



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 5, 2010

Mr. Ashok S. Bhatnagar
Senior Vice President
Nuclear Generation Development and Construction
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2010603 AND NOTICE OF VIOLATION**

Dear Mr. Bhatnagar:

On June 30, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on July 13, 2010, with Mr. Masoud Bajestani and other members of your staff.

This inspection examined activities conducted under your Unit 2 construction permit as they relate to safety and compliance with the Commission's rules and regulations, with the conditions of your construction permit, and with fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, one violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding this violation are described in detail in the enclosed report. The violation involved failure to implement adequate measures to review the suitability of application of materials, parts, and equipment essential to the safety related functions of molded case circuit breakers and provide for the verification of checking the adequacy of design, such as, calculational methods, performing a suitable test program, including qualifications testing of a prototype unit, under the most adverse conditions. Although determined to be a Severity Level IV violation, it is being cited because the criteria, specified in Section VI.A.1 of the NRC Enforcement Policy, for a non-cited violation was not satisfied. Please note that you are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

Additionally, this report documents seven NRC-identified findings which were determined to involve violations of NRC requirements. However, because these findings were Severity Level IV violations and were entered into your corrective action program, the NRC is treating them as non-cited violations consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the non-cited violations in the enclosed report, you should provide a response within 30

days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Senior Resident Inspector at the Watts Bar Unit 2 Nuclear Plant. In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert C. Haag, Chief
Construction Projects Branch 3
Division of Construction Projects

Docket No. 50-391
Construction Permit No: CPPR-92

Enclosure: 1. Notice of Violation
2. Inspection Report 05000391/2010603 w/attachment

cc w/encl: (See next page)

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cc w/encl: (See next page)

*See previous concurrence

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DATE	7/30/2010	8/4/2010	8/5/2010				
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

cc w/encl:

Mr. Gordon P. Arent
Manager
New Generation Licensing
Nuclear Generation Development
and Construction
WBN Nuclear Plant
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Masoud Bajestani
Vice President
WBN Unit Two
WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Michael K. Brandon, Manager
Licensing and Industry Affairs
WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Preston D. Swafford
Chief Nuclear Officer
and Executive Vice President
Tennessee Valley Authority
3R Lookout Place
1101 Market Place
Chattanooga, Tennessee 37402-2801

County Executive
375 Church Street
Suite 215
Dayton, Tennessee 37321

W.R. Crouch, Manager
WBN Unit 2 Licensing
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Gregory A. Boerschig
Plant Manager, WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. M.J. Hellstern
General Manager
NGDC Governance & Oversight
Tennessee Valley Authority
3A Blue Ridge Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Mr. R.M Krich
Vice President
Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Mr. E.J. Vigluicci
Assistant General Counsel
Tennessee Valley Authority
6A West Tower
400 West Summit Hill Drive
Knoxville, Tennessee 37402

Lawrence E. Nanney, Director
Tennessee Department of Environmental
Health and Conservation
Division of Radiological Health
3rd Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1532

Mr. D. E. Grissette
Site Vice President
WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

County Mayor
P.O. Box 156
Decatur, Tennessee 37322

Senior Resident Inspector
WBN Nuclear Plant
U.S. NRC
1260 Nuclear Plant Road
Spring City, Tennessee 37381-2000

TVA

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cc email distribution w/encl:
Greg Scott
Tennessee Valley Authority
Electronic Mail Distribution

Letter to Ashok S. Bhatnagar from Robert C. Haag dated August 5, 2010.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2010603

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PUBLIC

NOTICE OF VIOLATION

Tennessee Valley Authority
Watts Bar Nuclear Plant - Unit 2
Spring City, TN

Docket No. 50-391
Construction Permit No. CPPR-92

During an NRC inspection conducted on April 26-30, 2010, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 50, Appendix B, Criterion III, "Design Control," states that measures shall be established for the review for suitability of application of materials, parts, and equipment that are essential to the safety-related functions of the structures, systems, and components (SSCs). The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions.

Contrary to the above, measures used to review the suitability of application of materials, parts, and equipment essential to the safety-related functions of molded case circuit breakers and measures to provide for the verification of checking the adequacy of design, such as, calculational methods, performing a suitable test program, including qualifications testing of a prototype unit under the most adverse design conditions, were not adequate in that:

1. On October 5, 2009, the applicant installed molded case circuit breakers into the 120VAC vital instrument power boards; however, the test program used to seismically qualify a prototype circuit breaker failed to use a suitable mounting method that reflected the most adverse mounting condition.
2. On September 3, 2009, the applicant failed to perform an adequate review for suitability of application parts and material used to modify dimensional critical characteristics in molded case circuit breakers; further, the applicant failed to verify the adequacy of design for the modification and the effects on essential safety related functions of the circuit breakers.

This is a Severity Level IV violation (Supplement II)

Pursuant to the provisions of 10 CFR 2.201, Tennessee Valley Authority is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be

issued as to why the construction permit should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that delete such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 5th day of August, 2010

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2010603

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd
Spring City TN 37381

Dates: April 1 – June 30, 2010

Inspectors: W. Bearden, Senior Resident Inspector, Construction Projects
Branch 3 (CPB3), Division of Construction Projects (DCP)
Region II (RII)
T. Nazario, Resident Inspector, CPB3, DCP, RII
K. Miller, Resident Inspector, CPB3, DCP, RII
W. Lewis, Resident Inspector, CPB3, DCP, RII
J. Fuller, Senior Construction Inspector, Construction Inspection
Branch 3 (CIB3), Division of Construction Inspection (DCI), RII;
Sections C.1.8, C.1.9, C.1.10, C.1.11, C.1.12, C.1.13, C.1.14,
C.1.15, C.1.16, C.1.17, C.1.18, C.1.19, C.1.20
G. Crespo, Senior Construction Inspector, CIB1, DCI, RII;
Sections C.1.2, C.1.6, E.1.1, T.1.1, OA.1.4, OA.1.5, OA.1.6,
OA.1.7
A. Issa, Construction Inspector, CPB3, DCP, RII, Section Q.1.3
E. Michel, Senior Construction Inspector, CIB3, DCI, RII, Sections
C.1.9, C.1.11, C.1.12, C.1.13, C.1.14
T. Steadham, Construction Inspector, CIB3, DCI, RII, Section
C.1.5
J. Lizardi, Construction Inspector, CIB2, DCI, RII, Sections C.1.4,
C.1.7, C.1.8
C. Abbott, Construction Inspector, CIB2, DCI, RII, Section C.1.3
C. Jones, Senior Construction Inspector, CIB1, DCI, RII, Sections
E.1.2, OA.1.5, OA.1.8, OA.1.12
T. Fanelli, Construction Inspector, CIB1, DCI, RII, Sections C.1.2,
E.1.1

- L. Castelli, Senior Construction Inspector, CIB1, DCI, RII Section C.1.1
- A. Artayet, Senior Construction Inspector, CIB3, DCI, RII, Sections C.1.15, C.1.16
- C. Smith-Standberry, Construction Inspector, CIB1, DCI, RII, Section OA.1.13
- G. Khouri, Senior Construction Inspector, CPB2, DCP, RII, Section E.1.2
- E. Heher, Construction Inspector, CIB2, DCI, RII, Section E.1.2
- P. Heher, Construction Inspector, CPB2, DCP, RII, Section Q.1.3
- J. Kent, Construction Inspector, CIB1, DCI, RII, Sections OA.1.1, OA.1.9, OA.1.10, OA.1.11
- C. Fong, Construction Inspector, CPB2, DCP, RII, Section C.1.3

Approved by:

Robert C. Haag, Chief
Construction Projects Branch 3
Division of Construction Projects

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a three-month period of inspections in the areas of quality assurance (QA); identification and resolution of construction problems; construction activities; training and qualification of plant personnel; fire protection; and follow-up of other activities. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter (IMC) 2517. Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/reactors/plant-specific-items/watts-bar.html>.

The inspection identified one NRC-identified Severity Level (SL) IV violation (VIO), seven non-cited violations (NCV), and one Unresolved Item (URI).

Inspection Results

- A SL IV NCV of 10 *Code of Federal Regulations* (CFR) 50, Appendix B, Criterion XV, “Nonconforming Materials, Parts, or Components,” was identified by the inspectors for the failure to have procedures for identification, documentation and segregation of materials identified as nonconforming to Purchase Order (PO) requirements by the kick and count inspection. (Section Q.1.3)
- A SL IV NCV of 10 CFR 50, Appendix B, Criterion VI, “Document Control,” was identified by the inspectors for the failure to establish adequate measures to control the issuance of documents stored in the CONEX storage area. (Section Q.1.3)
- A SL IV NCV of 10 CFR Part 21 was identified by the inspectors for the failure to invoke 10 CFR Part 21 requirements on a supplier of safety-related services of basic components. (Section Q.1.3)
- A SL IV NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” was identified by the inspectors for failure to identify improper weld size by the welder, field engineer, and quality control (QC) in accordance with applicable instructions, procedures, and drawings. (Section C. 1.3)
- A SL IV NCV of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” was identified by the inspectors for inadequate measures to assure that conditions adverse to quality, specifically non-conforming safety-related concrete, was promptly identified and corrected. (Section C.1.4)
- The inspectors identified a URI related to the material condition inside of the loop-3 RCS crossover piping. The inspectors concluded that in order to properly evaluate and disposition this issue, additional inspection would be required to determine (1) whether areas of concern (potential pitting) were properly identified and documented at the time by QC and Field Engineer (FE) in accordance with applicable instructions and procedures; and (2) whether the engineering disposition appropriately addressed the area of concern. (Section C.1.8)

- A SL IV, NCV of 10 CFR 50 Appendix B, Criterion XIII, "Handling, Storage, and Shipping," was identified by the inspectors in that the applicant failed to control the storage and preservation of material and equipment in accordance with work and inspection instructions to prevent damage from nearby construction activities. Specifically, the inspectors identified multiple locations of weld and paint spatter, arc strikes, and mechanical damage on safety-related welds, piping, and components. (Section C.1.9)
- A SL IV VIO of 10 CFR 50, Appendix B, Criterion III, "Design Control," was identified by the inspectors in that the applicant failed to implement adequate design control measures in the qualification analysis, testing, and calculational methods used to qualify and analyze safety-related components. This is regarding the seismic qualification of circuit breakers in safety-related 120VAC Vital Instrument Power Boards. Two examples of design control violation are listed in the report details section. The violation did not meet the criteria for a non-cited violation in Section VI.A.1 of the NRC Enforcement Policy because the applicant's corrective action did not adequately address the findings identified and would not ensure that compliance was restored in a reasonable timeframe or prevent recurrence. (Section E.1.1)
- A SL IV NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," was identified by the inspectors for a failure to correctly translate the design basis, as described in a System Description Document, into affected drawings and specifications. Specifically, a design basis requirement to provide diverse level measurement systems for the Safety Injection System Accumulators was not correctly translated into affected specifications and drawings issued for construction. (Section E.1.2)
- The inspectors concluded that concerns pertaining to the cable CAP sub-issue on adhesive backed cable mount supports have been appropriately addressed for Watts Bar Unit 2 and this item is closed. (Section OA.1.3)
- Other areas inspected were adequate with no findings of significance identified. These areas included: response to response Three Mile Island (TMI) Action Items; electrical systems and components; nuclear welding; structural welding; nondestructive examination and inservice inspection activities; craft training; and fire protection.

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REPORT DETAILS

Summary of Plant Status

During the current inspection period, TVA performed pre-service inspection (PSI) activities and construction completion activities on safety-related systems, and continued engineering design activities.

I. Quality Assurance (QA) Program

Q.1 QA Oversight Activities

Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure (IP) 35007)

a. Inspection Scope

During this inspection period, the inspectors reviewed problem evaluation reports (PERs) as part of TVA's corrective action program to verify that issues being identified under the corrective action program were being properly identified, addressed, and resolved by TVA. Additionally, the inspectors reviewed three recent Bechtel QA surveillance reports regarding ongoing nondestructive examination work activities.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Generally, the PERs reviewed were properly identified, addressed, and resolved; however, as noted in Section C.1.4, Structural Concrete, a violation of regulatory requirements was identified for failure to promptly identify and correct a condition adverse to quality.

Q.1.2 Safety Conscience Work Environment (IP 35007)

a. Inspection Scope

The inspectors continued routine meetings with the Unit 2 Employee Concerns Program (ECP) representative to evaluate the effectiveness of the applicant's program for resolving employee concerns. The inspectors reviewed existing program requirements and all recent safety-related concerns identified by the applicant's and contractor's ECP programs. The inspectors also verified that significant problems were documented under the corrective action program and were being properly identified, addressed, and resolved by TVA. This included a review of anonymous PERs and trending for the months of April and May.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors did not identify any issues or concerns regarding the ability of the applicant to provide a safety-conscience work environment.

Q.1.3 Procurement, Receiving, and Storage Inspection (IP 35060 and IP 35065)

a. Inspection Scope

The inspectors performed a procurement, receiving, and storage inspection in accordance with IP 35065, Procurement, Receiving, and Storage, and Section 02.04 of IP 35060, Applicant management of QA activities. In addition, IP 38703, Commercial Grade Dedication, was used for guidance in reviewing commercial grade dedication activities. The inspection covered all aspects of procurement and procurement interfaces. This included a review of the design bases; material requests; procurement data sheets; technical evaluations and commercial dedication plans; purchase orders; 10 CFR Part 21 provisions; receiving inspection records; storage; corrective action program; interfaces between design, procurement engineering, procurement and QA; personnel training and qualification; and internal and external oversight. The objectives of the inspection were to verify that these activities were performed in accordance with the applicable QA programs and NRC requirements.

Specifically, the inspectors:

- 1) Reviewed audit reports of procurement activities at the site.
- 2) Independently reviewed material requests, technical specifications in procurement data sheets, and procurement documents to determine whether they invoked the applicable Quality Assurance (QA) requirements and the applicable codes and standards; and whether the specified design parameters were in accordance with those listed in the design specifications. This included ASME Code Section III requirements and environmental and seismic qualifications.
- 3) Reviewed purchasing documents for basic components to determine whether they imposed the requirements of 10 CFR 21 and whether the suppliers were on the approved suppliers list.
- 4) Reviewed two samples of commercial grade dedication, to determine the adequacy of the dedication plan including the identification of critical characteristics, and to ascertain that the completed dedication activities complied with the dedication plan.
- 5) Reviewed for adequacy, the requirements specified in the procurement documents for documentation and acceptance of purchased items and sampled certificate of conformance (COCs).
- 6) Reviewed procurement documents to determine whether source verification was specified for complex engineered items when required and whether the appropriate receiving inspection organization was aware of the source verification results.
- 7) Examined the CONEX trailer to determine the adequacy of implementation for the protection, handling and control of purchasing documents.
- 8) Examined the system established for conducting receiving inspection including facilities and records of acceptance such as COCs to determine whether receiving inspection records were available and whether identified discrepancies were reviewed by QA and/or engineering, as appropriate, to assure proper disposition.
- 9) Examined material receiving inspection records to determine compliance with acceptance requirements and to ascertain whether receiving inspections were based on acceptable documentation, direct examination, or record of source verification.

- 10) Examined storage facilities for safety-related items to ensure adequate protection and compliance with the applicable storage level. The inspectors checked for proper segregation and identification of nonconforming items. The warehouses examined included warehouse number 6 where the kick and count inspection takes place, warehouse number 8 where Quality Control (QC) inspection takes place, and warehouse number 7 where items are stored for issue to the field. Warehouse number 7 also included storage of items originally intended for warehouses 6 and 8.
- 11) Reviewed purchaser notification points, hold points, and access rights when required to be included in procurement documents.

b. Observations and Findings

The inspectors identified three violations of regulatory requirements as discussed below:

Violation 1:

Introduction: A Severity Level (SL) IV non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," was identified by the inspectors for the failure to have procedures for identification, documentation and segregation of materials identified as nonconforming to Purchase Order (PO) requirements by the kick and count inspection. Specifically, effective measures did not exist to segregate or properly identify hydraulic snubbers procured under PO 63534 as nonconforming to the PO identification requirements.

Description: On June 8, 2010, the inspectors conducted a walk-down of warehouse facilities at the WBN2 site. In warehouse number 7, the inspectors observed crates containing hydraulic snubbers that had not been subjected to QC receipt inspection, stored next to receipt inspected materials available for issue. Further review indicated that some of these snubbers did not conform to the PO requirements in that they did not have all the required identification. The finding was determined to be more than minor because it represented an improper and uncontrolled work practice that can impact quality or safety, involving nonconforming safety-related hydraulic snubbers, being stored without proper identification in close proximity to other materials available for use. This condition was documented in PER 234358. The cause of this finding was directly related to the resources component of the Human Performance cross-cutting area, as defined in IMC 0310, because TVA failed to provide a complete, accurate and up-to-date procedure, 25402-000-GPP-0000-N6104, Material Receiving, Revision (Rev.) 4, to address the handling of materials identified as nonconforming to PO requirements at the kick and count stage of the receiving inspection (H.2(c)).

Enforcement: 10 CFR, Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," states in part that "measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations."

Contrary to the above, on June 8, 2010, the inspectors observed crates containing hydraulic snubbers being stored next to receipt inspected materials available for issue even though some of the snubbers did not conform to the PO requirements, in that they did not have all the required identification. In addition, the affected snubbers were not properly identified as nonconforming. Although procedures SPP-4.3, Rev. 0006, section 3.5 and 25402-000-GPP-0000-N6104, Rev. 4, section 6.5.12, require the immediate

segregation or identification of nonconforming material, these requirements apply to the QC portion of the receiving inspection and not the kick and count portion. This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation and because it was entered into the corrective action program as PER 234358, it is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-01, Marking and Segregation of Nonconforming Materials from Accepted Materials Available for Use.

Violation 2:

Introduction: A SL IV NCV of 10 CFR 50, Appendix B, Criterion VI, "Document Control," was identified by the inspectors for the failure to establish adequate measures to control the issuance of documents. Specifically, the applicant failed to establish proper storage and control of documents stored in the CONEX storage area that were used during performance of safety-related work activities.

Description: On June 8, 2010, the inspectors walked down the CONEX storage area and interviewed warehouse personnel on its use. The storage area was environmentally controlled, used fire rated cabinets, and was locked during off shift hours. Files in the storage area were sometimes removed from storage or copied during performance of safety-related work activities. A sign-out folder was to be used whenever a file was removed from the area. The area included a refrigerator that was being used by personnel to retrieve drinks and food. On June 9, 2010, the inspectors attempted to retrieve a completed receiving package for PO 31774, I&C Instrument Isolation Valves ASME Section III, Class 2, Safety-Related. The package had been removed from the file cabinets without using a sign-out folder. The finding was determined to be more than minor because it represented an improper and uncontrolled work practice that could impact quality or safety, involving the use of improperly stored and uncontrolled documents in safety-related activities. This condition was documented in PER 234281. The cause of this finding was directly related to the resources component of the Human Performance cross-cutting area, as defined in IMC 0310, because TVA failed to provide a complete, accurate and up-to-date procedure, 25402-ADM-001, Document Control, Rev. 9, that describes what to do with copies of documents once originals have been transmitted to Document Control and how to control satellite document control facilities (H.2(c)).

Enforcement: 10 CFR, Part 50, Appendix B, Criterion VI, "Document Control," requires that "Measures shall be established to control the issuance of documents, such as instructions, procedures, and drawings, including changes thereto, which prescribe all activities affecting quality. These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed."

Contrary to the above, some files in the CONEX trailer have been used or copied to perform safety-related work activities effectively making it a satellite document control station, and the files in this trailer were not properly protected nor controlled. The area included a refrigerator containing food and drinks and the receiving records for PO 31774 were missing from the files in the CONEX trailer with no log out folder in place. In addition, there were no signs in the trailer, on the filing cabinets or on the folders themselves identifying these records as for information only (FIO). This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy.

