conducted both observations of BNI Quality Control final inspections of rebar placements and performed independent inspections of a large number of rebar placements confirming rebar configurations complied with design and engineering specification requirements including welding requirements. Two minor exceptions were identified regarding the configuration of the Steam Plant Facility basemat prior to concrete placement. These issues (rebar configuration underneath a water trench, and clearance around a firewater pipe riser) were corrected prior to placing concrete. (Inspection notes 001-06, 001-09, 001-18, 001-20, 001-25, 001-27, 001-31, 001-34, 001-50, 001-51, 001-65, 001-75, 001-83, 001-84, 001-85, and 001-95.)
- Electrical drawing 24590-WTP-E0-GRE-00002, detail G10 specified the wrong sized grounding cable (2/0AWG copper) for 3" and larger conduit. The cable should have been 250 kcmil based on the 2000-amp overcurrent protection device specified for the conductors associated with the conduit. This is a noncompliance with National Electric Code (NEC) Table 250-122. This is the third incident of permanent plant design drawings containing NEC noncompliance concerns (see inspection notes A-03-AMWTP-RPPWTP-005-14 and A-03-AMWTP-RPPWTP-006-28 for additional examples.) Failure to comply with NEC requirements is considered a Finding (A-04-AMWTP-RPPWTP-001-F02). (Inspection note 001-80.)
- With some exceptions and the Finding described above concerning design drawings, results of inspections of temporary and permanent electrical installations indicated BNI

and its subcontractors were conforming to the 2002 NEC. Exceptions included examples of emergency illumination not being fed off the same branch circuits as normal lighting circuits, failure to bond equipment grounding conductors to a metal enclosure in a wireway, failure to install a grounding bushing on a 480-volt liquid tight metal conduit installed in a concentric knockout at a mini load center, failure to install a bonding jumper from the grounded conductor to the equipment grounding conductors and to the grounding electrode, failure to install a grounding electrode at a subcontractor temporary power transformer or panelboard and failure to install a main breaker at the panelboard, two examples of failure to install the correct sized grounding conductor, and failure to adequately ground the mini power center #10 for temporary power at the southwest corner of the Pretreatment (PT) Facility. The exceptions were corrected in a timely manner. (Inspection notes 001-02, 001-03, 001-07, 001-14, 001-15, 001-16, 001-24, 001-30, 001-32, 001-39, 001-43, 001-44, 001-63, 001-68, 001-69, 001-71, 001-72, 001-73, 001-74, and 001-91.)

- BNI took appropriate corrective actions to a rigging event where a beam slipped through a choker falling to the ground. (Inspection note 001-04.)
- BNI had purchased, welded, inspected, and performed non-destructive examination on piping in the north tunnel of the PT building in accordance with established requirements. (Inspection note 001-08.)
- Early in the assessment period, BNI did not provide adequate documentation of their oversight of subcontractor work. Inconsistencies were evident between oversight of the construction of Switchgear Building 87 and the fabrication of the Raw Water Storage and non-radioactive liquid drain (NLD) tanks. Also, the Building 87 subcontractor's practice of having its onsite supervisor for electrical work inspect electrical work performed by him or his subordinates was inconsistent with BNI Quality Assurance Manual (QAM) requirements for an independent inspector to perform the inspections. Later in the assessment period, BNI provided appropriate guidance to the Subcontract Coordinators/Subject Matter Experts regarding surveillance/documentation of subcontracted work and subsequent documentation indicated the guidance was adequate. BNI rejected Building 87 electrical inspections and required the inspections be re-performed utilizing an independent inspector. (Inspection notes 001-12 and 001-46.)
- BNI took appropriate corrective actions to address an electrical shock received by an iron worker due to a mis-wired 480 volt electrical heater near the PT Facility. These actions included developing and implementing a complete assured grounding program that included inspection of 480 volt cord sets. The assured grounding program was adequately implemented. (Inspection notes 001-19 and 001-37.)
- Pressure tests of portions of the underground Potable Water System in area 26 and the incoming riser pipe to the Steam Plant Building; 12" underground Firewater System in area 25, 26, and 29; Plant Cooling Water Supply Lines located east and northeast of the PT Facility; portions of the 2", 3", and 6" Non-Radioactive Liquid Waste pipe risers to the

