



U.S. Department of Energy
Office of River Protection

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02-OSR-0426

Mr. R. F. Naventi, Project Manager
Bechtel National, Inc.
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC-01RV14136 – INSPECTION REPORT IR-02-011 – ON-LOCATION
INSPECTION REPORT FOR THE PERIOD JULY 17 THROUGH AUGUST 23, 2002

This letter forwards the results of the Bechtel National, Inc. (BNI) construction performance on the Waste Treatment Plant for the period July 17 through August 23, 2002. No Findings were identified. Details of the inspection are documented in the enclosed inspection report.

During this inspection period, BNI implemented corrective actions to address the programmatic aspects of the July 11, 2002, unplanned concrete cold joint that resulted when the concrete batch plant was not able to produce concrete at less than 70°F when ambient temperatures were greater than 100°F. The actions taken were comprehensive and BNI, subsequently, has placed a number of large concrete pours on the Low Activity Waste and High Level Waste basemats. Industrial Health and Safety performance was good during this period.

If you have any questions, please contact me, or your staff may call R. C. Barr, Office of Safety Regulation, (509) 376-7851.

Sincerely,

Roy J. Schepens
Manager

OSR: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 17 through August 23,
2002

REPORT NO: IR-02-011

FACILITY: Bechtel National, Inc.

LOCATION: 3000 George Washington Way
Richland, Washington 99352

DATES: July 17 through August 23, 2002

INSPECTORS: J. McCormick-Barger, Sr. Regulatory Technical Advisor, Inspection Lead
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Office of Safety Regulation

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EXECUTIVE SUMMARY

On-location Inspection Report for Period of July 17 through August 23, 2002
Inspection Report Number IR-02-011

INTRODUCTION

This inspection of Bechtel National, Inc. (the Contractor) construction activities covered the following specific areas:

- Assessment of the Contractor's Implementation of Corrective Actions to Support Resumption of 70°F Concrete Placements (Section 1.2)
- Adequacy of Construction Implementing Procedures and Observation of Construction Activities (Section 1.3)
- Adequacy of Fire Protection Piping System Work Activities (Section 1.4)
- Industrial Health and Safety (IH&S) Oversight (Section 1.5)
- Adequacy of Closure of Inspection Items. (Section 1.6)

Significant Observations and Conclusions:

- The Contractor's implementation of corrective actions associated with the July 11, 2002, unplanned cold joint was acceptable. Procedures, equipment, trained personnel, and administrative controls were put in place to provide assurance unplanned cold joints should not recur. (Section 1.2)
- Reinforcing steel installations and concrete placements, observed during the inspection period, for the Low Activity Waste (LAW) and High Level Waste (HLW) basemats were performed in accordance with the Authorization Basis in conformance with established procedures, specifications, and drawings. Qualified inspectors were performing Quality Control (QC) inspections of work in a thorough manner, and the inspection activities were documented in accordance with requirements established by the governing procedures. (Section 1.3)
- The Contractor performed hydrostatic testing of the firewater piping in accordance with established procedures and National Fire Protection Association (NFPA) 24 requirements. (Section 1.4)
- The Contractor had acceptably implemented their program for industrial health and safety, with minor exceptions, which were promptly and corrected during the inspection period. (Section 1.5)
- The following Findings and Open items were reviewed and closed during this inspection period: IR-01-010-02-FIN; IR-02-001-01-FIN; IR-02-004-01-IFI; IR-02-004-02-IFI; IR-02-004-03-FIN. (Section 1.6)

Table of Content

1.0	REPORT DETAILS.....	1
1.1	Introduction.....	1
1.2	Assessment of the Contractor’s Corrective Actions to Support Resumption of 70°F Concrete Placements (Inspection Technical Procedure (ITP) I-135).....	1
1.2.1	Inspection Scope.....	1
1.2.2	Observations and Assessments.....	1
1.2.3	Conclusions.....	4
1.3	Adequacy of Construction Implementing Procedures and Observation of Construction Activities (ITP I-113).....	4
1.3.1	Inspection Scope.....	4
1.3.2	Observations and Assessments.....	5
1.3.3	Conclusions.....	7
1.4	Adequacy of Fire Protection Piping System Work Activities (ITP-I-138).....	7
1.4.1	Inspection Scope.....	7
1.4.2	Observations and Assessments.....	7
1.4.3	Conclusions.....	7
1.5	Industrial Health and Safety (IH&S) Oversight (ITP-I-161).....	8
1.5.1	Inspection Scope.....	8
1.5.2	Observations and Assessments.....	8
1.5.3	Conclusions.....	12
1.6	Adequacy of Closure of Inspection Items (Inspection Administrative Procedures (IAP) A-105 and A-106).....	13
2.0	EXIT MEETING SUMMARY.....	18
3.0	REPORT BACKGROUND INFORMATION.....	18
3.1	Partial List of Persons Contacted.....	18
3.2	List of Inspection Procedures Used.....	19
3.3	List of Items Opened, Closed, and Discussed.....	19
3.4	List of Acronyms.....	20

ON-LOCATION INSPECTION REPORT FOR PERIOD OF JULY 17 THROUGH AUGUST 24, 2002

1.0 REPORT DETAILS

1.1 Introduction

This inspection assessed the Contractor's performance of important-to-safety (ITS) concrete production and placement and firewater construction activities in accordance with regulatory requirements specified in the Quality Assurance Manual (QAM), Safety Requirements Document (SRD), design documents, approved work procedures, and committed codes and standards. The inspectors also reviewed the Contractor's implementation of certain aspects of its Industrial Health and Safety program, including observing Contractor and subcontractor worker safety practices.

Details and conclusions regarding this inspection are described below.

1.2 Assessment of the Contractor's Corrective Actions to Support Resumption of 70°F Concrete Placements (Inspection Technical Procedure (ITP) I-135)

1.2.1 Inspection Scope

The inspectors reviewed the Contractor's corrective actions resulting from their self-assessment and analysis of the circumstances resulting in the cessation of concrete placement, and the resulting cold joint, in the first Low Activity Waste (LAW) basemat pour on July 11, 2002, and interviewed Contractor management and staff. The preliminary results of this review were provided to the Contractor in a letter dated August 2, 2002.¹

1.2.2 Observations and Assessments

The inspectors reviewed the Contractor's corrective actions associated with the July 11, 2002, unplanned concrete cold joint. This review was conducted to verify implementation of the actions required to be complete prior to resuming placement of concrete with a 70°F limit. These actions were documented in a letter to Office of River Protection (ORP) dated July 30, 2002.² In addition, the inspectors reviewed the Contractor's actions to address conditions imposed by the ORP in a letter to BNI dated July 31, 2002.³

¹ ORP letter from R. J. Schepens to R. F. Naventi, BNI, "Review of Bechtel National, Inc. (BNI) Implementation of Corrective Actions to Support Restart of 70°F Concrete Placement Activities," 02-OSR-360, dated August 02, 2002.

