



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

03-OSR-0111

Mr. R. F. Naventi, Project Manager
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC-01RV14136 – INSPECTION REPORT A-03-OSR-RPPWTP-008 –
ON-LOCATION INSPECTION REPORT FOR THE PERIOD JANUARY 25 THROUGH
MARCH 6, 2003

This letter forwards the results of the U.S. Department of Energy, Office of River Protection review of Bechtel National, Inc. (BNI) construction performance on the Waste Treatment and Immobilization Plant for the period January 25 through March 6, 2003. Three Findings were identified requiring a written response (Enclosure 1). Details of the inspection are documented in the enclosed inspection report (Enclosure 2).

The three Findings regard (1) failure to conduct a required in process inspection of Waste Feed Receipt Tank fabrication work at a subcontractor's offsite location; (2) failure of a subcontractor to perform fit-up inspections of Waste Feed Receipt Tank fabrication welding in accordance with the subcontractor's weld inspection procedure; and (3) failure to verify receipt of welding documentation for shear studs installed on the High Level Waste shield doors. During this inspection period, the inspectors found BNI's efforts to ensure the Waste Feed Receipt Tank fabrication subcontractor was ready to begin onsite work were noteworthy. Also, BNI took appropriate actions to improve electrical installation work to address previously identified National Electric Code compliance concerns.

If you have any questions, please contact me, or your staff may call Robert C. Barr, Director, WTP Safety Regulation Division, (509) 376-7851.

Sincerely,

Roy J. Schepens
Manager

OSR:JWM

Enclosures (2)

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

NOTICE OF FINDING

Section C.6, Standard 7, "Environment, Safety, Quality, and Health," of Contract DE-AC27-01RV14136, dated December 11, 2000, between Bechtel National, Inc. (the Contractor) and the U.S. Department of Energy (DOE), defined the Contractor's responsibilities under the Contract as they related to conventional non-radiological worker safety and health; radiological, nuclear, and process safety; environmental protection; and quality assurance.

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

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

The Contractor's QA Program is defined in 24590-WTP-QAM-QA-01-001, "Quality Assurance Manual," Rev. 3, dated January 6, 2003 (QAM).

The QAM contains the policies that established the QA requirements for the project. QAM Policy Q-02.1, "Quality Assurance Program," Section 1.1 states "The QA Program is binding on all project personnel, including those responsible for planning and scheduling activities and external organizations working under the direct control of BNI." QAM Policy Q-02.1, Section 1.11 states "Suppliers who provide items, parts, materials, consumables, and/or services that are within the scope of this program shall perform work to an appropriate QA program and implementing procedures."

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

The Contractor's QAM Policy Q-07.1, "Control of Purchased Items and Services," Section 3.10.2, states "Source verification shall be implemented in accordance with plans to perform inspections, examinations, or tests at predetermined points."

CB&I Quality Assurance Manual/Quality Assurance Procedure 10.2, *NDE, Inspection and Testing*, Section 3.4 stated, "NDE [nondestructive examination] shall be performed in accordance with procedures as required by detail drawings and process control documents."

During the performance of on-location inspections for the period January 25 through March 6, 2002, the following Findings were identified:

1. Subcontract document 24590-QL-SRA-MTF5-00001, *Construction Subcontract (CB&I)-Waste Feed Receipt Vessels and Stainless Steel Liner*, Revision 0, required, on Exhibit J, Section 3.0 under the paragraph titled "Surveillance Inspection Plan," the performance of Supplier Quality surveillance inspections of prefabrication, in process inspections of construction materials, witness of fit-up and welding, verification of welding procedure specifications and welder qualifications, and visual inspection of completed welds at the vendors (CB&I) facility.

Contrary to the above, during the performance of an inspection of the CB&I Waste Feed Receipt Tank construction activities within the period January 27 through 30, 2003, at the Contractor's offices and Waste Treatment Plant construction site, the Office of River Protection (ORP) identified the Contractor had not conducted surveillance activities in accordance with the surveillance inspection plan, for the CB&I manufacturing facility at Provo, UT, required by Exhibit J of the subcontract 24590-QL-SRA-MTF5-00001.

This is considered a Finding against QAM Policy Q-05.1 for failure to follow procedures (see inspection report A-03-OSR-RPPWTP-008, Section 1.5, Finding A-03-OSR-RPPWTP-008-F01.)

2. Specification 24590-WTP-3PS-MVB2-T0001, *Welding of Pressure Vessels, Heat Exchangers, and Boilers*, Revision 0, dated December 20, 2001, paragraph 10.1 stated "Each layer of welding shall be smooth and free of slag inclusions, porosity, excessive undercut, cracks and lack of fusion prior to beginning the next layer."

CB&I's procedure V15, *Visual Examination Technique Procedure ASME Section V Code – Article 9*, Revision 4, dated September 3, 1998, paragraph 4.1 stated "Prepare and clean the weld surface to be inspected", paragraph 4.1.1 stated "Remove weld spatter, slag and flux with descaling tools, wire brushes, grinding wheels or other suitable means".

Contrary to the above, CB&I Quality Control inspectors accepted fit-up of in process welding on Vessel A, ring 4, vertical welds C & D with welding slag, welding wire, and cracks on the ends of the tack welds.

Failure of CB&I to perform fit-up weld inspections in accordance with the CB&I *Visual Examination Technique Procedure ASME Section V Code – Article 9* procedure is a Finding against CB&I's QA Manual, QAP 10.2, *NDE, Inspection and Testing*, Paragraph 3.4 for failure to follow procedures (see inspection report A-03-OSR-RPPWTP-008, Section 1.6, Finding A-03-OSR-RPPWTP-008-F02.)

3. The Contractor's engineering specification 24590-HLW-3PS-MX00-T0001, *QL Shielded Personnel Access Doors*, Revision 1, dated July 16, 2002, Section 9.2.5 stated in part "Welding visual inspection reports shall be submitted to Buyer per MR Sections 3 and 5...."

Material Requisition number 24590-QL-MRA-ADDB-00001, *Shielded, Personnel Access Doors-QL*, Revision 2, dated July 17, 2002, Section 3, *Drawings and Data Requirements*, stated "Actual submittal requirements are listed on the G-321-E and G321-V forms attached

to this section. Form G-321-V, *Quality Verification Document Requirements*, document category number 12.0, required the submittal of Welding Verification Documents.

Contrary to the above, Material Receiving Report no. MRR-04312 for door liners HDH-LINER-00043 and HEH-LINER-00046 (Purchase Order No.24590-QL-POA-ADDB-00001, *Shielded, Personnel Access Doors-QL (MH-007) (VHL2) Q/DS*, Revision 2, dated August 9, 2002), contained Form G-321-V with Document Category Number 12 signed off by quality control indicating the documents were provided, however, the vendor had not included Welding Verification Documents for the shear studs used in the fabrication of the liners.

This is considered a Finding against QAM Policy Q-05.1 for failure to follow procedures (see inspection report A-03-OSR-RPPWTP-008, Section 1.7, Finding A-03-OSR-RPPWTP-008-F03.)

The ORP requests that 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 25 through March 6, 2003

REPORT NO: A-03-OSR-RPPWTP-008

FACILITY: Bechtel National, Inc.

LOCATION: 2435 Stevens Center
Richland, Washington 99352

DATES: January 25 through March 6, 2003

INSPECTORS: J. McCormick-Barger, Sr. Regulatory Technical Advisor, Inspection Lead
J. Bruggeman, ORP Site Representative
B. Harkins, ORP Facility Representative
D. Kirsch, Consultant
M. Evarts, Consultant
J. Mohatt, Consultant
D. Wallace, Consultant
D. Frey, Consultant
Chung-King Liu, Sr. Regulatory Technical Advisor
J. Polehn, Sr. Regulatory Technical Advisor
R. Treat, Consultant

APPROVED BY: P. Carier, Verification and Confirmation Official
WTP Safety Regulation Division

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EXECUTIVE SUMMARY

Introduction

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

- Chicago Bridge and Iron (CB&I) Tank Fabrication Readiness Assessment (Section 1.2 - 1.5)
- Adequacy of CB&I Tank Fabrication Activities (Section 1.6)
- Adequacy of Forms, Reinforcement Steel, and Embedded Steel Items and Associated Concrete Placements (Section 1.7)
- Adequacy of Fire Protection Piping System Work Activities (Section 1.8)
- Industrial Health and Safety (IH&S) Oversight (Section 1.9)
- Adequacy of Balance-of-Plant Construction Activities (Section 1.10)
- Review of Contractor actions to address the use of potentially contaminated soil for backfill (Section 1.11)
- Review of Inspection Follow-up Items (Section 1.12)
- Evaluation of ABCN 24590-WTP-ABCN-ENS-02-046, Rev. 0, *Revision to HLW PSAR to Reflect System RWH Drum Lidding Modification and Drum Assay Removal* (Section 1.13 and 1.14)
- Evaluation of ABCN 24590-WTP-ABCN-ENS-02-047, Rev. 0, *Melter Offgas (HOP) System AB Compliance* (Section 1.15 and 1.16).

Significant Observations and Conclusions

- The Contractor had performed substantial assessments of the CB&I activities involving Waste Feed Receipt Tank design, procurement, and fabrication readiness and provided a supportable basis for concluding CB&I readiness to proceed with construction activities. (Section 1.2)
- CB&I had provided the required details on Waste Feed Receipt Tank A drawings, and had reviewed and approved the drawings for construction in accordance with the CB&I Quality Assurance (QA) Manual requirements. (Section 1.3)
- CB&I's QA Manual conformed to the requirements of the SRD. (Section 1.4)

- CB&I established and implemented provisions onsite to assure Waste Feed Receipt Tank construction activities would be conducted in accordance with SRD, ASME Section VIII, and QA Manual requirements. One Finding (A-03-OSR-RPPWTP-008-F01) was identified regarding the Contractor's failure to conduct source surveillance inspections at CB&I Provo, Utah, as required by procurement documents. (Section 1.5)
- With one exception, CB&I established and implemented provisions onsite to assure welding and radiography of the Waste Feed Receipt Tanks would be conducted in accordance with Safety Requirements Document (SRD), American Society of Mechanical Engineers (ASME) Section VIII, ASME Section V, and QA manual requirements. One Finding (A-03-OSR-RPPWTP-008-F02) was identified regarding failure to perform fit-up inspections in accordance with established procedural requirements. (Section 1.6)
- The Contractor accomplished installation of reinforcement steel and placement of concrete in accordance with approved specifications, procedures, and authorization basis requirements. One Finding (A-03-OSR-RPPWTP-008-F03) was identified for failure to perform an adequate receipt inspection of HLW shield door liners. (Section 1.7)
- The Contractor accomplished hydrostatic testing, cleaning, and flushing of fire service water piping systems in accordance with established requirements. (Section 1.8)
- The Contractor acceptably implemented its program for industrial health and safety. Six examples of safety infractions were noted and promptly corrected during the inspection period. (Section 1.9)
- The Contractor initiated a number of positive electrical program improvements during the inspection period, which went a long way in addressing ORP's concerns regarding the Contractor's compliance with NEC requirements. One significant concern was identified and being addressed regarding the Contractor's failure to implement an adequate assured grounding program. (Section 1.10)
- Although some NEC noncompliances were identified during inspections of several new electrical installations, these noncompliances were addressed in a timely manner and marked improvement in performance was noted. (Section 1.10)
- The Contractor made substantial progress in upgrading the Potain tower cranes to meet National standards. (Section 1.10)
- The Contractor conducted hydrostatic testing on a portion of the potable water piping in areas 26, 30, and 31, in accordance with the established requirements. (Section 1.10)
- The Contractor performed concrete and soils testing associated with Switchgear Building # 87 subgrade wall concrete placement and backfill in accordance with the technical specifications, procedures, and applicable ASTM requirements. However, calibration frequency listed on the nuclear density gauge was for 18 months rather than the required

12 months. The concrete for the switchgear building walls was produced, placed, and consolidated in accordance with technical specifications, procedures, and required codes and standards. (Section 1.10)

- Following inappropriate use of off-project soil for backfill, the Contractor adequately identified and surveyed the soil to ensure it was not contaminated. The boundary between the WTP Project and the off-project location was reestablished with ropes and appropriate signage. (Section 1.11)
- Three previously identified Findings, two Assessment Follow-up Items (AFIs), and one Occurrence Report were closed during this inspection period. In addition, two AFIs were partially closed. (Section 1.12)

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ON-LOCATION INSPECTION REPORT FOR PERIOD OF JANUARY 24 THROUGH MARCH 6, 2003

1.0 REPORT DETAILS

1.1 Introduction

This inspection assessed the Contractor's and subcontractors' performance of important-to-safety (ITS) construction activities associated with readiness of Chicago Bridge and Iron Services (CB&I) to fabricate Pretreatment Facility (PTF) Waste Feed Receipt Tanks, CB&I welding activities, the Low Activity Waste (LAW), High Level Waste (HLW), and PTF installations of forms, reinforcing steel, and embedments, and concrete placements for conformance 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 inspection also reviewed the Contractor's implementation of firewater piping system construction activities, aspects of its Industrial Health and Safety program, including observing Contractor and subcontractor worker safety practices, and performance of Balance-of-Plant (BOP) construction activities not classified as ITS.

This report also contains ORP's review of Authorization Bases Change Notice (ABCN) 24590-WTP-ABCN-ENS-02-046 and 24590-WTP-ABCN-ENS-02-047. As part of these ABCN reviews, the inspectors assessed the Contractor's documented design changes regarding lidding and remote assay of waste drums, and melter offgas (HOP) system authorization bases AB compliance.

Details and conclusions regarding this inspection are described below.

1.2 Adequacy of the Contractor's Tank Construction Readiness Assessment (Inspection Technical Procedure [ITP] I-135)

1.2.1 Inspection Scope

The inspectors assessed the adequacy of the Contractor's assessment of readiness to perform Waste Feed Receipt Tank construction activities. CB&I had been selected to perform the tank design, procurement, fabrication, welding, and non-destructive examination (NDE) activities. The inspectors reviewed the Contractor's audits and surveys of CB&I to place CB&I on the Approved Supplier List (ASL) and the report of the assessment to determine the readiness of CB&I to perform tank fabrication activities at the site. The inspectors examined selected documentation and interviewed Contractor and CB&I management and staff.

