



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1257

April 30, 2010

Mr. Ashok S. Bhatnagar
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2010602**

Dear Mr. Bhatnagar:

On March 31, 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 April 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.

In addition, during this inspection period, your evaluations and methodologies to address issues associated with the Seismic Analysis Corrective Action Program (CAP) were reviewed by the NRC staff. This inspection determined that adequate corrective actions were taken to resolve the issues associated with the Seismic Analysis CAP. Based on the results of this inspection, the subject CAP is closed for Unit 2; however, future inspections may be conducted for new related activities.

This report documents two 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 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 enclosure, 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: Inspection Report 05000391/2010602 w/attachment

cc w/encl: (See next page)

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Letter to Ashok S. Bhatnagar from Robert C. Haag dated April 30, 2010.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2010602

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2010602

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd
Spring City TN 37381

Dates: January 1– March 31, 2010

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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 two NRC-identified Severity Level (SL) IV non-cited violations (NCV).

Inspection Results

- Problem Evaluation Reports (PERs) reviewed during the three-month period properly identified, addressed and resolved issues. (Section Q.1.1)
- A SL IV NCV of 10 *Code of Federal Regulations* (CFR) 50, Appendix B, Criterion XIII, "Handling, Storage, and Shipping," was identified by the inspectors for the failure to implement existing procedural guidance and protect safety-related components. Specifically, measures were not being implemented to protect safety-related cables from physical damage. (Section C.1.1)
- A SL IV NCV of 10 CFR 50, Appendix B, Criterion IV, "Procurement Document Control," was identified by the inspectors for the failure to include all required information in procurement documents for safety-related, Seismic Category I conduit supports. (Section C.1.4)
- A sample of seismic-related documentation, including seismic analysis calculations associated with the Seismic Analysis Corrective Action Program (CAP) was reviewed and determined that the implementation of the Seismic Analysis CAP for Unit 2 is adequate. Based on the results of this inspection, this CAP is closed for Unit 2; however, future inspections may be conducted for new related design and construction activities. (Section OA.1.3)
- Discussions were held with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with several CAPs and Special Programs (SPs). (Section OA.1.4)
- The inspectors concluded that the licensee was properly implementing WO and procedural cleaning and inspection instructions on the subject RCS piping. (Section C.1.5)
- The Phase 1 of the Historical Document Review (HDR) process identified all pertinent historical documents and adequately assessed their potential impact on WBN2 construction and licensing. (Section OA.1.5)

- Other areas inspected were adequate with no findings of significance identified. These areas included cable tray supports; electrical systems and components: refurbishment activities; safety-related piping work observation; reactor coolant pressure boundary piping activities; nuclear welding; structural welding; nondestructive examination and inservice inspection activities; moderate energy line break CAP activities; microbiologically induced corrosion CAP activities; control room design review CAP activities; craft training; and fire protection. (Sections C.1.2, C.1.3, C.1.6 through C.1.18, T.1.1, F.1, OA.1.1, and OA.1.2)

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REPORT DETAILS

Summary of Plant Status

During the current inspection period, TVA performed pre-service inspection (PSI) activities, performed 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 Procedures (IPs) 35007 and 40504)

a. Inspection Scope

During this inspection period, the inspectors reviewed 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 the most recent annual nuclear assurance oversight analysis report and three assessment reports regarding ongoing field work activities. Specific documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The issues identified in the PERs reviewed were properly identified, addressed, and resolved.

Q.1.2 Safety Conscience Work Environment (IP 35007 and TI 2512/015)

a. Inspection Scope

During this inspection period, the inspectors initiated 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.

The inspectors also attended an employee meeting, Fostering a Safety Conscious Work Environment (SCWE). During the meeting, management representatives communicated to workers TVA's policy on expressing concerns and differing views, why SCWE was important, and use of all available paths for reporting safety issues.

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.