² BNI letter from R. F. Naventi to R. J. Schepens, ORP, "Low Activity Waste 70°F Concrete Placement Root Cause Analysis and Corrective Action Plan," CNN: 037826, dated July 30, 2002.

³ ORP letter from R. J. Schepens to R. F. Naventi, BNI, "Acceptance of Low Activity Waste 70°F Concrete Placement Root Cause Analysis and Corrective Action Plan" 02-OSR-358, dated July 31, 2002.

The Contactor's July 30, 2002, letter stated they would establish a Concrete Placement Special Instruction (CPSI) for the 70°F concrete pours that contained the following administrative controls:

- Planned pour start times correlating with pour volume estimates and pour rates to ensure pours would be completed prior to excessive ambient temperatures.
- Batch Plant cooling systems would be configured to ensure adequate cooling capability to service the pour volume with the temperatures forecasted for the planned pour.
- Planning meetings would be conducted to include all effected parties and discuss the following variables:
 - Placement equipment details
 - Maximum pour rate requirements
 - Average planned pour rate
 - Expected significant changes to placement rate
 - Start time and duration
 - Placement size and required concrete mixes
 - Identification of any potential restraints
 - Aggregate volume and temperature requirements
 - Chilled water volume and temperature requirements
 - Contingency planning considerations.
- Go/No-Go criteria would be established ensuring the following:
 - Minimum available ice, chilled water, and aggregate, and other concrete constituents are available.
 - Minimum batch plant, placement, consolidation, finishing, testing, and QC staff are available.
 - Necessary equipment is available to ensure the maximum planned placement rate is achieved.
 - A contingency plan is approved and in place that addresses loss of critical equipment or failure to produce 70°F concrete, and necessary equipment and staff are available to implement the plan.
 - First acceptable truck load of concrete meets Concrete predetermined temperature criteria at or before a predetermined "Go/No-Go" start time is exceeded.

Go/No-Go releases would be signed on the day of placement by the Placement Superintendent, Concrete Supplier Subcontractor Supervisor, and the Testing Subcontractor Supervisor.

The inspectors reviewed the CPSI for the first planned 70°F concrete placement following the July 11, 2002, cold joint, and determined the instruction contained the provisions discussed

above. In addition, the inspectors reviewed the placement equipment details and the instruction to ensure they specified appropriate equipment for the specific pour, and reviewed the contingency plans to ensure backup equipment and plans were in place should likely failures occur.

The Contactor's July 30, 2002, letter stated Central Pre-Mix Company (CPM), the concrete supplier sub-contractor, was to install and make an Ice Plant operational. The inspectors verified an Ice Plant was installed but determined it was not operational. Incorrect parts were provided and new parts were on order. The inspectors discussed the lack of an operational Ice Plant with construction management and subsequently, the Contractor revised its corrective action in a letter to ORP dated August 2, 2002,⁴ to require CPM to have provisions to add ice if necessary and ensure adequate ice was available. The inspectors verified adequate procedures had been generated addressing operational requirements associated with adding ice, CPM staff were knowledgeable regarding adding ice to the mix, and the scales used to weigh the ice were calibrated to national standards.

The Contactor's July 30, 2002, letter stated technical specification 24590-WTP-3PS-DB01-T0001, *Furnishing and Delivering Ready-Mixed Concrete*, would be revised to reflect concrete temperature requirements and allowable deviations and contingencies should unexpected temperature increases occur. The inspectors determined the above-mentioned technical specification was revised to allow placements to continue if concrete temperature exceeded 70°F. However, the revised technical specification was poorly worded and construction staff could have easily interpreted it to mean that pouring 70°F concrete with concrete temperatures above 70°F was acceptable. The inspectors discussed this condition with the Contractor and they subsequently made changes and issued revisions to technical specifications 24590-WTP-3PS-D000-T0001, *Concrete Work*, and 24590-WTP-3PS-DB01-T0001, on July 31, 2002. The inspectors reviewed these technical specifications and determined they adequately addressed the above requirement and resolved the concern.

The Contactor's July 30, 2002, letter stated a Batch Plant monitoring plan was developed to monitor plant performance to better predict concrete temperature. The inspectors determined the CPSI contained requirements for taking data on the temperature of concrete constituents at a number of locations and to take temperatures of concrete batches at the point of discharge from the plant and at the point of delivery at the placement location. The Contractor stated they were going to analyze the data once it was collected. This plan addressed the action stated above.

The Contactor's July 30, 2002, letter stated training on lessons learned from the root cause analysis had been conducted for staff associated with concrete pours. The inspectors reviewed the records of training to the root cause analysis and determined staff (field engineers, construction superintendents, quality control, design engineers, subcontract superintendents, and others) attended the training.

The Contactor's July 30, 2002, letter also stated the Contractor would complete a verification of corrective action implementation prior to resuming placement of concrete. The inspectors

⁴ BNI letter from R. F. Naventi to R. J. Schepens, ORP, "Revision to the 70°F Concrete Placement Root Cause Analysis and Corrective Action Plan," CNN: 038256, dated August 2, 2002.

reviewed the results of the Contractors Quality Assurance (QA) review of the actions taken above. These QA reviews were documented in two Quality Assurance Surveillance Reports, 24590-WTP-SV-QA-02-437, *Close CAR #24590-WTP-CAR-02-145*, regarding failure of CPM to cover fine aggregate stockpiles, and 24590-WTP-SV-QA-02-442, *Implementation Plan; Required Actions to Resume Concrete Placement*. Due to the limited time between the QA review and the inspectors' review to support the Contractor's planned resumption of 70°F concrete placements, the surveillance reports had not been reviewed and issued at the time of the inspection. The inspectors found the surveillance reports adequately described the CPM and the Contractor's corrective action commitments and the results of QA staff findings. The results indicated the corrective actions were completed and the Contractor was ready to resume 70°F concrete placements.

The inspectors also verified the CPSI contained guidance to ensure the ORP conditions placed on the Contractor in the ORP July 31, 2002, letter, discussed above, were implemented. For example, the Contractor had placed a requirement that if concrete could not be placed within 45 minutes of the scheduled start time, the placement would be canceled. Other similar requirements were added to the CPSI to ensure the remaining conditions were addressed.