Because this was a SL IV violation and because it was entered into the corrective action program as PER 234281, it is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-02, Inadequate Storage and Improper Control of Documents Used in Safety Related Activities.

Violation 3:

Introduction: A SL IV NCV of 10 CFR Part 21 was identified by the inspectors for the failure to invoke the provisions of 10 CFR Part 21 on a supplier for services of safety-related components. Specifically, lever arms for limit switches were purchased under PO 87607. The lever arms were sent to TVA Central Laboratories to perform commercial grade dedication activities without invoking the provisions of 10 CFR Part 21.

Description: The inspectors reviewed the completed package for PO 87607 and concluded that it did not invoke the provisions of 10 CFR Part 21 on TVA Central Laboratories. The inspectors also reviewed intergroup agreement (IGA) -11, Central Laboratories, Rev. 001. This agreement, which is between TVA Nuclear Power Group (NPG) and TVA Central Laboratories, establishes the responsibilities and requirements in providing requested services. The inspectors noted that this agreement did not invoke the provisions of 10 CFR Part 21. The finding was determined to be more than minor because it represented an improper and uncontrolled work practice that can impact quality or safety, involving the issuance of procurement documents that did not invoke the provisions of 10 CFR Part 21. This condition was documented in PER 235485. There was no cross-cutting aspect associated with this violation.

Enforcement: 10 CFR Part 21.31 states that "each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall ensure that each procurement document for a facility, or a basic component issued by him, her or it on or after January 6, 1978, specifies, when applicable, that the provisions of 10 CFR Part 21 apply."

Contrary to the above, PO 87607 did not specify that the provisions of 10 CFR Part 21 applied to TVA Central Laboratories nor did IGA-11, between TVA (NPG) and TVA Central Laboratories. This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation and because it was entered into the corrective action program as PER 235485, it is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-03, Failure to Invoke 10 CFR Part 21 in Safety Related Procurement Documents.

In addition, the inspectors made the following observations as a result of their inspections:

- The dedication performed by TVA Central Laboratories for NAMCO limit switch lever arms purchased under PO 87607 was accepted even though it did not fully meet the dedication plan for verification of manufacturer and part number. This condition was documented in PER 234290.
- Level B Condition Examples on page 14 of CAP procedure 25402-MGT-0003, Rev. 7 cover repetitive supplier nonconformances detected during receiving but since trending only covers conditions documented in PERs, other

nonconformances detected during the kick and count portion of the receiving inspection will not support this trending effort.

c. Conclusions

Problems were identified in the areas of equipment storage, document control and invoking the provisions of 10 CFR Part 21 as documented above. Other inspected procurement, receiving and storage activities were performed in accordance with the applicable QA programs and NRC requirements.

II. Management Oversight and Controls

C.1 Construction Activities

C.1.1 Instrument Components and Systems – Work Observation (IP 52053)

a. Inspection Scope

The inspectors reviewed safety-related instrumentation components and systems by direct observation of work performance and work in progress to verify related activities were performed in accordance with NRC requirements and applicant procedures. Four samples were inspected and selected from those associated with the reactor trip system and the engineered safety features actuation system. Specifically, the inspectors reviewed receiving documents, component identification, controls for potential nonconforming components, storage conditions, qualifications of warehouse personnel, and physical condition of the components. The inspectors interviewed responsible personnel associated with receiving inspection and conducted walk-downs of warehouses 7, 8, and the Spring City facility to observe the storage facilities for purchased instrument components. The following items were inspected:

- 2-FT-68-6A (Receipt and Storage)
- 2-PT-68-340D (Receipt and Storage)
- 2-FT-68-48A (Receipt and Storage)
- Westinghouse Power Range Detector (Storage)
- 2LT-063-180, 181, 182, 183 (Receipt)

The following samples were inspected:

- IP 52053 Section 02.02.a – four samples
- IP 52053 Section 02.02.b – four samples

Additionally, the inspectors reviewed in-process work orders for containment sump level transmitters. The inspectors verified the transmitters were bench calibrated with proper control of measuring and test equipment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate receipt and storage controls were established for the inspected samples.

C.1.2 Instrumentation Installation Activities– Work Observation (IP 52053)

a. Inspection Scope

The inspectors interviewed responsible personnel, reviewed documentation, and evaluated Unit 2 instrument installation activities.

The inspectors interviewed responsible construction oversight personnel to determine the status of installation activities being performed at Unit 2. The inspectors reviewed installation procedures MAI-4.4A, “Instrument Line Installation” and MAI-4.4B, “Instrument and Instrument Panel Installation” to determine the verification, testing and documentation requirements for instrument and instrument line installation. The inspectors performed walk downs to evaluate the installation activities in the north and south fan rooms to determine the progress and quality of installation activities.

The following items were inspected:

- 2-LT-003-0094-F - Steam Generator 2 Narrow Range Level
- 2-LT-003-0156-A - Steam Generator 2 Narrow Range Level
- 2-RTV-003-0285A – Root Valve for 2-LT-3-42/174

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspection results are too limited to support a conclusion at this time.

C.1.3 Pipe Support and Restraint Systems (IP 50090, 46071, and TI 2512/023)

a. Inspection Scope

The inspectors reviewed procedures and instructions pertaining to pipe support and restraint systems to determine if they had been evaluated and approved by appropriate applicant personnel. The inspectors also conducted interviews with personnel engaged in pipe support installation and performed work observations to confirm adequate performance of pre-installation checks, field adjustments, equipment control, and calibrations. The inspectors assessed whether that personnel had received the appropriate training, had the latest revisions of applicable drawings, and significant modifications to supports had been approved by appropriate personnel.

The inspectors conducted walk-downs of the following installed safety-related pipe supports to verify their compliance with NRC requirements and applicant commitments:

- H-406-14-23-72 (Chemical and Volume Control System (CVCS))
- H-406-14-23-71 (CVCS)
- 2-47A462-11-172 (Ice Condenser System)
- 2-47A462-11-173 (Ice Condenser System)
- 2-47A462-11-174 (Ice Condenser System)
- 2-47A450-26-304 (Essential Raw Cooling Water (ERCW) System)

Specifically, the inspectors performed a visual inspection to verify the absence of deformation and corrosion. Independent measurements were also performed to determine whether the installed configuration of pipe supports was consistent with final as-built drawings.

The inspectors also observed applicable controls of specific processes and activities including torquing of bolts, minimum spacing between bolts, slippage of nut during installation, and number of washers used on bolts for the following supports:

SUPPORT ID # (2 bolts per support)

110714210-570
 110714210-385
 110714210-386
 110714210-373
 110714210-358
 110714210-413
 110714210-380
 110714210-158
 110714210-304
 110714210-115
 110714210-351
 110714210-329
 995417923-153
 995417923-055
 995417923-170

SUPPORT ID# (4 bolts per support)

110714194-084
 110714194-126
 110714194-128
 110714194-129

The following samples were inspected:

- IP 50090 Section 02.02.a – one sample
- IP 50090 Section 02.03.a – one sample
- IP 50090 Section 02.03.b – two samples
- IP 50090 Section 02.03.d.2 – six samples
- IP 50090 Section 02.03.d.2 – six samples
- IP 50090 Section 02.03.f – six samples
- IP 46071 Section 02.02.b – 46 samples

b. **Observations and Findings**

The inspectors identified the following NCV:

Introduction: A SL IV NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” was identified by the inspectors for failure to identify improper weld size by the welder, field engineer, and quality control (QC) in accordance with applicable instructions, procedures, and drawings.

Description: On February 25, 2010, the inspectors performed a walk-down of newly-installed pipe supports to determine whether their as-installed configurations matched those specified by the applicable drawing revision authorizations (DRAs). The inspectors identified an example where the weld throat did not meet the minimum size requirements, specified by DRA 52897-005, for a weld joining an embed plate to pipe support 2-47A450-26-304 for the safety-related ERCW system.

Specifically, the inspectors identified that Weld #1 joining embed plate 48N913-8B to pipe support 2-47A450-26-304 was (1) not welded in accordance with the drawings; (2) was verified and signed off by the field engineer (FE) despite the incorrect weld size; and (3) was accepted by QC despite the fact that the weld size did not meet the acceptance criteria specified in DRA 52897-005.

On February 26, 2010 the applicant initiated PER 219205 to document the conditions identified by the inspectors. The applicant concluded that although the weld had been final accepted by QC, it did not meet the size requirements specified by DRA 52897-005, and would have to be repaired or reworked. An initial extent of condition evaluation was performed and included re-inspection of 67 safety-related welds, 18 of which were found not to meet the acceptance criteria. The applicant's review of this issue and follow-up extent of condition review, which identified the additional 18 undersize weld, extended into the inspection period covered by this report and is the reason this violation is documented in this inspection report.

This finding was determined to be more than minor because it represented an inadequate work activity and inadequate quality oversight function that, if left uncorrected, could adversely affect the quality of the construction and records of a safety-related system, the ERCW system. The cause of this finding was directly related to the work practices component of the Human Performance cross-cutting area, as defined in IMC 0310, because TVA failed to appropriately communicate human error prevention techniques, such as self checking, and proper documentation of activities (H.4 (a)).

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" requires in part that activities affecting quality shall be accomplished in accordance with instructions, procedures, or drawings.

Section 6.1.3 of Bechtel procedure 25402-000-GPP-0000-N3504, "Pipe and Instrument Tubing Supports" requires that all materials, work, and services shall fully comply with the design drawings, specifications, applicable codes and standards. Additionally, Section 6.3.1 requires that the quality control engineer (QCE) inspect and verify all inspection attributes for Safety-Related (SR) and Quality Related (QR) activities. These inspection attributes include orientation, configuration, and dimensions as defined in attachment B of the procedure. Finally, Section 6.3.7 requires that the FE verify that hangers and supports are installed in accordance with design output documents, including drawings.

Contrary to the above, activities affecting quality were not accomplished in accordance with applicable instructions, procedures, and drawings. Specifically, Weld #1 joining embed plate 48N913-8B to pipe support 2-47A450-26-304 was (1) not welded in accordance with the drawings; (2) was verified and signed off by FE despite the incorrect weld size; and (3) was accepted by QC despite the fact that the weld size did not meet the acceptance criteria specified in DRA 52897-005.

This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation and because it was entered into the corrective action program as PER 219205, this violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-04, Undersized Pipe Support Welds.

c. Conclusions

The inspected activities associated with the installation of pipe supports for those discussed above were not performed in accordance with applicant procedures and NRC regulations; however, other activities observed were performed in accordance applicable procedures.

C.1.4 Structural Concrete (IP 46053)

a. Inspection Scope

The inspectors observed concrete placement activities associated with work order (WO) 09-954333-011. The inspectors interviewed personnel involved with these activities and assessed the following conditions prior to and during the placement process:

- The pre-placement inspection performed by QC was completed before any concrete was placed.
- The placement area was cleaned and joint preparation was as specified in the construction specification.
- Records were produced, reviewed, and indicated mix, location, time placed, water additions, and temperature of the concrete mix and ambient conditions.
- Concrete temperature, slump, air content, and unit weight were determined at the proper location and frequency.
- Sampling and testing techniques conformed to the procedures specified in the applicable American Society for Testing and Materials (ASTM) standards.
- Test specimens, for concrete strength determination, were sampled at the required location and frequency and were molded and cured in accordance with specified requirements.

The following samples were inspected:

- IP 46053 Section 02.03.e – one sample
- IP 46053 Section 02.03.f – one sample
- IP 46053 Section 02.03.h – two samples

b. Observations and Findings

The inspectors identified the following NCV:

Introduction: A SL IV NCV of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action”, was identified by the inspectors for inadequate measures to assure that conditions adverse to quality, specifically non-conforming safety-related concrete, were promptly identified and corrected.

Description: On May 17, 2010, the inspectors observed concrete placement activities associated with work order (WO) 09-954333-011. On May 21, 2010, PER 230811, “Concrete Mixing and Placement Violations,” was issued to document issues with concrete mixing and placement discrepancies identified during the placement of concrete into the floor for support No. 2-70-888 in accordance with WO 09-954333-011. Prior to placement, QC rejected the safety-related concrete batch; however, the concrete was placed with known concerns.

On June 30, 2010 the inspectors reviewed PER 230811 and discovered that the PER and associated actions had been closed and archived. The action to address the nonconforming condition did not fully address the discrepancies identified during placement as stated in PER 230811. On July 1, 2010, the applicant initiated PER 237820 to document the inappropriate closure of PER 230811.

This finding was determined to be more than minor because it represented an improper or uncontrolled work practice that can impact quality or safety, involving safety-related SSCs, in that the failure to appropriately disposition the nonconforming condition (concrete rejected by QC) led to the inadvertent use of concrete of indeterminate quality in a safety-related application. The cause of this finding was directly related to the work practices component of the Human Performance cross-cutting area, as defined in IMC 0310, because the applicant failed to ensure supervisory and management of oversight of work, including contractors, such that nuclear safety is supported (H.4(c)).

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires in part that measures shall be established to assure that conditions adverse to quality, such as deficiencies, deviations, defective materials, and nonconformances are promptly identified and corrected.

Contrary to the above, measures specified in the Corrective Action Program procedure 25402-MGT-003 including oversight by responsible organizations, were inadequate to assure that conditions adverse to quality, such as deficiencies, deviations, defective materials, and nonconformances were corrected. Specifically, PER 230811 was closed inappropriately without an adequate engineering disposition for non-conforming (as rejected by QC) safety-related concrete and the responsible organization did not verify completion of the PER corrective actions.

This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation and because it was entered into the corrective action program as PER 237820, this violation is being treated as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-05, Inadequate corrective actions for non-conforming safety-related concrete.

c. Conclusions

The inspected activities associated with the disposition of non-conforming safety-related concrete were not performed in accordance with applicant procedures and NRC regulations as noted above.

C.1.5 Safety-Related and RCS Pressure Boundary Piping Records Review (IPs 49055 and 49065, TI 2512/024)

a. Inspection Scope

The inspectors reviewed the applicant's actions related to the Heat Code Traceability Corrective Action Program (CAP) implementation plan ("plan") for Unit 2 following the guidance in Temporary Instruction (TI) 2512/024. This CAP was designed to resolve issues related to traceability problems identified in the mid-1980s with pressure retaining loose piping, fittings, and flange bolting (materials) used in American Society of Mechanical Engineers (ASME) applications. The overall objective of the CAP was to

provide a re-verification of ASME Section III Code compliance of the installed hardware. The plan for the CAP was designed to address the following identified issues and to provide for recurrence control:

- ASME systems containing lower class ASME or ASTM material; and
- ASTM plate material attached to ASME pressure boundaries.

The inspectors compared the Unit 2 plan to the Unit 1 plan to evaluate the similarity of approach for both units and to determine whether any differences were appropriate. Overall, the inspectors reviewed records related to ASME Section III, Class 1, 2, and 3 pressure retaining materials to determine if the applicant was effectively implementing the Unit 2 plan. The inspectors reviewed applicant efforts to resolve unverified non-destructive evaluation (NDE) for Class 1, 2, and 3 pressure retaining materials as well as recurrence control efforts. More specifically, the inspectors:

- Reviewed records to determine if the required performance tests, nondestructive tests, and other specification requirements were met and if the required inspections were performed. The inspectors reviewed the applicant's efforts to ensure adequate traceability and Code compliance of Class 1, 2, and 3 pressure retaining materials to determine if those efforts were being performed in accordance with the plan;
- Reviewed the applicant/contractor system for reporting and dispositioning nonconforming materials associated with the reactor coolant pressure boundary piping and other safety-related piping and two nonconforming reports to determine:
 - whether the records adequately documented the status of the nonconformances;
 - whether the sample of records was legible and complete; and,
 - whether the records were being properly identified and stored.
- Performed field walk-downs on nine Class 1 welds, four Class 2 welds, one Class 3 weld, and one Class 2 valve to evaluate the base metal traceability to the material certifications and the adequacy of the material certifications compared to the relevant Code requirements. This review included 27 loose material pieces consisting of 17 separate heat numbers installed in four systems. The nine reactor coolant pressure boundary welds reviewed included five 3/4" diameter, two 2" diameter, and two 3" diameter parts. These reactor coolant pressure boundary parts were located in the reactor coolant, chemical and volume control, and safety injection systems. The specific list of welds that were inspected is included in the Attachment to this report;
- Performed field walk-downs of welds 2-068A-T035-27 and 2-068A-T015-27, which were annotated in the N-5 database as being removed, to evaluate the accuracy of the database; and,
- Reviewed Bechtel and TVA procurement and material control procedures to determine if the procedures contained appropriate recurrence control elements;

The inspectors interviewed ASME N-5 personnel about TVA's implementation of the plan. The inspectors also reviewed Boundary Information Transmittals (BIT), engineering evaluations, work orders, material certification packages (weld map,

certified mill test reports, certificates of compliance, weld fit-up data sheets, and examination record data sheets), historical condition reports, and the Unit 1 plan to evaluate the applicant's plan for Unit 2. Other documents reviewed are also included in the attachment.

These inspection activities reviewed a portion of the applicant's plan. Therefore, this CAP remains open.

b. Observations and Findings

No findings of significance were identified.

During implementation of the Unit 2 plan, the applicant identified numerous traceability concerns with installed materials and addressed each issue by writing a BIT. The inspectors reviewed two BITs and determined the BITs appropriately characterized the nonconformance and the BITs were in conformance with all applicable procedures. Additionally, the inspectors reviewed all deviations between the plans for both units and determined that they were acceptable because the scope of the Unit 2 plan exceeded the scope of the Unit 1 plan. For example, the plan for Unit 1 consisted of a statistical sampling of all Class 2 & 3 materials to obtain a 95% confidence level that all materials complied with the Code; however, the applicant reviewed all Class 2 & 3 materials for Unit 2 and did not rely on a statistical sampling technique to ensure Code compliance.

c. Conclusions

The applicant's closure plan for the Heat Code Traceability CAP was similar to the plan used to close the Unit 1 CAP with no unacceptable deviations identified. The applicant was effectively implementing the Unit 2 plan for those activities reviewed during this inspection.

C.1.6 Cable Signal Tracing – Work Observation (TI 2512/016, IP 52053)

a. Inspection Scope

The inspectors reviewed calculation EDQ00299920090014, Engineering Document Construction Release (EDCR) 54264, and WO 111010149 associated with the signal tracing of B-train, safety-related cable 2V1916B. Additionally, the inspectors interviewed responsible engineering staff and observed field cable signal tracing activities.

b. Observations and Findings

No findings of significance were identified. The inspectors determined that the pre-job briefings were adequate, covering staff qualifications, equipment calibration and operating conditions, other staff assistance requirements for providing ladders and access to spaces inside the Auxiliary Building, operations coordination, and appropriate tools. The inspectors verified that the staff performing the tracing were following proper peer-to-peer verification procedures. The inspectors observed the signal tracing; however, the applicant noted the results did not appear reasonable to accurately identify routing. It was identified that the routing picked up by the tracing was different from the routing shown on the drawings and Integrated Cable and Raceway Design System (ICRDS) data sheets. At the end of the inspection period, the applicant was still investigating the tracing anomaly.

c. Conclusions

Further inspection is needed to verify ICRDS is updated with the results from the signal tracing.

C.1.7 RPV Internals and Protection of Installed Plan Equipment during Construction Activities (IP 50053)

a. Inspection Scope

During the inspection period, the inspectors conducted observations of the reactor pressure vessel (RPV) condition assessment activities. The assessment activities included walk-downs and non-destructive examinations (NDEs). This inspection was to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. The inspectors also observed ongoing visual examination activities performed by PCI Energy Services (PCI) inside the RPV. Housekeeping and protection controls of the RPV were observed to determine whether procedural requirements were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, Housekeeping. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 50053 Section 02.01.c - one sample
- IP 50053 Section 02.02.a - one sample
- IP 50053 Section 02.03.b - one sample
- IP 50053 Section 02.03.c - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate controls were in place to protect the RPV during the inspection period.