II. Management Oversight and Controls

C.1 Construction Activities

C.1.1 Electrical Cable Work Observations - Protection of Plant Equipment During Construction Activities (IP 51063 and TI 2512/016)

a. Inspection Scope

The inspectors conducted inspections of cable installation in the reactor annulus to determine whether NRC requirements, work procedures, and inspection (quality control) procedures were being met. Specifically, the inspectors reviewed construction documentation for proper instruction and revision, identification and installation of cabling, storage conditions of cabling, craft qualification, QC inspector qualification, documentation of any nonconformances, and documentation of construction activities. Specific documents reviewed are listed in the attachment. The following activities were inspected:

- Design change notice (DCN) 53334, Replace ampacity and voltage drop cable breakages on Train A and B 480 V Shutdown Boards
- Work Order (WO) 09-812367-008, Installation of cable 2PL4875A from tray node 2371 at the 480 V Shutdown Board 2-BD-212-A1/10C-A to 2-Pent-293-8-A
- WO 09-812367-010 Installation of cables 2PL4816A and 2PL4836A from tray nodes 2372 & 2336 at the 480 V Shutdown Board 2-BD-212-A1/7D-A & 2-BD-A2/8A-A through tray nodes at 757' and 772'.

The following samples were inspected:

- IP 51063 Section 02.02.c - three samples

b. Observations and Findings

One violation of regulatory requirements was identified as discussed below.

Introduction: A Severity Level (SL) IV non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XIII, "Handling, Storage, and Shipping," was identified by the inspectors for the failure to implement existing procedural guidance and protect safety-related components. Specifically, measures were not being implemented to protect safety-related cables from physical damage.

Description: On February 23, the inspectors performed observations of a cable pull area where cable pulling activities had been suspended. The cable pull area had barrier

caution tape and signs indicated "Caution - Cable Pulling" at the access point as a warning. The inspectors observed dirt and footprints on feeder cable 2PL4816A and the protective fabric that appeared to come from personnel walking on the cables and fabric. The observation was communicated to the licensee and TVA engineering discovered that in addition to the footprints, an outer jacket tear was present on cable. PER 217958 was written to document the conditions identified by the NRC inspectors and PER 218287 was issued to document and disposition the damage identified on the cable in question.

The finding was determined to be more than minor because it represented an improper or uncontrolled work practice that impacted the quality of safety-related components in that there was evidence of physical damage that adversely affected the physical integrity and quality of this cable, as documented in PERs 217958 and 218287. The cause of this finding was directly related to the work practices component of the Human Performance cross-cutting area, as defined in IMC 310, because TVA failed to appropriately define and communicate expectations regarding protection of safety-related cable during construction (H.4(b)).

Enforcement: 10 CFR, Part 50, Appendix B, Criterion XIII, "Handling, Storage, and Shipping," requires 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 TVA-NQA-PLN89-A and Bechtel Project Nuclear Quality Assurance Manual (PNQAM) both require the implementation of American National Standards Institute (ANSI) N45.2.3-1973, "Housekeeping during the Construction Phase of Nuclear Plants." This ANSI standard specifically addresses the protection of materials and equipment from physical damage during the construction phase. Additionally, procedure 25402-PRO-0007, Field Material Storage Control, provides instructions on preventing physical damage to stored equipment.

Contrary to the above, prior to February 23, 2010, TVA personnel failed to establish measures that controlled the storage of safety-related cabling in accordance with work instructions to protect the cable from physical damage as required by 25402-PRO-0007 and ANSI N45.2.3-1973. Subsequently, TVA took action to protect the cable and entered the issue into the corrective action program. 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 PERs 217958 and 218287, this violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010602-01, Protection of Safety-Related Cable During Construction Activities.

c. Conclusions

The inspected activities associated with the protection of safety-related electrical cables during installation were not in accordance with the licensee's procedures and NRC regulations as noted above.

C.1.2 RPV Internals and Protection of Installed Plant Equipment during Construction Activities (IP 50053)

a. Inspection Scope

During the inspection period, the inspectors conducted inspections of the reactor pressure vessel (RPV), core barrel, and internals storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, Housekeeping, Rev. 6. The inspectors entered the RPV to observe the condition of the RPV and to ensure that housekeeping measures were in place. 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.