Based on the above, the inspectors determined the Contractor had adequately implemented the corrective actions described in its corrective action plan to support resumption of 70°F concrete placements. Also, based on attendance at several concrete placement planning meetings, improvements were noted in communications of expectations and requirements, and communications amongst Contractor and subcontractor staff.

1.2.3 Conclusions

The Contractor's implementation of corrective actions associated with the July 11, 2002, unplanned cold joint was acceptable. Procedures, equipment, trained personnel, and administrative controls were put in place to provide assurance unplanned cold joints should not recur.

1.3 Adequacy of Construction Implementing Procedures and Observation of Construction Activities (ITP I-113)

1.3.1 Inspection Scope

The SRD, Volume II, Safety Criterion 4.1-2, required conformance with American Concrete Institute (ACI) 349, *Code Requirements for Nuclear Safety-Related Concrete Structures*, 2001 Edition. ACI 349, Section 3.8, required conformance to several American Society for Testing and Materials (ASTM) standards. The SRD, Volume II, Safety Criterion 7.3-5, required work be performed to established technical standards and administrative controls using approved instructions, procedures or other appropriate means.

The inspectors examined a sampling of the Contractor's procedures and engineering technical specifications governing the performance of important-to-safety concrete manufacture and

installation to determine whether the specified activities conformed to authorization basis and industry standard requirements. The inspectors examined the performance of selected concrete activities in the field to assess whether those activities had been conducted in accordance with these program and procedure requirements.

1.3.2 Observations and Assessments

The inspectors examined the following documents governing the installation and inspection of structural concrete:

- 24590-WTP-3PS-D000-T0001, *Engineering Specification for Concrete Work*, Revision 1, dated July 9, 2002
- 24590-WTP-3PS-DB01-T0001, *Furnishing and Delivering Ready-Mixed Concrete*, Revision 2, dated July 9, 2002
- 24590-BOF-3PS-C000-T0001, *Material Testing Services*, Revision 2, dated July 12, 2002
- 24590-WTP-3PS-DD00-T0001, *Purchase of Standard and Non-Standard Embedded Steel Items*, Revision 1, dated March 8, 2002
- 24590-WTP-3PS-FA01-T0001, *Furnishing of Anchor Bolts (Rods)*, Revision 1, dated February 5, 2002.

The inspectors had examined earlier revisions of some of the above documents during a previous inspection and documented the results of those reviews in Inspection Report IR-02-008, Section 1.8. From review of documents described above, the inspectors concluded the Contractor's specifications continued to reference the required Codes and Standards described in Section 1.3.1 above, and contained appropriate implementing requirements from the industry standards.

The inspectors examined Construction Work Package HLW-C-C-0012, Pour HLW-0012A, 36 Diameter C-5 Duct Encasement, Elevation (-) 32'-6" to Elevation (-) 29'-9." The inspectors reviewed the contents of the work package, which was not complete at the time of the inspection, and concluded the required design documents were in place to support the work activities.

In preparation for a walk down of recently installed reinforcing steel and review of other attributes incorporated within the placement, the inspectors reviewed applicable construction drawings furnished by the Contractor's QC staff, including: 24590-HLW-DB-S13T-00103, HLW-DB-S13T-000104, HLW-DB-S13T-00001, HLW-DB-S13T-00152, HLW-DB-S13T-00155, HLW-DG-S13T-00001001, HLW-DG-S13T-00001002, HLW-DG-S13T-00007002, HLW-DG-S13T-00007005, WTP-FCR-C-02-078, HLW-E22-GRE-00001, HLW-E0-GRE-00001, LAW-DB-S13T-00003, LAW-DB-S13T-0009, LAW-DB-S13T-00010, LAW-DG-S13T-0007, LAW-DG-S13T-00012, LAW-DG-S13T-00008, LAW-DG-S13T-00014, LAW-DG-S13T-00015, LAW-DG-S13T-00093, LAW-DG-S13T-00097, LAW-DO-S13T-00002, LAW-SS-S15T-00110, LAW-DD-S1ST-0001, LAW-DD-S1ST-00002, LAW-DG-S1ST-00005, LAW-

DG-S1ST-00095, WTP-DD-S1ST-00001, WTP-DD-S1ST-00002, WTP-DG-S1ST-00001 and FSK 24590-LAW-FSK-CON-L-02-001. The inspectors compared the drawings to the Document Report from Project Document Control (PDC), which provided the current revision status to determine whether the Contractor had provided and were using the most current drawing revisions to perform and inspect the work. Based on the comparison, the inspectors concluded the drawings provided were the most current revisions.

The inspectors witnessed in-process final inspections of top and bottom mat reinforcement, interior and exterior walls, embed plates, reinforcing steel concrete cover, and reinforcing steel splice lengths, performed by a Contractor QC inspector on the following placements:

- Placement HLW-0012A, 36 diameter C-5 Duct Encasement, Elevation (-) 32' - 6" to (-) 29' - 9"
- Basemat Placement LAW-0002A at top of concrete (TOC) Elevation (-) 21' - 0"
- Basemat Placement LAW-0002 at TOC Elevation (-) 21' - 0"
- Basemat Placement LAW-0003 at TOC Elevation (-) 21' - 0".

The inspectors concluded the Contractor's QC inspector was thorough in verifying applicable reinforcing steel attributes and was knowledgeable regarding the specifications. The inspectors independently performed a general inspection of the attributes of top and bottom basemat reinforcing steel size, spacing, concrete cover, splice lengths, 90 degree hook lengths, and embeds for size and type and found these items conformed to drawing requirements. The inspectors identified no discrepancies and concluded the inspections performed by the Contractor's QC were thorough. The inspectors reviewed the Concrete Pour Cards for the above placements, and verified the required signatures were in place prior to the start of each concrete placement.

The inspectors witnessed the placement and testing of concrete on the High Level Waste (HLW) 36" diameter C-5 Duct Encasement, Elevation (-) 32'-6" to (-) 29'-9," Placement HLW-0012A, and Placement HLW-0012B, Elevation (-) 29'-9" to (-) 27'-0." The inspectors also witnessed LAW basemat placements LAW-0002A, LAW-0002, and LAW-0003 to assess whether the activities involved in the placements conformed to procedurally specified production, placement, and testing requirements. The inspectors concluded the concrete was being produced, placed, and tested in accordance with the Contractor's approved specifications and procedures. The inspectors observed a Material Testing Subcontractor technician, performing a slump test on freshly batched concrete, had not performed the test as outlined in ASTM C 143, *Standard Test Method for Slump of Hydraulic Cement Concrete*, 1992 Edition. The technician was taking a longer period of time to lift the slump cone from the sample than allowed by the ASTM (conformance to ASTM C 143 was a requirement of the Contractor's engineering specification for Material Testing Services). The inspectors brought this to the attention of the Contractor. The Contractor's representative immediately re-instructed the technician regarding the time requirements for removal of the slump cone and subsequent tests were performed acceptably.