1.2.2 Observations and Assessments

CB&I tank fabrication activities at the Waste Treatment and Immobilization Plant (WTP) site consisted of tank plate receipt inspection; welding material receipt, storage, and issuing; plate fit-up and alignment; plate welding activities; and weld NDE activities. Tank design activities were

performed at the CB&I office in Plainfield, IL. Activities related to material procurement, receipt inspection, and welding of alignment and lifting lugs were performed at the CB&I-Provo, UT shop. At the time of the inspection, CB&I had just received authorization from the Contractor to begin ITS work on tank construction and welding. CB&I had begun Waste Feed Receipt Tank A fit-up and alignment activities in its work area and was constructing protective barriers to keep the welding areas free of contamination by wind and weather.

The inspectors examined the scope and results of the Contractor's full scope survey of the CB&I-Provo shop in March 2002, to verify implementation of the QA program and implementing procedures. The inspectors verified the CB&I-Provo shop was placed on the Contractor's ASL on March 21, 2002, with the restriction CB&I may not ship any ITS shop welded/fabricated items to the Contractor's jobsite until the Contractor's QA had satisfactorily conducted a QA audit of the CB&I-Provo weld fabrication process (planned for about May 2003). The inspectors concluded the survey was a broad scope review of shop activities identifying several good issues requiring correction prior to full acceptance of CB&I. The Provo shop was audited again in October 2002, to verify implementation of survey corrective actions. A few new minor issues were identified by the Contractor and corrected. The inspectors examined the audit documentation and determined the audit scope was comprehensive and the findings were of a minor nature and corrected immediately.

The inspectors examined the scope and results of the Contractor's audits and reviews of the CB&I-Plainfield, IL facility to verify implementation of the CB&I QA Manual for design of Waste Feed Receipt Tanks and stainless steel liner. The initial audit was done in March 2002 resulting in the placement of CB&I-Plainfield on the ASL on March 21, 2002, with the restriction the Contractor's QA shall perform a surveillance of CB&I-Plainfield at the end of February 2003. A follow-up audit was performed during July 2002 and identified problems with the CB&I calculation performance and documentation processes; all other areas of the design control program audited were found acceptable. An additional audit was performed to verify correction of these issues. The inspectors concluded the Contractor had performed substantial efforts to verify CB&I-Plainfield could be placed on the ASL and performed additional verifications to assure design activities were conducted in accordance with contract and the approved CB&I QA Manual requirements.

The inspectors examined the activities of the Contractor's design engineering organization in reviewing the design work products of CB&I design engineering. The contract for tank design and fabrication specified an exhaustive listing of design documentation submittals required for review by the Contractor's tank design engineering staff. The list of required documents included a thorough listing of drawings, calculations, procedures, and material test reports. The inspectors examined the shop drawing package submitted by CB&I and determined the Contractor's review was substantial and performed by affected design disciplines. On January 16, 2003, the Contractor issued Task Order 13 to release CB&I to perform Waste Feed Receipt Tank field fabrication, installation, and testing with the provision the Contractor would audit onsite fabrication prior to commencement of work. The Contractor performed an audit of the CB&I readiness to conduct tank fabrication activities onsite. At the time of the audit, CB&I at the site was restricted, in accordance with a restriction on the ASL, from performing any ITS fabrication. The audit found one deficiency, which was resolved and closed before the audit

report was issued. The Contractor's audit was completed on January 23 and CB&I-Site was released to perform tank fabrication activities on January 24, 2003.

1.2.3 Conclusions

The inspectors concluded the Contractor had performed substantial assessments of the CB&I activities involving Waste Feed Receipt Tank design, procurement, and fabrication readiness and provided a supportable basis for concluding CB&I readiness to proceed with construction activities.

1.3 Adequacy of CB&I Drawings to Support Construction (ITP I-121 and 135)

1.3.1 Inspection Scope

The inspectors examined the CB&I tank fabrication drawings to verify conformance with the requirements of the Contractor approved CB&I QA Manual (24590-QL-SRA-MTF5-00001-04-01B, *Quality Assurance Manual for Waste Feed Receipt Vessels*, Revision 1, dated September 17, 2002).

1.3.2 Observations and Assessments

The inspectors examined the tank design drawings for conformance with selected requirements of the CB&I QA Manual procedure QAP 4.1.1N, *Preparation, Review, Approval, and Release of Detail Drawings*, Revision 0, dated April 18, 2002.

The inspectors found only the design drawings for Waste Feed Receipt Tank A had been issued to the site for construction. The inspectors examined the drawings for Waste Feed Receipt Tank A and found the drawings conformed to the selected QAP 4.1.1N requirements, identified below with the applicable QAP section in parentheses:

- The drawings provided sufficient information regarding item size, description, code dimensional tolerances, welding, heat treating, non-destructive examination, pressure testing, leak testing, extent of code boundaries, and material classification (Section 4.3)
- The drawings had been reviewed and the reviews documented (Section 5.0)
- The drawings had been reviewed and approved by the design engineer (Section 6.1).

The drawings were clear, legible, and approved for construction. The drawings conformed to the above requirements of the QA Manual.

The other Waste Feed Receipt Tanks were still in the design process and drawings had not been received at the site.

There had not been any design changes requested or issued for the Waste Feed Receipt Tank A; accordingly, the inspectors were unable to verify proper implementation of the engineering change notice program.

1.3.3 Conclusions

The inspectors concluded CB&I had provided the required details on Waste Feed Receipt Tank A drawings, and had reviewed and approved the drawings for construction in accordance with the QA Manual requirements.

1.4 Adequacy of CB&I QA and Quality Control (QC) Programs (ITP I-135)

1.4.1 Inspection Scope

The inspectors examined the CB&I quality assurance and QC programs to assess conformance with the requirements of the SRD Safety Criterion 7.3 regarding program development, personnel training and qualification, documents and records, work performance, inspection and testing, and record retention.

1.4.2 Observations and Assessments

The inspectors examined the CB&I QA Manual and determined the Contractor had approved the Manual for implementation on October 14, 2002.

The inspectors examined the QA Manual implementing procedures to assess whether the above SRD requirements had been implemented. The inspectors found the Manual contained sufficient provisions to adequately control the required processes and specified sufficient requirements in each area. Verifications of conformance with the specifically selected requirements of the QA Manual are provided in Sections 1.3 and 1.5 of this report.

1.4.3 Conclusions

The inspectors concluded the CB&I QA Manual conformed to the requirements of the SRD Safety Criterion 7.3.

1.5 Adequacy of CB&I Construction Implementing Procedures (ITP I-120, 121, and 135)

1.5.1 Inspection Scope

The inspectors examined the Contractor's engineering technical specifications and the CB&I procedures governing the performance of procurement, receiving, and welding and non-

destructive examination activities of Waste Feed Receipt Tank weldments for conformance with the CB&I QA Manual and the ASME Boiler and Pressure Vessel Code (B&PV) Section VIII, 1998 Edition, as required by SRD Volume II, Safety Criterion 4.2-2.

1.5.2 Observations and Assessments

The inspectors examined the quality assurance implementing procedures, welding procedures, and non-destructive examination procedures for conformance with certain provisions of the CB&I QA Manual procedure QAP 2.7x, *Contract Procedures*, Revision 0, dated July 18, 2002. The inspectors verified the procedures had been reviewed and approved in accordance with QAP 2.7x, Sections 3.2.4 and 3.2.5 and records of non-destructive examination personnel, equipment, and procedure qualifications had been accomplished as required by Section 3.4.F.

The inspectors examined the following Contractor engineering technical specifications applicable to the construction of the Waste Feed Receipt Tanks:

- 24590-WTP-3PS-MVB2-T0001, *Welding of Pressure Vessels, Heat Exchangers and Boilers*, Revision 0, dated December 20, 2001
- 24590-WTP-3PS-MV00-T0001, *Engineering Specification for Pressure Vessel Design and Fabrication*, Revision 0, dated April 22, 2002
- 24590-WTP-3PS-SS00-T0002, *Welding of Structural Steel and Welding of Structural Carbon Steel to Structural Stainless Steel*, Revision 2, dated July 31, 2002.

The inspectors observed specification 24590-WTP-3PS-MV00-T0001, Section 2.1, properly required conformance with the latest edition, and addenda of ASME B&PV Code, Section VIII, Division 1, *Rules for Construction of Pressure Vessels*. Conformance with the proper edition of Section VIII required conformance with the most recent edition of American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*, 1996 Edition. Section 2.1.13 of specification 24590-WTP-3PS-MV00-T0001 required conformance with the 1980 Edition of SNT-TC-1A. The 1980 Edition was also specified in Section 4.4 of specification 24590-WTP-3PS-SS00-T0002. The Contractor stated the specifications would be revised to reference the proper edition of SNT-TC-1A. The Contractor's corrective action will resolve the issue; therefore, the inspectors considered this issue closed. Section 3.1.2 of QA Manual, QAP 10.2.x, *NDE, Inspection and Testing*, Revision 1, dated July 18, 2002, properly required the NDE program be kept up-to-date to the latest Code edition of SNT-TC-1A.

Qualification and Certification of Nondestructive Testing Personnel

The inspectors selected several attributes of CB&I procedure QAP 10.2x for verification in the field. The inspectors' observations and conclusions are identified below, with a reference to the applicable section of QAP 10.2x.

- The inspectors examined the NDE program and found it had been kept up-to-date with the latest edition of SNT-TC-1A (Section 3.1.2).
- The inspectors verified NDE personnel qualifications were maintained at the CB&I field site (Section 3.2.3).
- The inspectors examined CB&I NDE procedures and found they had been approved by the CB&I certified Level III NDE examiner (Section 3.3.1). The inspectors examined the certification documentation of the CB&I Level III examiner and found the certification was satisfactory. However, Section 3.3.1 allowed NDE procedures to be approved by a Level II examiner. The latest edition of SNT-TC-1A required NDE procedures may only be approved by a Level III qualified examiner. The Contractor instructed the CB&I Welding and QC Manager to revise the QAP to remove the Level II allowance. This issue is closed because all CB&I NDE procedures had been approved by the Level III examiner, as required by the correct edition of SNT-TC-1A.

The inspectors selected several attributes of CB&I procedure QAP 10.2.1.N, *Qualification of Inspection and Test Personnel*, Revision 0, dated July 18, 2002, for verification in the field. The inspectors examined the qualification documentation and certifications for all NDE examiners on the CB&I-Site staff. The inspectors' observations and conclusions are identified below with a reference to the applicable section of the QAP.

- The training records demonstrated staff had been trained by on-the-job training and formal training seminars (Section 4.3.1).
- The inspectors examined the education and experience of onsite CB&I NDE personnel to determine whether each conformed with the minimum requirements for Level I or II, as specified by Section 4.4.4.A and B. The inspectors found the NDE staff had only one Level I examiner. The Level I individual did not have one year of experience in NDE activities and would have to be certified under the requirement for three months experience and high school graduation; however, the completion of high school graduation could not be verified because no high school graduation evidence was provided in the record. The Welding and QC Manager stated evidence of high school graduation would be obtained and included in the certification documentation. The inspector verified the training and certification records demonstrated satisfactory qualification for two Level II examiners. However, a third Level II examiner's record was missing evidence of NDE experience to demonstrate conformance with experience requirements. The Welding and QC Manager stated the individual had many years of requisite experience and the records would be obtained and inserted into the training file. The inspectors considered this was a documentation problem only because no NDE examinations had been performed up to the time of the inspection; accordingly, this issue is considered closed (Sections 4.4.4.A and B).
- The inspectors verified the Welding and QC Manager was certified by the Manager of Corporate Welding and QA Technologies (Section 4.5.1).

- The inspectors found the Welding and QC Manager was in process of generating documentation of qualification of each person who manages inspections and tests (Section 4.5.2). The Welding and QC Manager had documented the qualification of each person who performed inspections and tests (Section 4.5.2).

Training and Qualification of Non-NDE Personnel

The inspectors selected several attributes of CB&I procedure QAP 18.2x, *Training and Qualification Requirements of Personnel*, Revision 1, dated July 18, 2002, for verification in the field. The inspectors examined the qualification documentation and certifications for personnel on the CB&I-Site staff. The inspectors' observations and conclusions are identified below with a reference to the applicable section of the QAP.

- The inspectors verified the Welding and QC Manager had established a training matrix listing, by position, the education, training, and/or experience requirements determined necessary for all CB&I-Site positions (Section 4.1.1.1).
- The inspectors verified the CB&I-Site personnel had been trained in general criteria, applicable codes and standards, and the quality management system requirements, including familiarization with the QA Manual, QA procedures, and CB&I standards (Section 3.2).
- The inspectors verified the training matrix identified individual training needs (Section 4.1.1.2) and documented completion of the required training (Section 4.2.3).
- The inspectors verified CB&I had established a signed and dated organization chart of the qualified individuals in their organization by position (Section 4.1.1.3).
- The inspectors found the Welding and QC Manager was in process of generating individual training records for all CB&I-Site personnel. The manager stated these would be stored in the fire rated container when completed (Section 4.1.1.4).

Nonconformance Reporting

The inspectors were unable to verify conformance with the applicable QAP requirement because, due to the early phase of work, no nonconforming conditions had been identified. Likewise, no Corrective Action Reports had yet been generated; accordingly, the inspectors were unable to assess conformance with the applicable QAP.

Purchasing and Receiving

The inspectors determined the CB&I-Site had no procurement responsibility beyond requesting welding material from CB&I-Provo. The CB&I-Provo office accomplished all tank and welding material procurement and receiving inspection; accordingly, all procurement and receiving documentation was located at CB&I-Provo and not available on site for review by the inspectors.

To replenish inventory, the Welding and QC Manager requested welding material from CB&I-Provo and provided information regarding the requirements the welding material must meet.

The inspectors determined the CB&I-Site staff verified the receipt of acceptable material from CB&I-Provo. Waste Feed Receipt Tank plate was inspected on site to verify quantity, damage, and plate identification corresponded with documentation of material shipped by CB&I-Provo. The documentation supplied with the shipment by CB&I-Provo contained a unique identifier traceable to material heat numbers and Certified Material Test Reports (CMTR) retained at CB&I-Provo. The inspectors examined the documentation supplied to the site, and several tank plates, and concluded there was adequate information to provide for traceability to material heat numbers and CMTRs, located at the CB&I-Provo office. The inspectors examined the Contractor's actions to assure the material supplied to the jobsite by the CB&I-Provo shop was fully adequate in all respects; specifically, the inspectors requested evidence of source inspection or other methods used by the Contractor to provide assurance the items supplied by the CB&I-Provo shop fully conformed to procurement document requirements. The inspectors found the Contractor had not conducted source inspections or any other verifications of acceptability of items supplied by the CB&I-Provo shop. The Contractor took immediate action to provide an inspection of the shop by a QA representative during the week of February 2, 2003, and assure source inspections of the CB&I-Provo shop would be conducted in the future.