The inspectors verified that the cover was in place and installed around the top of the open vessel to prevent entry of foreign objects and debris. The core barrel and internals continued to be in their storage locations in the refueling cavity protected with temporary protective material. Access controls were verified by the inspectors including a review of access logs documenting entry into the RPV.

c. Conclusions

Adequate controls were in place to protect the RPV, core barrel and internals during the inspection period.

C.1.3 Electrical Cable and Cable Tray Supports - Work Observation (IP 51063, 35065 and TI 2512/016)

a. Inspection Scope

The inspectors conducted inspections of receipt inspections of multi-conductor control cable as directed by procedure 25402-000-GPP-0000-N6104, Materials Receiving, Revision 3, to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. The material inspected included cable reels received on September 15, 2008 and inspected as Transfer T-49304.

The inspectors also observed portions of the installation activities for cable tray support 2-CTSP-293-0032 inside the Unit 2 reactor building annulus. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 51063 Section 02.02.a - two samples
- IP 51063 Section 02.02.c- two samples

b. Observations and Findings

No findings of significance were identified.

The inspectors verified the information on the following cable reels to be consistent with receipt documentation:

- Cat ID – BTH468G 1, insulated cable QA-1, signal, #16 AWG, copper, 2 twisted stranded FRXLPE, 300 V, 90 deg. part no. WVA-50, 1290 feet
- Cat ID - BTV999W 1, insulated cable QA-1, Power/Control, #14 AWG, copper, 7 conductors stranded, FRXLPE, 600V, 90 deg. part no. WHG-52, 520 feet.

The inspectors verified that the latest approved revision of applicable construction specifications, drawings and procedures were available and used by the cable tray support installers; and that installation and inspection activities were being documented during the activity.

c. Conclusions

The material receipt inspection documentation reviewed was complete and adequate for the type of material received. Cable tray support installation activities were adequate for the activities observed.

C.1.4 Electrical Systems and Components - Work Observations (IP 51053)

a. Inspection Scope

The inspectors observed portions of work associated with a containment sump level transmitter inside the Unit 2 containment. Work activities were performed in accordance with engineering document construction release (EDCR) 52419 for the replacement of Barton sump level transmitters with Gulton-Statham model PD3200-200-72-XX-N2-00 series level transmitters.

The inspectors also reviewed, observed, and evaluated portions of the receipt inspection, storage, and completed work activities for safety-related, Seismic Category I conduit supports. The inspectors reviewed safety analysis report commitments, site specifications, applicant procedures, and other documents to determine the minimum requirements necessary to ensure adequate quality of the supports. The inspectors reviewed procurement documents used to purchase both fabricated supports from an outside vendor and raw materials for supports fabricated on-site. As applicable, the inspectors:

- reviewed completed POs to determine if the procurement documents contained all applicable design and fabrication requirements;
- reviewed the receipt inspection criteria and receipt inspection documents to evaluate the applicant's compliance with applicable procedures;

- inspected supports to determine if they had adequate traceability markings to the applicable certified material test reports (CMTRs);
- inspected supports for compliance with all applicable design requirements;
- reviewed the storage level requirements to determine if the supports were stored in the proper storage level designation and if the storage locations were in conformance with the applicant's requirements; and,
- inspected the storage location to determine if the supports were properly identified while in storage.

Additionally, the inspectors reviewed the installation of conduit supports to determine if they were installed in accordance with all applicable installation specifications and if traceability markings and item identifications were maintained.

The inspectors also reviewed portions of the applicant's corrective action program to determine if procurement-related issues were being entered into the corrective action program at an appropriate threshold. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 51053 Section 02.01.f - one sample
- IP 51053 Section 02.02.d - one sample
- IP 51053 Section 02.02.e – one sample

b. Observations and Findings

The inspectors observed that the work associated with EDCR 52419 that involved the use of galvanized conduit clamps verses the required stainless steel clamps. The licensee stated that the stainless steel clamps were unavailable at the time of conduit installation and that the temporary clamps were being used until the required clamps could be received and installed. The licensee captured this concern in PER 218785.

The inspectors also identified the following NCV:

Failure to Include Applicable Welding Code in Procurement Documents

Introduction: The inspectors identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion IV, "Procurement Document Control," for the applicant's failure to include all required information in procurement documents for safety-related, Seismic Category I conduit supports.