1.3.3 Conclusions

The inspectors concluded the reinforcing steel installation and concrete placements, observed during the inspection period, for the LAW and HLW basemats, were performed in accordance with the Authorization Basis in conformance with established procedures, specifications, and drawings. Qualified inspectors were performing QC inspections of the work in a thorough manner, and the inspection activities were documented in accordance with requirements established by the governing procedures.

1.4 Adequacy of Fire Protection Piping System Work Activities (ITP-I-138)

1.4.1 Inspection Scope

The SRD, Volume II, Section 4.5, safety criteria required the Contractor to conform with National Fire Protection Association (NFPA) 801, *Standard for Facilities Handling Radioactive Materials*, 1995 Edition. NFPA 801 required conformance with several other NFPA standards, including NFPA-24, *Standard for the Installation of Private Fire Service Mains and their Appurtenances*, 1992 Edition.

The inspectors examined several hydrostatic test packages and observed the conduct of hydrostatic testing on several fire protection piping segments to determine whether the testing conformed to established Contractor procedure and NFPA 24 requirements.

1.4.2 Observations and Assessments

The inspectors examined the Contractor's test packages for three firewater piping hydrostatic tests and verified the proper test boundaries were specified, valve line-ups were thorough, and all required test parameters had been specified. The inspectors verified the calibrations of the pressure gauges were current, the appropriate calibration stickers were properly affixed, and the gauge range conformed to the requirements established by NFPA 24.

The inspectors observed the conduct of hydrostatic testing on portions of the fire water piping in Areas 16, 17, 18, and 19 and verified the hydrostatic testing had been conducted in accordance with the Contractor's established requirements and NFPA 24, and the systems tested conformed to established requirements regarding leakage and time at pressure.

1.4.3 Conclusions

The inspectors concluded the Contractor had accomplished hydrostatic testing of firewater piping systems in accordance with established procedure and NFPA 24 requirements.

1.5 Industrial Health and Safety (IH&S) Oversight (ITP-I-161)

1.5.1 Inspection Scope

The inspections in this area focused on the Contractor's implementation of the Contract industrial health and safety requirements described in ORP M 440.1-2, *Industrial Hygiene and Safety Regulatory Plan for the Waste Treatment Plant Contractor*. Specifically, the inspectors assessed compliance to the requirements of the Contractor's *Non-Radiological Worker Safety and Health Plan*, PL-W375-IS00001, Revision 1, dated March 12, 2001, for the River Protection Project-Waste Treatment Plant, which had been reviewed and approved by the Office of Safety Regulation (OSR), along with applicable requirements specified in ORP M 440.1-2. Areas reviewed included concrete transport and placement, hoisting and rigging, and cutting and welding operations.

1.5.2 Observations and Assessments

The inspectors performed on site inspections of the industrial safety and health related activities associated with the installation of forms, rebar and embedments (FRE) on the LAW site during the preparations for and during the mixing, loading, transport, and placement of concrete. Several requirements, within the ORP M 440.1-2, were inspected including, but not limited to; equipment operations, flagging/pedestrian safety, task lighting, pinch point avoidance, shoring safety, walking/working surfaces, industrial hygiene, and first aid/emergency response.

The inspectors accompanied the Contractor's site safety and health representative to examine the site preparations prior to the concrete pour scheduled for the evening of August 5, 2002. The inspectors observed the Contractor had provided plans for rotating crews working on the mat and was providing task lighting on the work area. An updated Job Hazard Analysis (JHA) was being prepared which included special precautions for working on or near heavy moving equipment, such as the pumping equipment and concrete trucks during hours of darkness.

The inspectors performed an onsite inspection on the concrete pour during the swing shift of August 5 through the morning of August 6, 2002. The following activities were observed:

a. Crew and equipment planning and preparations

The Contractor's site safety and health representative orally presented and explained the JHA to two separate crews who were to be involved in the pour. Further, the general foreman provided a follow-on discussion, which emphasized the need to take mandatory breaks and to move with thoughtfulness at night. With one exception (discussed below), the JHA briefing and the "tool box" safety meeting were comprehensive and clear.

b. Hauling and transfer of concrete

The inspectors assessed the safety conditions and operations employed in hauling and transferring concrete. The Batch Plant subcontractor loaded the mix into concrete trucks, which were guided by the Contractor's flagging persons to the discharge point of the pump trucks near the LAW basemat. The flagging persons were stationed in the

appropriate area and the trucks were able to be safely position into the off-load point. However, the inspectors observed large equipment had difficulty getting into position to off-load because of space limitations. The space limitations were compounded because, periodically, numerous observers of the concrete field-testing operations were standing between the pump trucks. The inspectors observed one ready mix truck having difficulty making the transition onto the descending ramp into LAW basemat area. The inspectors expressed concern regarding the excessive number of people in the vicinity of the concrete pumping equipment to the Contractor's site safety and health representative, who took action to reduce the number of people in the area. Further, the inspectors observed inadequate lighting when walking from the parking or badge area to the LAW basemat and from the LAW basemat up to the first aid station. The Contractor's site safety and health representative had independently observed these problems and had later resolved the situation by adding increased lighting.

c. Pouring, placing, and inspecting the concrete placement

The inspectors observed personnel, working on the basemat during concrete placement, using several pneumatic consolidation vibrators and tools. The inspectors observed all hose couplings were tight fitting and whip-checked. The personnel working the vibrating tools and handling the hoses were given periodic breaks for purposes of employee welfare and ergonomic enhancement. The inspectors concluded the Contractor exercised good safety practices in these areas.

In order to minimize risk, the number of personnel working in the front of the shoring during the backfill was limited to two carpenters and one backup carpenter, stationed away from the shoring face. The carpenters were required to periodically check and measure form deflection during the pour. Non-essential personnel were kept away from the form face and the essential personnel maintained a standing position behind the shoring brace butt between checks and measurements. The inspectors concluded this was a good safety practice.