The Contractor investigated the above situation and found the CB&I Services contract had required and scheduled source verification inspections at the CB&I-Provo facility and the source inspections had not been performed, as required. The Contractor documented the discrepancy by Corrective Action Report (CAR) 24590-WTP-CAR-QA-03-024, *Subcontract Surveillance Inspection Activities*, dated January 30, 2003.

The Contractor's QAM Policy Q-07.1, "Control of Purchased Items and Services," Section 3.10.2, states "Source verification shall be implemented in accordance with plans to perform inspections, examinations, or tests at predetermined points."

The Contractor's subcontract document 24590-QL-SRA-MTF5-00001, *Construction Subcontract (CB&I)-Waste Feed Receipt Vessels and Stainless Steel Liner*, Revision 0, required, on Exhibit J, Section 3.0 under the paragraph titled "Surveillance Inspection Plan," the performance of Supplier Quality surveillance inspections of prefabrication, in process inspections of construction materials, witness of fit-up and welding, verification of welding procedure specifications and welder qualifications, and visual inspection of completed welds at the vendors (CB&I) facility. The failure to perform the subcontract required surveillance inspection is an inspection Finding against QAM Policy Q-05.1 for failure to follow procedures (Finding A-03-OSR-RPPWTP-008-F01.)

The inspectors examined CB&I's implementation of selected attributes of QAP 9.2x, *Welding Control*, Revision 0, dated July 18, 2002. The inspectors determined welding material was receipt inspected at the CB&I-Provo shop. The CB&I-Provo shop provided welding material to the site, from the supply of material retained at CB&I-Provo, as needed and requested by the site, including material heat information and CMTRs identifying the chemical and physical properties. The site performed receipt inspections to verify quantity received, damage, and material conformance with welding material Code requirements. The inspectors examined

documentation of CB&I-Site receipt inspections of welding material and concluded the documentation demonstrated completion of the required inspections and material conformance with specified requirements.

The inspectors verified the Welding and QC Manager prepared Welding Material Specifications for the purchase, by CB&I-Provo, of welding material (QAP 9.2x, Sections 2.1 and 3.1) in accordance with the provisions of QAS-W1, *Quality Assurance Specification for Welding Materials*, Revision 0, dated September 19, 2002, and QAS-W2, *Quality Assurance Specification for Welding Fluxes*, Revision 0, dated September 19, 2002. The inspectors examined the Welding Material Specifications for E316L-15 and E316LT1-1/4 electrode purchased, and in storage onsite, and verified conformance with specified requirements.

The inspectors examined the welding material storage area and verified the material was stored on dunnage within an enclosed area, properly identified, and accurately marked.

Records

The inspectors selected several attributes of CB&I procedure QAP 16.1x, *Quality Records*, Revision 1, dated July 18, 2002, for verification in the field. The inspectors examined the record storage provisions and access controls. The inspectors' observations and conclusions are identified below with a reference to the applicable section of the QAP.

- The inspectors verified CB&I quality records were stored in a 1-hour fire rated container at the facility (Section 6.1).
- The inspectors verified the record storage containers were locked and access had been restricted to only authorized personnel (Section 8.1).

Measuring and Test Equipment Calibration

The inspectors selected several attributes of CB&I procedure QAP 11.1x, *Calibration*, Revision 0, dated July 18, 2002, for verification in the field. The inspectors examined the calibration records for available equipment. The inspectors' observations and conclusions are identified below with a reference to the applicable section of the QAP.

The inspectors examined Material and Testing Equipment for conformance to CB&I's Quality Assurance Manual. CB&I had only one piece of calibrated equipment to-date on site, a densitometer numbered 3047, calibrated January 9, 2003, with an expiration date of April 9, 2003. The densitometer was calibrated in accordance with CB&I's procedure C8, *Calibration and Verification Check of Radiographic Transmission Densitometers*, Revision 10, dated August 15, 2001. The inspectors observed CB&I had not documented final approval of this procedure, indicated by a vacancy in the approval block on the procedure; this was pointed out to CB&I's QA Manager. The QA Manager notified the CB&I home office to correct the vacancy in the approval block. The inspectors concluded the densitometer was calibrated acceptably in accordance with the above procedure, ASME Section V, and QA Manual.

Welding Procedures

The inspectors examined CB&I's Welding Procedure Specifications (WPS), Procedure Qualification Records (PQR), and General Welding Procedure Specifications (GWPS) for compliance to ASME, Section VIII (*Division 1, Rules for Construction of Pressure Vessels, 2001* edition), and Section IX (*Boiler & Pressure Vessel Code – Welding & Brazing Qualifications, 2001* edition) Codes. The inspectors examined the following procedures:

- GWPS – SMAW, Revision 16, dated May 27, 1994
- GWPS – GTAW, Revision 15, dated May 27, 1994
- GWPS – GMAW/FCAW, Revision 16, dated May 27, 1994
- GWPS – SAW, Revision 17, dated May 27, 1994
- WPS – E316L, Revision 0, dated August 1, 2002, and PQR 9990, dated January 5, 1994
- WPS – E316LT1, Revision 0, dated August 1, 2002, PQR 7961, dated February 3, 1988, and PQR 5250, dated June 8, 1981
- WPS – ER316L, Revision 0, dated August 1, 2002, and PQR 7672, dated February 20, 1987
- WPS – ER316L/880M, Revision 0, dated October 17, 2002, and PQR 10056, dated February 28, 1994.

The inspectors concluded CB&I's welding procedures and specifications were in conformance with the above codes.

Welding Inspection Procedures

The inspectors examined CB&I's Non-Destructive Examination Procedures (NDE) for conformance with ASME, Section VIII and Section V (*ASME Boiler & Pressure Vessel Code-Non-Destructive Examination, 2001* edition) Codes. The inspectors examined the following procedures:

- Liquid Penetrant Procedures PT5S, *Liquid Penetrant Examination Technique Procedure for Color Contrast Solvent Removable, Wet Nonaqueous Developer*, Revision 18, dated August 29, 2001
- PT5W, *Liquid Penetrant Examination Technique Procedure for Color Contrast, Water Washable, Wet Nonaqueous Developer*, Revision 14, dated August 29, 2001

- PT8X, *Liquid Penetrant Requirements for ASME Section VIII Code – Division 1 & 2 Pressure Vessels Standard*, Revision 0, dated July 23, 2002
- RT5, *Radiographic Examination Technique Procedure for Plate and Pipe Welds*, Revision 15, dated August 29, 2001
- RT8, *Radiographic Requirements ASME Section VIII Code – Division 1 & 2 Pressure Vessels Standard*, Revision 11, dated November 16, 2001
- RT31.3, *Radiographic Requirements ASME B31.3 Code – Chemical Plant and Petroleum Refinery Piping Standard*, Revision 12, dated June 19, 2002
- RTWQ, *Radiographic Requirements ASME Section IX Code – Welding & Welding Operation Standard*, Revision 10, dated January 3, 2002
- V15, *Visual Examination Technique Procedure – ASME Section V Code – Article 9*, Revision 4, dated September 3, 1998
- V18, *Visual Inspection Requirements for ASME Section VIII Code – Division 1 & 2 Pressure Vessels Standard*, Revision 6, dated November 16, 2001
- UT1N, *Ultrasonic Examination Procedure Shell Base Material Examinations Before Welding of Fittings or Attachments*, Revision 1, dated July 23, 2002
- UT2N, *Ultrasonic Examination Procedure Shell & Head Attachment Welds Austenitic*, Revision 0, dated July 29, 2002
- UT3N, *Ultrasonic Examination Procedure Fitting Welds Austenitic*, Revision 0, dated July 29, 2002
- UT4N, *Ultrasonic Examination Procedure Skirt to Bottom Head Weld Austenitic*, Revision 0, dated July 29, 2002
- UT-DTM, *Ultrasonic Testing Digital Thickness Measurement*, Revision 2, dated September 5, 2002.

The inspectors concluded the NDE procedures were in conformance with the above referenced codes.

Tank Construction Process Control

The inspectors examined CB&I's work package traveler for vessel FRP-VSL-00002A. From review of the work package and inspection documentation the inspectors verified all the necessary attributes were addressed in accordance with CB&I QA Manual. CB&I had only performed one inspection, for receiving of material from Provo, Utah. The inspectors concluded

CB&I's work process control and inspection documentation was acceptable in accordance with ASME Section VIII and CB&I's QA Manual.

Welder Qualifications

The inspectors examined 21 CB&I welder qualification records for conformance with ASME Section VIII, Section IX, and the above welding procedures. CB&I's welders were qualified in accordance with the above codes and welding procedures. CB&I was maintaining the welders qualification matrix acceptably to verify the welders were maintaining current qualifications in accordance with ASME Section IX. The inspectors concluded CB&I's welder qualification program was in conformance with ASME Section VIII and ASME Section IX.

1.5.3 Conclusions

The inspectors concluded CB&I had established and implemented provisions onsite to assure Waste Feed Receipt Tank construction activities would be conducted in accordance with SRD, ASME Section VIII, and QA Manual requirements. One Finding (A-03-OSR-RPPWTP-008-F01) was identified regarding failure to conduct source surveillance inspections as required by the procurement contract.

1.6 Adequacy of CB&I Waste Feed Receipt Tank Fabrication (ITP I-120 and 121)

1.6.1 Inspection Scope

The inspectors examined the Contractor's engineering technical specifications and the CB&I procedures governing the performance of procurement, receiving, welding, and non-destructive examination activities of Waste Feed Receipt Tank weldments for conformance with the CB&I QA Manual and the ASME Boiler and Pressure Vessel Code (B&PV) Section VIII, 1998 Edition, as required by SRD Volume II, Safety Criterion 4.2-2.

1.6.2 Observations and Assessments

The inspectors performed a general overview of in-process-welding on Vessel A, ring 4, vertical welds C & D. The inspectors observed fit-up gaps, alignment, and general workmanship were in conformance with welding details on drawing FRP-VSL-00002A, *Waste Feed Receipt*, Revision 3, dated August 28, 2002. The CB&I welding inspector had signified the acceptance of the fit-up by marking his initials and date and "fit-up ok" on the vessel shell next to the weld. The inspectors observed welding slag, welding wire, and cracks on the ends of the tack welds. Specification 24590-WTP-3PS-MVB2-T0001, *Welding of Pressure Vessels, Heat Exchangers, and Boilers*, Revision 0, dated December 20, 2001, paragraph 10.1 stated "Each layer of welding shall be smooth and free of slag inclusions, porosity, excessive undercut, cracks and lack of fusion prior to beginning the next layer." CB&I's procedure V15, *Visual Examination Technique Procedure ASME Section V Code – Article 9*, Revision 4, dated September 3, 1998, paragraph 4.1 stated "Prepare and clean the weld surface to be inspected", paragraph 4.1.1 stated

“Remove weld spatter, slag and flux with descaling tools, wire brushes, grinding wheels or other suitable means”. Failure of CB&I to perform fit-up weld inspections in accordance with the CB&I procedure V15 is a Finding against CB&I’s QA Manual, QAP 10.2, *NDE, Inspection and Testing*, Paragraph 3.4 (Finding A-03-OSR-RPPWTP-008-F02.)

CB&I issued Nonconformance Report H1, dated February 20, 2003, to address this issue.

The inspectors performed a general review of the first radiographs on vessel A, welds 5-A, 5-B, 5-D, and 5-E for compliance to ASME Section VIII and ASME Section V, Article 2. The inspectors verified the film quality and reviewed the film for rejectable defects. Weld 5-A was rejected by CB&I for slag, repaired by welding, and re-radiographed. The repaired weld was acceptable per ASME Section VIII. The inspectors verified the calibration of film strip #4303, and found it to be acceptable in accordance with CB&I’s procedure C7, *Calibration and Verification Check of Step Wedge Calibration and Comparison Films*, Revision 9, dated August 15, 2001, and ASME Section VIII.

1.6.3 Conclusions

With one exception, the inspectors concluded CB&I had established and implemented provisions onsite to assure welding and radiography of the Waste Feed Receipt Tanks would be conducted in accordance with SRD, ASME Section VIII, ASME Section V, and QA manual requirements. One Finding was identified regarding failure to perform fit-up inspections in accordance with established procedural requirements (Finding A-03-OSR-RPPWTP-008-F02.)

1.7 Adequacy of Forms, Reinforcement Steel, and Embedded Steel Items and Associated Concrete Placements (ITP I-113)

1.7.1 Inspection Scope

The inspectors examined the Contractor’s and subcontractor’s procedures and engineering technical specifications governing the installation of reinforcement steel, embedment plates, and structural concrete, to determine whether the specified activities conformed to authorization basis (AB) and industry codes and standards, specified in the SRD, Volume II, Safety Criterion 4.1-2. Further, for the following placements, the inspectors examined the installations of reinforcing steel and concrete placement activities in the field to assess whether those activities had been conducted in accordance with Contractor program, procedure, and AB requirements.

- Concrete Pour Card – HLW-0001C
- Concrete Pour Card – HLW-0001D
- Concrete Pour Card – HLW-002D
- Concrete Pour Card – HLW- 007C
- Concrete Pour Card – HLW-014
- Concrete Pour Card – PTF-C-0006
- Concrete Pour Card – PTF-C-0007

- Concrete Pour Card – PTF-C-0010-2
- Concrete Pour Card – PTF-C-0011-1
- Concrete Pour Card – PTF-C-0011-2
- Concrete Pour Card - LAW-0012
- Concrete Pour Card – LAW-0017.

1.7.2 Observations and Assessments

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

- 24590-WTP-3PS-D000-T0001, *Engineering Specification For Concrete Work*, Revision 2, dated July 31, 2002
- 24590-WTP-3PS-DB01-T0001, *Engineering Specification For Furnishing and Delivering Ready-Mixed Concrete*, Revision 4, dated September 4, 2002
- 24590-BOF-3PS-C000-T0001, *Engineering Specification For Material Testing Services*, Revision 2, dated July 12, 2002
- 24590-WTP-3PS-FA01-T0001, *Engineering Specification For Furnishing of Anchor Bolts (Rods)*, Revision 1, dated February 5, 2002
- 24590-WTP-GPP-CON-3203, *Concrete Operations (Including Supply)*, Revision 1, dated October 1, 2002.