C.1.8 Reactor Coolant System (RCS) Piping (IP 49053)

a. Inspection Scope

The inspectors observed work activities associated with the reactor coolant system including loops 1 through 4 hot legs and cold legs. The inspectors entered and visually examined the piping to verify the material condition. The inspectors also verified the following:

- Inspection (QC) and/or work performance verification, including specified frequency of inspections
- Utilization of qualified inspection personnel
- Control of nonconforming items

The following samples were inspected:

- IP 49053 Section 02.03 - one sample
- IP 49055 Section 02.02 - one sample

b. Observations and Findings

The inspectors identified the following unresolved item:

Introduction: The inspectors identified an unresolved item (URI) related to the material condition inside of the loop-3 RCS crossover piping.

Description: On June 30, 2010, the inspectors reviewed PER 224434 associated with the material condition of the loop-3 RCS crossover piping. The inspectors had previously entered the loop-3 crossover piping on March 20 and 21 to inspect the material condition of the interior of the piping as documented in inspection report 05000391/2010602. During that time and after work had been completed and signed off by QC. The inspectors noted that some potential areas of pitting had not been documented by the applicant as specified in WO 110739214. Specifically, Step 5.5.3.C of WO 110739214, stated the following:

“After cleaning, the surface of the RCS piping and welds shall be visually examined to determine if surface pitting has occurred. The pipe interior shall be inspected for any area showing a reduction in wall thickness as PER NDRF 211911. Any suspect areas shall be forwarded to engineering for inspection and further evaluation.”

In addition, Appendix B of the Corrective Action Program procedure 25402-MGT-003 requires that nonconforming items be dispositioned by engineering and a technical justification be included for Accept-As-Is or Repair.

As result of the NRC's questions, on April 7, 2010 the applicant initiated PER 224434 to address the issues identified by the NRC related to the material condition of the crossover piping and document the location of these potential areas of concern; however, on June 30 after further review of the PER, the inspectors noted that corrective action 224434-002 included an engineering disposition unrelated to the issue and instead addressed a 3" drain line.

The inspectors concluded that in order to properly evaluate the applicant's disposition of this issue, additional inspection would be required to determine (1) whether areas of concern (potential pitting) were properly identified and documented at the time by QC and FE in accordance with applicable instructions and procedures; and (2) whether the engineering disposition appropriately addressed the area of concern. This issue was identified as URI 05000391/2010603-06, "Material Condition Inside Loop-3 RCS Crossover Piping."

c. Conclusions

The inspectors concluded that additional inspection would be required to resolve questions associated with material condition of RCS piping.

C.1.9 Protection of Installed Plant Equipment During Construction Activities – Reactor Coolant Pressure Boundary Piping (IP 49053)

a. Inspection Scope

The inspectors performed a walk-down of a sample of installed safety-related welds, piping, and components to determine whether the applicant and their contractors had established adequate controls for the storage and preservation of safety-related, ASME materials and equipment. Specifically, the inspectors performed walk-downs of portions of the following systems:

- Reactor coolant system (pressurizer surge line, pressurizer spray line, pressurizer relief and safety valve lines)
- Residual heat removal system
- Safety injection system

The inspectors observed housekeeping activities to determine whether quality assurance program requirements were adequately implemented by the applicant and their contractors. The inspectors compared observations made to the following quality assurance program requirements:

- Appendix B, Criterion XIII, “Handling, Storage, and Shipping,” of 10 CFR Part 50
- The TVA quality assurance program, TVA-NQA-PLN89-A, “Nuclear Quality Assurance Program (NQAP),” Rev. 23
- Watts Bar Unit 2 Construction Completion Project, Bechtel Project Nuclear Quality Assurance Manual (PNQAM), Rev. 6
- American National Standards Institute (ANSI) N45.2.3-1973, “Housekeeping during the Construction Phase of Nuclear Plants,” (referenced in both NQAP and PNQAM)
- ANSI N45.2.2-1972, “Packaging, Shipping, Receiving, Storage, and handling of Items for Nuclear Plants.” (Referenced in both NQAP and PNQAM)
- ANSI N45.2.8-1975, “Supplementary Quality Assurance Requirements for the Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction of Nuclear Power Plants.”

b. Observations and Findings

The inspectors identified the following NCV:

Introduction: The inspectors identified a SL IV, NCV of 10 CFR 50, Appendix B, Criterion XIII, “Handling, Storage, and Shipping,” in that, the applicant failed to control the storage and preservation of safety-related material (welds, piping, and components) to prevent damage from nearby construction activities. Specifically, the inspectors identified multiple locations of weld and paint spatter, arc strikes, and mechanical damage on safety-related welds, piping, and components.

Description: On June 23, 2010, while performing a walk-down of the pressurizer safe-end to elbow weld (RCF-D144-11), the inspectors identified multiple examples of weld and paint spatter, arc strikes, and mechanical damage (e.g., dents, dings, gouges, etc.) on adjacent ASME Class 1, safety-related welds, piping, and components. On June 24, 2010, the inspectors performed another walk-down of piping systems in the reactor building and identified additional examples of weld and paint spatter, arc strikes, and mechanical damage on ASME Class 1, safety-related welds, piping, and components.

The inspectors identified approximately 70 locations of damage associated with welds, piping, and components within the following systems: (1) reactor coolant system, (2) safety injection system, and (3) residual heat removal system. The specific issues identified by the inspectors were documented by the applicant in PER 236720.

The inspectors noted that affected welds, piping, and components were fabricated from stainless steel alloys, and were all ASME Class 1, pressure boundary items. The inspectors determined that these issues were reasonably within the applicant's ability to foresee and correct, and should have been prevented.

TVA's Nuclear Quality Assurance Program and the Bechtel PNQAM both require the implementation of ANSI N45.2.8-1975, "Supplementary Quality Assurance Requirements for the Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction of Nuclear Power Plants." Section 4.6, Care of Items, of ANSI N45.2.8-1975, states in part:

"Items on which inspection and testing activities are being performed shall be protected from personnel traffic, weather, and adjacent construction activities such as sandblasting, acid cleaning, welding, jack hammering, chipping, burning and stress relieving that would adversely affect the quality of the item or test results. Such protection shall be provided through good cleanliness and housekeeping practices, temporary packaging, erection of barriers, protective covers, and walkways as required in accordance with Subsection 2.6."

ANSI N45.2.8-1975, Section 2.6 references ANSI N45.2.3-1973, "Housekeeping during the Construction Phase of Nuclear Plants," which both TVA and Bechtel commit to in their quality assurance programs. This ANSI standard specifically addresses the protection of materials and equipment from physical damage during the construction phase. Bechtel implements the requirements of ANSI N45.2.3-1973 through adherence to Procedure 5402-000-GPP-0000-N2102, "Housekeeping." Section 6.11, "Housekeeping During Construction Activities," of this procedure, states in part:

"Barriers, screens, shields, restricted access, or other protection shall be provided as necessary for isolation of areas where dust, inclement weather, or other conditions exist that may affect the quality of work being performed. This protection should be maintained throughout the work cycle."

Based on the applicant's preliminary evaluation of the conditions identified, the inspectors determined that the applicant failed to provide adequate protection of safety-related welds, piping, and components from adjacent construction activities in accordance with work and inspection instructions.

The inspectors determined that this finding was more than minor because it represented an inadequate quality oversight function that, if left uncorrected, could adversely affect the quality of the construction of safety-related, pressure boundary welds, piping, and components. Specifically, these conditions could render the quality of the installed items unacceptable or indeterminate. Additionally, the repairs or rework required to correct the identified conditions may require additional examinations to verify conformance with the construction code of record. Furthermore, the applicant had previously completed pre-service inspections on some of the affected welds, and depending on the repair required to correct the condition, the pre-service examination results may be invalidated.

This issue was entered into the corrective action program as PER 236720. This PER stated that some of these issues were likely the result of recent construction activities and others were likely historical issues, in that they were caused by construction and/or installation activities that occurred prior to 2008. There was no cross-cutting aspect associated with this violation.

Enforcement: 10 CFR 50 Appendix B, Criterion XIII, "Handling, Storage, and Shipping," requires, in part, that, "measures shall be established to control the handling, storage, shipping, cleaning and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration."

TVA's Nuclear Quality Assurance Program and the Bechtel PNQAM both require the implementation of ANSI N45.2.8-1975 and ANSI N45.2.3-1973. Section 4.6, "Care of Items," of ANSI N45.2.8, states in part that, "Items on which inspection and testing activities are being performed shall be protected from ...adjacent construction activities...that would adversely affect the quality of the item or test results."

Section 6.11, "Housekeeping During Construction Activities," of Procedure 5402-000-GPP-0000-N2102, "Housekeeping," Rev. 8, states in part: "Barriers, screens, shields, restricted access, or other protection shall be provided as necessary for isolation of areas where dust, inclement weather, or other conditions exist that may affect the quality of work being performed."

Contrary to the above, prior to June 24, 2010, the applicant failed to control the storage and preservation of material and equipment in accordance with work and inspection instructions to prevent damage from adjacent construction activities as evidenced by multiple locations of weld and paint spatter, arc strikes, and mechanical damage on safety-related welds, piping, and components.

This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation and because it was entered into the corrective action program as PER 236720, it is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-07, Failure to Protect Safety-Related Welds, Piping, and Components During Construction Activities.

c. Conclusions

The inspectors identified a violation for the applicant's failure to control the storage and preservation of material and equipment in accordance with work and inspection instructions to prevent damage from nearby construction activities.

C.1.10.Unresolved Item 78-05-02, Reactor Vessel – Nozzle Weld Surface Cracking

a. Inspection Scope

The inspectors conducted interviews and reviewed documentation related to URI 78-05-02, Reactor Vessel – Nozzle Weld Surface Cracking, to determine whether the cracking had been adequately repaired. The inspectors reviewed welding records and NDE reports related to repairs completed to loop four, reactor vessel cold leg nozzle weld 2-068C-W004-01, to evaluate compliance with the requirements of ASME Section III, 1971 edition through the summer 1973 addenda. Following all repairs, the final radiographic exam (RT) was performed on May 9, 1978, and was accepted by both the

Level II reviewer and Authorized Nuclear Inspector (ANI). However, a subsequent May 19, 1988, review rejected the May 9, 1978, RT due to excessive geometric unsharpness and use of the wrong penetrometer. This issue was generic in nature, in that, during an NRC conducted review of RT film for both Unit 1 and Unit 2, 683 Class 1 and Class 2 welds were identified with geometrical unsharpness issues. See NRC inspection report 50-390, 391/91-23 for additional information on the RT review. A subsequent evaluation, and development of a special procedure per the 1971 edition of the ASME Section III, Appendix IX, paragraph IX-3110, was performed by the applicant to resolve the geometrical unsharpness issue for Watts Bar Unit 1. See NRC inspection report 50-390, 391/91-32 for additional details and disposition.

As these issues relate to Watts Bar Unit 2, the applicant intends to submit a special procedure to the NRC as a proposed alternative per the requirements of 10 CFR 50.55a, "Codes and Standards," and to the ANI for review and acceptance. Further inspection of URI 78-05-02 will continue, once those reviews or acceptable alternatives, have been completed.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that URI 78-05-02, Reactor Vessel – Nozzle Weld Surface Cracking will remain open.

C.1.11 Inservice Inspection – Review of Program (IP 73051)

a. Inspection Scope

The inspectors reviewed a sample of NDE coverage calculations to determine whether the applicant adequately calculated the percentage of code-required examination volume coverage obtained. The inspectors also performed a walk-down of the following welds in order to evaluate the validity of relief requests intended to be submitted for less than 90% NDE coverage within the preservice inspection (PSI) program. The inspectors also reviewed the following NDE report coverage diagrams:

- CVCF-F-T284-06, 2" Class 1 pipe to flange weld
- RCF-G1-4, 31" Class 1 pipe to reactor coolant pump bowl weld
- SIF-B-T090-06, 2" Class 2 pipe to flange weld
- SIF-D198-06, 6" Class 1 elbow to check valve weld

The following samples were inspected:

- IP 73051 Section 02.09 – 4 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the observed NDE activities met the requirements established by the applicant's PSI program and the ASME Code.

C.1.12 Inservice Inspection – Review of Procedures (IP 73052)

a. Inspection Scope

The inspectors reviewed N-UT-78, "PDI Generic Procedure for the Manual Ultrasonic Examination of Reactor Pressure Vessel Welds PDI-UT-6," Rev. 0005 to determine the adequacy of both the scope and technical content in meeting the requirements of the 10 CFR 50.55a "Codes and Standards," and Section XI of the ASME Boiler and Pressure Vessel Code, 2001 edition through 2003 addenda. The inspectors also observed the procedure in use during the examination of W09-10, reactor pressure vessel head circumferential weld.

The following samples were inspected:

- IP 73052 Section 02.03 – 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the ultrasonic examination procedure reviewed met applicable ASME code and 10 CFR 50.55a requirements.

C.1.13 Preservice Inspection – Observation of Work and Work Activities (IP 73053)

a. Inspection Scope

The inspectors observed a selected sample of PSI related activities to determine whether the onsite preservice inspection of ASME Class 1, 2 and 3 pressure retaining components was performed in accordance with the applicant's PSI program, "Preservice Inspection Program Plan, Watts Bar Nuclear Plant Unit 2," Rev 3. Specifically, the inspectors observed the ultrasonic (UT) PSI examination of reactor pressure vessel head Circumferential Weld W09-10.

The inspectors observed portions of the examination and reviewed associated NDE reports to determine whether the examinations were performed in accordance with approved procedures and consistent with the ASME Code of Record for the PSI program (ASME, Boiler and Pressure Vessel Code, 2001 edition including 2003 addenda, Section XI, Division 1, Inservice Inspection of Nuclear Power Plant Components). Examination records were reviewed to determine whether they were prepared, evaluated, and maintained in accordance with the applicant's QA program requirements (TVA-NQA-PLN89-A, Rev. 23) and the requirements specified in ASME Section XI.

Qualification and certification records for examiners, inspection equipment, and consumables along with the applicable NDE procedures for the pre-service examination activities were reviewed to determine whether they met the requirements established by the applicant's PSI program and the ASME Code.

The following samples were inspected:

- IP 73053 Section 02.03 – 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the observed NDE activities and qualification records for examination personnel met the requirements established by the applicant's PSI program and the ASME Code.

C.1.14 Preservice Inspection - Data Review and Evaluation (IP 73055)

a. Inspection Scope

The inspectors reviewed a sample of recently completed PSI examination records (NDE records) for safety-related systems. The inspectors reviewed these records to determine whether they met the requirements the ASME Code, the associated NDE procedure, and the applicant's quality assurance program. Specifically, the inspectors reviewed the records to determine whether they contained or referenced the following information:

- Examination results and data sheets
- Examination equipment data
- Calibration data sheets (as applicable)
- Extent of examination
- Records on disposition of findings (if applicable)
- Identification of NDE material such as penetrant, penetrant cleaner, couplant, films, tapes, etc.

The inspectors also reviewed these records to determine whether:

- Collected examination data and any recordable indications were properly recorded to permit accurate evaluation and documentation.
- Evaluation of examination data was performed by a Level II or Level III examiner.
- Evaluation of examination data was consistent with the procedure.
- Evaluation of indications (if applicable) complied with the criteria of the NDE procedure and ASME Section XI.
- Incomplete examinations and results were repeated to permit full evaluation (if applicable).

The inspectors reviewed the following PSI examinations:

Report #	NDE Method	Weld # / Component #	System	Description	ASME Class
R-P0240	Liquid Penetrant	RCF-D144-11	Reactor Coolant	Safe End to Elbow Weld	1
R-P0970	Liquid Penetrant	SIS-163	Safety Injection	Elbow to Pipe Weld	2
R-P0972	Liquid Penetrant	SIF-D123-07	Safety Injection	Valve to Reducer Weld	2
R-P0992	Visual	RCP3FLG	Reactor Coolant	Flange	1
R-P0993	Magnetic Particle	FWF-D002-03	Feed Water	Valve to Pipe Weld	2
R-P0994	Magnetic Particle	FWS-015	Feed Water	Pipe to Reducer Weld	2
R-P0996	Magnetic Particle	MSS-052	Main Steam	Cap to Pipe Weld	2

For PSI examinations that identified unsatisfactory examination results, the inspectors reviewed the applicant's actions to determine whether indications were dispositioned in accordance with approved procedures, and the ASME Code. Specifically, for PSI report R-P0240 (weld number RCF-D144-11), the inspectors reviewed the associated corrective action documents (PER 166624) that the applicant used to correct an unsatisfactory linear indication. The inspectors reviewed WO 10-951028-000 and supplemental examination reports (PT-019 and UT-019) to determine whether the indication was adequately corrected. The inspectors also performed an independent visual inspection of the repair area to determine whether the weld conformed to contour and surface finish requirements. For the other PSI reports that documented unacceptable indications, the inspectors were unable to review the corrective actions because the conditions had not been corrected at the time of the inspection. The inspectors reviewed the PERs that were generated for the unacceptable indications.

The inspectors reviewed records related to the PSI ultrasonic examination of the reactor pressure vessel head circumferential weld, W09-10, to determine whether the examination was performed in accordance with N-UT-78, Rev. 5. The inspectors also reviewed these records to determine whether the records provided documentary evidence that the examination met the prescribed acceptance criteria and other technical and quality requirements. Specifically, the inspectors reviewed records to determine whether:

- The method, extent and technique complied with the requirements of the PSI program and ASME Section XI.
- Exam data were within the ASME Section XI and NDE procedure acceptance criteria.
- Recording, evaluation and disposition of findings were in compliance with Section XI and the NDE procedure.
- The method used was sufficient to determine the full extent of an indication or its acceptance.

The inspectors performed the following samples:

- IP 73055 Section 02.02 and 02.04 – seven NDE records
- IP 73055 Section 02.03 – one NDE record for the RPV head circumferential weld

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the PSI data reviewed met applicable ASME Code Sections, the applicant quality assurance program, and PSI Program requirements. The inspectors also determined that the PSI data was complete and was either within the prescribed acceptance criteria or documented in a corrective action document to restore compliance with acceptance criteria.

C.1.15 Nuclear Welding General Inspection Procedure (IP 55050)

a. Inspection Scope

The inspectors performed an inspection of applicant activities associated with the fabrication and repair of safety-related piping welds at Watts Bar Unit 2. The inspectors reviewed the contractor's welding program controls for welding fabrication and weld repair of safety-related piping welds.

The inspectors compared safety-related welding activities and records reviewed to the following technical and quality requirements:

- Bechtel Quality Assurance Manual, Rev. 3 (Section 9, "Control of Special Processes")
- The applicant's quality assurance manual TVA-NQA-PLN89-A, Rev. 23 (Section 9.3, "Control of Special Processes")
- Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- The Watts Bar Unit 2 piping code of record (American Society of Mechanical Engineers [ASME] *Boiler and Pressure Vessel Code*, 1971 Edition with addenda through summer 1973, Section III, Division 1, Rules for Construction of Nuclear Facility Components).

The inspectors reviewed portions of the contractor's Special Processes Manual (SPM), Rev. 1, to determine whether the contractor had established an adequate program to implement the above quality and technical requirements. The SPM included program documents such as: welding procedure specifications (WPSs) with supporting procedure qualification records (PQRs); welding filler metal control procedures; welder performance qualification procedures; general welding standards; general purging specification; various NDE procedures; postweld heat treatment (PWHT) procedures; and weld documentation procedures.

Base Material and Weld Filler Material Compatibility for Welding

The inspectors reviewed WPMC-1, "Bechtel Welding Specification – Welding Filler Material Control," Rev. 1, to verify that the contractor had established procedures and instructions for the purchasing, receiving, storing, identifying, disbursing, and handling of welding filler metals. The inspectors reviewed the contractor's procedures to determine whether they had established procedural controls for the following: (1) environmental (moisture) control; (2) holding and baking temperatures and out-of-oven exposure times for covered electrodes; (3) filler metal identification and control; and (4) filler metal disbursement. The inspectors compared WPMC-1 to the applicable quality requirements of 10 CFR Part 50, Appendix B; and technical requirements of the ASME Section III piping code of record.