The inspectors examined, with the Contractor's concrete Foreman, concrete conveyance equipment, excluding the mixing trucks, used in the observed concrete placements, and the tower equipment, which were to be used in the future placements. The inspectors examined the equipment for safe configuration, access, and pinch points, among other attributes. The inspectors observed an adequate number of safety shut-off and control systems were designed within each item of equipment.

The credible risks of working on the site at night were adequately covered. However, the Contractor needed to explain, during the "tool box" meeting, in plain and brief language, the risks and necessary protective measures associated with the chemicals used in the concrete placement, i.e., bonding, sealing agent, etc. The inspectors brought this to the attention of the site safety and health representative and the situation was immediately resolved to include the information.

The congested area, near the pump units, was a noise hazard area and was designated as a hearing protection required zone. There were other areas within the work site, which

were also marked as hearing protection areas. However, the segmenting of the zones provided opportunities for personnel to forget to re-don hearing protection when moving in or out of the zones. Additionally, some personnel were not wearing any protection within the marked areas. The inspectors brought this to the attention of the Contractor who stated their intent to re-examine the site hearing protection zones for ease of control and to require absolute hearing protection requirements be met by all employees within designated areas.

The inspectors observed equipment maintenance and repair files for concrete placement equipment were not kept in a readily accessible folder, as other heavy equipment and rolling stock. Complete files for the concrete equipment were unavailable for inspection within the designated area. This was brought to the attention of the equipment General Foreman, who stated the issue would be evaluated and resolved.

The inspectors observed the hopper mixing shaft rotating butt ends on the “Creter” crane were located on the exterior of the hopper container and posed a nip point hazard to personnel in the area; accordingly, the inspectors concluded 10 CFR 1926.550 (8) requirements for guarding applied to the rotating shaft. The Contractor’s concrete Foreman informed the inspectors guards would be installed.

d. Cutting and Welding

The inspectors observed several jobs where active cutting and welding operations were in progress. The inspectors observed the Contractor’s operational safety performance for conformance with the requirements of 24590-WTP-GPP-SIND, *Compressed Gas Cylinders*, Revision 0, and 24590-WTP-SIND-035A, *Welding and Cutting Safety*, Revision 0.

Specifically, the inspectors examined the condition of the gas bottles, their storage and maintenance, gas hoses, fire extinguishers, torches, arc welders, and leads. In addition, the inspectors examined the use of Personnel Protective Equipment. This inspection included observing the following Contractor and subcontractor activities:

The inspectors observed the welders were taking active precaution to protect their hoses and leads from hot slag while cutting and welding. Further, the inspectors observed crafts were properly disposing of cut or punctured hoses and leads. The bottle carts were substantial and the oxy-acetylene gases were properly stabilized. Proper separation of the oxygen and fuel gas inventory was maintained.

One welder, within the LAW basemat area, was working without hand or forearm protection. The inspector reported the situation to the LAW safety and health representative, who resolved the deficiency on-the spot.

The inspectors observed one subcontractor arc welding lead was inadequately insulated. A safety and health representative discussed the situation with the subcontractor’s management and proper corrections were made.

The inspectors observed the safety and health representative identified and took immediate steps to correct issues regarding missing signage at the bulk gas storage area in the re-bar yard. More substantial racks and signage were being fabricated for gas bottle storage, while the inspectors were in the area. One subcontractor's acetylene bottle was observed with a non-protective cap. The Contractor's safety and health representative requested the subcontractor to replace it with a proper cap. The inspectors concluded the safety and health representative used good initiative to resolve these issues.

e. Hoisting and Rigging

The inspectors evaluated the Contractor's hoisting and rigging operations for conformance with 24590-WTP-GPP-CON-1901A, *Rigging Work Operations*, Revision 0, dated March 19, 2002, 24590-WTP-GPP-SIND-016, *Cranes Use and Operations*, Revision 0, dated May 13, 2002, and 24590-WTP-GPP-SIND-017, *Crane Operator Qualification*, Revision 0, dated August 9, 2001.

In the process of performing the programmatic inspection, the inspectors witnessed a new operator taking the functional test for crane operation. The inspectors listened to the tester's instructions and details of the test; observed and clocked the operator between mandatory tasks, and observed the grading of the examination by the tester. The inspectors concluded the testing grade sheet was properly exercised and timed.

The inspectors observed record keeping for cranes and operators had become more sophisticated since the last inspection (following the Luffing Crane boom damage incident). Information management systems were being put in place for capturing the elements of the crane inspection reports, and tracking maintenance and repair requirements. Licenses were being generated for each heavy equipment operator, which contain such items as medical examinations, equipment of qualification, and other pertinent information. The inspectors concluded the record keeping system had improved and conformed to established requirements.

The Contractor demonstrated thorough compliance with their crane inspection procedures for cranes brought on the site by the Contractor and sub-contractors. However, the same level of scrutiny has not been applied to the "below the hook" lifting tools brought on site by the subcontractors. The inspectors observed a sling, with a "come-a-long," was used as a structural tie back on the construction of a metal framed building-change house. The sling was looped around an I-beam (with sharp edges) without the use of softeners. The wire rope had been damaged; the lays had separated and the core was exposed. The Contractor requested subcontractor management to replace the sling with a properly configured and protected replacement at the earliest opportunity.

The inspectors reviewed the design and criteria for the Hammerhead tower cranes. The Contractor's lead rigging engineer informed the inspectors the manufacturer's representative was scheduled to approve each critical portion of the assembly, as required by ASME B30.3-1996, *Construction Tower Cranes*. The factory representative had approved the bases and "bolt-ups" during this inspection period.

f. Electrical Safety

The inspectors observed one electrical extension cord had several slag burns on the insulation and another extension cord was hung by a series of nails, which appeared to be in violation of 29 CFR 1926. The Contractor's procedure required extension cords be inspected daily prior to use for serviceability. These discrepancies demonstrated not all extension cords had been inspected daily. The inspectors brought this to the attention of the Contractor's representative. The Contractor's foreman took the burned extension cord out of service, rolled it up, and indicated the other would be removed from the nail hooks. The Contractor's site safety and health representative at the Exit Meeting, informed the inspectors the burns on the cord had not penetrated through to the wire; accordingly, the cord was still in service and being inspected daily.

g. Other Observations

The inspectors attended a Contractor class in Safety Leadership for Superintendents, Foremen, and Field Engineers. The class was based upon an interactive workbook that walked the students through a series of situations where they (as a team) were to pose answers regarding sound safety management solutions through leadership. The class was well presented and the participants were actively engaged.