The inspectors concluded the documents described above continued to conform to the Codes and Standards required by SRD Safety Criterion 4.1.2, and contained the necessary installation requirements to perform the work.

In preparation for walk downs of recently installed reinforcement steel and other components incorporated within the placements described above, the inspectors examined ten drawings in the areas of concrete reinforcement, forming, and arrangement, and examined construction work activities associated with the placements for conformance with the requirements of the applicable drawings. The inspectors concluded the ten drawings were the most current revisions at the time of the walk down.

Installation of Forms, Reinforcement Steel, and Embedments

For the placements listed above, the inspectors witnessed in-process final inspections of installed forms, reinforcement steel, and embedments performed by QC inspectors. These inspections included verifying exterior wall, embed plates, form configuration, clear cover requirements, splice lengths, joint preparation, and final clean up conformed to applicable drawings and procedure requirements. The inspectors concluded the QC inspectors were thorough in verifying applicable reinforcement steel and related components within the placements, and were

knowledgeable regarding the applicable specifications. The inspectors performed a general inspection of the above items and other attributes shown on the drawings applicable to the items being inspected. The inspectors concluded the inspections performed by the QC inspector were acceptable and the above attributes conformed to established requirements.

HLW Shield Doors

The inspectors reviewed the following drawings, specifications, purchase orders, and the material receiving report for the HLW personnel shielded access door embedded liners HDH-LINER-00043 and HEH-LINER-00046:

- 24590-HLW-MX-30-00001001, *HLW Vitrification Design Proposal Drawing Personnel Shielded Access Door Schedule*, Revision 1, dated July 16, 2002
- 24590-QL-POA-ADDB-00001-09-01, *Door Assembly Bechtel Job # 24590 Premier Shop # C-4663-NQA1 Left Hand Shielded Personnel Access Door 12" thk. 48" Wall*, Revision 00F, dated December 13, 2002
- 24590-QL-POA-ADDB-00001-25-01, *Headed Shear Connector Bechtel Job # 24590 Premier Shop # C-4663-NQA1 Left Hand Shielded Personnel Access Door 12" thk. 48" Wall*, Revision N/A, dated August 2, 2002
- MRR-04312, *Material Receiving Report*, Revision 0, dated September 19, 2002
- 24590-HLW-3PS-MX00-T0001, *Engineering Specification for QL Shielded Personnel Access Doors*, Revision 1, dated July 16, 2002
- 24590-QL-POA-ADDB-00001, *Purchase Order Number*, Revision 1, dated August 9, 2002.
- Material Requisition number 24590-QL-MRA-ADDB-00001, *Shielded, Personnel Access Doors-QL*, Revision 2, dated July 17, 2002.

The inspectors reviewed the purchase order, Material Requisition, and Material Receiving Report (MRR) against the requirements specified in the engineering specification. The purchase order addressed the engineering specification requirements.

The Material Requisition, Section 3, *Drawings and Data Requirements*, stated "Actual submittal requirements are listed on the G-321-E and G321-V forms attached to this section." Form G-321-V, *Quality Verification Document Requirements*, document category number 12.0, required the submittal of Welding Verification Documents. MRR-04312 contained Form G-321-V with Document Category Number 12 signed off by quality control indicating the documents were provided, however, the vendor had not included Welding Verification Documents for the shear studs used in the fabrication of the liners. This is considered a Finding against QAM Policy Q-05.1 for failure to follow procedures (A-03-OSR-RPPWTP-008-F03.)

Concrete Placements

The inspectors examined the above listed Concrete Pour Cards for placements observed during this inspection period, and concluded the required signatures were in place prior to the start of the placements.

The inspectors observed the Contractor's training staff on the requirement to perform added concrete consolidation (revibration) needed to address excessive cracks on a prior HLW slab placement. This revibration was referenced in ACI 309 *Guide for Consolidation of Concrete*. The inspectors verified the revibration requirement was listed on applicable Concrete Pour Cards PTF-C-0006, PTF-C-0010-2, and LAW-0012. The inspectors observed revibration efforts on these placements approximately 90 minutes after completion of the final lifts and before the concrete had reached its initial set. The inspectors observed a dark substance after consolidation from the fourth and fifth lifts of concrete of wall placement # PTF-C-0006 only. The inspectors notified the Contractor of the dark substance. The Contractor identified the dark substance as fly ash in the mix. The inspectors concluded that the Contractor was correct in their assessment of the dark substance.

The inspectors observed field engineering staff performing concrete receipt activities and observed their review of the batch tickets, as required by Section 3.11.2 of *Concrete Operations (Including Supply)*. The inspectors observed a field engineer directing the Material Testing subcontractor to perform additional testing of the delivered concrete to ensure conformance with specification requirements. The inspectors concluded these activities were performed in accordance with established requirements.

The inspectors observed the Materials Testing subcontractor field technicians performing concrete receipt activities, observed the review of batch tickets, and observed recording of information required by Section 3.2.1 of the *Engineering Specification for Material Testing Services*. The inspectors concluded these activities were performed in accordance with the specification.

The inspectors examined the conduct of testing for concrete temperature, slump, and unit weight, and observed filling and capping the 6-inch by 12-inch compressive test cylinders, and the field storage of the test cylinders for the placements identified above. The inspectors concluded the Material Testing subcontractor technicians were performing these testing activities in accordance with their procedures, the applicable American Society for Testing and Materials (ASTM) standards, and Contractor's specifications.

The inspectors witnessed the placement of concrete, for the placement listed above, and concluded the concrete was being produced, placed, consolidated, and tested in accordance with procedures, specifications, and required codes and standards. The inspectors concluded the Contractor was conforming with the maximum 24 inch lift height, as required by Section 3.7.4 of *Engineering Specification for Concrete Work*. The inspectors observed the 4 vertical feet per hour maximum placement rate, established by the panel manufacturer, was being maintained. Placements were being performed using cut-away tremie systems, which insured concrete was being placed in a controlled manner. The process also ensured the concrete did not exceed the

maximum free fall distance, as outlined in Section 3.7.1 of *Engineering Specification for Concrete Work*.

1.7.3 Conclusions

Concrete was being produced, placed, consolidated, and tested in accordance with procedures, specifications, and required codes and standards. Reinforcement steel installations were performed in accordance with established procedures, specifications, and drawings. Qualified inspectors were performing QC activities for this work in a thorough manner, and QC activities were documented as required by procedures. One Finding was identified regarding failure to ensure HLW shield door frame welding documentation was provided by the vendor during receipt inspection (A-03-OSR-RPPWTP-008-F03.)

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

1.8.1 Inspection Scope

The SRD, Volume II, Section 4.5, *Fire Protection*, safety criterion 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 the 1192 addition of NFPA-24, *Standard for the Installation of Private Fire Service Mains and their Appurtenances*.

The inspectors examined seven hydrostatic test packages for conformance with SRD Safety Criteria specified in Volume II, Section 4.5 requirements and observed the conduct of hydrostatic testing on five fire protection piping segments, and two piping system flushes to determine whether the testing conformed to the requirements.

1.8.2 Observations and Assessments

In preparation for inspecting firewater testing activities, the inspectors examined the following documents governing the installation, flushing and cleaning, and hydrostatic testing of the Fire Service Water System:

- 24590-BOF-C2-C12T-00022, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 22*, Revision 2, September 9, 2002.
- 24590-BOF-C2-C12T-00025, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 25*, Revision 2, September 9, 2002.
- 24590-BOF-C2-C12T-00026, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 26*, Revision 2, September 9, 2002.

- 24590-BOF-C2-C12T-00029, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 29*, Revision 2, September 9, 2002.
- 24590-BOF-C2-C12T-00031, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 31*, Revision 3, September 10, 2002.
- 24590-BOF-C2-C12T-00032, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 32*, Revision 2, September 10, 2002.

The inspectors examined the Contractor's test packages 24590-WTP-PTR-P-03-0015, Revision 0, BOF Area 26; 24590-WTP-PTR-P-03-0016, Revision 0, Area 26; 24590-WTP-PTR-P-03-0018, Revision 0, BOF Area 31 and 32; 24590-WTP-PTR-P-03-0019, Revision 0, BOF Areas 25 and 29; and 24590-WTP-PTR-P-03-0044, Revision 0, BOF Areas 22 and 26. The inspectors verified the proper test boundaries were specified, valve line-ups were thorough, and the required test parameters had been specified. The inspectors verified the calibration of the pressure gauge was current, the appropriate calibration stickers were affixed, and the gauge range conformed to the requirements established by National Fire Protection Association (NFPA), *Standard for the Installation of Private Fire Service Mains and their Appurtenance*.

The inspectors observed the conduct of hydrostatic testing on a portion of the fire service water piping in Areas 22, 25, 26, 29, 31, and 32, and verified the hydrostatic testing had been conducted in accordance with the Contractor's established requirements and NFPA 24, and the system tests conformed to established requirements regarding leakage and time at pressure.

1.8.3 Conclusions

The inspectors concluded the Contractor had accomplished hydrostatic testing, cleaning, and flushing of fire service water piping systems in accordance with established requirements.

1.9 Industrial Health and Safety (IH&S) Oversight (ITP I-162)

1.9.1 Inspection Scope

The inspections in this area focused on the 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 *Nonradiological Worker Safety and Health Plan (HSP)*, 24590-WTP-PL-IS-01-001, Revision 1, dated December 30, 2002, for the River Protection Project –Waste Treatment Plant, which had been reviewed and approved by the ORP, along with applicable requirements specified in ORP M 440.1.2. Areas reviewed included Contractor oversight of subcontractor safety and health programs; lock and tag activities; hoisting and rigging activities; maintenance of heavy equipment (as specified within 29 CFR 1926); safety practices during performance of maintenance services; and hazards reviews associated with balance-of-plant (BOP) facilities.

1.9.2 Observations and Assessments

Lock and Tag

The inspectors inspected two electrical construction operations in order to determine the Contractor's conformance with 24590-WTP-GPP-SIND-008_3, *Lockout/Tagout*, dated November 7, 2002. This procedure governed the control and isolation of hazardous energy throughout the site.

The inspectors investigated the adequacy of the Contractor's conformance to 24590-WTP-GPP-SIND-008, Revision 3, *Lockout/Tagout*, dated November 7, 2002. The above-mentioned procedure had been reviewed by ORP and found to conform to the requirements of Revision 0 of the HSP, dated July 10, 2001.

The following two electrical tasks were "walked down" by the inspectors and Contractor representatives to determine if the manner in which the connections were made conformed to the Lockout/Tagout procedure.

- The inspectors walked down the temporary electrical connection from the T-11 transformer, located near the LAW facility, to the Potain Tower Crane panel (third level). The inspectors determined through discussions with craft and the foreman the T-11 switch had been locked and tagged by the tagging authority. Further, the inspectors inspected the tagging authority's logbook and confirmed a lock and tag had been applied before the date of the connection in accordance with the procedure. The inspector determined the Contractor had conformed to the Lockout/Tagout procedure.
- The inspectors walked down the T-4 facility roof mounted outdoor lighting installation. Based upon the method used to connect the lights, the location of the junction box, and the foreman's response to inspectors' questions, the inspectors concluded the Contractor had conformed to the Lockout/Tagout procedure. The Contractor used authorized/qualified individuals to properly control unwanted energy sources and protected the workers in lieu of using locks and tags. The inspectors determined this job had been completed in accordance with the Lockout/Tagout procedure, which allowed the process used in this case.

Hoisting and Rigging

The Contractor was required, under the HSP, to conform with all requirements specified within the ASME B30.5 (with addenda), *Mobile and Locomotive Cranes*. This ASME standard included requirements for erection, construction, inspections, testing, and operator certification. The inspectors based their inspections on the above ASME requirements.

The inspectors attended meetings held by the Contractor detailing steps taken to safely assemble, outfit, and train the operators for the Model 248 Link-Belt crane configured for luffing operation. These steps were based upon accident investigation team findings and corrective actions in the report of a July 1, 2002, accident involving a model 278 Link-Belt crane configured for luffing operation (discussed in ORP Inspection Report IR-02-008, Section 1.13.2.7). The Contractor

used a checklist that required (amongst other items), the installation of additional limit switches for the boom and the jib, enhanced operator training, and more detailed daily, monthly, and annual inspections (performed by the Contractor and vendor representatives). The inspectors witnessed the assembly, pre-operational checks, inspections, operator proficiency testing, and the installation of limit switches. The inspectors interviewed crane personnel, including the vendor, operator, oiler, and maintenance personnel. Finally, the inspectors witnessed the operation of the limit switch functions from the operator's cab as well as witnessed the pre-operational load and brake test.

After completion of the checklist items, the Contractor met with the inspectors and discussed the efforts taken to make the Model 248 Link-Belt crane ready for luffing operations. The inspectors determined the crane and operator preparation and readiness conformed to the Contractor's commitments made following the Model 278 Link-Belt luffing crane accident described above. Following verification of the actions taken, the inspectors briefed senior ORP management on these actions. Senior ORP management released the Contractor to use the Model 248 Link-Belt crane in the luffing configuration. Subsequently the Contractor placed the crane in luffing operation.

During a subsequent inspection, the inspectors observed luffing crane operations at the LAW construction site and, based upon the inspectors observations and further discussions with the Contractor, determined the crane was operated in the manner in which it was designed. Later, after two weeks of operations, the inspectors interviewed the crane operator and the oiler to determine if the necessary adjustments and improvements to the crane were working. The response to the inspectors was the machine was operating in its intended manner.

CBI IH&S Program Readiness

Section 2.7 of the HSP specified all subcontractors will be required to adhere to the Contractor's HSP. The inspectors inspected the Contractor's procedures for assessing the health and safety program of a major subcontractor, CB&I, using the appropriate elements of the Contractor's HSP.

The Contractor developed a checklist used to verify major subcontractor compliance with the HSP. The inspectors reviewed the checklist and determined the checklist did not include some of the program elements required by the Contractor's safety and health plan, such as industrial hygiene hazard analysis, and sampling and monitoring. The Contractor's representative agreed to amend the existing checklist to include all pertinent elements within the Contractor's plan and ensure the subcontractor would be evaluated for the aforementioned elements not included in the Contractor's checklist. This was the first time that a formal checklist was used to evaluate a major subcontractor. However, the inspectors have determined, from previous inspections, the Contractor had required other subcontractors to provide baseline and routine sampling and monitoring for their employees. Such documentation had been provided during previous inspections.