The inspectors reviewed a sample of welding material purchasing and receiving records to verify conformance with the applicable quality and technical requirements. The inspectors reviewed the certified material test reports (CMTRs) for 17 heat/lot numbers of welding filler metals to determine whether they met the requirements of the ASME code (ASME Section II - Part C) and the applicable technical requirements prescribed by the contractor's specifications. The inspectors also reviewed these records to determine whether the traceability of heat/lot numbers for weld filler metals and base materials were properly recorded on production weld records.

The inspectors observed the issuance of weld filler material from the weld rod issue room and observed the identification, storage, and handling of welding filler materials. The inspectors observed these activities to determine whether they were performed in accordance with WPMC-1.

Welding Procedures

The inspectors reviewed the contractor's welding program to determine whether they had established adequate procedures for the preparation, qualification, distribution, and revision of WPSs. Specifically, the inspectors reviewed the contractor's general welding requirements for pressure retaining components GWS-1, "Bechtel General Welding Standard," Rev. 2, along with the following four welding procedures:

- P1-AT-Lh (CVN+10)
- P1-AT-Lh
- P8-AT-Ag
- P8, P1-AT-Ag

The inspectors reviewed the above welding procedures to determine whether they met the requirements of ASME Section IX, Welding and Brazing Qualification. The inspectors reviewed these procedures to determine whether they adequately defined the essential, supplementary essential (for impact toughness), and nonessential variables for each welding process, as prescribed by ASME Section IX.

For the above welding procedures, the inspectors also reviewed the supporting PQRs for conformance to ASME Section IX requirements to verify that the procedures were properly qualified. The inspectors verified that the PQRs were certified by the contractor and properly listed the essential variables. For each PQR, the inspectors: (1) verified that the ranges of the essential variables were consistent with those permitted by the WPS and were within the limits of ASME Section IX; and (2) reviewed the mechanical

testing results to verify that they were completed and properly documented in the PQR, and that the test results met or exceeded the minimum technical requirements.

During the review of the above WPSs, the inspectors verified that any changes or revisions to the essential or nonessential variables were properly identified, documented, and supported by requalification (if necessary).

Welder Performance Qualifications

The inspectors reviewed the contractor's welding program to determine whether: (1) the contractor had established adequate procedures for the qualification of welders and welding operators; and (2) the contractor had established an adequate system to control the qualification status of welding personnel. Specifically, the inspectors reviewed the contractor's procedure, WQ-1, "Welding Performance Qualification Specification [ASME Section IX]," Rev. 2, for conformance to welder qualification requirements prescribed by ASME Section III and Section IX. The inspectors reviewed six welder performance qualification records, and compared these records to procedure WQ-1 and ASME Section IX.

Production Welding

The inspectors reviewed three work packages containing completed weld records for compliance with the contractor's welding program requirements, the applicant's ASME Section III code of record, and 10 CFR Part 50, Appendix B. Specifically, the inspectors reviewed "Field Weld Checklists (WR-5)" and associated fabrication and installation drawings, material traceability documents, ASME code data reports, and NDE reports on the following welds:

- Weld Number 2-068A-D145-02 C1R0; safety-related ASME Section III, Class 1
- Weld Number 2-061B-T023-1, C0R0; safety-related ASME Section III, Class 3
- Weld Number 2-061B-T023-2, C0R0; safety-related ASME Section III, Class 3

The inspectors reviewed the weld records for the above welds to determine whether: (1) the welding activity was properly documented on the weld traveler; (2) the weld traveler appropriately referenced the correct welding procedure; (3) the welding technique and sequence requirements were specified; (4) the weld traveler established quality control and authorized nuclear inspector hold points; and (5) the base materials and welding filler materials were properly identified and traceable to the required test reports and certifications.

Preheat and Postweld Heat Treatment

The inspectors reviewed the contractor's welding program to determine whether the contractor had established adequate procedures for weld joint preheating and PWHT. Specifically, the inspectors reviewed the contractor's procedure; PHT-1, "Bechtel General Welding Standard," Rev. 2; for the process of localized PWHT. The inspectors verified that PHT-1 contained requirements for the monitoring and recording of the time and temperature of the weld joint. The inspectors reviewed this procedure to determine whether it implemented the applicable ASME Section III requirements for PWHT.

The inspectors performed the following samples:

- IP 55050 Section 02.01 – seventeen heat/lot numbers for welding filler metals
- IP 55050 Section 02.02 – four welding procedures, with supporting PQRs
- IP 55050 Section 02.03 – six welder performance qualification records
- IP 55050 Section 02.04 – three field welding document packages
- IP 55050 Section 02.05 – one PWHT procedure

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The welding program documents reviewed met the requirements of 10 CFR Part 50, Appendix B; the contractor's quality assurance manual; the applicant's quality assurance manual; and the applicant's ASME Section III code of record.

C.1.16 Structural Welding General Inspection Procedure (IP 55100)

a. Inspection Scope

The inspectors performed an inspection of applicant activities associated with the fabrication and repair of safety-related structural steel welds at Watts Bar Unit 2. The inspectors reviewed the contractor's welding program controls for welding fabrication and weld repair of safety-related structural steel.

The inspectors observed in-process welding, inspected completed structural steel welds, and reviewed completed weld records. The inspectors compared safety-related welding activities and records reviewed to the following technical and quality requirements:

- Bechtel Quality Assurance Manual, Rev. 3 (Section 9, "Control of Special Processes")
- The applicant's quality assurance manual, TVA-NQA-PLN89-A, Rev. 23 (Section 9.3, "Control of Special Processes")
- 10 CFR Part 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- Watts Bar Unit 2 structural steel welding code of record (American Welding Society [AWS] D1.1, Structural Welding Code, 1972 edition with Rev. 1-73 and 1-73.)

Base Material and Filler Material Compatibility for Welding

The inspectors reviewed WPMC-1, "Bechtel Welding Specification – Welding Filler Material Control," Rev. 1, to verify that the contractor had established procedures and instructions for the purchasing, receiving, storing, identifying, disbursing, and handling of welding filler metals. The inspectors reviewed the contractor's procedures to determine whether the contractor had established procedural controls for the following: (1) environmental (moisture) control; (2) holding and baking temperatures and out-of-oven exposure times for covered electrodes; (3) filler metal identification and control; and (4) filler metal disbursement. The inspectors compared WPMC-1 to the applicable quality

requirements of 10 CFR Part 50, Appendix B; and technical requirements of the AWS D1.1.

The inspectors reviewed a sample of welding material purchasing and receiving records to verify conformance with the applicable quality and technical requirements. The inspectors reviewed the CMTRs for two heat/lot numbers of welding filler metals to determine whether they met applicable quality and technical requirements. The inspectors also reviewed these records to determine whether the traceability of heat/lot numbers for weld filler metals and base materials were properly recorded on production weld records.

The inspectors observed the issuance of weld filler material from the weld rod issue room and observed the identification, storage, and handling of welding filler materials. The inspectors observed these activities to determine whether they were performed in accordance with WPMC-1. The inspectors also observed the control and handling of welding material during the welding of safety-related conduit supports to determine whether they met the requirements of procedure WPMC-1.

Welding Procedures

The inspectors reviewed the contractor's welding program to determine whether the contractor had established adequate procedures for the preparation, qualification, distribution, and revision of WPSs. The inspectors reviewed the contractor's general welding standard, GWS-Structural, Rev. 1, and a prequalified structural steel welding procedure for conformance with the AWS D1.1 code of record. Specifically, the inspectors reviewed the prequalified welding procedure P1-A-Lh (Structural) for conformance with AWS D1.1.

Welder Performance Qualification

The inspectors reviewed the contractor's welding program to determine whether: (1) the contractor had established adequate procedures for the qualification of welders and welding operators; and (2) the contractor had established an adequate system to control the qualification status of welding personnel.

The inspectors reviewed the contractor's procedure WQ-2, "Bechtel Welding Performance Qualification Specification [D1.1]," Rev. 0, for the qualification of welders, and compared the procedure to the Watts Bar Unit 2 AWS D1.1 code of record. The inspectors reviewed three welder performance qualification records to determine whether welding personnel were qualified in accordance with procedure WQ-2, ASME Section IX, and AWS D1.1.

Production Welding

The inspectors observed a sample of in-process welding activities associated with safety-related conduit supports to determine whether: (1) welding procedures, detailed drawings and instructions, and weld data sheets were readily available to the welder; (2) the WPS used was appropriate for the weld joint; (3) the welding technique and sequence requirements were specified; (4) base materials and welding filler materials were properly inspected, tested, and identified, and were traceable to test reports and certifications; (5) weld joint geometry was specified and the weld joint surfaces were properly prepared, cleaned, and inspected; (6) weld fit-up was as specified on the design

drawing; (7) welding was performed in accordance with approved welding procedures; and (8) welders were properly qualified.

The inspectors also reviewed portions of WO 09-954179-023, "Fabricate Typical Supports in the Fabrication Shop to be Installed in WOs under EDCR 54633." During the review of this WO, the inspectors reviewed a sample of completed weld records to determine whether the welds met applicable quality and technical requirements.

The inspectors reviewed weld records for the following safety-related conduit support welds:

- 995417923-001
- 995417923-002
- 995417923-003
- 995417923-031
- 995417923-036
- 995417923-040
- 995417923-066
- 995417923-155 FW-2
- 995417923-156 FW-3
- 995417923-157 FW-4
- 995417923-160 FW 7
- Four support welds (WO 09-954333-01)

The inspectors reviewed the weld records for the above welds to determine whether: (1) the welding activity was properly documented on the weld traveler; (2) the weld traveler appropriately referenced the correct welding procedure; (3) the welding technique and sequence requirements were specified; (4) the weld traveler established quality control hold points; and (5) the base materials and welding filler materials were properly identified and traceable to the required test reports and certifications.

Examination and Inspection of Welds

The inspectors independently inspected a sample of safety-related conduit support welds fabricated on-site by the contractor to determine whether these welds met the acceptance criteria specified in the AWS-D1.1 code of record. During the inspection of a sample of fillet welds, the inspectors also compared the following attributes to the AWS D1.1 code of record: weld surface finish; shape and size of fillet welds; and the absence of surface defects including cracks, lack of fusion, porosity, and slag. Specifically, the inspectors observed the following safety-related conduit support welds:

- 995417923-124
- 995417923-125
- 995417923-126
- 995417923-155
- 995417923-157
- 995417923-160
- 995417923-163
- 995417923-164
- 995417923-165

- 995417923-166
- 995417923-167

The inspectors performed the following samples:

- IP 55100 Section 02.01 – two samples of lot numbers for welding filler metals
- IP 55100 Section 02.02 – one sample for a prequalified welding procedure
- IP 55100 Section 02.03 – three samples of welder performance qualification records
- IP 55100 Section 02.04 – seventeen samples (2 in-process welds, 15 completed weld records)
- IP 55100 Section 02.06 – eleven samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The welding program documents reviewed met the requirements of 10 CFR Part 50, Appendix B; the contractor's quality assurance manual; the applicant's quality assurance manual; and the applicant's AWS D1.1 code of record. Welding activities observed were performed in accordance with approved welding procedures. With the exception of undersized welds identified in Section C.1.3, the completed welds observed by the inspectors met the acceptance criteria of the contractor's inspection procedures and the AWS D1.1 code of record.

C.1.17 Visual Examination of Safety Related Welds (IP 57050)

a. Inspection Scope

The inspectors reviewed the contractor's NDE procedure; VT-ASME III Piping, "Bechtel Nondestructive Examination Standard, Visual Examination," Rev. 1. The inspectors compared this procedure to the ASME Section III code of record and ASME Section V, Nondestructive Examination, 1971 edition with addenda through summer 1973.

The inspectors also reviewed the contractor's visual examination procedure for safety-related structural steel VT-AWS D1.1, "Bechtel Nondestructive Examination Standard, Visual Examination," Rev. 1. The inspectors compared this procedure to the AWS code of record.

The inspectors also reviewed the above procedures to determine whether they were issued and qualified in accordance with the contractor's quality assurance program, and were reviewed and approved by the authorized nuclear inspector (if required).

The inspectors reviewed the contractor's written practice NEPQ, "Bechtel Construction Operations Inc. Nondestructive Examination Standard, NDE Personnel Qualification and Certification," Rev. 1. The inspectors compared the written practice to the NDE personnel qualification requirements specified in the ASME Section III code of record. The inspectors also reviewed the personnel qualification records (visual examination) for one Level III inspector, for conformance with the requirements of the contractor's written practice.

The inspectors performed the following samples:

- IP 57050 Section 02.01 – one sample
- IP 57050 Section 02.03 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The visual examination procedures and NDE personnel qualification records reviewed by the inspectors met the requirements of 10 CFR Part 50, Appendix B, and the applicant's ASME Section III and AWS codes of record.

C.1.18 Liquid Penetrant Examination of Safety Related Welds (IP 57060)

a. Inspection Scope

The inspectors reviewed the contractor's NDE procedure PT (SR)-ASME III Piping, "Bechtel Nondestructive Examination Standard, Liquid Penetrant Examination," Rev. 5. The inspectors compared this procedure to the ASME Section III code of record and ASME Section V, Nondestructive Examination, 1971 edition with addenda through summer 1973.

The inspectors also reviewed the above procedure to determine whether it was issued and qualified in accordance with the contractor's quality assurance program and approved by the authorized nuclear inspector.

The inspectors also reviewed the personnel qualification records (liquid penetrant examination) of one Level III inspector for conformance with the requirements of the contractor's written practice.

The inspectors reviewed the following liquid penetrant examination reports to determine whether they met the requirements of the applicant's procedure PT (SR)-ASME III Piping: PT-022, ASME Section III Class 1, pressurizer spray line, pipe to fitting.

The inspectors performed the following samples:

- IP 57060 Section 02.01 – one sample
- IP 57060 Section 02.03 – two samples (one personnel and one examination record)

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The liquid penetrant examination procedure and NDE personnel qualification records reviewed by the inspectors met the requirements of 10 CFR Part 50, Appendix B, and the applicant's ASME Section III code of record.

C.1.19 Magnetic Particle Examination of Safety Related Welds (IP57070)

a. Inspection Scope

The inspectors reviewed the contractor's NDE procedure MT-ASME, "Bechtel Nondestructive Examination Standard, Magnetic Particle Examination," Rev. 5. The inspectors compared this procedure to the ASME Section III code of record and ASME Section V, Nondestructive Examination, 1971 edition with addenda through summer 1973.

The inspectors reviewed the above procedure to determine whether it was issued and qualified in accordance with the contractor's quality assurance program and was approved by the authorized nuclear inspector.

The inspectors also reviewed the personnel qualification records (magnetic particle examination) of one Level III inspector for conformance with the requirements of the contractor's written practice.

The inspectors reviewed the following magnetic particle examination reports to determine whether they met the requirements of the applicant's procedure MT-ASME:

- MT-058, ASME Section II Class 3, Ice condenser drain piping, pipe to elbow
- MT-064, ASME Section II Class 3, Ice condenser drain piping, pipe to elbow

In addition to the document review, the inspectors observed magnetic particle (MT) examination for the completed pipe welds listed below, including review of the qualification records of examination personnel and review of the applicable measuring and test equipment calibration records. These welds were on safety-related piping and part of the ongoing ice condenser drain piping modification activities performed under WOs 08-956218-025 and 08-956218-038. These welds were ASME Section III Class III piping welds associated with EDCR 52813, Redesign and Reinstall Ice Condenser Drain Piping. MT examinations were observed to determine whether they were performed in accordance with the applicable ASME Boiler and Pressure Vessel Code, Section III.

Specific MT examinations observed included the following:

<u>Weld ID</u>	<u>Component</u>
2-061B-T018-09	12-inch diameter pipe weld
2-061B-T028-04	12-inch diameter pipe weld

The inspectors performed the following samples:

- IP 57070 Section 02.01 – one sample
- IP 57070 Sections 02.02 - one sample
- IP 57070 Section 02.03 – three samples (one personnel and two examination records)

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The magnetic particle examination procedure and NDE personnel qualification records reviewed by the inspectors and the magnetic particle examinations observed by the inspectors met the requirements of 10 CFR Part 50, Appendix B, and the applicant's ASME Section III code of record.

C.1.20 Ultrasonic Examination (UT) of Safety-Related Welds (IP 57080, 73053)

a. Inspection Scope

The inspectors observed phased array UT examination for completed dissimilar metal welds on nine safety-related control rod drive mechanism (CRDM). A circumferential and axial scan was performed with both the shear and refracted longitudinal waves. UT examinations were observed to determine whether they were performed in accordance with ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition with Addenda through summer 1973 to verify compliance.

The inspectors reviewed applicant NDE procedure N-UT-87, "Generic Procedure for the Phased Array Ultrasonic Examination of Dissimilar Metal Welds," Rev. 0. For the examination, the inspectors reviewed the completed NDE reports, the qualification records of the examination personnel, and observed calibration checks of the UT equipment. The observed examinations and completed examination reports were compared with the contractor's procedures for UT examination of ASME Code welds. Specific UT examination was observed for dissimilar metal welds on CRDMs 54, 60, 64, 65, 66, 67, 71, 72, and 73.

Additionally, the inspectors reviewed records of completed observation reports for QA oversight activities of contractor NDE activities. A list of QA observation reports is included in the attachment.

The following samples were inspected:

- IP 57080 Section 02.02 - one sample
- IP 73053 Section 02.03 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the observed/reviewed UT examinations met applicable Code requirements and other regulatory requirements.

E.1 Engineering Activities

E.1.1 Procurement, Receiving, and Storage (IP35065)

a. Inspection Scope

The inspectors reviewed the applicant's actions to resolve Bulletin 88-10 for non-conforming molded case circuit breakers (breakers). The inspectors reviewed the

applicant's program for commercial grade molded case breakers dedicated under the QA plan. The inspectors compared observations to references in the Final Safety Analysis Report, Chapter 3.10 Seismic Design of Category I Instrumentation and Electrical Equipment, paragraph 3.10.1 Seismic Qualification Criteria based on IEEE 344-1971 or IEEE 344-1975 and IEEE 323-1974 requiring the capability of Class 1E power equipment to withstand seismic disturbances to be established by seismic analysis and/or testing of each system component.

b. Observations and Findings

The inspectors identified the following VIO:

Introduction: On April 30, 2010, the inspectors identified a violation with two examples of 10 CFR 50, Appendix B, Criterion III, "Design Control," for failure to implement design control measures that provided for design reviews, calculational methods, and qualification testing of a prototype unit under the most adverse design conditions and to review for suitability of application of materials, parts, and equipment.

Description: The applicant installed breakers into the 4 divisions of 120VAC Vital Instrument Power Boards. The electrical loads in the power boards are safety related and necessary to shut down and maintain the plant in a safe condition. The following describes the violation with two examples resulting from the inspectors' observations and review of the records and time line involved in the installation of the breakers.

Example 1: The inspectors found that significant differences existed between the original qualification mounting and the actual mounting method of the breakers in the power boards. During the 1992 qualifications testing, (report S522-RP-02) the breakers were individually mounted to a plate with screws and no front cover. The actual breakers are mounted in the power boards by clamping 12 breakers with a 36" front cover against two horizontal angle iron supports in the rear and without additional screws. The actual mounting method used introduces different shock and random frequency impacts during a postulated seismic event to the breakers that were not simulated nor analyzed in the tested mounting method. Additionally, the actual mounting method exposes the bus bar to additional seismic loading not simulated in the qualification testing. The front cover plate is held in place with one screw in each corner and introduces an uncertain clamping pressure across the 12 breakers. The inspectors determined that the tested breaker mounting did not envelope the mounted condition of the breakers in the power boards.