The carpenter's steward gave the inspectors a briefing on how the Safety Education through Observations (SETO) program worked on site. The SETO program used a team of craft-persons and supervisors to observe the various tasks being performed. The team observed the activities and then graded the tasks based upon whether they were being performed safely or not.

The team tallied the number of safe and unsafe work practices in several distinct categories and used the data to examine improvements or slippage in safe work performance percentages each observation period. The results of the team's observations were posted on the badge house bulletin board. As an example of the effectiveness of the initiative, according to the steward, with the aid of this technique, the observed safe ladder use work practices rose 57% from previous observations.

1.5.3 Conclusions

The inspectors concluded, with the exception of a few minor instances, the Contractor had acceptably implemented the program for industrial health and safety. Identified discrepant conditions were promptly and acceptably corrected. The inspectors determined the Contractor had met the applicable requirements of ORP M 440.1-2.

1.6 Adequacy of Closure of Inspection Items (Inspection Administrative Procedures (IAP) A-105 and A-106)

The following inspection follow-up items were reviewed to determine if they could be closed. For follow-up on Findings, the inspectors reviewed the notice of Findings and the Contractor's responses to the Findings, and verified implementation of the corrective actions stated in the responses.

1.6.1 (Closed IR-01-010-02-FIN) Contractor did not perform adequate receipt inspection of fire hydrants in that the hydrants were not Underwriter Laboratory (UL) listed as required by engineering technical specification.

The Contractor provided their responses to the Finding in a letter dated April 30, 2002,⁵ and a letter dated May 20, 2002,⁶ and documented the discrepancy by Corrective Action Report (CAR) 24590-WTP-CAR-QA-02-004 dated January 8, 2002.

In their response, the Contractor agreed with the Finding; however, they pointed out the cause was not inadequate receipt inspection. Instead, the Contractor determined the cause was the result of the failure of the Field Materials Requisition (FMR) to accurately reflect the requirement for UL listing and the resulting absence of critical information in the Purchase Order.

As immediate corrective action, on February 20, 2002, the Contractor implemented Immediate Procedure Change (IPC) 24590-WTP-GPP-GCB-00100C, adding a requirement to procedure 24590-WTP-GPP-GCB-0100, *Field Materials Management*, Revision 0, dated October 1, 2001, for the originator of the FMR to prepare a Material Receiving Instruction (MRI) containing any special receiving instructions specified by the field engineer, in addition to the FMR, for all permanent plant material procured. The inspectors verified the corrective action had been completed as stated. In addition, the Contractor implemented IPC 24590-WTP-GPP-GCB-00100D, on March 27, 2002, to revise the Field Materials Management procedure to ensure the correct wording regarding the description of the item being purchased was included on the Purchase Order. The inspectors verified the procedure change had been implemented as stated.

The inspectors examined the Contractor's corrective steps to avoid further Findings. The Contractor's CAR required the revision and reissue of the procurement documentation to ensure procurement and receipt of the correct items. The inspectors reviewed Purchase Order 24590-CM-FPC-JV00-00001, Revision 3, dated January 9, 2002, and verified this action had been completed as stated. The Contractor conducted an investigation to determine the cause and extent of the problem. The inspectors examined the CAR and documentation of the investigation. The Contractor's response provided actions, and the inspectors verified: (1) Purchase Order 24590-CM-FPC-JV00-0001, Revision 1, deleted the incorrect hydrant requirement and added the correct information; (2) similar purchase orders were reviewed by the Contractor to verify this omission of technical data was not a trend; and (3) a Special Audit of Project Procurement Activities, 24590-WTP-IAR-QA-02-002, Revision 0, dated

⁵ BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Bechtel National, Inc.'s Response to Geotechnical/Foundations, Firewater, and Industrial Health and Safety Inspection Report, IR-02-010 [sic IR-01-010]," CNN: 029091, dated April 30, 2002.

⁶ BNI letter from R. F. Naventi to M. K. Barrett, ORP, "Response to U. S. Department of Energy, Office of Safety Regulation Letter- 'Rejection of Bechtel National, Inc.'s Response to Findings from Geotechnical/Foundations, Firewater, and Industrial Health and Safety Inspection Report, IR-01-010'," CNN: 033347, dated May 20, 2002.

March 21, 2002, was performed. The Contractor's response stated procurement was conducting a 100% review of permanent plant purchase orders prior to issuance to ensure pertinent technical information had been provided. The inspectors verified the stated review had been accomplished, as specified, by discussion with the Procurement Manager, examination of selected purchase orders, and examination of the electronic mail implementing the purchase order examination commitment. However, the review of purchase orders, by Procurement, for inclusion of the required technical information, was intended to be temporary until confidence had been gained that Engineering, the organization responsible by procedure for providing the technical information, was adequately doing so. Discussions with the Procurement Manager established their intent to stop reviewing purchase orders within the near future because the quality of engineering specification of technical requirements had improved to the point where a high level of confidence could be placed in the Engineering products.

The Contractor's response stated Procurement conducts quarterly self assessments. Discussions with Contractor representatives established the quarterly self assessment initiative had been initiated during early 2002 in response to the problems identified in the procurement process and only one had been accomplished to the time of this inspection period; further, the initiative was intended to be temporary and had not been institutionalized as a procedure requirement. The inspectors verified the stated self assessment had been performed and reviewed the one performed during the first quarter of 2002. The inspectors found the self assessment provided a thorough evaluation of procurement activities and resulted in substantial corrective actions in response to problems.

The Contractor stated they had reviewed their construction procedures and work processes to ensure adequate controls were specified to accomplish Quality Assurance Manual compliance. The inspectors verified the Contractor reviewed their procedures to ensure adequate controls had been specified to accomplish Quality Assurance Manual activities by discussion with QA engineers and management, review of established procedure review administrative controls, and examination of documentation of reviews for selected procedures.

The Contractor's response committed to the revision of the Field Materials Management procedure by the insertion of specific requirements; the inspectors verified, by review of the procedure and changes, the specific requirements had been included, as stated.

In a letter dated May 3, 2002,⁷ the OSR requested the Contractor provide a description of the deficiencies identified by the Special Audit of Procurement Activities, and corrective actions and other procurement initiatives instituted to improve performance in the procurement area. The Contractor responded by letter on May 20, 2002,⁸ and identified six specific process improvement actions. The inspectors conducted inspections to verify the stated accomplishment of each action and found five of the issues had been the topic of QA surveillance inspections. The inspectors examined each surveillance report, identified below, and concluded each issue had been adequately resolved and verified as accomplished by QA.