The inspectors verified the Contractor had completed the checklist (minus the elements missing as discussed above) when assessing CB&I's IH&S program implementation. The inspector accompanied the Contractor's IH&S representatives to the CB&I job site and discussed CB&I's

IH&S program with CB&I IH&S management. The inspectors determined, with the exception of ambient air sampling/monitoring of welding operations discussed below, documents and actions taken or planned conformed to the requirements of the Contractor's IH&S Plan.

Prior to conducting a walk-through of the CB&I job site, the inspectors were required to sign a Safety Task Analysis Risk Reduction Talk (STARRT) card as well as read the safety and health bulletin board and the job hazard analysis. During the initial walk-through of the job site the inspectors determined required ambient air sampling/monitoring of welding operations within the fabrication area had not been performed. The Contractor's IH&S representative committed to request the subcontractor to initiate prompt baseline sampling on welding operations. Further, the subcontractor had verbally committed to initiate monitoring. The subcontractor subsequently undertook personnel sampling during this inspection period. Results of the sampling were awaiting laboratory analysis and reporting.

The inspectors determined CB&I was conforming to the Contractor's IH&S plan.

Maintenance of Equipment-Heavy and Light

29 CFR 1926, subparts N and O specified requirements for the maintenance, testing, and inspection of construction equipment. This inspection assessed the Contractors compliance with these requirements and assessed maintenance personnel compliance with other applicable worker protection requirements within the Contractor's HSP.

The inspectors reviewed random Contractor equipment maintenance files and compared the frequency and type of inspections and tests entered in the file against the applicable equipment vendor recommendations. The inspectors determined from this sampling, the maintenance work conformed to the vendor requirements. In one instance, the inspectors determined the required load and brake test data sheets were not included in a crane file. The inspectors also determined the Contractor entered repairs as "Contractor Serviced" in a crane maintenance file, when a vendor subcontractor accomplished the repairs. The Contractor foreman corrected the entries and inserted the latest load and brake test data in the appropriate file prior to the completion of this inspection. The inspectors determined, based upon the random selection and inspection of files and manuals, the maintenance and servicing of equipment conformed to the requirements specified within 29 CFR 1926, subparts N and O.

The inspectors accompanied mechanics/equipment service persons during back-shift maintenance activities in order to determine the safety of these routine activities. The mechanics inspected, serviced, and repaired (when authorized) Contractor owned and leased equipment ranging from the small compactors to the largest lattice boom cranes. The inspectors participated in the pre-job meeting and the daily exercise session, and then accompanied various mechanics. Personnel wore proper protective equipment for the tasks assigned, including fall protection. The inspectors noted seat belts were worn prior to starting any of the equipment requiring service. Mechanics were removing keys from the ignition of large items of equipment prior to servicing or inspecting them in order to protect against un-wanted, hazardous energy sources. Adequate task lighting was provided for the workers on jobs requiring servicing, inspecting etc. The inspectors noted one fuel line with a permanent kink in the hose on one of the service vehicles. The kink constituted a potential for a sudden loss of fuel creating both an

employee safety risk and an environmental risk. The foreman committed to order a replacement hose promptly.

During a return inspection of the Operating Engineer's shop, the inspectors noted two welders were welding and one was grinding with no local exhaust ventilation and minimal general ventilation. The inspectors immediately attempted to report this nonconformance to the Contractor's HSP to the superintendent. The issue was reported to the Contractor's senior safety engineer and he promptly initiated corrective action.

During this inspection period, the Contractor installed an exhaust ventilation system. The inspectors determined the installation of the exhaust system coupled with necessary personnel sampling provided conformance with the requirements of ORP-M440-1.2.

Combo Shop

See Section 1.12.4 for a discussion of the Contractor's actions to address a concern regarding the failure to performing an IH&S hazards review of the combo shop. During a walk-through of the combo shop the inspectors noted compressed gas bottles unsecured. This was a violation of 29 CFR 1926, Subpart J. The inspectors brought this condition to the Contractor's attention and it was immediately corrected.

Tower Cranes

The Contractor was required by ORP M440.1-2 to conform to requirements of the ASME, Standard B30.3, *Tower Cranes*. The inspectors utilized the ASME standard and the Contractor's resulting procedures for this inspection. Problems with the tower crane compliance with ASME B30.3 concerning ladder way access to the tower cranes were extensively documented and discussed in Inspection Report A-03-OSR-RPPWTP-001, Section 1.5.2, and A-03-OSR-RPPWTP-006, Section 1.5.2.

Drawings were prepared by the Contractor and approved by the vendor to provide new ladder ways in the transition areas of the tower cranes. Nonconforming ladder ways were being tracked as assessment follow-up item (AFI) A-03-OSR-RPPWTP-006-A02. Based upon the drawings and an onsite inspection, the new ladder way installation conformed to ASME B30.3 requirements. However, the Contractor was reviewing the drawings to ensure any additional hangers or devices required for the elevator installation would not compromise the safety of the proposed ladder section. From an onsite inspection of the crane, the inspectors determined rotating equipment, located on the jib deck adjacent to a foot walk, was not guarded in accordance with the ASME B30.3. Also, the inspectors noted significant deformation of the expanded metal on the counter jib foot walk. During the test, the inspectors witnessed a weld machine being removed from the counter jib foot walk. Based upon ASME B30.3 requirements, the structural criteria for foot walks are based upon personnel loading; not heavy equipment. The above standard also provided protection from deformation of foot walk surfaces. The foot walk surface of the LAW tower crane had been deformed by weights other than personnel loading.

The Contractor committed to provide an engineering assessment of the foot walks on the jib to determine if they meet the personnel load specifications required by the ASME Standard. The Contractor further committed to evaluate the placement of the new ladder ways and guarding of rotating equipment where such equipment constituted credible nip or catch hazards. These issues will continue to be tracked under AFI A-03-OSR-RPPWTP-006-A02.

The inspectors attended a briefing by the Contractor regarding the start-up testing protocol for the tower crane operation in accordance with a punch list of electrical and structural deficiencies. The Contractor provided the inspectors with a discussion of open and closed punch list items. Based upon the discussion and presentation of the punch list items, and subsequent verification of completion of the open items by the inspectors (see Section 1.10, Subsection *Potain Tower Crane (Electrical)*), the Contractor began pre-operational testing of the crane.

The inspectors witnessed the Contractor's operational/functional crane testing. The functional testing was performed in accordance with 24590-WTP- RIG-CON-03-050, *Rigging Plan and Test for Tower Cranes*, Revision 0, dated February 27, 2003.

During testing, the inspectors observed on one occasion, workers had moved under the suspended load test weight. The inspectors informed the onsite foreman and the superintendent and necessary corrections in work practice were initiated.

The inspectors observed one noteworthy practice where the crane operator stopped the job, during the three hundred sixty-degree rotation test, when he observed a potential interference with his flight path. The job was halted, until the potential interference (a lattice boom) was lowered.

During a lunch break while load testing the crane, the inspectors observed a craft person exit the tower crane without using the required fall protection while passing through the transition portion of the tower. The inspectors brought this observation to the attention of Contractor's safety representatives and senior construction management. The inspectors were subsequently informed the crews were reminded of the fall restraint requirement and the need for compliance to this requirement.

Pedestal Cranes

ASME B30.4, *Pedestal Cranes*, provided structural criteria, and testing and rigging requirements similar to that provided in ASME B30.3, *Tower Crane*. The inspector reviewed the Contractor's efforts to ensure the Pedestal Cranes (foreign made) were being procured in a manner that would preclude similar problems as those experienced with the tower cranes regarding compliance with national safety standards.

The inspectors reviewed correspondence from the Contractor to the vendor of the pedestal cranes re-iterating the need for the cranes to be equipped with OSHA approved equipment and be in compliance with NEC requirements. The inspectors determined adequate hazards reviews and proactive efforts were taken to ensure the cranes, which were scheduled to arrive in April, would be either in compliance with the above cited requirement or be returned to the vendor for re-work.

Scaffolding and Ladder Usage

The inspectors conducted a field review of scaffolding and ladder usage at the LAW, HLW, PTF, switchgear, and support buildings. The inspectors determined ladders, stairways, aerial lifts, and scaffolding met the requirements of 29 CFR 1926.1053, 29 CFR 1926.1052 and 29 CFR 1910.23, 29 CFR 1926.453, and 29 CFR 1925.451, respectively. In addition the inspectors observed personnel using the installations. The inspectors observed no unsafe or improper usage.

During the inspection, inspectors identified two incidents of missing scaffolding inspection tags. During searches in the applicable areas, the inspectors located the missing tags. In both cases, no personnel were currently using the scaffolding and the tags indicated the scaffolds had been inspected on the day of the inspection. During this inspection, the site was experiencing high winds. The dislocated tags were brought to the Contractor's attention.

The inspectors interviewed some craft and safety personnel to determine if they knew the requirements for safely using the ladders, stairways, aerial lifts, and scaffolding. Personnel interviewed were knowledgeable of the specific requirements. In some instances, without prompting, the inspectors were challenged by craft personnel to ensure the inspectors had received the necessary training on scaffolding and ladder usage. Craft personnel also offered suggestions as to how the inspectors could be safer while using scaffolding and ladders.

The inspectors inspected an extension ladder used on the LAW wall to gain access to the top of the wall. The extension ladder rails were resting evenly on the top of the wall, solidly anchored in the mid section to the wall, and firmly cleated at the base. However, the ladder terminus was extended by the use of two 2x4s anchored to the outside of the ladder side rails by the use of threaded rods (inserted inside the top two rung orifices) with lock nuts and washers. The inspectors had used this ladder arrangement several times and found it to be sound and sturdy. Although American National Standards Institute (ANSI) A14.2-2, *Extension Ladders*, Section 8.3.11, prohibits ladder sections from being fastened together and prohibits deformation, this practice, (mentioned above) did not fall under the definition of "fastening together". The extensions were placed in order to provide handholds for persons exiting the ladder on the wall top.

The inspectors determined some stress could be imparted on the ladder by the use of the extended holds. Thus the inspectors requested the Contractor's competent person inspect the interior of the rungs used for the 2X4 extensions as well as the side rails for any deformation created by stress associated with the use of these 2X4s on a frequent basis to ensure deformation was not detected. Further, if deformation were to have been detected during the competent person's inspection, the ladder was to have been destroyed and the practice curtailed. The Contractor had agreed to provide inspections and ladder destruction if required by the competent person.

After review of the installation of ladders, stairways, and scaffolding and the use of aerial lifts, the inspectors concluded the Contractor's program for use of these devices was adequately implemented.

1.9.3 Conclusions

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

1.10 Adequacy of BOP Construction Activities (ORP M 414.1-4)

1.10.1 Inspection Scope

The inspectors reviewed selected balance-of-plant (BOP) construction activities to determine if the Contractor was performing these activities in accordance with the QAM, and approved design, technical specifications, construction procedures, work packages, and other related documents.

1.10.2 Observations and Assessments

Electrical Equipment Installation Program Improvements

During the previous two on-location inspection periods, the ORP identified about 30 examples of National Electric Code (NEC) noncompliances associated mostly with temporary power installations at the WTP construction site. These noncompliances cumulated in a request in the cover letter¹ for inspection report A-03-OSR-RPPWPP-006 for the Contractor to develop a systematic process to ensure compliance with NEC requirements and to ensure past site electrical work would be reviewed for compliance with NEC requirements.

In response to ORP's concerns, the Contractor made the following improvements to its electrical program: (1) Hired an experienced NEC inspector to supplement BNI field engineering inspection efforts; (2) Revised the "Control of Temporary Electrical Installations Procedure," requiring inspections on all new installations and modifications to ensure compliance with the 2002 NEC, including verifying installations agree with the issued design, and documenting inspection results on NEC Reports; (3) Required electrical field engineers to provide more detailed design information to the installers; (4) Established a "Temporary Power Open Inspections Items List" for tracking inspection deficiencies; (5) Distributed Lessons Learned to the Responsible Field Engineer; and (6) Required Field Engineering to train the craft on the most frequent misapplications of the NEC.

During this inspection period the Contractor corrected numerous existing Assessment Follow-up Items (AFIs) (see Section 1.12 for a discussion of review of previous AFIs). The inspectors assessed several new temporary installations and identified minor or no deficiencies (see

¹ ORP letter from R. Schepens to R. Naventi, BNI, "Inspection Report A-03-OSR-RPPWTP-006 – On-Location Inspection Report for the Period December 5, 2002 Through January 24, 2003," 03-OSR-0040, dated February 13, 2003.

discussion below). The majority of the deficiencies had been corrected within this inspection period. The inspectors did identify one electrical safety concern pertaining to the assured grounding program required for temporary wiring. The Contractor's program included providing ground fault circuit interruption (GFCI) protection for 110 volt cord protection. The program did not consider 240 volt and 480 volt cords used to power other equipment such as weld machines and portable outlet boxes (spiders).

The assured grounding item was identified during the last week of the inspection period and, although the Contractor was not fully in agreement with ORP's interpretation of the requirements, the Contractor was taking action to implement an assured grounding program that included 240 and 480 volt cords use and was researching these requirements against the GFCI program it had previously put in place. This issue is further discussed under PTF Temporary Power, below.

Concrete Batch Plant (Electrical)

The inspectors observed an unacceptable splice in a flexible cord installed for a pump at the Concrete Batch Plant Waste Water Basin. The splice did not retain the insulation, outer sheath properties, and usage characteristics of the cord being spliced, as reference in 1999 NEC Article 400-9.

The inspectors notified the Contractor of the NEC noncompliance and the Contractor stated this would be corrected immediately.

The splice was subsequently replaced with an approved splice kit and the inspectors verified the correction the following day. This resolved this issue.

Temporary Carpenters' Shop (T21) (Electrical)

The inspectors examined temporary construction power distribution for the Carpenters' Shop as specified by *Temporary Power Request Form*, 24590-WTP-GPP-CON-3311, Revision 0, dated January 21, 2003, and *Control of Temporary Electrical Installations*, 24590-WTP-GPP-CON-3311, Revision 1, dated January 28, 2003, for conformance with the 2002 NEC.