Example 2: The inspectors reviewed WO 08-816370-000 used to replace old and add new breakers into the WBN-2-BD-235-0003 120VAC vital instrument power board. The inspectors determined the applicant received breakers in which two attributes had been changed. The depth (Z dimension), a critical characteristic, was reduced and the auxiliary contact was moved from the outside to the inside of the breakers. The 1992 qualification report indicated a Z dimension of 3.75" and the manufacturer's catalog now indicates 2.609" for the critical characteristic. The applicant recognized that the breaker with the smaller Z dimension would not mount into the power board. The inspectors determined that the applicant modified the breaker by attaching a Micarta plate to the rear of the breaker using 4 nuts and bolts to fit them in the power boards as described in example 1 without updating the qualification package. The inspectors determined the applicant did not analyze if any detrimental effects may have been introduced by the modification, demonstrate an adequate review for suitability of application, or the impact on other components.

The inspectors reviewed calculation WCG-ACQ-1004, Rev. 1, used by the applicant to demonstrate qualification by analysis. The inspectors verified the calculation's purpose was to qualify the breakers and the calculation concluded the breakers were qualified. The calculation only determined the power board weight change and the shift in natural frequency of the power board and its effect on the power board floor anchor bolts. However, the calculation did not address the breaker performance during a seismic event. The inspectors determined that the conclusion that the breakers were qualified was not validated by the calculation.

The inspectors reviewed problem evaluation report (PER) 227786 dated May 10, 2010 for the qualification findings identified by the inspectors. The inspectors determined that the PER was inadequate. The PER characterized the seismic evaluation calculation WCG-ACQ-1004, Rev. 1 as having evaluated and addressed the seismic qualification of the breakers. The inspectors determined the calculation did not address the qualification of the breakers but rather the qualification of the floor anchor bolts of the power boards. The PER further stated that the breaker installation was in compliance with the 1992 qualification report S522-RP-02. The inspectors determined that the 1992 seismic qualification of the breakers did not envelope the breaker mounting method used for the breakers in the power boards. The 1992 seismic qualification report did not envelope the breaker mounting method used either before or after the attribute changes imposed by the manufacturer occurred. The PER stated that the breakers are acceptable and the integrity of the breakers in the power boards is maintained. No further action was required by the applicant in the corrective actions of the PER. The inspectors determined the PER did not address the effects that changes in attributes may impose on safety, verify the conclusions made in the above calculation, address the qualification of the breakers, or the different mounting method in the 1992 qualification report. The inspectors determined the PER failed to adequately address the findings identified and would not ensure that compliance was restored in a reasonable timeframe or prevent recurrence in accordance with the enforcement policy. Therefore, the criterion for a non-cited violation was not met and a Notice of Violation is warranted, requiring a formal response from the applicant.

Example 1 is more than minor because the finding represents a deviation that, if left uncorrected, could adversely affect the environmental or seismic qualification of a component. Example 2 is more than minor because the violation represents an inadequate process, procedure, or quality oversight function that, if left uncorrected, could adversely affect the quality of the fabrication, construction, testing, analysis, or records of a safety-related component. The cause of this finding was directly related to the decision-making component of the Human Performance cross-cutting area because the applicant failed to appropriately review safety significant decisions to verify the validity of the underlying assumptions and identify possible unintended consequences. H.1 (b) An unresolved item, URI-05000390/2009002-03, was identified on Unit 1 related to the adequacy of the same seismic qualification report for breakers associated with station 120VAC Vital Instrumentation Boards.

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," states that measures shall be established for the review for suitability of application of materials, parts, and equipment that are essential to the safety-related functions of the structures, systems, and components (SSCs). The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Where a test program is used to verify the

adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions.

Contrary to the above, measures used to review for the suitability of application of materials, parts, and equipment essential to the safety related functions of molded case circuit breakers and measures to provide for the verification of checking the adequacy of design, such as, calculational methods, performing a suitable test program, including qualifications testing of a prototype unit under the most adverse conditions were not adequate in that:

1. On October 5, 2009, the applicant installed molded case breakers into the 120VAC vital instrument power boards, however, the test program used to qualify a prototype breaker failed to use a suitable mounting method that reflected the most adverse mounting condition.
2. On September 3, 2009, the applicant failed to perform an adequate review for suitability of application parts and material used to modify dimensional critical characteristic in molded case breakers, and further, the applicant failed to verify the adequacy of design for the modification and the effects on essential safety related functions of the breakers.

This is identified as violation (VIO) 005000391/2010603-08, Failure to Adequately Evaluate and Qualify Molded Case Circuit Breakers.

c. Conclusions

The applicant failed to verify the validity of the underlying assumptions and identify possible unintended consequences resulting from inadequate qualification testing and a modification to a critical characteristic of the molded case circuit breakers used for safety related 120VAC power applications.

E.1.2 Engineering Design Activities and Design Control (IPs 35100 and 37055)

a. Inspection Scope

The inspectors reviewed the implementation of design controls and the content of drawings, specifications, and instructions that had been verified, approved, and issued for construction. The reviews consisted of document reviews and interviews with responsible engineering personnel.

The inspectors' reviews were conducted to verify the design documents were correctly incorporated into applicable design inputs, including a site-specific commitment to maintain fidelity to the associated Unit 1 designs. Inspectors evaluated whether designs were technically adequate, and that they had been reviewed, verified, approved, and controlled in accordance with NRC requirements and applicant's procedures.

b. Observations and Findings

The inspectors identified the following NCV associated with EDCR 52424, Rev. B, Replace Level Transmitters for the Safety Injection System Cold Leg Accumulators:

Introduction: A SL IV NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," was identified by the inspectors for a failure to correctly translate the design basis, as

described in a System Description Document, into affected drawings and specifications. Specifically, a design basis requirement to provide diverse level measurement systems for the Safety Injection System Accumulators was not correctly translated into affected specifications and drawings issued for construction.

Description: The inspectors identified that Section 3.3.1 of System Description Document WBN2-63-4001, Rev.1, Safety Injection System, stated “Each CLA [i.e. Cold Leg Accumulator] is provided with two diverse level measurement systems. Both systems are used to determine the operational readiness of the accumulators during steady state operations.”

TVA Nuclear Standard Department procedure NEDP-1, Rev. 5, “Design Basis and Design Input Control,” Appendix D, identified System Description Documents as a primary source for defining design inputs.

The drawings and specifications released for construction under EDCR 52424 did not provide diverse level measurement systems for the Cold Leg Accumulators. Instead, the design documents provided duplicate level measurement systems. This configuration also differed from the Unit 1 design which contained diverse level measurement systems. The inspectors identified that the level measurement systems were required to implement Technical Specification Surveillance 3.5.1.2, and were classified as Quality-Related and non-Safety Related.

EDCR 52424 identified that differences existed between Unit 1 and Unit 2 on Attachment E, EDCR Unit Difference Form. Specifically, the EDCR stated that each accumulator on Unit 1 was provided a Rosemount Model 1152 DP level transmitter and an FCI Thermal Dispersion level element; whereas each accumulator on Unit 2 was provided two Rosemount Model 1153 DD3RB transmitters. Although the EDCR documentation provided a justification for using a different model Rosemount transmitter on Unit 2 than installed on Unit 1, it did not provide a basis for specifying a different form and function of level sensor in comparison to the thermal dispersion devices provided for Unit 1. The inspectors noted this omission did not comply with a requirement in procedure 25402-3DPG04G-00081, Engineering Document Construction Release, Section 7.2.4, which states that every unit difference must contain an evaluation which addresses differences in form, fit, or function.

The inspectors also noted the EDCR contained a draft Revision to WBN-63-4001, System Description for Safety Injection System; however, neither the description of the revision contained in the document nor the marked changes in Section 3.3.1 identified any intent to change the requirement for diverse level measurement systems.

The violation was determined to be more than minor because the failure to correctly translate the design requirement from the System Description Document and the failure to properly evaluate the difference created with the Unit 1 design represented an improper work practice which could impact the proper functioning of the Safety Injection System Accumulator level measurement system.

A cross-cutting aspect was identified for this violation which was related to Human Performance – Work Practices (H.4 (b)). This aspect is applicable in that the applicant did not effectively communicate expectations regarding procedural compliance and personnel following procedures.

The applicant issued PER 226246 to address this condition and other concerns with discrepancies in EDCR Technical Evaluations.

Enforcement: 10 CFR 50 Appendix B, Criterion III, Design Control, requires, in part, that measures are to be established to correctly translate the design basis into affected

drawings and specifications. TVA Nuclear Standard Department procedure NEDP-1, "Design Basis and Design Input Control," identifies System Description Documents as a primary source for defining design inputs.

Contrary to the above, on May 21, 2010, the inspectors identified that the applicant failed to correctly translate a requirement for a diverse level measurement system into design drawings and specifications issued for construction under EDCR 52424, as specified in System Description Document WBN2-63-4001, Safety Injection System.

This finding was determined to be a SL IV violation using Supplement II of the Enforcement Policy. Because this was a SL IV violation, and because it was entered into the corrective action program under PER 226246, this violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010603-09, Failure to Correctly Translate the Design Basis into Affected Specifications and Drawings Issued for Construction.

c. Conclusions

The inspectors determined that, in most cases, design drawings, specifications, and instructions were developed in accordance with NRC and applicant requirements. Design documents were provided specific approvals for differences that were created between the Unit 2 design and the Unit 1 design. However, one violation was identified where a requirement to provide diverse level measurement systems for Safety Injection System Cold Leg Accumulators was not correctly translated into design documents.

T.1 Training and Qualification of Plant Personnel

T.1.1 Craft Training (IPs 51051 and 64051)

a. Inspection Scope

The inspectors observed a classroom training session for electrical craft personnel. Specifically, the inspectors observed containment CONEX penetration and Kapton insulated conductor familiarization in accordance with vendor technical document WBN-VTD-C515-0060, Installation Manual for CONEX Electrical Conductor Seal Assemblies. The training session included discussions on installation and repair of Kapton insulated conductors.

The inspectors also observed classroom fire watch training. The inspectors reviewed the associated procedures and lesson plans, and held discussions with the instructors. The training highlighted selected portions of TVA procedure SPP-10.11, Control of Ignition Sources (Hot Work).

Samples inspected are as follows:

- IP 51051 Section 02.03 – one sample
- IP 64051 Section 02.04 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

TVA's program for training of newly hired personnel relating to repair or installation of CONEX Penetration Seals and Kapton Insulated Conductors and training for hot work fire watches was adequate for the current level of construction activities being performed.

T.1.2 Engineering Organization Training (IP 35960)

a. Inspection Scope

The inspectors observed a classroom training session for engineering personnel. Specifically, the inspectors observed Introduction to ASME Code for Design Engineers. The training session was intended to be an introduction on use of the ASME Class III Code by engineering design personnel. Additional future training on ASME Code requirements would be required.

Samples inspected are as follows:

- IP 35960 Section 02.01 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspection results are too limited to support a conclusion at this time.

III. Operational Readiness Activities

F.1 Fire Protection (IP 64051)

a. Inspection Scope

The inspectors conducted a walk-down of TVA's established fire protection/prevention controls for Unit 2 and inspected hot work activities inside the Unit 2 reactor building. Inspectors observed fire watches and verified that fire suppression devices were available at or near the location of the hot work activities. The inspectors interviewed fire watch personnel to verify knowledge of responsibilities as fire watches. The inspectors also verified that hot work permits were posted at the location of any hot work and that appropriate signoffs had been completed in the associated work control documents. The inspectors also verified that the assigned fire watches had current training and appropriate qualifications. The inspectors observed fire prevention aspects associated with welding activities. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 64051 Section 02.07 – one sample
- IP 64051 Section 02.08 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

TVA implemented adequate fire protection measures and controls to support Unit 2 construction activities and minimize impact on Unit 1 operation activities.

IV. Other Activities

OA.1.1 (Discussed) Quality Assurance Corrective Action Program (TI 2512/28, IPs 50075, 51065, 51055, 52055)

a. Inspection Scope

Background: The QA Records Corrective Action Program (CAP) was developed in the mid-1980s after TVA determined that required QA records were:

- Not retrievable in a timely manner or were missing
- Not maintained in proper storage
- Incomplete, technically, or administratively deficient

The applicant has taken various actions to correct previously identified records deficiencies. These actions included:

- Ensuring adequate storage and retrievability
- Resolving quality and technical problems
- Ensuring programs were established to prevent recurrence of previous record problems

TVA selected a sample size of 124 records for each of the ANSI/ASME N45.2.9, 1974, Appendix record types for Unit 2 and utilized an accepted statistical sampling methodology (95/95). NRC Safety Evaluation Reports (SERs) dated June 9, 1992, and September 8, 2009, approved the sampling methodology used by the applicant.

The inspectors reviewed the applicant's implementation of the QA Records CAP. Specifically, the inspectors reviewed the results of sample assessments performed by the applicant in several areas to verify resolution of previously identified problems with retrievability, storage, and completeness and to resolve quality and technical problems. Additionally, the inspectors performed an independent sample selection of 47 records which were shown on the applicant's Engineering Construction Monitoring and Documentation (ECM&D) database as active records for the following QA record types:

Mechanical Records (23 records)

- Valves (7 records)
- Mechanical Equipment (5 records)
- Piping (5 records)
- Ductwork (6 records)

Electrical/Instrument Records (24 records)

- Cables (6 records)
- Electrical Equipment (8 records)
- Instrument Subassemblies (4 records)
- Electrical Instruments (6 records)

Specific QA records and applicant sample assessment reports reviewed are listed in the attachment.

The following samples were inspected:

- IP 50075 Section 02.02 – one sample
- IP 51055 Section 02.01 – one sample
- IP 51055 Section 02.04 – one sample
- IP 51055 Section 02.06 – one sample
- IP 51065 Section 02.01 – one sample
- IP 51065 Section 02.05 – one sample
- IP 51065 Section 02.07 – one sample
- IP 52055 Section 02.01 – one sample
- IP 52055 Section 02.04 – one sample
- IP 52055 Section 02.06 – one sample

b. Observations and Findings

No findings of significance were identified. The applicant was able to produce each of the above requested QA records from the Unit 2 records vault. The inspectors reviewed the original records and determined that the records were legible and complete. The inspectors verified that TVA had adequately reviewed an appropriate size sample of each record type for mechanical and electrical/instrument records. Record-related discrepancies were properly identified and entered into the Corrective Action Program as appropriate. The applicant had not yet completed all planned QA record sample assessments at the end of the inspection period. Future QA record sample assessments are planned for various civil, welding and system cleanliness record types.

c. Conclusions

The actions performed to resolve the issues associated with the QA Records CAP for Unit 2 mechanical and electrical/instrument records were found to be adequately planned and implemented. Additional NRC review of future applicant QA record assessments will be needed prior to closure of this CAP.

OA.1.2 Corrective Action Plans and Special Programs Reviews (TI 2512/017, 025)

The inspectors held discussions with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with the Cable Tray and Cable Tray Supports CAP, TI 2512/017, and HVAC Duct and Supports, CAP TI 2512/025. The initial meeting associated with these CAPs was held during previous inspection periods; however, the inspectors reviewed applicable documentation to plan future inspections in these areas.

The actions discussed covered the following areas as applicable:

- Walk-downs
- Engineering
- Construction
- Testing

The purpose of these discussions was for the inspectors to gain an understanding of the actions required to close the subject CAPs, in order to help them develop inspection plans and preliminary inspection schedules. Actual inspection activities associated with CAPs and SPs performed during this reporting period are discussed elsewhere in this report and contain the appropriate observations and findings.

OA.1.3 (Closed) Electrical Issues CAP Sub-issue: Adhesive Backed Cable Support Mount (TI 2512/020, IP 51063)

a. Inspection Scope

The inspectors reviewed the applicant's actions to resolve the Electrical CAP Sub-Issue, Adhesive Backed Cable Support Mount, to confirm that the applicant's program complies with all commitments and NRC requirements. The inspectors reviewed calculations, specification (G-38), EDCR, drawings, documentation of walk downs, and inspected a number of control panels in the Unit 2 Control Room.

b. Observations and Findings

No findings of significance were identified. The inspectors determined that all adhesive backed cable support mounts have been removed and replaced with cable ties and Ty-rap clamps to maintain separation inside panels and control cabinets to provide the physical restraint required by the specifications. The inspectors verified that redundant divisional train safety-related cables inside selected Main Control Room cabinets were placed in braided sleeves as called out in the specifications.

c. Conclusions

This inspection concluded that concerns pertaining to the electrical CAP sub-issue, on adhesive backed cable mount supports, have been appropriately addressed for Watts Bar Unit 2.

OA.1.4 (Discussed) Cable Issues CAP Sub-Issue: Computerized Cable Routing System Software and Database Verification and Validation (TI 2512/016)

a. Inspection Scope

The inspectors reviewed the applicant's actions to resolve the Cable CAP Sub-Issue, Computerized Cable Routing System (CCRS) software and database verification and validation and to evaluate related activities to confirm that the applicant's program complies with all commitments and NRC requirements. The inspectors reviewed documentation and scheduling to inspect signal tracing field activities associated with this sub-issue. The inspectors interviewed responsible design personnel and reviewed the "Environmental Qualification Cable Walkthroughs" that establishes the schedule for signal tracing field activities. Anomaly tables and action listings were reviewed to establish reasonable assurance that data transfer from CCRS to ICRDS has been verified.

b. Observations and Findings

No findings of significance were identified. The applicant replaced CCRS with ICRDS and transferred the data, which included Unit 1 and 2 cables, to the new system. The inspectors determined that the applicant verified and validated the transfer of data into ICRDS in accordance with TVA QA procedures. Part of the Unit 2 verification methodology will be to signal trace all Environmental Qualification (EQ) and Appendix R cables that are shown as installed in ICRDS, but do not have pull cards available (missing QA records). The purpose of the signal trace is to verify the routing and lengths of cables for comparison with information in ICRDS. Observations of signal tracing activities are discussed in Section C.1.6.

Conclusions

The inspectors determined that further inspection will be required to verify acceptable completion of the CAP Sub-Issue, ICRDS software and database verification and validation.

OA.1.5 (Discussed) Station Blackout (SBO) Rule Procedures and Actions (TI 2515/120)

a. Inspection Scope

The inspectors reviewed design activities associated with implementation of the SBO requirements for Unit 2. The inspectors examined planned and in-process actions to confirm Unit 2 actions paralleled the actions implemented on Unit 1 and to determine whether the Unit 2 actions were technically valid, and were implemented in accordance with NRC and applicant requirements.

The inspectors interviewed the responsible engineering representatives to determine the applicant's status toward completion of the SBO rule requirements. The inspectors reviewed design calculations EPMMA041592 Rev. 10, "SBO Coping Evaluation," to determine the applicant's required SBO time period and actions necessary to cope with an the event. Additionally, the inspectors reviewed EDQ00023620070003 Rev. 5, "125V DC Vital Battery System Analysis," to determine the adequacy of the applicant's 125V DC batteries and chargers.

b. Observations and Findings

No findings of significance were identified. The inspectors' interviews and reviews of design calculations determined that the applicant has not completed the as-built design calculations, procedures, and action requirements. The applicant's intent is to parallel Unit 1 SBO requirements.

c. Conclusions

The inspectors determined that further inspection will be required to verify acceptable completion of SBO procedures and processes.

OA.1.6 (Discussed) Non-cited Violation NCV-391/2008-010-01 Corrective Action for Failure to Document a Cable Raceway Separation Non-conforming Condition.

a. Inspection Scope

The inspectors reviewed documentation, performed an independent walk down, and interviewed responsible personnel related to the Unit 2 corrective action plan associated with NCV-391/2008-010-01 for failure to document non-conforming cable raceways.