Steam Plant and/or NLD tank; 2” Plant Service Air risers to the Steam Plant and Cooling Tower Support Building; 4” Plant Service Air line from the Cooling Tower to the Fuel Oil Pumphouse; 24” Plant Service Air from the 24” blind at the Compressor/Chiller Plant tie-in to a 24” weld, 2” diesel fuel oil line riser at the Steam Plant; the Low Activity Waste (LAW) LCP concentrate feed from the PT Facility (just inside the LAW facility); a portion of the 8” underground Raw Water System; the RLD return line to PT Facility (also just inside the LAW facility); and domestic water risers for the Firewater Pumphouse were conducted in accordance with the appropriate specification and procedure. (Inspection notes 001-21, 001-28, 001-36, 001-40, 001-47, 001-52, 001-54, 001-55, 001-56, 001-57, 001-58, 001-59, 001-60, 001-61, 001-81, 001-89, and 001-93.)

- BNI conducted dry-barrel hydrant testing of two fire hydrants in accordance with the applicable engineering specification and NFPA requirements. (Inspection note 001-90.)
- The Waste Treatment Plant Independent Qualified Registered Professional Engineer (IQRPE) was conducting the necessary surveillances required by the Washington Administrative Code. However, several issues were identified regarding the documentation of the qualifications of the IQRPE inspectors. BNI wrote a Corrective Action Request to require the IQRPE to document inspector qualifications. (Inspection note 001-22.)
- Based on a pipe installation program review, BNI was installing piping at the LAW, PTF, and Balance of Facilities areas in accordance with applicable codes and specifications, procedures, and design drawings. (Inspection note 001-23.)
- BNI had installed and inspected the flexible liner and cathodic protection system for the Fuel Oil Tank in accordance with the design drawings and applicable Special Instructions. (Inspection notes 001-26 and 001-33.)
- Liner plates for the PT Facility High Level Waste (HLW) Drain Vessel Pit (Room P-B002) were being installed in accordance with the applicable design drawings and engineering specification. (Inspection note 001-29.)
- Several issues were identified with two subcontractor Industrial Health and Safety Plans. For example, neither of the subcontractors specified the American Governmental Industrial Hygiene Threshold Values for all required cases nor did they cite the standing site rule (exclusive of any other value) of 6’ vertical distance for fall protection. For lock and tag control they cited 29 CFR 1926 which was not relevant when compared to the controls and rigor required by BNI’s Health and Safety Plan. Also, the site emergency plan was not referenced. BNI was working with the subcontractors to guide them through the required site rules that differ from typical commercial construction sites. (Inspection note 001-35.)
- BNI’s confined space entry plan for the inspection of the HLW Submerged Bed Scrubber Receiver Vessel was in conformance with BNI’s procedures and DOE approved health

and safety plan. (Inspection note 001-35.)