To perform this inspection the inspectors reviewed Temporary Power Request Number 24590-WTP-EIP-CON-02-048. The following electrical equipment were examined at the Carpenters' Shop: (1) 200 amp 480 volt main disconnect; (2) 30 amp tablesaw disconnect; (3) two 100 amp heater disconnects (line side only); (4) 30 amp radial armsaw disconnect; (5) 100 amp transformer disconnect; (6) 50 KVA single phase transformer; and (7) lighting panelboards L1 & L2. The following NEC noncompliance's were identified and discussed with the Contractor:

- NEC Article 2002, Article 250.118 requires an equipment grounding conductor to be installed in liquidtight flexible metal conduit.

The Contractor had not installed equipment grounding conductors in the raceways routed from the transformer to panelboards L1 & L2.

The inspector discussed this NEC noncompliance with the electrical field engineer and the Contractor subsequently added the grounding conductors. This resolved this issue.

- NEC Article 200.2, Article 250.148(A) requires a connection to be made between one or more equipment grounding conductors and a metal box by means of a grounding screw that shall be used for no other purpose or a listed grounding device.

The Contractor had not bonded the equipment grounding conductors to the 6 x 6 wireway located above panelboards L1 & L2.

The inspector discussed this NEC noncompliance with the electrical field engineer and the Contractor subsequently bonded the equipment grounding conductors to the wireway. This resolved this issue.

Temporary Power Distribution Racks TS-018 & TS-013 (Electrical)

The inspectors examined the temporary construction power distribution rack TS-018 located south of the Electrician's Shop and TS-013 located south of the Pipefitter's Connex as specified by *Temporary Power Request Form*, 24590-WTP-GPP-CON-3311, Revision 0, dated January 21, 2003, and *Control of Temporary Electrical Installations*, 24590-WTP-GPP-CON-3311, Revision 1, dated January 28, 2003, for conformance with the 2002 NEC.

To perform this inspection the inspectors reviewed Temporary Power Request Number 24590-WTP-EIP-CON-050. The following electrical equipment was examined at both distribution racks: 1) 200 amp main disconnect; 2) three 100 amp disconnects (line side only); 3) 30 amp heater disconnect (fused 20 amp); 4) 100 amp transformer disconnect (fused 60 amp); and 5) 25 KVA single-phase mini load center MPC-018 & MPC-013.

The inspectors observed the Contractor had installed the temporary power distribution racks in compliance with the 2002 NEC.

Comfort Stations T-9, T-8, T-12, & T-35

The inspectors examined the temporary power distribution for the Comfort Stations T-9, T-8, T-12, & T-35 as specified by *Temporary Power Request Form*, 24590-WTP-GPP-CON-3311, Revision 0, dated January 21, 2003, and *Control of Temporary Electrical Installations*, 24590-WTP-GPP-CON-3311, Revision 1, dated January 28, 2003, for conformance with the 2002 NEC.

To perform this inspection the inspectors reviewed NEC Inspection Report Number 24590-WTP-EIP-CON-03-011 and Temporary Power Request Number 24590-WTP-EIP-CON-02-053, -054, & -055. The 60 amp 480 volt main disconnect and 100 amp 120/240 volt panelboard were examined at all four of the comfort stations. The 25 KVA transformers were energized and not inspected. The following NEC noncompliances were identified and discussed with the Contractor:

- NEC Article 2002, Article 406.8(B)(1) requires receptacles installed outdoors in a wet location have enclosures that are weather proof whether or not the attachment plug cap is inserted.

The Contractor had not installed weatherproof covers on the receptacles mounted on the comfort stations below the panelboards.

The inspector discussed this NEC noncompliance with the electrical field engineer and the Contractor stated the receptacle covers are on order and will be replaced at that time. The Contractor's corrective actions will be examined during a future inspection. (A-03-OSR-RPPWTP-008-A04)

PT Temporary Power

The inspectors observed a 50 amp flexible cord (type SOW) installed from mini load center MCP-002 to a temporary power outlet unit (spider) SB-062 located on the east side of the PT building. The flexible cord was routed through a wood protector and then buried underneath the roadway. The wood protector had shifted and was lying on top of the cord; this was corrected immediately. The inspectors were unsure if the cord was direct buried or installed in a nonmetallic raceway with approximately six inches of cover.

The inspectors notified the Contractor electrical field engineer of the following electrical code deficiencies:

- NEC-2002, Article 400-6 requires flexible cord to be evaluated for direct burial in the earth. Article 400-7 does not permit flexible cord to be installed in a raceway or where it is concealed. Article 300-5 requires a minimum of 24 inches of cover over direct buried cables or nonmetallic raceways installed under roadways.

The Contractor's engineer stated the proper personnel would be notified and the deficiency corrected. The inspectors will examine the Contractor's corrective actions during a future inspection. Follow-up will be tracked as (A-03-OSR-RPPWTP-008-A05).

- 29 CFR 1926.404(b)(1)(iii) & NEC-2002, Article 527.6(B) require a written Assured Equipment Grounding Conductor Program at the site for all receptacles other than 125-volt, single-phase, 15-, 20-, and 30-ampere receptacles unless ground-fault protection is provided.

The Contractor did not have a written assured grounding program for 50 amp flexible cord discussed above nor for other flexible cords on the site. The inspectors discussed this deficiency with the electrical field engineers and the Contractor believed the ground-fault circuit interrupter protection provided on the 125-volt, single phase, 15-, 20-, and 30-ampere receptacle outlets was sufficient. The inspectors disagreed with this position in that the 50 amp cord and spider units feed by the 50 amp cord were not protected. In addition, the inspectors notified the Contractor 480 volt flexible cords must also be placed under the assured ground program. The Contractor was taking immediate action

to comply with the assured grounding requirements and was researching the validity of ORP's interpretation of this requirement. This item will be tracked as AFI A-03-OSR-RPPWTP-008-A06.

Potain Tower Crane (Electrical)

Problems with the Potain tower cranes have been extensively documented and discussed in Inspection Report A-03-OSR-RPPWTP-001, Section 1.5.2, and A-03-OSR-RPPWTP-006, Section 1.5.2. The inspectors performed a follow-up inspection of this area to examine the Contractor's actions to resolve electrical wiring and hardware issues associated with the Potain tower cranes regarding wiring and hardware not listed as acceptable by a Nationally Recognized Testing Laboratory (NRTL). TUV Rheinland (TUV), a National Recognized Testing Laboratory performed a rigorous and thorough field evaluation of the entire LAW Potain tower crane, and developed a list of actions required of Potain and the Contractor before TUV would certify the crane met National safety standards. The cranes were not accepted/certified by TUV during this inspection period. The inspectors reviewed the completion of the following follow-up action items identified in Section 1.5.2 of Inspection Report A-03-OSR-RPPWTP-001:

1. Vertical connection of cables through boots into junction or other electrical boxes did not have provisions for strain relief. This was necessary to prevent tension from being transmitted to terminals (NFPA 70 Article 400.10).

This item remains open and will be tracked as follow-up item A-03-OSR-RPPWTP-008-A07.

2. The junction box for the main power supply (Legs A, B, and C) did not have an indication of its rating. The suitability of the junction box for this application should be included in the research of the wiring by TUV and verified as appropriate or replaced.

The Contractor replaced the junction box with an acceptable enclosure. This resolves this issue.

3. Connectors rated 380-415 volts were installed at various locations for 480 volt circuits; this did not meet the requirements of NEC-1999 Article 110.4 which states "*The voltage rating of electrical equipment shall not be less than the nominal voltage of a circuit to which it is connected.*"

The Contractor replaced the connectors used on 480-volt circuits with the proper rated connector. This resolves this issue.

4. Control panel did not have the required working clearance as described in NEC-1999 Article 610.57, "*The dimension of the working space in the direction of access to live parts that are likely to require examination, adjustment, servicing, or maintenance while energized shall be a minimum of 750 mm (2 ½ ft).*"

The Contractor relocated the handrail to meet the above working clearance requirement. This resolves this issue.

5. Power and Control Circuits were installed in the same raceway/bundled together. The suitability of this installation should be included in the research of the wiring by TUV to determine compliance with the requirement of NEC-1999 Article 725.

The Contractor separated the power and control wiring. This resolves this issue.

6. Enclosures were required to be evaluated for equivalent NEMA rating by TUV and an identification label installed on each enclosure (NEC-1999 Article 430.91 "*Enclosure type number shall be marked on the motor controller enclosure.*")

TUV evaluated the enclosures and confirmed the ratings met the equivalent NEMA rating; the enclosures have been labeled with the appropriate NEMA rating. This resolves this issue.

7. Transfer switch (rated 160 amps) with overcurrent protection of 600 amps did not meet the requirements of NEC-1999 Article 110.10 which states: "*The overcurrent protective devices, the total impedance, the component short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit-protective devices used to clear a fault to do so without extensive damage to the electrical components of the circuit.*"

The Contractor added overcurrent protection ahead of the transfer switch meeting the above requirements. This resolves this issue.

8. TUV should determine suitability (either appropriate or need to replace) of internal wiring and transformers during their research.

TUV evaluated and accepted the internal wiring and transformers. This resolves this issue.

The following items were identified in the table summarizing the identified items, their status, and a risk-based priority for correction in Inspection Report A-03-OSR-RPPWTP-001, Section 1.5.2, subheading Hoist and Rigging. The table listed below updates the status as of March 6, 2003.

Item (Initiator)	Status	Priority		
		Assembly	Testing and Certification	Operations
Electrical Connector Ring (Contractor)	Complete		X	
Auxiliary Winch Panel				
Plug holes (OSR/TUV)	Complete	X		
Broken E-stop (TUV)	Complete	X		
Oper. Cabin Panel Schem. (TUV)	Complete			X
Miniature Aux. Host box name plate (TUV)	80% complete		X	
General				
Panel Name Plates (TUV)	Complete		X	
Non UL Breakers (TUV)	Complete	X		
Lightning Protection (TUV)	In-progress			X
E-Stop Painting (TUV)	Complete		X	
Ground Labels (TUV)	Complete		X	
Condensation Heater –Aux. Hoist (TUV)	In-progress		X	
Wiring identification (OSR)	In-progress		X Identification completed	X Labeling completed
Strain relief on terminals (OSR)	90% complete see item #1 above		X	
Verification of Main Power Junction Box Rating (OSR)	Complete			X
Relocation of cables from catwalks (TUV)	Complete			
Main Disconnect (TUV)	Complete			
Equipment grounding (TUV)	Complete			
415 Volt Connectors used on 480 Volt System (OSR)	Complete		X	
Control Panel working clearance less than required (OSR)	Complete		X	
Power and control circuits installed in same raceway (OSR)	Complete			X
Enclosure not rated/identified (OSR)	Complete			X
Transfer with rated 160 Amps – protected at 600 Amps (OSR)	Complete		X	
Transformers not approved (TUV)	Complete			X

The inspectors witnessed the following electrical testing performed on the LAW crane by TUV and the Contractor during functional, operational, and load testing: (1) amperage readings recorded while crane was performing three different functions at the same time; (2) voltage

readings; (3) temperature readings at various terminations; and 4) high potential testing of the cables at 2500 volts. All electrical testing performed was acceptable.

Hydrostatic Pressure Testing of PVC Potable Water Piping

The inspectors examined the hydrostatic test packages 24590-WTP-PTR-P-03-0001, Revision 0, BOF Area 26 and 24590-WTP-PTR-T-03-0013, Revision 0, BOF Area 26, 30, and 31, and observed the conduct of hydrostatic testing on one PVC Potable Water Piping segments to determine whether the testing conformed to the documents described below:

The inspectors examined the following documents governing the installation and testing of the PVC Potable Water System:

- 24590-BOF-3PS-PX12-T0001, *Engineering Specification For PVC Potable Water Piping Installation*, Revision 2, dated March 3, 2002.
- 24590-BOF-M6-DOW-00001, *Domestic Water System Domestic Water Distribution*, Revision 1, dated February 2, 2002.

The inspectors examined test packages 24590-WTP-PTR-P-03-0013, Revision 0, BOF Areas 26, 30, and 31, and 24590-WTP-PTR-T-03-0001, Revision 0, BOF Area 26, and verified proper test boundaries were specified, valve line-ups were thorough, and the required test parameters had been specified. The test packages contained the requirements of the above listed specifications and referenced codes. The inspectors verified the calibration of the pressure gauge was current, and the appropriate calibration sticker was affixed.

The inspectors observed conduct of hydrostatic testing on a portion of the potable water piping in areas 26, 30, and 31, and verified the hydrostatic testing had been conducted in accordance with the Contractor's established requirements and AWWA C605 (94), *Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water*, dated July 1, 1995. The system tests conformed to established requirements regarding leakage and time at pressure and the test packages were completed as required.

Switchgear Building # 87

The inspector reviewed Switchgear Building # 87 wall (from elevation (-) 9'-0" to elevation 0'-0") rebar and embed plate installations (Concrete Pour Card-24590-BOF-DBR-CON-03-C005). Using the drawings and specifications listed below, the inspectors determined rebar size, correct lap length (spot check) and embed type, size, and location were in accordance with the following drawing and engineering specification requirements.

- 24590-WTP-3PS-D000-T0001, *Engineering Specification For Concrete Work*, Revision 2, dated July 31, 2002.
- 24590-BOF-3PS-C000-T0001, *Engineering Specification For Material Testing Services*, Revision 2, dated July 12, 2002.

- 24590-BOF-DB-S13T-00003, *Switchgear Building Foundation Vault Reinforcing Details*, Revision 1, dated December 17, 2002.
- 24590-BOF-DB-S13T-00004, *Switchgear Building Foundation-Grade Beams and Slab Reinforcing Details*, Revision 0, dated December 17, 2002.
- 24590-BOF-DB-S13T-00002, *Switchgear Building Foundation Section and Details*, Revision 1, dated December 17, 2002.
- 24590-BOF-DB-S13T-00004, *Switchgear Building Foundation-Grade Beams and Slab Reinforcing Details*, Revision 0, dated December 17, 2002.
- 24590-BOF-DB-S13T-00002, *Switchgear Building Foundation Section and Details*, Revision 1, dated December 17, 2002.
- ASTM D 2922, *Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)*, Revision 0, dated 1998.
- ASTM D 3017, *Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)*, Revision 0, dated 1998.
- ACI 224R, *Tolerable Crack Widths, Reinforced Concrete*, Revision 0, dated 1990.