⁷ ORP letter from R. C. Barr to R. F. Naventi, BNI, "Rejection of Bechtel National, Inc.'s Response to Findings from Geotechnical/Foundations, Firewater, and Industrial Health and Safety Inspection Report, IR-01-010," 02-OSR-0192, dated May 3, 2002.

⁸ BNI letter from R. F. Naventi to M. K. Barrett, ORP, "Response to U. S. Department of Energy, Office of Safety Regulation Letter- 'Rejection of Bechtel National, Inc.'s Response to Findings from Geotechnical/Foundations, Firewater, and Industrial Health and Safety Inspection Report, IR-01-010'," CNN: 033347, dated May 20, 2002.

- The Contractor stated they had completed special training for procurement personnel regarding the requirements for handling quality documents and focus on Price Anderson Amendments Acts compliance. This issue was closed by QA surveillance report 24590-WTP-SV-QA-02-0258, Revision 0, dated June 8, 2002, report items CA-1 and CA-6.
- The Contractor stated they had completed special training for procurement personnel on engineering procedures for Engineering Specifications and Materials Requisition. This issue was closed by QA surveillance report 24590-WTP-SV-QA-02-0258, Revision 0, dated June 8, 2002, report item CA-4.
- The Contractor stated seven shop inspectors had been trained to project procedures and continued shop inspector training was an ongoing activity. The inspectors examined the training records of the seven shop inspectors and verified each had been trained as stated.
- The Contractor stated an internal review of all permanent plant purchase orders prior to award had been implemented, to check for compliance and consistency. This issue was closed by QA surveillance report 24590-WTP-SV-QA-02-0258, Revision 0, dated June 8, 2002, report item CA-5.
- The Contractor stated the Supplier Quality procedure (24590-WTP-GPP-GPQ-00100-01) had been issued on May 2, 2002. This issue was closed by QA surveillance report 24590-WTP-SV-QA-02-0220, Revision 0, dated May 16, 2002, report item 1.
- The Contractor stated Project Document Control had assigned additional personnel to Procurement to expedite entering documents into the records system. This issue was closed by QA surveillance report 24590-WTP-SV-QA-02-0259, Revision 0, dated June 7, 2002, report item CA-2.

Based upon the above, this Finding is closed.

1.6.2 (Closed IR-02-001-01-FIN) Contractor failed to take timely corrective action to address a deficiency report as required by the Quality Assurance Manual. The Contractor provided their response to the Finding in a letter⁹ dated March 14, 2002, and documented the discrepancy by CAR 24590-WTP-CAR-QA-020008 on January 9, 2002.

In their response, the Contractor agreed with the Finding. The Contractor specified several actions, which had been taken. Specifically, the Contractor stated the above CAR had been issued; an assertion verified by the inspectors. In addition, the Contractor asserted a root cause analysis had been performed to verify the circumstances surrounding the discrepancy. The inspectors verified the stated root cause analysis had been performed to identify the breakdowns in issuance, tracking, and reporting deficiencies, and to evaluate the potential for similar instances. Further, the Contractor stated the Corrective Action Management System (CAMS) database had been modified to flag the field identifying the responsible manager as a mandatory field and CARs could not be submitted with the responsible manager field

⁹ BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Bechtel National, Inc.'s Response to Assessment and Corrective Action Inspection Report, IR-02-001'," CNN: 028935, dated March 14, 2002.

empty. The Contractor had replaced the CAMS database with a totally new system identified as the Quality Assurance Information System (QAIS). The inspectors verified the QAIS required the responsible manager field as a mandatory field and the CAR could not be submitted with the responsible manager field empty. The Contractor stated procedure 24590-WTP-GPP-QA-201, *Corrective Action*, had been revised to require the responsible manager assignment by the originator of the CAR; the inspectors verified this had been accomplished. The Contractor stated the weekly report generator had been modified to reflect all Discrepancy Reports/CARs on the status report received by management. The inspectors found the weekly status report had been replaced by the QAIS system and the system was a real time system, which automatically notified the responsible manager before a responsible action was due and when it was late by one day and again at one week. When the responsible manager was three weeks late, the QAIS automatically notified the QA Manager and Project Manager of the delinquency. The inspectors found the QAIS implemented the committed action. The Contractor committed to implement a new procedure to comply with the ISMP requirement that a committee be established to provide independent oversight of safety. The inspectors examined procedure 24590-WTP-GPP-MGT-006, *Management Oversight*, Revision 0, dated March 15, 2002, and verified the accomplishment of the committed action.

In their response to the Finding, the Contractor specified four corrective steps to avoid further Findings.

- Inform all QA personnel CARs would be assigned to Functional Managers and not Project Management.
- Train QA personnel regarding the assignment of CARs.
- Inform QA personnel, in those instances where CARs are reassigned, the original start date would be retained in order to maintain traceability.
- Train QA personnel regarding the need to maintain CAR corrective action dates.

The inspectors examined e-mail documentation, dated March 11, 2002, which accomplished the above four corrective steps.

Based upon the above, this Finding is closed.

1.6.3 (Closed IR-02-004-01-IFI) Evaluate the thoroughness of the Contractor's initiative to ensure ITS concrete technical specifications, construction procedures, and work packages address requirements.

The inspectors examined Engineering organization e-mail documentation and discussed the issue with contractor representatives to determine the scope and depth of the Contractor's evaluations and results. The inspectors found the Contractor had reviewed nine specifications, currently in use at the site. The reviews were conducted by Construction, QA, QC, and Engineering representatives to identify the requirements of the specifications and potential problems with implementation. The Contractor found there were minor changes required to eliminate or clarify requirements and refinements of some wording to ensure a clear understanding of the expectations.

The Contractor identified several lessons learned regarding the proper application of codes and standards and communicated these lessons to their engineering staff.

Based upon the above discussions and inspections, this follow-up item is closed.

1.6.4 (Closed IR-02-004-02-IFI) Construction Superintendents not required to read or be trained on applicable technical specifications.

The inspectors discussed, with the General Superintendent, the need for training Construction Superintendents on technical specifications under their area of responsibility. The General Superintendent stated (a) the work procedures reference the applicable engineering technical specification(s), (b) the Construction Superintendent responsible for implementing the procedure was required by the Training Matrix to read the procedure and document completion in the Training Record, (c) the responsible Construction Superintendent was accountable for implementation of the procedure and the technical requirements applicable to the activity, (d) in the exercise of their responsibility and accountability, the Construction Superintendents were expected to read and understand the applicable engineering technical specification(s), and (e) those expectations had been clearly communicated to the project Construction Superintendents.