Description: On July 31, 2009, the applicant received 100 safety-related, Seismic Category I conduit supports from an outside vendor that were purchased under PO 78077. Sixty of these supports were made from a Unistrut channel welded perpendicular to a square base plate. The inspectors reviewed PO 78077 and identified that the applicant failed to specify the required welding code for the supports. As described in Section 3.10.3.3.2 of the Safety Analysis Report, the welding code of record for these supports was AWS (American Welding Society) D1.1-1972, "Structural Welding Code," with Revisions 1-73 and 1-74.

The applicant used Bechtel procedure VT-AWS-D1.1, Bechtel Nondestructive Examination Standard Visual Examination, Revision 0, to provide the requirements for performing direct visual examination of welds in structural steel components where AWS D1.1 applied. Step 5.1.6 of this procedure stated that, “undercut shall not be more than 0.01” deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32” for all other situations.”

The inspectors independently inspected 18 supports purchased under this PO and identified 15 examples of potential unacceptable weld undercut. One of those supports was installed under EDCR 52419 for electrical conduit containing safety-related cables for the safety injection system. Subsequently, the inspectors identified PO 63330 that purchased an additional 100 similar safety-related, Seismic Category I conduit supports from the same vendor. The inspectors examined 69 supports from PO 63330 and identified 14 examples of potential unacceptable weld undercut. All of the inspected supports were either installed or released for use (i.e. accepted by QC). The inspectors identified undercut concerns with the following supports:

- PO 78077: STR-11, STR-19, STR-9, STR-18, STR1-4, STR1-17, STR1-13, STR1-8, STR2-9, STR2-14, STR-8, STR2-30, STR2-10, STR2-12, and 89513534-1 (installed support).
- PO 63330: PL1-95, PL1-48, PL1-5, PL1-53, PL1-44, PL1-12, PL1-75, PL1-68, PL1-25, PL1-27, PL1-66, PL1-77, PL1-37, and PL1-89.

The applicant entered the issues into their corrective action program as PER 219039. The applicant inspected all available (151 of 160) supports and found unacceptable undercut associated with 47. Of the 47 supports identified, 22 were installed and 25 were released for use. Subsequently, the applicant issued a stop work order on all work related to conduit supports, placed all vendor supports that were in the warehouse on QC hold, and initiated an investigation to determine the root cause of the related issues.

The inspectors determined that the failure to include all applicable fabrication requirements for the fabrication of safety-related components in the procurement documents was contrary to both applicant procedures and NRC requirements. The finding was determined to be greater than minor in accordance with IMC 2517, Appendix C, “Watts Bar Unit 2 Construction Inspection Program,” because the finding represented an improper or uncontrolled work practice that could impact quality involving safety-related components. Specifically, the failure to specify all applicable fabrication requirements for safety-related, Seismic Category I conduit supports in the procurement documents contributed to the applicant’s failure to ensure that installed and released-for-use supports met those requirements. The cause of this finding was not directly related to any of the cross-cutting area components as defined in IMC 0310, “Components Within The Cross-Cutting Areas.”

Enforcement: 10 CFR Part 50, Appendix B, Criterion IV, “Procurement Document Control,” requires, in part, that measures shall be established to assure that applicable regulatory requirements, design bases, and other requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material, equipment, and services, whether purchased by the applicant or by its contractors or subcontractors.

Contrary to the above, between June 2009 and February 2010, the applicant failed to assure that applicable regulatory requirements, design bases, and other requirements which were necessary to assure adequate quality were suitably included or referenced in procurement documents for safety-related conduit supports. Specifically, the applicant failed to include or reference the required welding code in POs 78077 and 63330 for safety-related conduit supports. This finding was determined to be a SL IV violation using Supplement II of the NRC Enforcement Policy because this finding was not the result of a programmatic QA breakdown. Because this was a SL IV violation and because it was entered into the corrective action program as PER 219039, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2010602-02, Failure to Specify Requirements for Safety-Related Conduit Supports.

c. Conclusions

The inspected activities associated with the procurement of conduit supports were not performed in accordance with applicant procedures and NRC regulations as noted above.