The inspectors reviewed PER 158979 to determine the corrective action plan taken by the applicant. The inspectors reviewed walk down procedure WDP-GEN-1 package

number LSWDP-430 to determine the extent of condition found by the applicant. The inspectors performed an independent walk down of a portion of the facility to verify the adequacy of the applicant findings. The inspectors interviewed engineering personnel responsible for implementing the extent of condition walk down to determine the synthesis of the corrective action plan and extent of condition.

b. Observations and Findings

No findings of significance were identified.

The inspectors' independent walk down and interviews with applicant personnel determined that corrective actions were adequate with the exception of non safety raceways associated with safety race ways and conduits and their traceability between divisions, which could not be verified.

c. Conclusions

The inspectors determined that further inspection will be required to verify acceptable closure of the NCV. The inspection of the associated raceways could not be completed during this inspection.

OA.1.7 (Closed) NRC Generic Letter (GL) 2007-01, Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients.

a. Inspection Scope

The inspectors reviewed the TVA's actions in response to GL 07-01 including Response Letter dated September 7, 2007 – Attachment 22 identifying the extent of the scope covering 24 pump feeder cables. The inspectors reviewed ICRDS cable reports on safety-related control cables running underground to address similar concerns of disabling accident mitigating systems. The inspectors reviewed wiring diagram drawings and conduit & grounding detail drawings associated with the underground control cables.

b. Observations and Findings

This generic issue identified that cables, qualified for 40 years through the equipment qualification program, were failing at several nuclear stations prior to the end of their qualified life. In an effort to address this issue, the NRC published Generic Letter 2007-01. At Watts Bar Nuclear Plant, twenty of the 24 feeders that fall under this category are either Unit 1 or are common to both units and are already in service. The remaining four feeders are the Unit 2 Condenser Circulation Water (CCW) pump non safety-related cables that the applicant has scheduled for testing prior to fuel load. Based on the results of this inspection, this GL is closed for Unit 2.

c. Conclusions

Based on the results of this inspection, Generic Letter 2007-01 is closed for Unit 2. The only four remaining feeder cables left as part of the response to the generic letter are the Unit 2 CCW pump feeders, which are non safety-related and are scheduled to be tested.

OA.1.8 (Discussed) Inspection of Watts Bar Nuclear Plant Master Fuse List Special Program (TI 2512/037)

a. Inspection Scope

The inspectors reviewed design activities associated with implementation of the Master Fuse List (MFL) Special Program for Unit 2. The inspectors evaluated planned and in-process activities to confirm Unit 2 actions paralleled the actions implemented on Unit 1;

and to determine whether the Unit 2 actions were technically valid and were implemented in accordance with NRC and applicant requirements. The inspectors interviewed responsible design personnel and reviewed documents related to the Unit 2 implementation plan. The information was compared to actions taken on Unit 1 as described in the Watts Bar SER (NUREG 0847), the Watts Bar Nuclear Performance Plan, and the Watts Bar Unit 1 CAPs/SPs Closure Book.

b. Observations and Findings

The Unit 2 implementation plans were found to be generally consistent with the scope of the Unit 1 MFL Special Program.

The inspectors made the following observations about the key elements of the Unit 2 Special Program:

1) Establishment and maintenance of a field-verified Master Fuse List

Consistent with the Unit 1 Special Program, the inspectors found that requirements for Unit 2 fuses were formally defined in Design Criteria WB-DC-30-05, WB-DC-30-27, and WB-DC-30-28. The design criteria were applicable to both units and were controlled according to TVA Nuclear procedure NEDP-1, "Design Basis and Design Input Control."

A review of EDCRs 52324, 54796, and 54798 determined that design engineering had developed coordinated fuse applications and had specified fuse types, fuse sizes, and fuse ratings. The requirements were formally input into a master list of fuses (i.e. Fuse Tabulations) in the Master Equipment List (MEL). The inspectors' review of EDCR 52324 verified that, consistent with Unit 1, vendor-supplied fuses were controlled in the MEL for those instances where the fuses were credited for protection of safety-related items. A review of TVA procedure SPP-9.6, "Master Equipment List," verified the control of the MEL information system was guided by a written procedure, and was applicable to both Unit 1 and Unit 2.

A review of TVA Operations procedure OPDP-7, "Fuse Control," verified that controls had been established to maintain correct fuse configurations after equipment turnover from construction. The controls were applicable to both Unit 1 and Unit 2.

The inspectors noted that the Unit 1 program called for field walk-downs by the applicant to verify correct installations of Special Program fuses; however, interviews with responsible applicant personnel indicated that the construction project had not yet progressed to the point where the fuses have been installed. Thus, the applicant had not yet implemented plans to field-verify the correct installation of fuses on Unit 2. Further, interviews with responsible applicant personnel indicated the fuse tabulations in the MEL will not be appended to the permanent equipment information system (MAXIMO) until after the as-installed fuse configurations are verified.

2) Correction of deficiencies with misapplication of Bussmann KAZ actuators

The inspectors' review of electrical calculations WBNEEBEDQ00299920080019 and WBNEEBMSTI0070005 verified that the applicant has identified applications using KAZ actuators and, consistent with Unit 1, has specified replacement fuses that were electrically coordinated with the associated distribution systems. Requirements for the replacement fuses were formally input to the Fuse Tabulations of the MEL as documented in EDCR 54798.

The inspectors' interviews with responsible applicant personnel indicated that the construction project had not progressed to the point where replacement fuses for KAZ actuators could be physically installed on Unit 2. Accordingly, the applicant was not ready to field-verify the correct installations of replacement fuses as done under the Unit 1 Special Program.

3) Correction of deficiencies with redundant protection for electrical penetration assemblies.

The inspectors' review of calculation WBNEEBEDQ00299920080019 verified the calculation specified redundant protection for electrical penetration assemblies to prevent damage from fault currents or overload conditions. The calculation documented that the analyzed configurations were based upon reviews of as-designed drawings and ultimately were to be compared to as-constructed or configuration controlled drawings. The inspectors determined that the analyzed capabilities of the penetration assemblies were documented and demonstrated to be able to withstand the analyzed fault currents. Also, the calculation demonstrated the coordination of electrical protection devices associated with the penetration assemblies. The inspectors determined that the requirements for the electrical penetration assembly fuses were formally input to the Fuse Tabulations of the MEL as documented in EDCR 54798.

Because the construction project had not progressed to the point where the new fuse configurations have been installed, inspectors did not perform a verification of correct installation.

c. Conclusions

The inspectors determined that the activities committed for the MFL Special Program are still in process and will require further inspection to verify acceptable completion. In this inspection, the inspectors obtained sufficient samples to verify that a master list of fuses was being configured in the MEL; however, the permanent fuse list had not been updated. Inspectors verified that provisions have been made to replace KAZ actuators, and that design requirements have been developed to provide redundant protection of electrical penetration assemblies. However, the applicant had not yet installed the Special Program fuses on Unit 2, and had not conducted field verifications of the as-installed configurations. Further inspection will be required to verify effective implementation and completion of the Special Program.

OA.1.9 (Discussed) NRC Bulletins 74-15, "Misapplication of Cutler-Hammer Three Position Maintained Switch Model No. 10250T"; 75-03, "Incorrect Lower Disc Spring and Clearance Dimension in Series 8300 and 8302 ASCO Solenoid Valves"; and 75-06, "Defective Westinghouse Type OT-2 Control Switches"

a. Inspection Scope

The inspectors reviewed the responses from the applicant regarding all three NRC Bulletins. The inspectors reviewed historical NRC inspection reports, response letters, and tracking records. The inspectors interviewed TVA engineers responsible for compliance with the individual bulletins to understand what activities had been performed. The documents reviewed in response to each of the NRC Bulletins were:

- 1) Bulletin 74-15; the inspectors reviewed NRC inspection reports 50-390/75-5 and 50-391/75-5, response letter T90 080128 001, and tracking record NCO080008070.
- 2) Bulletin 75-03; the inspectors reviewed NRC inspection reports 50-390/75-6 and 50-391/75-6, response letter T90 080128 001, and tracking record NCO080008030.

- 3) Bulletin 75-06; the inspectors reviewed NRC inspection reports 50-390/85-25 and 50-391/85-20, response letter T02 080320 001, and tracking record 10187136.

b. Observations and Findings

No findings of significance were identified.

The inspectors made the following observations about each electrical component and system:

- 1) Interviews conducted by the inspectors with TVA and Bechtel engineers, responsible for compliance with this bulletin, revealed that TVA plans to replace existing Cutler-Hammer model 10250T switch with the new Eaton 10250T switch and to environmentally qualify existing Eaton 10250T switches.
- 2) Discussions with licensing and engineering personnel overseeing compliance to Bulletin 75-03 revealed that the intent was to replace all associated valves instead of modification.
- 3) The original applicant response letter for Bulletin 75-06 stated that the only action would be to inspect these switches. Licensing and engineering personnel indicated that the applicant will be refurbishing functional control switches and replacing inadequate control switches.

In all three cases the applicant has not yet prepared design modification packages for this work.

c. Conclusions

The inspectors determined that the activities committed to correct the misapplication of the Cutler-Hammer three position switches, incorrect lower disc spring and clearance dimension in Series 8300 and 8302 ASCO solenoid valves, and defective Westinghouse Type OT-2 control switches are still in process and will require further inspection to verify acceptable completion.

OA.1.10 (Discussed) NRC Bulletin 76-02, Relay Coil Failures – General Electric Type HFA, HGA, HKA, and HMA Relays

a. Inspection Scope

The inspectors reviewed the response from the applicant regarding NRC Bulletin 76-02, "Relay Coil Failures - GE Type HFA, HGA, HKA, and HMA Relays." The inspectors reviewed the applicant's response letter T02 080320 001 and tracking record 10187197. The inspectors interviewed the TVA and Bechtel engineers responsible for compliance with this bulletin to understand what activities had been achieved.

b. Observations and Findings

No findings of significance were identified. The responsible engineer for this effort informed the inspectors that 14 of these relays were safety-related and that the entire population would be replaced with the current version of the same relay.

c. Conclusions

The inspectors determined that the activities committed to correct relay coil failures for GE type HFA, HGA, HKA, HMA relays are still in process and will require further inspection to verify acceptable completion.

OA.1.11 (Discussed) Violation 391/86-02-01; Failure to Follow Procedures that Resulted in Improperly Installed Solenoid Valves

a. Inspection Scope

The inspectors reviewed the response from the applicant regarding NRC Violation 86-02-01, "10 CFR 50, Appendix B, Criterion V, Failure to Follow Procedures." The inspectors reviewed the historical NRC reports 50-390/86-02 and 50-391/86-02, as well as the applicant's response letter to Violation 86-02-01, tracking record NCO860152003, and PER 143711. The inspectors interviewed the TVA and Bechtel engineers responsible for resolution of this violation to understand what activities had been achieved.

b. Observations and Findings

No findings of significance were identified.

Actions required to resolve this violation for Unit 2 have not been completed. An updated response to the violation dated June 12, 1995 sent to the NRC (Applicant tracking number T04950612145 - WATTS BAR NUCLEAR PLANT (WBN) - REVISED RESPONSE TO VIOLATION 50-390, 391/86-02-01, FAILURE TO FOLLOW PROCEDURE AND REVISED FINAL REPORT FOR CDRs 50-390/85-52 AND 50-391/86-14) outlined the proposed solution to modify the solenoid valve mounts to become compliant through vendor-approved instructions or justification to use "as-is".

c. Conclusions

The inspectors determined that the activities committed to correct this violation have not been performed and will require further inspection to verify acceptable completion.

OA.1.12 (Discussed) Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program (TI 2512/041)

a. Inspection Scope

The inspectors reviewed design activities associated with implementation of the Radiation Monitoring System (RMS) Special Program for Unit 2. The inspectors examined planned and in-process actions to confirm Unit 2 actions paralleled the actions implemented on Unit 1; and to determine whether the Unit 2 actions results were technically valid, and were implemented in accordance with NRC and applicant requirements. The inspectors interviewed responsible design personnel and reviewed program documentation related to the Unit 2 implementation plan. The information was compared to actions taken on Unit 1 as described in the Watts Bar SER (NUREG 0847), the Watts Bar Nuclear Performance Plan, and the Watts Bar Unit 1 CAPs/SPs Closure Book.

b. Observations and Findings

The Unit 2 activities were found to be generally consistent with the scope of the Unit 1 RMS Special Program.

The inspectors made the following determinations about the key elements of the Unit 2 Special Program:

1) Establishment and maintenance of formally defined design criteria

The inspectors' review of RMS Design Criteria, WB-DC-40-24, determined the document implemented the Special Program commitment to formally define RMS design requirements and to incorporate the requirements of NRC Regulatory Guide 1.97. The design criteria were applicable to both units. In addition,

inspectors found that design criteria documents were controlled according to TVA Nuclear procedure NEDP-1, "Design Basis and Design Input Control."

2) Correction of deficiencies with RMS sample lines

Design actions to correct deficiencies with radiation monitoring system sampling lines were still in process. No samples were yet available for NRC inspection.

3) Correction of deficiencies with RMS hardware

The inspectors evaluated design measures for the Main Steam Line Radiation Monitors as defined in EDCR 2-52342. Consistent with the Special Program actions implemented for Unit 1, the Unit 2 EDCR and its supporting calculations were found to define range and accuracy requirements in accordance with the specifications for Type "E" variables contained in NRC Regulatory Guide 1.97.

The EDCR documented that the Unit 2 design had no equipment differences or operating differences with Unit 1. Inspectors noted a companion design change, Design Change Notice (DCN) 51154, was incorporated into the EDCR that changed the radiation monitors' reset logic following loss of power to the monitors. The design change was appropriately justified, was reviewed and approved by designated authority, and was applied to both units.

Interviews with responsible management indicated the procurement of the Main Steam Line Radiation Monitors was still in process, and the monitors have not yet been received or installed.

No other designs for Special Program radiation monitors were issued at the time of this inspection.

4) Correction of omissions in documenting calibrations of RMS devices

Actions to correct deficiencies with documenting primary calibrations of radiation monitor were still in process. No samples were available for NRC inspection.

c. Conclusions

The inspectors determined that the activities committed for the RMS Special Program were still in process and will require further inspection to verify acceptable completion. The inspectors verified that formal design criteria had been established for the Unit 2 radiation monitoring system. The inspectors reviewed one of the Special Program measures to correct hardware deficiencies. No significant issues were identified; however, further inspection will be required to evaluate correct installation of design features. Also, additional reviews of hardware designs will be required to determine acceptable implementation of this element of the RMS Special Program. The Special Program elements associated with deficient sample lines and primary calibrations were still in process and not available for inspection. Further inspection will be required to verify effective implementation of the Special Program.

OA.1.13 (Discussed) Applicant Actions on Three Mile Island (TMI) Action Items

a. Inspection Scope

The inspectors reviewed Unit 2 design activities associated with TMI Action Items and for the following electrical components and systems: 1) Acoustic Monitoring Valve position indication, 2) emergency power for pressurizer heaters, 3) power supplies for pressurizer relief valves, block valves, level indicators, and 4) emergency power associated with coolant pump seals. Unit 2 design activities associated with hydrogen igniter backup power were also reviewed for consistency with Generic Safety Issue-189

(GI-189) requirements. The inspectors assessed whether TMI or GI-189 actions including NRC requirements and SAR commitments were properly translated into drawings, design change packages, procedures, and other electrical component design documentation and whether the design was adequately controlled.

The inspectors observed and evaluated storage activities and conditions for electrical components to determine whether components were stored in the proper storage level designation, properly identified, and that storage environmental conditions and requirements were controlled and monitored as specified by the applicable manufacturer specification. The inspectors reviewed applicant and contractor monitoring activities to determine if they were being performed in accordance with procedural requirements. The inspectors reviewed documentation received with components relative to quality requirements to assure manufacturer requirements were met.

The inspectors reviewed storage procedure, "Bechtel Field Material Storage Control No. 25402-PRO-0007," to determine if it provided a means to assure that proper storage environments were established for various types of electrical components and met applicable storage classification levels regardless of location of stored component.

The inspectors reviewed design drawings and documents and interviewed responsible design personnel related to this inspection scope. The design information was reviewed for actions taken on Unit 2 required in NUREG 0737, "Clarification of TMI Action Plan Requirements." The Unit 2 planned or in-process activities were also compared to actions taken on Unit 1 as a result of the TMI requirements to determine whether the Unit 2 actions were technically valid and were implemented in accordance with NRC and applicant requirements.

Additionally, the inspectors evaluated actions planned or in-process for the following TMI Action Items: Noble Gas Monitors (TMI II.F.1.2.A), Iodine Particulate Sampling (TMI II.F.1.2.A), Containment High Range Monitoring (TMI II.F.1.2.C), and In-Plant Radiation Monitoring (TMI III.D.3.3).

b. Observations and Findings

No findings of significance were identified.

The inspectors made the following observations about each electrical component and system:

1) Valve Position Indication of Acoustic Monitoring on PORVs (TMI Action Item II.D.3)

The inspectors reviewed EDCR 52409, "Replacement of Equipment required for Unit 2 Acoustic Monitoring system." Since Unit 1 has already completed the required TMI Actions, the Unit 2 design parallels Unit 1. Types of new components that were installed in Unit 1 are planned to be installed in Unit 2 per EDCR 52409. The inspectors determined that the design change package was in accordance with Procedure SPP-9.3, "Plant Modification & Engineering Change Control," and design changes were technically valid.

The design had not progressed to the point of installation of the Acoustic Monitors on Unit 2. Therefore, the inspectors were unable to verify the correct installation of Acoustic Monitor level indication components on Unit 2. Procurement documentation for Acoustic Monitors and electrical components (PO#: 00049277) was reviewed for adherence to manufacturer's storage specifications and applicant requirements. Five samples of electrical components were inspected for proper storage in the warehouse. The electrical components were stored in the proper storage level designation and were

properly identified by the correct labels, part numbers, and serial numbers on the receipt inspection label. Storage conditions and requirements were controlled and monitored as specified by the applicable specification and manufacturer, and in-place storage requirements were satisfied.

- 2) Emergency Power for Pressurizer (PZR) Heaters (TMI Action Item: II.E.3.1) / Power Supplies for PZR Relief Valves, Block Valves, & Level Indicators (TMI Action Item: II.G.1) / Power from Emergency Diesel Generator on Reactor Coolant Pump seals (TMI Action Item: II.K.3.25)

According to the drawings, the design for Unit 2 PZR heater emergency power, power supplies for PZR relief and block valves, level indicators, and power from emergency diesel generator for reactor coolant pump seals is identical to the Unit 1 design. TMI actions, NRC requirements and SAR commitments were properly translated into design drawings for adequate control and installation of electrical components. Through interviews with responsible applicant personnel, the inspectors determined that there was no other design documentation to review because there were no planned design change activities taking place on the Unit 2, and the design had not progressed to the point of installation on Unit 2. Therefore, the inspectors were unable to verify the correct installation of the PZR heater components on Unit 2.

- 3) Back-up Power for Hydrogen Igniters (GI-189 and TI 2515/174)

The inspectors reviewed EDCR 52348, complete installation/refurbish of Hydrogen Mitigation System in Unit 2. The inspectors determined that the design change package was in accordance with Procedure SPP-9.3, design changes were technically valid, and the Unit 2 design of hydrogen igniters parallels Unit 1. New hydrogen igniters will be installed on Unit 2 per EDCR 52348.

Procurement documentation for Hydrogen Igniters and electrical components (PO#: 00070570) was reviewed for adherence to manufacturer's storage specifications and applicant requirements. Two samples of electrical components were inspected for proper storage in the warehouse. The electrical components were stored in the proper storage level designation and were properly identified by the correct labels, part numbers, and serial numbers on the receipt inspection label. Storage conditions and requirements were controlled and monitored as specified by the applicable specification and manufacturer, and in-place storage requirements were satisfied.