The inspectors observed the Materials Testing subcontractor field technicians performing concrete receipt activities, observed the review of batch tickets, and observed recording of information required by Section 3.2.1 of the *Engineering Specification for Material Testing Services*. The inspectors concluded these activities were performed in accordance with the specification.

The inspectors examined the conduct of testing for concrete temperature, slump, and unit weight, and observed filling and capping the 6-inch by 12-inch compressive test cylinders, and the field storage of the test cylinders for the placement listed above. The inspectors concluded the Material Testing subcontractor technicians were performing these testing activities in accordance with their procedures, the applicable American Society for Testing and Materials (ASTM) standards, and Contractor's specifications.

The inspectors witnessed the placement of concrete, for the placement listed above, and concluded the concrete was being produced, placed, consolidated, tested, and revibrated in accordance with procedures, specifications, and required codes and standards. The inspectors concluded the Contractor was conforming with the maximum 24 inch lift height, as required by Section 3.7.4 of *Engineering Specification for Concrete Work*. The inspectors observed the 4 vertical feet per hour maximum placement rate, established by the panel manufacture, was being maintained. Placements were being performed using the concrete pump hose, which ensured concrete was being placed in a controlled manner. The process also ensured the concrete did not exceed the maximum free fall distance, as outlined in Section 3.7.1 of *Engineering Specification for Concrete Work*.

The inspectors reviewed the concrete pour card for the placement listed above after the placement for completeness and identified field engineering had not signed-off on the pour card indicating acceptance of the installation of the embedded wall plates. The inspectors notified the Contractor's QA personnel of the oversight, and Corrective Action Report # 24590-WTP-CAR-QA-03-030 was generated to document the deficiency. This same Corrective Action Report (CAR) identified numerous locations within the placement where tie wire was touching the wall forms. This Corrective Action Report (CAR) was still open at the end of the inspection period.

The inspectors witnessed backfill placement, compaction, and nuclear density testing for the switchgear building walls. The inspectors identified the calibration frequency listed on the nuclear density gauge was for 18 months. ASTM D2922/98, paragraph A1.1 states in part..."Verify or re-establish calibration curves...at least once every 12 to 18 months...". ASTM D3017/98, paragraph A1.1 states in part..."Calibration curves, tables, or equations shall be established or verified once each year ...". This was brought to the attention of the Contractor QA, the Sub Contractor documented the discrepancy by Corrective Action Report # CAR- BCA-037.

The inspectors verified the Contractor identified several cracks on the north and south walls of the switchgear building (#87). These cracks were being tracked by the report for Electrical Switchgear Building (87), Concrete Surface Crack Issue Tracking Number 24590-WTP-RITS-QAIS-03-169. The Contractor based the closure of this item on ACI 224R-90 table labeled "Tolerable Crack Widths" for an exposure condition against soil. Cracks under these conditions are acceptable up to a width of 0.012". Since the vault wall cracks were less than 0.012", the Contractor determined they were acceptable as is, and no additional action was required. This issue was closed on February 26, 2003.

1.10.3 Conclusions

During this inspection period a number of inspections of balance-of-plant construction activities were conducted. The following is a summary the results of these inspections:

- The Contractor initiated a number of positive electrical program improvements during the inspection period. These improvements addressed ORP concerns regarding the Contractor's compliance with NEC requirements. The inspectors identified one significant concern regarding the Contractor's failure to implement an adequate assured grounding program.
- Although the inspectors identified some NEC noncompliances during inspections of several new electrical installations, these noncompliances were addressed in a timely manner and improvement in performance was noted.
- Substantial progress was made and verified by the inspectors in upgrading the Potain tower cranes to meet National standards.

- Hydrostatic testing on a portion of the potable water piping in areas 26, 30, and 31, was conducted in accordance with the Contractor's established requirements.
- The inspectors concluded concrete and soils testing associated with Switchgear Building # 87 subgrade wall concrete placement and backfill were performed in accordance with the technical specifications, procedures and applicable ASTM requirements. However, the inspectors identified the calibration frequency listed on the nuclear density gauge was for 18 months rather than the required 12 months. The concrete for the switchgear building walls was produced, placed and consolidated in accordance with technical specifications, procedures, and required codes and standards.

1.11 Review of Contractor Actions to Address the Use of Potentially Contaminated Soil for Backfill (ITP I-145)

1.11.1 Inspection Scope

The inspectors examined the Contractor's response to soil used for backfill from an unapproved offsite location. The inspectors verified the Contractor effectively performed radiological contamination monitoring activities and met the requirements of the Radiation Protection Program. The inspectors reviewed the records generated and verified the site controls.

1.11.2 Observations and Assessments

The inspectors examined the following documents addressing the unapproved soil used for backfill:

- RPP/WTP Hanford *Environmental Incident Report*, CCN 050969
- *Incident Report for Use of Apollo Soil Stockpile for Bechtel Backfill on Night Shift 2/3 – 4/3*, CCN 050969
- 24590-WTP-RSR-RAD-03-003, *Radiological Survey Report*, dated February 5, 2003
- 24590-WTP-RSR-RAD-03-005, *Radiological Survey Report*, dated February 6, 2003.

On February 4, 2003, the Contractor's swing-shift crew used approximately 100 cubic yards of soil removed from the transfer line excavation being performed by Apollo, Inc. (a subcontractor for CHG) for backfill around temporary utilities. The soil was in a stockpile just off the WTP site. Apollo had performed radiological surveys of the soil and determined it was not contaminated. After becoming aware of this incident, the inspectors notified the Contractor of the soil removal. Based upon the swing-shift logs, the Contractor was able to determine three areas where the soil was placed. The Contractor subsequently isolated these areas with tape marked "Danger Tape -Do Not Enter." The Contractor performed radiological surveys of the soil stockpile, the backfill areas, and some craft. The inspectors verified the radiological surveys

confirmed the soil was clean. Applicable staff was counseled on the prohibition of using off-project soil for backfill, and a rope boundary was reestablished between the two sites with appropriate signage notifying project staff to stay clear of the off-project area.

1.11.3 Conclusions

The Contractor adequately identified and surveyed unapproved soil obtained from an off-project location and used for backfill to ensure it was not contaminated. The boundary between the WTP Project and the off-project location was reestablished with ropes and appropriate signage.

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

The following Findings, Follow-up Items, and Occurrence Report were reviewed to determine if they could be closed. The inspectors reviewed the Contractor's description of the item, the corrective actions, and other information provided. The inspectors verified by records review the corrective actions stated were appropriately completed.

1.12.1 (Closed IR-02-014-01a-FIN) Failure to ensure the concrete curing tank temperature monitors were calibrated in accordance with ASTM E77. The Contractor provided its response to the Finding on December 4, 2002, by letter CCN:045033 and documented the discrepancy by Corrective Action Report (CAR) 24590-WTP-CAR-QA-02-287 on November 11, 2002.

The inspectors verified that the subcontractor implemented the corrective actions referenced in the above CAR and Finding response. The inspectors reviewed the recording thermometer calibration reports and determined they met ASTM C511-98 requirements. The inspectors concluded the subcontractor was complying with the requirements of the authorization bases.

Based on the above, this item is closed.

1.12.2 (Closed IR-02-014-01b-FIN) Contrary to ASTM C511-98, the Materials Testing subcontractor was utilizing only one 7-day chart recorder thermometer, located within the middle tank of each of the three and four tank in-line configurations, rather than the requirement to monitor each tank. The Contractor provided its response to the Finding on December 4, 2002, by letter CCN:045033 and documented the discrepancy in Nonconformance Report (NCR) 24590-WTP-NCR-CON-02-173 on October 9, 2002.

The inspectors verified the subcontractor was implementing the corrective actions referenced in the above NCR and Finding response. The inspectors verified each tank the subcontractor was using for curing concrete cylinders had a calibrated recording thermometer.

Based on the above, this item is closed.

1.12.3 (Closed IR-02-014-02-FIN) Failure of the Field Project Documentation Control (FPDC) Manager to ensure current revisions of drawings were available for use at the site. The

Contractor provided its response to the Finding on December 4, 2002, by letter CCN: 045033 and documented the discrepancy by CAR 24590-WTP-CAR-QA-02-200 on August 29, 2002, and CAR 24590-WTP-CAR-QA-02-221 on September 18, 2002.

The inspectors verified the Contractor was implementing the corrective actions referenced in the above CAR's and Finding response. The inspectors verified the following items:

- The Contractor was to create new reports from the Project Document Control Database in real time to allow FPDC to print out a listing of all documents distributed to a particular Controlled Station location with any changes identified. The inspectors verified the new FPDC reports were in use and were adequate to perform Controlled Station document verifications.
- The Contractor was to perform Line Management Assessments on the ten existing control stations on a weekly basis for a six-month period starting October 14, 2002. The inspectors concluded FPDC was performing weekly Line Management Assessments on the ten control stations as required.
- The Contractor was to assign three personnel to the Controlled Stations on a full time basis. The inspectors confirmed the Contractor has assigned three full time personnel to the Controlled Stations.
- The Contractor was to generate a Line Management Assessment report with results from the assessment including documenting any actions needed from each audit performed. The inspectors concluded there was a Line Management Assessment report generated for each assessment, which included the results of the assessment and any needed corrective actions.
- The Contractor was to take the actions from the Line Management Assessments and track them in the RITS database. The FPDC manager was to ensure the actions were completed in a timely manner. The inspectors verified the FPDC manager was placing the actions in the RITS database and the actions were being completed in a timely manner, usually within one working day.

The inspectors sampled approximately 50 drawings in each of the LAW, HLW, PTF, Balance of Facility (BOF), and T1 (Main Construction Administrative Building) controlled stations for proper revision number and change postings to the drawings. The inspectors found no discrepancies in this review.

Based on the above, this item is closed.

1.12.4 (Closed A-03-OSR-RPPWTP-006-A01) Follow-up on Contractor efforts to perform an IH&S evaluation of the Combo Shop. During the last On-Location Inspection Period (report number A-03-OSR-RPPWTP-006) the inspectors determined the Contractor had not performed a thorough IH&S hazards review for the combo shop. This review was required by the ORP M440.1-2. Subsequently, the Contractor initiated actions to conduct this IH&S hazards review.

An Assessment Follow-up Item was assigned to track the Contractor's efforts to perform this review.

During this inspection period, the inspectors reviewed the planning and expected condition of the Combo Shop operations. The inspectors reviewed a schematic (a layout of craft locations and operations) that was given to the balance-of-facility (BOF) safety engineer for review and comment. The schematic outlined where various operations and crafts would be conducting work. Further the inspectors reviewed three Job Hazard Analyses (JHA's), initiated by the Contractor, which were issued for safe entry to the shop, welding and cutting, and the use and care of the 5-ton mobile gantry. The safety engineer had previously "tagged out" the gantry because the proper pre job planning had not been performed for gantry operations. The inspectors noted that the pedestal grinder, which was not satisfactorily mounted during the previous inspection, was "tagged out" by the safety engineers. Further, both the BOF safety engineer and the industrial hygienist were involved in the examination of the engineering controls, including local exhaust for welding operation, necessary for the Combo Shop. One JHA, 24590-SIND-F00018, Revision 0, *Welding and Cutting for the Combo Shop*, undated, specified additional local exhaust measures be utilized, if fumes were not adequately extracted by the roof fans. The other JHAs discussed the need to barricade special equipment and to provide necessary personal protective equipment (PPE) where required. Further Contractor representatives informed the inspectors the field engineering staff was evaluating the necessary environmental conditions. The inspectors have noted increased and proactive attention to hazard reviews of equipment being located and operated in the shop.

Based on the above, this item is closed.

1.12.5 (Closed A-03-OSR-RPPWTP-006-A03) The Contractor had not installed the grounding electrodes (ground rods) at CB&I Administration and Engineering Office Trailer disconnects required by NEC-1999 Article 550-23 & Article 250-32(b)(1). During electrical inspection performed during the last inspection period (December 5, 2002, through January 24, 2002), the inspectors identified the above NEC noncompliance and informed the Contractor of the issue.

During this inspection period, the Contractor installed the ground rods to meet the above requirement and the inspectors verified the correction. Based upon the above this item is closed.

1.12.6 (Closed, RP-BNRP-RPPWTP-2002-0010) Occurrence Report No. RP-BNRP-RPPWTP-2002-0010, *Environmental Non-Compliance*. During a Contractor assessment of the Central Pre-Mix concrete batch plant the WTP Environmental Safety & Health group found that two Sand & Gravel Permit requirements were not being met. The Contractor reported this occurrence on August 26, 2002, and provided to the Department of Energy via the DOE Occurrence Report Processing System (ORPS), a Final Report on October 1, 2002.

On August 26, 2002, the Contractor found an unauthorized discharge of process water and a failure to meet signatory requirements for permit-required plans. Concrete process and/or wash water escaped the paved areas designed to contain it from discharging directly to the ground. The discharge was caused by inadequate berming to contain process and/or wash water. The Contractor also found the current Environmental Compliance Plan was signed but not at the management level required by the Sand & Gravel Permit.

On December 2, 2002, the inspectors verified the corrective actions have been completed. The additional berms have been installed and additional areas asphalted to redirect process and wash water to drainage catch areas. A drying pad was established for basin cleanout of spills and waste concrete. On December 3, 2002, Central Pre-mix Concrete Company submitted a revised Environmental Compliance Plan of the batch plant facility to BNI. The revised Environmental Compliance Plan (24590-QL-HC1-DB50-00001-53-01 Rev. 00B) was signed by senior Contractor management on December 31, 2002.

Based on the above, the inspector determined the Contractor adequately addressed this Occurrence Report and this item is closed.

1.12.7 (Partial Closure of A-03-OSR-RPPWTP-001-A02) An equipment-grounding conductor was not connected to the grounding electrode, the neutral wire was fused in the emergency shutoff switch, and a 208/120-volt three-phase four-wire panelboard was used as a 120/240 single-phase three-wire panelboard at the fuel dispensing station. During inspection period (October 11, 2002, through December 4, 2002) the inspectors identified the above electrical code deficiencies pertaining to the Fuel Dispensing Station, two of the three items have been reviewed as stated below:

The Contractor installed the equipment grounding conductor to the grounding electrode at the 480 volt main disconnect located at the Fuel Dispensing Station required by NEC-1999, Article 250-32. The Contractor also replaced the fuse installed in the neutral conductor at the emergency shutoff disconnect with the correct jumper, meeting the requirements of NEC-1999, Article 240-22.