C.1.5 Reactor Coolant System (RCS) Material Condition and Cleanliness (IP 49051 and 49053)

a. Inspection Scope

The inspectors reviewed WO 110739214, which contained instructions for the inspection and cleaning of loop-3 crossover piping. The cleaning and inspection of the crossover piping were conducted to specifically address the corrective actions in PER 211911, Water and obstructions inside RCS. The inspectors also reviewed procedure 25402-000-GPP-000-N3505, Piping System Cleanliness, and verified that the procedure contained provisions for cleanliness criteria, measurement methods, and cleaning materials.

The inspectors entered and observed cleaning and inspection activities associated with loop-3 crossover piping. The inspectors also verified cleanliness of the seating surface of the loop-3 reactor coolant pump (RCP) casing prior to the pump being installed. This work was done in accordance with WO 09-953326-000 and the Piping System Cleanliness procedure. On March 5, 2010, the inspectors also entered loops 1 and 4 to observe the material condition of the interior surface of the piping.

The following samples were inspected:

- IP 49051 Section 02.04.f - one sample (cleaning)
- IP 49053 Section 02.02 - one sample (cleaning and quality related inspections)

b. Observations and Findings

No findings of significance were identified; however, on March 20 and 21, 2010, the inspectors entered loop-3 crossover piping to inspect the material condition of the interior of the piping. The inspectors entered the piping after cleaning and visual examination of the interior of the piping by QC had been completed (Step 5.5.3 in WO 110739214). The applicant had not fully evaluated the material condition of the RCS

piping including a 3" line attached to the bottom of the crossover line which was marked as not applicable in the work instruction. The applicant issued PER 159168 to address questions by the NRC on the material condition of the crossover piping. During discussions with the construction and startup organizations, the inspectors were informed that the cleaning and inspection of the 3" line would be addressed at a later time.

During a meeting with TVA on March 17, 2010 to discuss plans for RCP loop 3 installation, TVA indicated that the final cleaning and inspection of the piping would be performed at a later time. The activities would be planned to meet cleanliness Class B requirements and evaluate any potential pitting of interior RCS piping surfaces in accordance with applicable procedures and standards. During the inspection period, the cleanliness levels and controls for the RCS piping had not yet been established and as discussed by TVA during the meeting, these controls would be established at a later time. These activities will be revisited as the construction project enters the preoperational testing portion of the NRC's inspection program outlined in IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase.

c. Conclusions

The inspectors concluded that the licensee was properly implementing WO and procedural cleaning and inspection instructions on the above RCS piping.

C.1.6 Refurbishment (IPs 37002, 50071, 50073 and 51053)

a. Inspection Scope

The inspectors reviewed onsite inspection/refurbishment activities of the containment spray pumps 2A-A and 2B-B. The inspectors reviewed work instructions contained in WOs 08-951181-000 and 08-953047-000 and to confirm that appropriate vendor acceptance criteria had been incorporated into these instructions. Inspectors also assessed whether installation, testing, and inspection activities met applicable specifications and established procedures. The scope of the work included instructions to refurbish the containment spray pump motor on site to like new condition. The inspectors also witnessed removal of the 2B-B pump and motor disassembly, including handling. This included measurements of different pump and motor components including the bearings and shaft, as specified in the work instructions. The inspectors observed baseline electrical testing consistent with manufacturer's instructions including winding resistance testing, insulation resistance testing and surge comparison tests. The inspectors also observed handling, storage, and protection of safety-related components associated with the containment spray pumps. PERs 216839 and 217499 were reviewed to confirm that the issues associated with the containment spray pumps were thoroughly evaluated commensurate with the significance. In addition, the inspectors interviewed personnel performing the work and quality assurance (QA) personnel providing oversight of the activities. Specific documents reviewed are listed in the attachment. The following quality surveillance reports were reviewed:

- Quality Surveillance Report 25402-WBN-SR-10-0853, Containment Spray Pump Motor 2A-A and 2B-B Refurbishment.