The design of the backup power supply for hydrogen igniters per GI-189 and TI 2515/174 commitments could not be verified from design documentation reviewed for Unit 2. The inspectors determined, from interviews with the applicant, that Unit 1 has developed procedures to support the temporary connection of a backup power supply to hydrogen igniters; however, the Unit 2 design activities have not progressed to incorporate any of the GI-189 requirements into the Unit 2 design, or to the point of installation of the hydrogen igniters.

c. Conclusions

The inspectors determined that the activities committed to for the previously mentioned TMI actions and GI-189 requirements are still in process or not available for review, and will require further inspection to verify acceptable completion. Inspectors were able to obtain sufficient samples of electrical components to verify that storage requirements were met and manufacturer specifications were followed. Design packages and/or

drawings were also verified for adherence to SAR commitments and requirements. On each system, the applicant had not yet installed the necessary components on Unit 2 in accordance with TMI actions and GI-189, so further inspection will be required to verify effective implementation and completion of the TMI Action Items and GI-189 commitments.

V. Management Meetings

X.1 Exit Meeting Summary

On July 13, 2010, the resident inspectors presented the inspection results to Mr. Masoud Bajestani and other members of his staff. Although some proprietary information may have been reviewed during the inspection, no proprietary information was included in this inspection report..

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant personnel

C. Ankeny, Quality Assurance Manager, PCI Energy Services
G. Arent, Licensing Manager, Unit 2
M. Bajestani, Vice President, Unit 2
M. Bali, Electrical Design Manager, Bechtel
R. Baron, Nuclear Assurance Project Manager, TVA, Unit 2
D. Beckley, Electrical Design Manager, Bechtel
T. Moran, MELB and MIC Special Program Owner
B. Briody, Maintenance and Modifications Manager, TVA, Unit 2
B. Crouch, Lead Mechanical Engineer, TVA, Unit 2
M. Das, Principal Engineer, Bechtel
L. Davenport, Contracts/Procurement Manager, TVA, Unit 2
M. Easter, Westinghouse Joint Test Team Manager
R. Esnes, Engineering Manager, Washington Group, Inc
T. Franchuk, Quality Manager, Bechtel
E. Freeman, Engineering Manager, TVA, Unit 2
W. Goodman, Procurement Manager, Bechtel
J. Hannah, Corrective Action Coordinator, Bechtel
D. Helms, Lead Engineer CAPs & SPs, TVA, Unit 2
S. Hilmes, Lead Electrical Engineer, TVA, Unit 2
M. Lackey, ECP Rep, TVA, Unit 2
I. Khan, Electrical Engineer, Bechtel Design
R. Kuhn, Quality Assurance Manager, Bechtel
D. Malone, Quality Assurance, TVA, Unit 2
J. Mitchell, Field Procurement Manager, Bechtel
J. Moseley, Westinghouse Site Director
D. Myers, Quality Assurance Manager, TVA, Unit 2
B. Newton, General Manager- Welding Technology and Programs, PCI Energy Services
J. Robertson, Engineering Manager, Bechtel
S. Sawa, Training Manager, Bechtel
J. Schlessel, Construction Manager, TVA, Unit 2
P. Theobald, Radcon Supervisor, TVA, Unit 2
D. Tinley, Quality Assurance, TVA, Unit 2
R. White, Radiography Level III

INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction
IP 35060	Licensee Management of QA Activities
IP 35065	Procurement, Receiving, and Storage
IP 35100	Review of QA Manual
IP 35960	QA Program Evaluation of Engineering Organization
IP 37002	Construction Refurbishment Process – Watts Bar Unit 2
IP 37055	Onsite Design Activities
IP 46053	Structural Concrete - Work Observation
IP 48053	Structural Steel and Supports Work Observation
IP 49053	Reactor Coolant Pressure Boundary Piping – Work Observation
IP 49055	Reactor Coolant Pressure Boundary Piping Record Review
IP 49061	Safety-Related Piping – QA Review
IP 49063	Safety-Related Piping - Work Observation
IP 50075	Safety-Related Components – Records Review
IP 50090	Pipe Support and Restrain Systems
IP 51051	Electrical Components and Systems – Procedure Review
IP 50053	Reactor Vessel and Internals Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51061	Electrical Cable – Procedure Review
IP 51063	Electric Cable – Work Observation
IP 51065	Electric Cable – Record Review
IP 52051	Instrument Components and Systems – Procedure Review
IP 52053	Instrument Components and Systems – Work Observation
IP 52055	Instrument Components and Systems – Record Review
IP 51053	Electrical Components and Systems Work Observation
IP 55050	Nuclear Welding General Inspection Procedure
IP 55100	Structural Welding General Inspection Procedure
IP 57050	Visual Testing Examination
IP 57060	Liquid Penetrant Testing Examination
IP 57070	Nondestructive Examination Procedure Magnetic Particle Examination Procedure Review/Work Observation/Record Review
IP 57080	Nondestructive Examination Procedure Ultrasonic Examination Procedure Review/Work Observation/Record Review
IP 57090	Nondestructive Examination - RT
IP 64051	Procedures - Fire Prevention/Protection
IP 73051	Inservice Inspection - Review of Program
IP 73052	Inservice Inspection - Review of Procedures
IP 73053	Preservice Inspection – Observation of Work and Work Activities
IP 73055	Preservice Inspection Data Review and Evaluation
IP 92701	Followup
TI 2512/015	Inspection of Watts Bar Nuclear Plant Employee Concerns Program
TI 2512/016	Plant Cable Issues Corrective Action Program
TI 2512/018	Inspection of Watts Bar Nuclear Plant Electrical Conduit and Supports Corrective Action Program Plan
TI 2512/020	Plant Electrical Issues Corrective Action Program
TI 2512/024	Inspection of Watts Bar Nuclear Plant Heat Code Traceability Corrective Action Program Plan
TI 2512/025	Inspection of Watts Bar Nuclear Plant HVAC Duct and Supports Corrective Action Program Plan

TI 2512/028 QA Records Corrective Action Program
 TI 2512/037 Inspection of Watts Bar Nuclear Plant Master Fuse List Special Program
 TI 2512/041 Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program
 TI 2515/174 Hydrogen Igniter Backup Power Verification

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

2010603-01	NCV Marking and Segregation of nonconforming materials from accepted materials available for use (Section Q.1.3)
2010603-02	NCV Inadequate storage and improper control of documents used in safety related activities (Section Q.1.3)
2010603-03	NCV Failure to invoke 10 CFR Part 21 in safety related procurement documents (Section Q.1.3)
2010603-04	NCV Undersized pipe support welds (Section C.1.3)
2010603-05	NCV Inadequate corrective actions for non-conforming safety-related concrete (Section C.1.4)
2010603-06	URI Material Condition inside loop-3 RCS crossover piping (Section C.1.8)
2010603-07	NCV Failure to Protect Safety-Related Welds, Piping, and Components During Construction Activities (Section C.1.9)
2010603-08	VIO Failure to adequately evaluate and qualify molded case circuit breakers (Section E.1.1)
2010603-09	NCV Failure to correctly translate the design basis into affected specifications and drawings issued for construction (Section E.1.2)

Discussed

2512/018	TI QA Records CAP (Section OA.1.1)
2512/016	TI Cable Issues CAP Sub-Issue: Computerized Cable Routing System (CCRS) Software and Database Verification and Validation (Section OA.1.4)
2515/120	TI Station Blackout (SBO) Rule Procedures and Actions (Section OA.1.5)

2008-010-01	NCV Corrective action for failure to document a cable raceway separation non-conforming condition (Section OA.1.6)
2512/037	TI Inspection of Watts Bar Nuclear Plant Master Fuse List Special Program (Section OA.1.8)
74-15	BL Misapplication of Cutler-Hammer Three Position Maintained Switch Model No. 10250T (Section OA.1.9)
75-03	BL Incorrect Lower Disc Spring and Clearance Dimension in Series 8300 and 8302 ASCO Solenoid Valves (Section OA.1.9)
75-06	BL Defective Westinghouse Type OT-2 Control Switches (Section OA.1.9)
76-02	BL Relay Coil Failures – General Electric Type HFA, HGA, HKA, and HMA Relays (Section OA.1.10)
86-02-01	VIO Failure to Follow Procedures that Resulted in Improperly Installed Solenoid Valves (Section OA.1.11)
2512/041	TI Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program (Section OA.1.12)

Closed

2512/020 (Partial)	TI Electrical Issues Corrective Action Program – Sub-issue Adhesive Backed Cable Mount Supports CAP Electrical Sub-issue (Section OA.1.3)
2007-01	GL Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients (Section OA.1.7)

LIST OF DOCUMENTS REVIEWED

I. Quality Assurance Program

Q.1.1 Identification and Resolution of Construction Problems

Procedures/Programs

25402-MGT-0003, Corrective Action Program, Rev. 5

Bechtel Oversight/Self-Assessment Documents

QA Surveillance Report 25402-WBN-SR-10-0932, NDE – Liquid Penetrant (PT) by Ivey Cooper
 QA Surveillance Report 25402-WBN-SR-10-0958, NDE – Magnetic Particle (MT) by Ivey Cooper
 QA Surveillance Report 25402-WBN-SR-10-0960, Eye exam records of project QC personnel

Q.1.3 Procurement, Receiving, and Storage Inspection

Procedures/Programs

25402-000-GPP-0000-N6104, Materials Receiving, Rev. 4
 25402-MGT-0003, Corrective Action Program, Rev. 7
 CLS.QPP.03.001, TVA Central Laboratories Services, Corrective Action, Rev. 1
 CLS.QPP.03.002, TVA Central Laboratories Services, 10 CFR Part 21 Reporting Requirements, Rev. 1
 IGA-2, Intergroup Agreement TVA Nuclear and Fossil Power Group, Rev. 4
 IGA-11, Intergroup Agreement with Central Laboratories Services, Rev. 0001
 SPP-4.3, Material Storage and Handling, Rev. 0006
 Watts Bar Unit 2 Construction Completion Project, Project Nuclear Quality Assurance Manual, Rev. 5

Audits

25402-WBN-AR-09-0004, Bechtel's Internal Audit of Procurement, Supplier Quality, and Subcontractors, Rev. 0

Procurement Documents

25402-000-FMR-JV01-00071, Field Material Requisition (FMR) for Diaphragm, Actuator, QA 1for Valve WBN-2-PCV-003-0183, Rev. 0
 MEL Package No. 10EMC3072, Component Update Request for EDCR 53276, dated 04/06/2010
 PEG PKG No. FMR-JV01-00011 M0, Technical Evaluation for Diaphragm, Aux Feedwater Turbine Pressure Reducing Valve WBN-2-PCV-003-0183, Rev. 0
 PEG PKG No. CPT802W, Procurement Data Sheet (PDS) for Diaphragm, Actuator, QA 1for Valve WBN-2-PCV-003-0183, Rev. 0
 PO 28498, Welding Consumables, Tape, Insulation, QA 2, Rev. 0
 PO 22993-1, Pipe and Fittings, ASME III, for Auxiliary Feedwater System, Rev. 1
 PO 32815 -1, Valve, Solenoid (Nuclear), Rev. 1

PO 33205, Breakdown Orifices for Aux Feedwater, Orifice Assembly, ASME Section III, Class 3, QA 1, Rev. 0
 PO 37189, Relay, QA 1, Order Date: 10/29/2010
 PO 42199-2, Main Steam Safety Valves, Refurb., ASME Section III, Rev. 2
 PO 54795, Fuses, Holder, QA 2, Order Date: 12/08/2009
 PO 59120, Valves, Fittings, Bolt Studs, QA 2, Rev. 0
 PO 63534, Snubber, Hydraulic, QA 1, for Steam Generators, Rev. 0
 PO 80513, Diaphragm, QA 1, Order Date: 02/24/2010
 PO 87607, Limit Switch, ARMS, for Actuator, QA 2, Rev. 0
 PO 87844, Electrical, Push Buttons, Etc., QA 1, Rev. 0
 PO 92806, Valve, Fittings, ASME, QA 1, Rev. 0

Problem Evaluation Reports

PER 224697, New MRs Generated for Issued EDCRs, Reported Date: 04/12/2010
 PER 225712, Increased Activity in Project Trend Code M.1 – Procurement of Material, Reported Date: 04/19/2010

II. Management Oversight and Controls

C.1.3 Pipe Support and Restraint Systems (IP 50090, 46071, and TI 2512/023)

TVA Work Order 08-957282-001
 Drawing Rev. Authorization 52897-005

C.1.4 Structural Concrete (IP 46053)

TVA Procedure MAI-5.10 "Concrete Placement, Surface Preparation, Placing, Finishing, Curing, and Testing," Rev. 5
 TVA Procedure MAI-5.4 "Concrete Removal, Repair, Grouting, and Dry Packing," Rev. 11
 TVA Walk-down Procedure WDP-GEN-1 "General Walk-down Requirements," Rev. 13
 Service Request 180764, "Concrete Mixing and Placement Violations"

C.1.5 Safety-Related and RCS Pressure Boundary Piping Records Review (IPs 49055 and 49065, TI 2515/024)

Procedures/Programs

Bechtel Procedure 25402-3DP-G06G-00001, Material Requisitions, Rev. 6
 Bechtel Procedure 25402-000-GPP-0000-N6204, Field Material Control and Traceability, Rev. 7
 Bechtel Procedure 25402-3DP-G06G-00010, Specifying and Evaluating Supplier Quality Management System or Quality Assurance Program Requirements, Rev. 2
 Bechtel Procedure 25402-PRO-0002, Purchase Order Formation, Rev. 3
 Bechtel Procedure 25402-3DP-G06G-00012, Supplier Deviation Disposition Requests, Rev. 3
 Bechtel Procedure 25402-3DP-G04G-00082, Interface with the TVA Boundary Information Transmittal Process, Rev. 3
 TVA procedure SPP-4.1, Procurement of Material, Labor, and Services, Rev. 23
 TVA Procedure NEDP-8, Technical Evaluation for Procurement of Materials and Services, Rev. 14
 TVA Procedure NGDC-PP-6, Completion of TVA Partial ASME Section III N-5 Data Reports, Rev. 5

Purchase Orders

Contract 74C38-83015, Principal Piping Systems, 11/19/1975

Corrective Action Documents

PER 228857, ASME Code Class Not Properly Recorded in WO 08-952876-000, 05/11/2010

PER 228824, Missing FME Cover, 05/11/2010

PER 228845, Procedure Enhancement Regarding Requirements for CMTRs, 05/11/2010

Miscellaneous

Watts Bar Unit 2 ASME N-5 Database

Watts Bar Unit 2 Heat Code Traceability Closure Implementation Plan

25402-011-YDA-PB02-00002-001, Evaluation of Flange Supplied to 1995 Code Edition, 08/05/2009

25402-011-YDA-JXF0-00002-001, Evaluation of Fittings Supplied to 1995 Code Edition, 08/13/2009

WO 08-952876-000, Remove Non-Code Pipe and Replace with Code Pipe, 01/07/2009

BIT 371 for TVA Partial N-5 No. TVA-2-62-1-P9, Rev. 2

BIT 841 for TVA Partial N-5 No. TVA-2-03-2-P6, Rev. 0

Weld No. 2-068A-T037-05 ASME Material Certification Package

Weld No. 2-068A-T037-06 ASME Material Certification Package

Weld No. 2-068A-T037-07 ASME Material Certification Package

Weld No. 2-068A-T037-08 ASME Material Certification Package

Weld No. 2-068A-T037-16 ASME Material Certification Package

Weld No. 2-062B-T342-10 ASME Material Certification Package

Weld No. 2-062B-D136-11 ASME Material Certification Package

Weld No. 2-062B-D136-11B ASME Material Certification Package

Weld No. 2-063A-T013-02 ASME Material Certification Package

Weld No. 2-063B-T082-06 ASME Material Certification Package

Weld No. 2-068G-T013-02 ASME Material Certification Package

Weld No. 2-062B-T328-01 ASME Material Certification Package

Weld No. 2-062A-T019-04A ASME Material Certification Package

Weld No. 2-062A-T036-03 ASME Material Certification Package

Valve 2-3-845 ASME Material Certification Package

C.1.7 RPV Internals and Protection of Installed Plant Equipment during Construction Activities (IP 50053)

Service Request 180764, "Concrete Mixing and Placement Violations"

Service Request 182224, "Liquid Penetrant Exam in Reactor Vessel"

C.1.8, C.1.9, C.1.10, C.1.11, C.1.12, C.1.13, C.1.14, C.1.15, C.1.16, C.1.17, C.1.18, C.1.19, C.1.20 Collective section documentation)

Procedures

TVA-NQA-PLN89-A, Tennessee Valley Authority Nuclear Quality Assurance Program, Rev. 23

25402-000-GPP-0000-N3701, Unit 2 Construction Completion Project Procedure (CCPP),

Welding Program, Rev. 3

25402-000-GPP-0000-N3705, Welding and NDE Documentation and Records Management, Rev. 2

25402-000-GMX-GCE-00001, Watts Bar Unit 2 Construction Completion Project, Special

Processes Manual, Rev. 1
 25402-000-4MP-T040-S0036, Bechtel Welding Standard, Documentation of Welds, WD-1, Rev. 6
 25402-000-4MP-T040-S0012, Bechtel General Purging Standard, GPS-1, Rev. 1
 25402-000-4MP-T040-S0013, Bechtel General Welding Standard, GWS-1, Rev. 2
 25402-000-4MP-T040-S0021, Bechtel General Welding Standard, GWS-Structural, Rev. 1
 25402-000-4MP-T040-S00038, WPMC-1, Bechtel Welding Specification – Welding Filler Material Control, Rev. 1
 25402-000-4MP-T040-S0078, WQ-1, Bechtel Welding Performance Qualification Specification [ASME Section IX], Rev. 2
 25402-000-4MP-T040-S0079, WQ-2, Bechtel Welding Performance Qualification Specification [D1.1], Rev. 0
 25402-000-4MP-T040-S0030, PHT-1, Bechtel General Welding Standard, Rev. 2
 25402-000-4MP-T040-S0165, NEPQ, Bechtel Construction Operations Inc. Nondestructive Examination Standard, NDE Personnel Qualification and Certification, Rev. 1
 25402-000-4MP-T040-S0131, VT-ASME III Piping, Bechtel Nondestructive Examination Standard, Visual Examination, Rev. 1
 25402-000-4MP-T040-S0133, VT-AWS D1.1, Bechtel Nondestructive Examination Standard, Visual Examination, Rev. 1
 25402-000-4MP-T040-S0125, PT (SR)-ASME, Bechtel Nondestructive Examination Standard, Liquid Penetrant Examination, Rev. 5
 25402-000-4MP-T040-S0124, MT-ASME, Bechtel Nondestructive Examination Standard, Magnetic Particle Examination, Rev. 5
 25402-000-4MP-T040-S0049, Bechtel Technical Specification for Welding Filler Metal, WM-E7018(CVN), Rev. 1
 25402-000-4MP-T040-S0066, Bechtel Technical Specification for Welding Filler Metal, WM-ER70S-2(CVN), Rev. 1
 25402-000-4MP-T040-S0068, Bechtel Technical Specification for Welding Filler Metal, WM-ER70S-6 (CVN), Rev. 1
 TVA-NQA-PLN89-A, Tennessee Valley Authority Nuclear Quality Assurance Program, Rev. 23
 25402-PRO-0007, Field Material Storage Control, Rev. 2
 Bechtel Project Nuclear Quality Assurance Manual, Rev. 6
 N-UT-78, PDI Generic Procedure for the Manual Ultrasonic Examination of Reactor Pressure Vessel Welds PDI-UT-6, Rev 0005
 N-PT-9, Liquid Penetrant Examination of ASME and ANSI Code Components and Welds, Rev 0033
 EPRI-DMW-PA-1, Procedure for Manual Phased Array Ultrasonic Examination of Dissimilar Metal Welds, Rev. 1
 NPG Nondestructive Examination Procedure N-UT-87, Generic Procedure for the Phased Array Ultrasonic Examination of Dissimilar Metal Welds, Rev. 0

Work Orders (WOs)

WO 10-951203-000, Cut-Out and Remake Weld 2-068A-D145-02 C0R0
 WO 09-954333-001, Modification of Pipe Supports on the Component Cooling System in the Reactor Building under EDCR 52526
 WO 09-954179-023, Fabricate Typical Supports in the Fabrication Shop to be Installed in Work Orders under EDCR 54633
 WO 08-956218-021, Install New Drain Piping and Fittings for Lower Ice Condenser Bay #1 and Reinstall Flapper Valve 2-CKV-61-913 System 061 under EDCR 52813

WO 10-951028-000, Rework weld by removing linear indication and have inspected and accepted.