Based on the above, items 1 & 2 of A-03-OSR-RPPWTP-001-A02 are closed; item 3 pertaining to the three-phase panelboard remains open.

1.12.8 (Partial Closure of A-03-OSR-RPPWTP-006-A04) Follow-up on Contractor efforts to resolve NEC violations associated with HLW Temporary Power. During inspection period (December 5, 2002, through January 24, 2002) the inspectors identified five electrical code deficiencies pertaining to the HLW Temporary Power, the following items have been reviewed as stated below:

(A-03-OSR-RPPWTP-006-A04a) The Contractor had installed a #6 AWG equipment bonding jumper in the 400 amp main disconnect switch, located on distribution rack PDR-014 in the HLW building, instead of a #3 AWG conductor required by NEC-1999, Article 250-102(d), Table 250-122.

The Contractor replaced the #6 grounding conductor with a #3 grounding conductor and the inspectors verified the correction. Based upon the above, this portion of item A-03-OSR-RPPWTP-006-A04 is closed.

(A-03-OSR-RPPWTP-006-A04b) The Contractor had not sized the equipment grounding conductor correctly in the 400 amp main disconnect and on the line side of the two 200 amp disconnects TS-010 & TS-012, located on distribution rack PDR-014 in the HLW building, as required by NEC-1999, Article 250-102(d), Table 250-122.

The Contractor replaced the equipment grounding conductors with the correct size grounding conductors and the inspectors verified the correction. Based upon the above, this portion of item A-03-OSR-RPPWTP-006-A04 is closed.

(A-03-OSR-RPPWTP-006-A04d) The Contractor had not clearly distinguished the white wires (used as ungrounded conductors) in the 12 x 12 junction box located on distribution rack PDR-014 in the HLW building, as required by NEC-1999, Article 310-12(c).

The Contractor identified the ungrounded conductors with the appropriate phase tape and the inspectors verified the correction. Based upon the above, this portion of item A-03-OSR-RPPWTP-006-A04 is closed.

(A-03-OSR-RPPWTP-006-A04e) The Contractor had not installed grounding bushings on the liquid-tight flexible metal conduit (480 volt) installed in concentric knockouts, at the two 30 amp welding receptacle disconnects, at both TS-010 & TS-012 locations as required by NEC-1999, Article 250-97.

The Contractor installed the grounding bushings at both locations and the inspectors verified the correction. Based upon the above, this portion of item A-03-OSR-RPPWTP-006-A04 is closed.

Based on the above, four sub-items of item A-03-OSR-RPPWTP-006-A04 (items A-03-OSR-RPPWTP-006-04a, -04b, -04d, & -04e) have been closed. Sub-item A-03-OSR-RPPWTP-006-04c, pertaining to the 480/277 volt panelboard, remains open.

1.13 Review of Changes Associated with ABCN 24590-WTP-ABCN-ENS-02-046, Rev. 0 (ITP I-107)

1.13.1 Inspection Scope

This inspection assessed the Contractor's documented design changes regarding lidding and remote assay of waste drums associated with the ABCN against the requirements of REG/RL-97-13, *Office of River Protection Position on Contractor Initiated Changes to the Authorization Basis*, Paragraph 3.5.a.1.i and 3.5.a.1.ii.

1.13.2 Observations and Assessments

Changes assessed in the ABCN included (1) eliminating a through-wall drive for the drum bogie, (2) eliminating a drum lid crimping system, (3) adding a bolted ring system for locking lids onto drums using master slave manipulators (MSMs), and (4) deleting reference to the waste monitoring station. The assessment of the changes was based on a review of the ABCN and sections of the PSAR where changes were proposed. Because a system for assaying remote-handled containers was postulated but not fully described, new hazards may be identified in the future.

1.13.3 Conclusions

The changes identified in the ABCN do not add new hazards. New hazards may be associated with the currently undefined remote drum assay system, however.

1.14 Review of the Safety Evaluation Associated with ABCN 24590-WTP-ABCN-ENS-02-046, Rev. 0 (ITP I-107)

1.14.1 Inspection Scope

The inspectors examined the Contractor's safety evaluation for the changes associated with the ABCN against the requirements of REG/RL-97-13, *Office of River Protection Position on Contractor Initiated Changes to the Authorization Basis*, Paragraph 3.5.a.1.i thru viii, and 3.5.a.2.iii.

1.14.2 Observations and Assessments

The inspectors reviewed each of the BNI Safety Evaluation (SE) checklist questions and concurred with the yes/no responses and the written descriptions specified in the checklist. Documents inspected included the SE (No. 24590-WTP-SE-ENS-02-065) and the Preliminary Safety Analysis Report (PSAR). The Partial Construction Authorization Request (PCAR) was not inspected since the PSAR represents the most current revision of the AB. Design documents were not inspected due to the routine nature of the change and absence of new Design Basis Events (DBEs) and ITS SSCs caused by the changes. The changes were clearly stated and understood. Regulatory and safety standard drivers (i.e., 10 CFR 820, 10 CFR 830, 10 CFR 835, and RL/REG-96-0006) were not affected by the changes.

1.14.3 Conclusions

The inspectors concur with the changes proposed in this ABCN since safety is enhanced by the changes.

1.15 Review of Changes Associated with ABCN 24590-WTP-ABCN-ENS-02-047, Rev. 0, (ITP I-107)

1.15.1 Inspection Scope

This inspection assessed the Contractor's documented design changes regarding the melter offgas (HOP) system associated with the ABCN against the requirements of REG/RL-97-13, *Office of River Protection Position on Contractor Initiated Changes to the Authorization Basis*, Paragraph 3.5.a.1.i and 3.5.a.1.ii.

1.15.2 Observations and Assessments

Changes assessed in the ABCN included (1) adding Activated Carbon Column, (2) removing fluidic sampler from the system, (3) replacing steam ejector pump with a siphon transfer air ejector pump, (4) eliminating ADS sampler and emptying ejector, (5) removing Pulse Jet Mixers, (6) deleting density measurement, (7) changing normal operating volume for HOP-SCB-00001 from 4800 gallons to 2790 gallons, and (8) changing normal operating volume for HOP-VSL-00903 from 8134 gallons to 7896 gallons. The assessment of the changes was based on a review of the ABCN and sections of the PSAR where changes were proposed. Because the Activated Carbon Column for mercury abatement in the Melter Offgas was postulated but not fully described, new hazards may be identified in the future.

1.15.3 Conclusions

The changes identified in the ABCN do not add new hazards. However, new hazards may be identified in the future associated with the currently undefined Activated Carbon Column system.

1.16 Review of the Safety Evaluation Associated with ABCN 24590-WTP-ABCN-ENS-02-047, Rev. 0 (ITP I-107)

1.16.1 Inspection Scope

The inspectors examined the Contractor's safety evaluation for the changes associated with the ABCN against the requirements of REG/RL-97-13, *Office of River Protection Position on Contractor Initiated Changes to the Authorization Basis*, Paragraph 3.5.a.1.i thru viii, and 3.5.a.2.iii.

1.16.2 Observations and Assessments

The inspectors reviewed each of the BNI Safety Evaluation (SE) checklist questions and concurred with the yes/no responses and the written descriptions specified in the checklist. Documents inspected included the SE (No. 24590-WTP-SE-ENS-02-071) and the PSAR. The PCAR was not reviewed since the PSAR represents the most current revision of the AB. Design documents were not inspected due to the routine nature of the change and absence of new DBEs and ITS SSCs caused by the changes. The changes were clearly described. Regulatory and safety standard drivers (i.e., 10 CFR 820, 10 CFR 830, 10 CFR 835, and RL/REG-96-0006) were not affected by the changes; therefore, the changes were determined to be acceptable.

1.16.3 Conclusions

The inspectors concur with the changes proposed in this ABCN since safety is enhanced by the changes.

2.0 EXIT MEETING SUMMARY

The inspectors presented preliminary inspection results to members of Contractor management at an exit meeting on March 6, 2003. 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

J. Betts, Deputy Project Manager
 H. Crotts, Supplier QA Manager
 J. Dougherty, Site Manager
 M. Ensminger, Quality Control Supervisor
 R. Grimsley, CB&I Project Welding and QA/QC Manager
 T. Horst, Construction Manager
 W. Klinger, Assessment Manager
 G. McClain, General Superintendent
 T. Robison, CB&I Welding and QC Supervisor
 G. Shell, Quality Assurance Manager
 R. Simmons, Vessel Engineer
 C. Slater, Principal Engineer-Vessel Group Supervisor
 W. Turnbow, Lead Coordinator, CB&I Contract
 J. Wright, QC Engineer

3.2 List of Inspection Procedures Used

Inspection Administrative Procedure A-105, "Inspection Performance"

Inspection Administrative Procedure I-106, " Verification of Corrective Actions"

Inspection Technical Procedure I-107, "Authorization Basis Management Assessment"

Inspection Technical Procedure I-112, "Geotechnical/Foundation Inspection"

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

Inspection Technical Procedure I-120, "Nondestructive Testing Inspection"

Inspection Technical Procedure I-121, "Piping Systems Construction Inspection"

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

Inspection Technical Procedure I-145, "Contamination Monitoring and Control Assessment"

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

Inspection Technical Procedure I-162, "Industrial Health and Safety Inspection"

ORP Instruction ORP M 414.1-4, "WTP Balance-of-Plant Construction Oversight Program."

3.3 List of Items Opened, Closed, and Discussed

Opened

A-03-OSR-RPPWTP-008-F01	Finding	Failure to perform the required supplier quality inspections of CB&I offsite facilities. (Section 1.5.2)
A-03-OSR-RPPWTP-008-F02	Finding	Failure of CB&I to perform fit-up inspections during fabrication of the Waste Feed Receipt Tanks in accordance with CB&I procedures. (Section 1.6.2)
A-03-OSR-RPPWTP-008-F03	Finding	Failure of QC receiving inspectors to ensure weld documentation for shear studs associated with HLW shield door liners were received with the liners. (Section 1.7.2)
A-03-OSR-RPPWTP-008-A04	Assessment Follow-up Item	Follow-up of Contractor's action to install weatherproof covers on receptacles associated with comfort stations T-8, -9, -12, and -35. (Section 1.10.2)
A-03-OSR-RPPWTP-008-A05	Assessment Follow-up Item	Follow-up of Contractor's action to address in appropriate direct burial of a 50 amp 240 volt flexible cable on the east side of the PTF facility. (Section 1.10.2)
A-03-OSR-RPPWTP-008-A06	Assessment Follow-up Item	Follow-up of Contractor's action to implement an adequate assured grounding program. (Section 1.10.2)
A-03-OSR-RPPWTP-008-A07	Assessment Follow-up Item	Follow-up of Contractor's action to address the need to add strain relief for the Potain tower crane vertical cables. (Section 1.10.2)

Closed

IR-02-014-01a-FIN	Finding	Failure to ensure the concrete curing tank temperature monitors were calibrated in accordance with ASTM E77. (Section 1.12.1)
IR-02-014-01b-FIN	Finding	Contrary to ASTM C511-98, the Materials Testing subcontractor was utilizing only one 7-day chart recorder thermometer, located within the middle tank of each of the three and four tank in-line configurations, rather than the requirement to monitor each tank (Section 1.12.2)
IR-02-014-02-FIN	Finding	Failure of the Field Project Documentation Control (FPDC) Manager to ensure current revisions of drawings were available for use at the site. (Section 1.12.3)
A-03-OSR-RPPWTP-006-A01	Assessment Follow-up Item	Follow-up on Contractor efforts to perform an IH&S evaluation of the Combo Shop. (Section 1.12.4)
A-03-OSR-RPPWTP-006-A03	Assessment Follow-up Item	Follow-up on Contractor efforts to resolve NEC noncompliance associated with the Chicago Bridge and Iron Office Trailers (Section 1.12.5)
RP-BNRP-RPPWTP-2002-0010	Occurrence Report	Two Sand and Gravel Permit environmental requirements were not met at the Batch Plant. (Section 1.12.6)

Partially Closed

A-03-OSR-RPPWTP-001-A02	Assessment Follow-up Item	An equipment grounding conductor was not connected to the grounding electrode, the neutral wire was fused in the emergency shutoff switch, and a 208/120-volt three-phase four-wire panelboard was used as a 120/240 single-phase three-wire panelboard at the fuel dispensing station. (Section 1.12.7)
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A-03-OSR-RPPWTP-006-A04	Assessment Follow-up Item	Follow-up on Contractor efforts to resolve NEC noncompliances associated with HLW Temporary Power. (Section 1.12.8)
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Discussed

A-03-OSR-RPPWTP-006-A02	Assessment Follow-up Item	Follow-up on Contractor efforts to resolve OSHA concerns associated with the Potain tower crane. (Section 1.9.2)
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3.4 List of Acronyms

AB	authorization basis
ABCN	Authorization Basis Change Notice
ACI	American Concrete Institute
ASL	Approved Suppliers List
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Material
AWG	American Wire Gage
BNI	Bechtel National, Inc.
BOF	balance-of-facilities
BOP	Balance of Plant
CMTR	Certified Material Test Report
DBE	Design Basis Event
DOE	U.S. Department of Energy
FPDC	Field Project Document Control
GWPS	General Welding Procedure Specification
HLW	High Level Waste
HSP	Nonradiological Worker Safety and Health Plan
IH&S	Industrial Health and Safety
IR	Inspection Report
ITP	Inspection Technical Procedure
ITS	important-to-safety
JHA	Job Hazards Analyses
LAW	Low Activity Waste
MSM	master slave manipulator
NCR	Nonconformance Report
NDE	Nondestructive Examination
NEC	National Electric Code
NFPA	National Fire Protection Association
ORP	Office of River Protection
OSR	Office of Safety Regulation
PCAR	Preliminary Construction Authorization Report
PPE	personal protective equipment
PQR	Procedure Qualification Record
PSAR	Preliminary Safety Analysis Report

PTF	Pretreatment Facility
QA	Quality Assurance
QAM	Quality Assurance Manual
QC	quality control
SC	Safety Criteria
SE	safety evaluation
SRD	Safety Requirements Document
SSC	structures, systems, and components
WIPP	Waste Isolation Pilot Plant
WPS	Welding Procedure Specification
WTP	Waste Treatment and Immobilization Plant