- Quality Surveillance Report 25402-WBN-SR-10-0833, Containment Spray Pump Motor 2A-A Refurbishment

The following samples were inspected:

- IP 37002 Section 02.02.a, b, f - two samples
- IP 50071 Section 02.02.c - one sample
- IP 50073 Section 02.02.d - two samples
- IP 51053 Section 02.02.c, g - two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The refurbishment activities observed relative to the Containment Spray pumps and motors were adequate and completed in accordance with applicable procedures and specifications.

C.1.7 Safety-Related Piping Receipt Inspection (IPs 49061, 49063, and 35065)

a. Inspection Scope

The inspectors interviewed staff and reviewed activities, facilities, records and procedures, including SPP-4.2, Material Receipt and Inspection, Revision 22, for conducting receiving inspections. The inspectors verified that the procedures identified requirements and provisions for ensuring that the material received was in conformance with purchase specifications. This included a review of documentation and components associated with intake pumping station piping and equipment work, DCN-52920, Replace ERCW pumps. Inspectors reviewed PO 73725-368, Material Inspection Form No. 5944, and the 16 safety-related 20" weld neck flanges procured and receipt inspected. The inspectors also inspected the flanges to ensure proper marking, documentation, and storage conditions.

The following samples were inspected:

- IP 49061 Section 02.02.a, b - one sample
- IP 49063 Section 02.02.d, e - one sample
- IP35065 Section 02.02 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Receipt inspection activities for the components inspected were adequately controlled and performed in accordance with TVA receipt inspection requirements.

C.1.8 Reactor Coolant Pressure Boundary Piping – Work Observation (IP 49053)

a. Inspection Scope

The inspectors reviewed a sample of construction activities associated with EDCR 52987, RTD Bypass Elimination. This EDCR involved the fabrication of new ASME Class 1 welds.

The inspectors reviewed PCI work instruction 901099-01B, Watts Bar Unit 2 – RTD Bypass Elimination for Loop 2. This work activity involved the cutting, cleaning, machining, grinding, NDE, and welding of ASME Class 1 pressure boundary instrument piping.

The inspectors observed a sample of these in-process activities on all four RCS loops to determine whether PCI Energy Services' (PCI) activities were performed in accordance with applicable QA program requirements; the contractor's welding manual; applicable work instructions; and the ASME code Section III, Division 1, Subsection NB, Requirements for Class 1 Components.

Other activities reviewed and observed by the inspectors included: record keeping; construction techniques; certified material issuance; utilization of qualified inspection personnel; and control of nonconforming items. Review of radiographic examination (RT) film records for selected welds associated with the RTD Bypass Elimination Modification is documented in Section C.1.15.

The inspectors also conducted inspections of the reactor pressure vessel (RPV) head penetration modification activities to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. The inspectors observed cleanliness controls, installation, grinding, supporting, cleaning and welding activities. Specifically, this modification eliminated the upper head injection (UHI) piping and RPV Head mounted core exit thermocouple (CET) System. Portions of the safety-related ASME Section III, Class I piping was removed and capped. Observation/review of NDE activities associated with this modification are discussed in Section C.1.14.

These work activities were controlled by EDCR 53125, WBN2 RPV UHI/CET Cap Installation, and WO 09-954257-000. The work involved removal of the four UHI head adaptors and replacing three of them with 5 inch inside diameter (ID) welded caps. The fourth UHI location was being provided with a welded cap with a vent coupling for the reactor head vent system. In addition, elimination of the top-mounted CET system involved removing the five CET head adaptors below the threaded flange joint and replacing them with 2.75 inch ID welded caps.

The inspectors verified that all nine adaptors were removed per the work instructions. In-process welding performance was observed on UHI Location R7 and CET Penetration 77 caps. The inspectors also observed the welding fit-up of the cap on CET Penetration 78. The inspectors observed the completed weld finish on the caps for UHI Location R7 & A9 and CET Penetrations 77 & 78. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 49053 Section 02.01 - four samples
- IP 49053 Section 02.03 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The records reviewed and work observed on the reactor coolant pressure boundary piping, met the requirements of 10 CFR 50, Appendix B; the ASME code; and other regulatory requirements.