Based upon the discussions, and because the inspectors had consistently found any contacted Construction Superintendent to be knowledgeable of the technical specification requirements, this follow-up item is closed.

1.6.5 (Closed IR-02-004-03-FIN) Firewater bolted joint accessories were not coated in accordance with NFPA 24, as required by SRD, Safety Criterion 4.5-17.

The Contractor responded to the Finding by letter¹⁰ dated June 17, 2002, documenting agreement with the Finding and specifying corrective actions.

The Contractor issued CAR 24590-WTP-CAR-QA-02-058 on March 22, 2002, documenting the Finding and specifying corrective actions. The Contractor issued a Field Change Request, 24590-WTP-FCR-P-02-021, Revision 0, on March 21, 2002, to revise the engineering specification, 24590-BOF-3PS-PZ41-T0001, *Engineering Specification for Underground Fire Protection Piping Mains*, Revision 1, dated September 19, 2001, to include requirements for cleaning and coating buried bolted joint connections with corrosion retarding material after installation. The inspectors verified the required specification change had been incorporated in Revision 2 of the specification, dated April 22, 2002, by adding, in Section 5.9, the required coating provisions.

The Contractor issued Nonconformance Report (NCR) 24590-WTP-NCR-CON-02-036 on April 15, 2002, to correct the nonconforming condition of non-coated bolted connections, which had already been covered by backfill. The NCR was closed on June 5, 2002, based upon Field Engineer verification that buried connections had been reworked by cleaning and applying a bituminous coating. The inspectors verified field engineering inspection reports had been created to document the completion.

The Contractor's corrective steps to avoid further Findings, specified in their response letter, included the following actions:

¹⁰ BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Response to U. S. Department of Energy, Office of Safety Regulation – Inspection Report IR-02-004 On-Location Inspection Report for the Period February 25 through April 11, 2002," CNN: 034358, dated June 17, 2002.

- Detailed reviews, by Engineering, Construction, Quality Control, and Quality Assurance, of engineering specifications used by Construction for determination of the completeness of referenced codes and standards to identify potential problems with implementation. Changes or clarifying guidance, resulting from the reviews, would be provided as training to discipline engineers as lessons learned for use in future specification writing activities. The completion of these corrective actions was verified during the inspections performed to resolve Inspection Follow-up Item IR-02-004-01-IFI, documented in Section 1.6.3 of this report, above.
- The Contractor stated Construction would provide guidance to the field engineering staff to not act on verbal direction from engineering that was contrary to the requirements of specifications or drawings. The inspectors verified the accomplishment of this corrective action by review of e-mail communication from the Construction Manager to the WTP construction staff, dated June 25, 2002.

Based on the above inspections, this Finding is closed.

2.0 EXIT MEETING SUMMARY

The inspectors presented preliminary inspection results to members of Contractor management at an exit meeting on August 24, 2002. The Contractor acknowledged the observations and conclusions. The inspectors asked the Contractor whether any materials examined during the inspection should be considered limited rights data. The Contractor stated no limited rights data were examined during the inspection.

3.0 REPORT BACKGROUND INFORMATION

3.1 Partial List of Persons Contacted

B. Niemi, Safety Program Engineer
 M. Ensminger, Quality Control Supervisor
 W. Clements, Site Manager
 G. McClain, General Superintendent
 S. Jabbour, Geotechnical Engineer
 R. Pohjola, Lead BOF Civil Field Engineer
 G. Torres, Subcontract Coordinator
 D. Neal, QA Engineer
 S. Sunday, QA Engineer
 P. Vukovich, Purchasing Manager
 F. Boozer, Lead QC Engineer
 M. Weaver, Lead Civil Field Engineer, LAW Building
 M. Platt, Safety Lead
 D. Foss, Safety Engineer
 G. Shell, Quality Assurance Manager
 B. Kerrigan, Quality Assurance

M. Jackson, Project Management
 G. Palm, Site Safety and Health Supervisor
 T. Meagher, Industrial Safety and Health Manager
 E. Smith, Safety Program Engineer

3.2 List of Inspection Procedures Used

Inspection Administrative Procedure A-105, "Inspection Performance"

Inspection Technical Procedure I-106, "Personnel Training and Qualification Assessment"

Inspection Technical Procedure I-113, "Structural Concrete Inspection"

Inspection Technical Procedure I-135, "Readiness for Construction Inspection"

Inspection Technical Procedure I-138, "Inspection of Fire Protection System Inspection, Testing, and Maintenance"

Inspection Technical Procedure I-161, "Industrial Health and Safety Inspection"

3.3 List of Items Opened, Closed, and Discussed

Opened

None.

Closed

IR-01-010-02-FIN	Finding	Contractor did not perform adequate receipt inspection of fire hydrants in that the hydrants were not UL listed as required by engineering technical specification. (Section 1.6.1)
IR-02-001-01-FIN	Finding	Contractor failed to take timely corrective action to address a deficiency report as required by the Quality Assurance Manual. (Section 1.6.2)
IR-02-004-01-IFI	Inspection Follow-up Item	Evaluate the thoroughness of the Contractor's initiative to ensure ITS concrete technical specifications, construction procedures, and work packages address requirements. (Section 1.6.3)

IR-02-004-02-IFI	Inspection Follow-up Item	Construction Superintendents not required to read or be trained on applicable technical specifications. (Section 1.6.4)
IR-02-004-03-FIN	Finding	Firewater bolted joint accessories were not coated in accordance with NFPA 24, as required by SRD, Safety Criterion 4.5-17. (Section 1.6.5)

Discussed

None

3.4 List of Acronyms

ACI	American Concrete Institute
ASTM	American Society for Testing and Material
BNI	Bechtel National, Inc.
CAMS	Corrective Action Management System
CAR	Corrective Action Report
CFR	Code of Federal Regulations
CPM	Central Pre-Mix Company
CPSI	Concrete Placement Special Instruction
FMR	Field Material Request
HLW	High Level Waste
IFI	Inspection Follow-up Item
IR	Inspection Report
ITS	important-to-safety
JHA	Job Hazards Analyses
LAW	Low Activity Waste
MRI	Material Receiving Instructions
NCR	Nonconformance Report
NFPA	National Fire Protection Association
ORP	Office of River Protection
OSR	Office of Safety Regulation
PDC	Project Document Control
QA	Quality Assurance
QAIS	Quality Assurance Information System
QAM	Quality Assurance Manual
QC	Quality Control
SETO	Safety Evaluation through Observation
SRD	Safety Requirements Document
TOC	top of concrete
UL	Underwriter Laboratory