- Cooling Tower support columns and structural framing were installed in accordance with the applicable design drawings. Louver fill and casing installation inspections identified some quality issues with damaged filler sheets and missed casing screws. BNI was notified and was addressing work quality with the subcontractor. (Inspection notes 001-38, 001-76, and 001-87.)
- The construction management assessment program was well-structured with appropriate depth and breadth of assessment scopes. Planned assessments were started by the scheduled month and additional assessments were performed to respond to emerging issues. Necessary corrective actions were entered into the Recommendation Issue Tracking System and tracked to completion. (Inspection note 001-41.)
- The Waste Receipt Vessel fabrication subcontractor was welding vessel nozzles in accordance with the appropriate design drawing and welding code. (Inspection note 001-42.)
- BNI was installing HLW structural steel in accordance with design requirements and welding specifications. (Inspection note 001-45.)
- BNI had implemented an effective Hazardous Communication Program at the WTP that complied with the requirements of 29 CFR 1910.1200. (Inspection note 001-64.)
- BNI performed adequate flushing activities for several fire hydrants and lines during the inspection period in accordance with engineering specifications. (Inspection notes 001-66 and 001-67.)
- BNI construction developed and implemented new controls to ensure design documents used in the field were in accordance with project document control procedures and requirements. Sampling of in progress work activities confirmed these controls were addressing previously identified weaknesses in this area. (Inspection note 001-78.)
- BNI installed and inspected the LAW Bogie Maintenance Shield Doors in accordance with the design drawings and Special Instructions. (Inspection note 001-82.)
- Repair of the HLW SBS Condensate Receiver Vessel was underway during the inspection period. Inspection of exterior repairs indicated the repairs complied with design and ASME code requirements. (Inspection note 001-86.)
- Concerns with BNI's plastic pipe bonding and bonder qualification specifications regarding specified test pressures for bonder qualifications were addressed by BNI during a revision to the specifications. (Inspection note 001-88.)

- With one potential exception, the subcontractor responsible for purchasing and installing LAW firewater sprinkler piping was performing these functions in accordance with NFPA code and design requirements. The one exception regarded a concern with the proper marking of welder identification on shop welded firewater piping. This concern was discussed with the Contractor and staff were researching the requirements and assessing the issue. This item will be tracked as assessment follow-up item A-04-AMWTP-RPPWTP-001-A03. (Inspection note 001-92.)
- BNI had been installing temporary anchor bolts without an approved procedure until March 31, 2004. Following approval of the procedure, construction staff was inappropriately installing temporary anchor bolts outside the requirements of the procedure. BNI QA staff identified the discrepancies and was taking actions to document and address them. Follow-up on BNI's efforts to address concerns with the installation of temporary concrete anchors will be tracked as inspection follow-up item A-04-AMWTP-RPPWTP-001-A04. (Inspection note 001-94.)
- Preliminary layout of lift points, rigging, flight plan, and conveyance and load charts for the PT Facility Feed Receipt Vessel lifts were appropriate for the present stage of planning. (Inspection note 001-96.)
- BNI's mask station was found to be in compliance with applicable DOE requirements. Zinc baseline exposure testing was in compliance with the applicable breathing air standards; however, the standard recently changed and the previously testing results would have exceeded the current Time Weighted Average (TWA) standard for zinc (2 PPMV). BNI intends to do additional testing for zinc to ensure baseline sampling meets the current standard. (Inspection note 001-96.)

List of Assessment Items Opened, Closed, and Discussed

Opened

A-04-AMWTP-RPPWTP-001-F01	Finding	Follow-up on Contractor actions to address Suspect Counterfeit Item Program implementation issues. (Inspection note 001-53.)
A-04-AMWTP-RPPWTP-001-F02	Finding	Follow-up on Contractor actions to address electrical drawing issues. (Inspection note 001-80.)
A-04-AMWTP-RPPWTP-001-A03	Assessment Follow-up Item	Follow-up on Contractor actions to address firewater sprinkler system welder identification marking concerns. (Inspection note 001-92.)
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 001-94.)

Closed

A-03-AMWTP-RPPWTP-002-A02	Assessment Follow-up Item	Follow-up on Contractor actions to address administrative control concerns with the concrete placement guide used to address hot weather concrete placements. (Inspection note 001-05.)
A-03-AMWTP-RPPWTP-005-A04	Assessment Follow-up Item	Follow-up on Contractor actions to resolve electrical issue regarding LAW design drawings calling out undersized equipment grounding conductors to be installed with the various parallel conductors (not sized correctly per NEC Table 250-122.) (Inspection note 001-10.)
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 001-11.)

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 notes 001-62 and 001-70.)
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 notes 001-13 and 001-77.)