C.1.9 Reactor Coolant Pressure Boundary Piping Record Review (IP 49055)

a. Inspection Scope

The inspectors reviewed a sample of construction activities associated with EDCR 52987, RTD Bypass Elimination. This EDCR involved the fabrication of new ASME Class 1 welds.

The inspectors reviewed a sample of receipt inspection, material certification, and installation inspection records for ASME Class 1 components related to this EDCR. Specifically, the inspectors reviewed CMTRs and certificates of conformance for RTD fast response thermowells, cold leg installation bosses, and crossover leg nozzle caps. The inspectors compared the above hardware to the applicable ASME, *Boiler and Pressure Vessel Code (BPVC)*, 1971 Edition with Addenda through Summer 1973 (herein referred to as the ASME code) material specifications as well as the associated design drawings and equipment specifications.

The inspectors also reviewed a sample of installation records for new ASME Class I components. These records were reviewed to ensure: (1) that components were installed as specified in design drawings and specifications; and (2) that required inspections were performed.

The inspectors reviewed a sample of nonconformance reports (NCRs) generated by the applicant and their subcontractors. The inspectors reviewed these corrective action documents to determine whether the applicant and their subcontractor had adequately described the scope of the issues and implemented appropriate corrective actions. The inspectors compared these corrective action documents to the requirements of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action. The specific NCRs and PERs reviewed by the inspectors are listed in the attachment.

The inspectors reviewed the qualification and training records for a sample of welders and NDE personnel involved with EDCR 52987. These qualification records were compared to the contractor's welder qualification program and written practice. The inspectors also reviewed the following QA surveillance reports:

- 25402-WBN-SR-10-0844, RTD Bypass Elimination Work

- 25402-WBN-SR-09-0739, PCI Welder Qualification
- 25402-WBN-SR-09-0748, Control of Welding Filler Material

The following samples were inspected:

- IP 49055 Section 02.01 – three samples
- IP 49055 Section 02.02 – five samples
- IP 49055 Section 02.03 – one sample
- IP 49055 Section 02.04 – three samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The sample of reactor coolant pressure boundary piping records met the requirements of 10 CFR 50, Appendix B; the ASME Code; and other regulatory requirements.

C.1.10 Nuclear Welding General Inspection Procedure (IP 55050)

a. Inspection Scope

The inspectors reviewed a sample of construction activities associated with EDCR 52987, RTD Bypass Elimination. This EDCR involved the fabrication of new ASME Class 1 welds. Additionally, the inspectors observed in-process welding of safety-related ASME Class 1 pressure boundary instrument lines. The inspectors reviewed the contractor's written practice and compared it to the requirements of SNT-TC-1A, Personnel Qualification and Certification in Non-Destructive Testing, and ASME code Section III, Division 1, Subsection NB, Requirements for Class 1 Components. The inspectors also reviewed the qualification records of two of the contractor's level II inspectors (visual inspection and liquid penetrant testing) to determine if they met the qualification requirements of their written practice. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 55050 Section 02.01 – two samples
- IP 55050 Section 02.02 – one sample
- IP 55050 Section 02.03 – two samples
- IP 55050 Section 02.04 – two samples
- IP 55050 Section 02.06 – two samples

Welding Procedures and Base Material - Filler Metal Compatibility

The inspectors reviewed the contractor's welding procedure and supporting procedure qualification records. The inspectors compared this welding procedure to the requirements of the ASME code Section III, Division 1, Subsection NB, Requirements for Class 1 Components; and ASME Section IX, Welding and Brazing Qualifications.

Welder Performance Qualification

The inspectors reviewed two welder performance qualification records. These qualification records were compared to the contractor's welding manual and ASME Section IX, Welding and Brazing Qualifications.

Production Welding

The inspectors observed a sample of in-process welding on the ASME Code pressure boundary. Specifically, the inspectors observed:

- Weld FW-2-068C-W002-04; RTD Thermowell to the Loop-2 cold leg; ASME Class 1
- Weld FW-2-068G-W003-05; RCS Nozzle Cap to the Loop-3 crossover leg; ASME Class 1

The inspectors reviewed weld preparation, cleaning, fit-up, essential and nonessential variables, materials used, and associated CMTRs, and quality control practices to ensure compliance with the welding procedure, PCI drawings, and overall welding program.