Bechtel Welding Procedure Specification

P1-AT-Lh (CVN+10)
 P1-AT-Lh
 P8-AT-Ag
 P8-P1-AT-Ag
 P1-A-Lh (Structural)

NDE Reports

MT-058, ASME Class III
 MT-064, ASME Class III
 PT-022, ASME Class 1
 R-P0240, Penetrant – ASME Class 1
 R-P0970, Penetrant – ASME Class 2
 R-P0992, Visual – ASME Class 1
 R-P0993, Magnetic Particle – ASME Class 2
 R-P0994, Magnetic Particle – ASME Class 2
 R-P0996, Magnetic Particle – ASME Class 2
 TVA Radiographic Examination Report for acceptance of weld 2-068C-W004-01, 10/28/08
 TVA-WPNP NDE Evaluation Data Sheet Radiographic No. 2-1228, 5/19/88

PERs and Service Requests

PER 212696
 PER 219039
 PER 222093
 PER 222236
 PER 214589
 PER 166624
 PER 236720
 PER 236733
 Service Request 166386
 Service Request 167044

Other

NRC Inspection Report 50-390/91-32
 NRC Inspection Report 50-390, 391/91-23
 NRC Inspection Report 50-390/78-05 and 50-391/78-04
 Preservice Inspection Program Plan Watts Bar Nuclear Plan Unit 2, WBN-2 PSI Rev. 3
 NGDC PP-15, Watts Bar Unit 2 ASME Section XI, Rev 0
 Watts Bar Unit 2 “Red Lined” FSAR Sections 5.2.8, 5.4.4.4, and 6.6
 PDI RPV Manual Detection PDI-UT-06 Table 1 and Table 2, Rev 15
 Performance Demonstration Qualification Summary No. 621, PDI-UT-06, Rev G, Addenda 0
 NDE UT Examination Report R-P1028, Welds CRDW-60, CRDW-64, CRDW-65, CRDW-72, CRDW-73

NDE UT Examination Report R-P1029, Welds CRDW-54, CRDW-60, CRDW-62, CRDW-64, CRDW-65, CRDW-66, CRDW-67, CRDW-72, CRDW-73

III. Operational Readiness Activities

F.1 Fire Protection

Procedures and Standards

SPP-10.9, Control of Fire Protection Impairments, Rev. 3
SPP-10.11, Control of Ignition Sources (Hot Work), Rev. 3

IV. Other Activities

OA.1.1 QA Records CAP

Procedures

TVA Construction Engineering Procedure CEP-1.40-3, Universal System Program, Rev. 2

TVA QA Record Sample Assessment Reports

Records Assessment, Mechanical Valves, April 2010
Records Assessment, Mechanical Equipment, April 2010
Records Assessment, Mechanical Ductwork, April 2010
Records Assessment, Mechanical Piping, April 2010
Records Assessment, Electrical Cables, April 2010
Records Assessment, Electrical Equipment, April 2010
Records Assessment, Electrical Instrument Subassemblies, April 2010
Records Assessment, Electrical Instruments, April 2010

Corrective Action Documents

PER 233454, ASME/Hanger inspection records cannot be retrieved in timely manner

Other

Engineering Construction Monitoring and Documentation (ECM&D) database

Mechanical Records

Valve, 0-067-DA-V-RTV-825B, Test 70A
Valve, 2-001-NV-V-RTV-290A, Test 70A
Valve, 2-030-RB-V-TV-555, Test 70A
Valve, 2-062-AB-V-FCV-128, Test 73B
Valve, 2-062-AB-V-ISV-537, Test 70A
Valve, 2-063-AB-V-FCV-175, Test 70A
Valve, 2-067-AB-V-TCV-132, Test 70A

Mechanical Equipment, 0-03B-AB-SL-0786A, Test 35A
Mechanical Equipment, 0-041-AB-SL-2014A, Test 01A

Mechanical Equipment, 0-082-DIEG-0C1, Test 34A
 Mechanical Equipment, 2-I&C-RB-SL-0005, Test 01A
 Mechanical Equipment, 2-081-PMP-81-7, Test 33A

Duct, 0-030-DA-D-029, Test 12A
 Duct, 2-030-AB-D-141C, Test 11A
 Duct, 2-030-RB-BKD-572, Test 13A
 Duct, 2-030-RB-BT-TVA4, Test 91A
 Duct, 2-030-RB-CT-005, Test 15A

Pipe Segment, 0-018-DA-L-840-2-018, Test 23A
 Pipe Segment, 0-067-FB-F-0041, Test 02A
 Pipe Segment, 0-067-YD-P-845-5-12, Test 79A
 Pipe Segment, 0-067-47W845-5-6-18, Test 50A
 Pipe Segment, 2-003-NV-P-803-1-14, Test 23A
 Pipe Segment, 2-003-PT-F-0009, Test 28A
 Pipe Segment, 2-03B-AB-P-803-3-50, Test 18A

Electrical Records

Cable, 2-2A-62-3624, Test 77A
 Cable, 2-2NM-92-100-D, Test 55A
 Cable, 2-2NM-92-243-E, Test 77A
 Cable, 2-2NM-92-416-F, Test 64A
 Cable, 2-3V-1-7611-A, Test 77A
 Cable, 2-3V-74-1938-A, Test 77B

Electrical Component, 2-BKR-212-B2/3B-B, Test 67A
 Electrical Component, 2-JB-290-2875-D, Test 25B
 Electrical Component, 2-JB-293-692-A, Test 61A
 Electrical Component, 2-MCCC-213-A1/17E-A, Test 70A
 Electrical Component, 2-MTR-61-AHU/07, Test 25A
 Electrical Component, 2-PENT-293-14-A, Tests 04A and 64A
 Electrical Component, 2-PENT-293-31-G, Test 25A

Instrument Subassembly, 0032JN-042, Test 59A
 Instrument Subassembly, 0032LA-A, Test 52A
 Instrument Subassembly, 2001AO-001, Test 04A
 Instrument Subassembly, 2032BC-042, Test 41A

Electrical Instrument, 2-FCV-62-90-A, Test 47A
 Electrical Instrument, 2-FCV-63-118-A, Test 75A
 Electrical Instrument, 2-FCV-67-146-A, Test 61A
 Electrical Instrument, 2-HS-1-18A-B, Test 61D
 Electrical Instrument, 2-HS-3-164A-A, Test 61B
 Electrical Instrument, 2-TM-68-65B-E, Test 25A

OA.1.6 Non-cited Violation NCV-391/2008-010-01 corrective action for failure to document a cable raceway separation non-conforming condition.

Walk Down Package

LSWDP-430 Cable Trays for Electrical External Separation Baseline Calculation Program:
Corrective Action for PER 158979

Others

ICRDS QA Report, Cable ID 2PM3870D, 2PM3877E, 2PM3882F, and 2PM3887G; Conduits 2PLC29D, 2PLC62E, 2PLC31E, 2-2PLC-299-23F, and 2-2PLC-299-39G.

OA.1.7 NRC Generic Letter (GL) 2007-01, Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients.

Others

T90 070911 002, TVA – Watts Bar Nuclear Plant Unit 2 Initial Responses to Bulletins and Generic Letters dated September 7, 2007.

OA.1.8 Inspection of Watts Bar Nuclear Plant Master Fuse List Special Program (TI 2512/037)

Design Change Documents

EDCR 52324, Rev. A, Refurbish Solid State Rod Control System Cabinets
EDCR 54796, Rev. A, Install Fuses for Radiation Monitoring System, etc.
EDCR 54798, Rev. A, Install Fuses for 120 VAC Vital AC, etc.

Procedures

SPP 4.1 - Rev. 21
NEDP-1, Rev. 5, (TVA Procedure) Design Basis and Design Input Control
OPDP-7, Rev. 3, (TVA Procedure) Fuse Control
SPP-9.3, Rev. 22, (TVA Procedure) Plant Modifications and Engineering Change Control
SPP-9.6, Rev. 9, (TVA Procedure) Master Equipment List (MEL)
25402-3DP-G04G-0081, Rev. 007, (Bechtel Procedure) Engineering Document Construction Release
WB-DC-30-5, Rev. 022, (Design Criteria) Power, Control, and Signal Cables For Use in Category I Structures -- (Unit 1 / Unit 2)
WB-DC-30-27, Rev. 030, (Design Criteria) AC and DC Control Power Systems - (Unit 1 / Unit 2)
WB-DC-30-28, Rev. 20, (Design Criteria) Low and Medium Voltage Power Systems

Others

WBNEEBMSTI070005, Rev. 53, (Calculation) 125V DC Protection and Coordination Calculation
EDQ00299920080019, Rev. 001, (Calculation) Electrical Penetration Protection Study Voltage Level V3 – Unit 2
CATD 20103-WBN-02, (Concern) Discrepancies Have Been Identified for Electrical Design Criteria
CATD 23702-WBN-04, (Concern) No Calculations could be found to demonstrate that fuses provided adequate full range short circuit protection
CATD 23702-WBN-05, (Concern) Circuit breakers with trip settings higher than permitted by criteria
NCO850160001, (Commitment) Provide redundant tripping devices to protect containment penetrations

OA.1.9 NRC Bulletins 74-15, “Misapplication of Cutler-Hammer Three Position Maintained Switch Model No. 10250T”; 75-03, “Incorrect Lower Disc Spring and Clearance Dimension in Series 8300 and 8302 ASCO Solenoid Valves”; and 75-06, “Defective Westinghouse Type OT-2 Control Switches”

Others

10187136, “B 1975-06, ‘Defective Westinghouse Type OT-2 Control Switches’ Inspect Westinghouse Type OT-2 control switches,” 6 October 2009

T02 080320 001, Dated 20 March 2008

T90 080128 001, Dated 29 January 2008

NCO080008030 (Commitment), “B 75-03, ‘Incorrect Lower Disc Spring and Clearance Dimension in Series 8300 8302 ASCO Solenoid Valves’-Modify Valves Not Modified At Factory,” initiated 27 March 2008

NCO080008070 (Commitment), Misapplication of Cutler-Hammer Three Position Maintained Switch Model No. 10250T, initiated 31 March 2008

OA.1.10 NRC Bulletin 76-02, Relay Coil Failures – General Electric Type HFA, HGA, HKA, and HMA Relays

Others

T02 080320 001, Dated 20 March 2008

10187197, “B 1976-02, ‘Relay Coil Failures – GE Type HFA, HGA, HKA, HMA Relays’; Repair or replace relays before preoperational tests.,” 6 October 2009

OA.1.11 Violation 391/86-02-01, Failure to Follow Procedures that Resulted in Improperly Installed Solenoid Valves

Others

NCO860152003 (Commitment), Modify Existing ASCO 8315 Series Valves or Ensure Justification for Use “As-Is” is provided

OA.1.12 Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program (TI 2512/041)

Design Change Documents

EDCR 2-52342, Rev. A, Install Radiation Monitoring Loops in the Unit 2 Auxiliary Building

Procurement Documents

25402-011-MRA-HARA-00001, Rev. 4, (Purchase Requisition) Radiation Monitoring System (System 90)

Procedures

WB-DC-40-24, Rev. 021, (Design Criteria) Radiation Monitoring (Unit 1/ Unit 2)

Others

WBNAPS3047, Rev. 4, (Calculation) Calibration Factors for the Main Steam Line Radiation Monitors

WO 08-813772-000 – Field Change

WBNAPS3048, Rev. 19, (Calculation) Instrument Range and Accuracy for Measurement of Regulatory Guide 1.97 Type E Variables

OA.1.13 Applicant Actions on Three Mile Island (TMI) Action Items

Design Change Documents

EDCR 52409, Rev. A, Replacement of Equipment required for Unit 2 Acoustic Monitoring system

EDCR 52348, Rev. A, Complete installation/refurbish of Hydrogen Mitigation System in Unit 2
EDCR-2 # 55127, Rev. A, - Resolves physical internal cable separation and electrical isolation breakages identified by Calc EDQ0029992009002 Rev. 0. - dated: 4/20/10

Drawings

2-45W724-3 Rev. 0, Unit 2 6900 Shutdown Board 2A-A Single Line, 12/15/08
2-45W724-4 Rev. 0, Unit 2 6900 Shutdown Board 2B-B Single Line, 12/15/08
2-45W760-68-3 Rev. 1, Unit 2 Reactor Coolant System Schematic Diagrams, 12/15/08
2-45W760-68-4 Rev. 1, Unit 2 Reactor Coolant System Schematic Diagrams, 12/15/08
1-45W724-3 Rev. 23, Units 1& 2 6900 Shutdown Board 2A-A Single Line, 9/22/90
1-45W724-4 Rev. 20, Units 1& 2 6900 Shutdown Board 2B-B Single Line, 9/22/90
1-45W760-68-3 Rev. 12, Unit 1 Reactor Coolant System Schematic Diagrams, 9/22/90
1-45W760-68-4 Rev. 8, Unit 1 Reactor Coolant System Schematic Diagrams, 9/17/90
2-45W751-8 Rev. 1, Unit 2 480V Reactor MOV Bds 2B1-B Single Line SH-2, 12/15/08
2-45W751-3 Rev. 1, Unit 2 480V Reactor MOVE Bds 2A1-A Single Line SH-3, 12/15/08
2-45W760-68-5 Rev. 0, Unit 2 Reactor Coolant System Schematic Diagrams, 12/15/08
2-45W600-68-1 Rev. 1, Unit 2 Reactor Coolant System Schematic Diagrams, 12/11/08
1-45W600-68-1 Rev. 12, Unit 1 Reactor Coolant System Schematic Diagrams, 9/22/90
1-45W760-68-5 Rev. 18, Unit 2 Reactor Coolant System Schematic Diagrams, 9/21/90
1-45W751-3 Rev. 42, Units 1& 2 480V Reactor MOVE Bds 1A1-A & 2A1-A Single Line SH-3, 9/22/90
1-45W751-8 Rev. 26, Units 1& 2 480V Reactor MOV Bds 1B1-B & 2B1-B Single Line SH-2, 9/22/90
1-45W703-1 Rev. 47, Units 1&2 125V Vital Battery Board I Single Line Sh-1, 9/22/90
1-45W703-2 Rev. 36, Units 1&2 125V Vital Battery Board II Single Line Sh-2, 9/22/90
1-45W703-3 Rev. 40, Units 1&2 125V Vital Battery Board III Single Line Sh-3, 9/22/90
1-45W703-4 Rev. 32, Units 1&2 125V Vital Battery Board IV Single Line Sh-4, 9/22/90
2-45W760-68-4 Rev.1, Unit 2 RCS Schematic Diagram, 12/15/08
2-45W760-68-3 Rev.1, Unit 2 RCS Schematic Diagram, 12/15/08
1-45N709-4 Rev.2, Units 1&2 Chargers Inverters and Misc Equip Connections Diagram, SH-4, 6/14/76
1-45W756-2 Rev.69, Units 1&2 480V Cont and Aux Bldg VT BD 1A1-A & 2A1-A Single Line, SH-2, 9/22/90
1-45W756-6 Rev.74, Units 1&2 480V Cont and Aux Bldg VT BD 1B1-B & 2B1-B Single Line, SH-2, 9/22/90
2-45W756-2 Rev.0, Unit 2 480V Cont and Aux Bldg VT BD 2A1-A & 2B1-B Single Line, SH-2, 12/15/08
1-45W749-4A Rev.40, Units 2 480V 2B2-B Single Line, 1/29/93
1-45W749-1A, Rev.37, Units 2 480V 2A1-A Single Line, 2/1/93
1-45W749-3A, Rev.38, Units 2 480V 2B1-B Single Line, 1/29/93
2-45W749-4, Rev.2, Units 2 480V 2B2-B Single Line, 12/15/08
2-45W749-1, Rev.1, Units 2 480V 2A1-A Single Line, 12/15/08
2-45W749-3, Rev.1, Units 2 480V 2B1-B Single Line, 12/15/08
2-45W2640, Rev. 1, Unit 2 Wiring Diagram Control Boards Critical Wiring Braid Installation, 08/14/09

2-45W2640-1, Rev. 0, Unit 2 Wiring Diagram Control Boards Critical Wiring Braid Installation, 07/14/09

Procurement Documents

25402-011-MRA-HAYS-00001, Acoustic Monitoring Material Requisition

PO# 00070570, Hydrogen Igniter Purchase Order

PO# 00049277, Acoustic Monitoring Purchase Order

25402-011-MRA-EWE2-00012, Hydrogen Igniters Material Requisition

QAR-2375, Qualification Summary Report, Tayco Engineering Inc, Hydrogen Igniter Assembly

Procedures

25402-PRO-0007 Rev.1, Bechtel Field Material Storage Control, 10/9/08

MAI-4.4B Instrument and Instrument panel Installation

Walk Down Package

LSWDP-404 Rev. 0, 2-PNL-99-L116 Internal Separation Walk-down

LSWDP-409 Rev. 0, 0-PNL-278-M26 Internal Separation Walk-down

LSWDP-422 Rev. 0, 2-PNL-278-M9 Internal Separation Walk-down

Others

N3-68-4001, Rev. 0028, TVA, Reactor Coolant System, 8/27/09

WBN2-68-4001, Rev. 0000, TVA, Reactor Coolant System, 7/23/08

PER Service Request # 170923, Drawing Deviation, NRC Identified 1-45W760-68-5, 2-45W760-68-5, 4/29/10

Problem Evaluation Report (PER) 158979, Cable separation issues not identified during walk down.

WO 08-951069-001 – CRDR EDCR2 52366 (U1RG Approved) PHASE III, PANEL 2-M-9, WILL PROCURE, MOUNT, & WIRE ONLY T, June 15, 2010.

LIST OF ACRONYMS

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BIT	Boundary Information Transmittals
CAP	Corrective Action Program
CAQ	condition adverse to quality
CCRS	Computerized Cable Routing System
CET	core exit thermocouple
CFR	<i>Code of Federal Regulations</i>
CMTR	certified material test report
CRDM	control rod drive mechanism
DCN	design change notice
ECM&D	Engineering construction monitoring & documentation
ECP	Employee Concerns Program
EDCR	engineering document construction release
FE	Field Engineer
FPIP	fire protection impairment permit
HDR	Historical Document Review
IMC	Inspection Manual Chapter (NRC)
ICRDS	Integrated Cables Raceway Design System
IP	Inspection Procedure (NRC)
IR	inspection report
MT	magnetic particle
NA	Nuclear Assurance
NCV	non-cited violation
NDE	non-destructive examination
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation (NRC)
NUREG	(NRC) technical report designation
PCI	PCI Energy Services
PER	Problem Evaluation Report
PO	purchase order
PSI	Pre-Service Inspection
PT	Liquid Penetrant Testing (examination)
QA	quality assurance
QC	quality control
RCP	reactor coolant pump
RCS	reactor coolant system
RHR	residual heat removal
RMS	radiation monitoring system
RPV	reactor pressure vessel
RT	radiograph test (examination)
SCWE	safety conscience work environment
SL	Severity Level
SP	Special Program
SSC	structures, systems, and components
SWBP	sidewall bearing pressure

TI	Temporary Instruction (NRC)
TVA	Tennessee Valley Authority
UHI	upper head injection
URI	unresolved item
UT	Ultrasonic test
VIO	Violation
WBN	WBN Nuclear Plant
WBNPP	Watts Bar Nuclear Performance Plan
WO	work order