The inspectors also performed a walk-down of the contractor's material storage room. This storage room was classified as Level B storage. The inspectors compared the conditions of the storage room to the requirements specified in the contractor's procedure WCP-3, Weld Material Control, Revision 9.

Examination of Welds

The inspectors observed visual and liquid penetrant (PT) examinations of welds FW-2-068C-W002-04 and FW-2-068G-W003-05. The inspectors compared these NDE exams to the contractor's procedures and ASME Section V, Nondestructive Examination.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The contractor's training and qualification program for NDE personnel and the reviewed qualification records met the requirements of 10 CFR 50, Appendix B; the ASME code; and applicable industry codes and standards. Welding and NDE activities observed met the requirements of 10 CFR Part 50, Appendix B; the ASME Code; and other regulatory requirements.

C.1.11 Structural Welding General Inspection Procedure (IP 55100)

a. Inspection Scope

The inspectors reviewed a portion of the contractor's structural steel welding program, General Welding Standard (GWS)-1, Revision 3. The inspectors compared it to the requirements of the AWS Code D1.1 – Structural Steel Welding, 1972 edition.

The inspectors reviewed several CMTRs for a sample weld filler material. The inspectors compared the CMTRs to the applicable material specifications. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 55100 Section 02.01.a – two samples
- IP 55100 Section 02.01.c – two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Records and procedures reviewed met the requirements of 10 CFR Part 50, Appendix B; applicable material specifications; and other regulatory requirements.

C.1.12 Visual Testing Examination (IP 57050)

a. Inspection Scope

The inspectors reviewed the contractor's visual inspection procedure, PCI Energy Services General Quality Procedure GQP-9.6, Visual Examination of Welds, Revision 9. The procedure was compared to the requirements of ASME Section V, and the inspectors verified that indications, if present, were evaluated and dispositioned in accordance with the requirements of ASME Section III.

The inspectors observed visual examinations on the following welds:

- FW-2-068C-W002-04, ASME Class 1 – socket weld
- FW-2-068G-W003-05, ASME Class 1 – butt weld

For the above examinations, the inspectors reviewed the qualification records of the level II examiners and reviewed the applicable measuring and test equipment calibration records. These records were compared with the contractor's written practice for qualification and procedures for calibration. The observed examinations were compared to the contractor's procedures for visual examination of ASME Code welds.

The following samples were inspected:

- IP 57050 Section 02.01 – one sample
- IP 57050 Section 02.02 – two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Visual examination activities, records, and procedures met the requirements of 10 CFR 50, Appendix B; the ASME Code; and other regulatory requirements.

C.1.13 Liquid Penetrant Testing Examination (IP 57060)

a. Inspection Scope

The inspectors reviewed/observed ongoing PT examination activities performed by two sub-contractor organizations performing construction completion activities. For these examinations, the inspectors reviewed the qualification records of the level II examiners, and reviewed the applicable measuring and test equipment calibration records. These records were compared to the contractor's written practice for qualification and procedures for calibration. The observed examinations were compared to the contractor's procedures for PT testing of ASME Code welds.

PT Examination by PCI Energy Services

PCI Energy Services provides welding and NDE examination services to Westinghouse for ongoing RCS construction completion activities. The inspectors reviewed the contractor's procedure, GQP-9.7 Solvent Removable Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials and Cladding, Rev. 12. The procedure was compared to the requirements of ASME Section V and the inspectors verified that indications, if present, were evaluated and dispositioned in accordance with the requirements of ASME Section III.

The inspectors observed PT examinations of the following welds:

- FW-2-068C-W002-04, ASME Class 1 – socket weld
- FW-2-068G-W003-05, ASME Class 1 – butt weld
- FW-2-085-W001-A5-1-0, ASME Class 1 – four-inch RPV Head Penetration Cap weld
- FW-2-087B-W001-03, ASME Class 1 – six-inch Upper Head Injection cap weld

PT Examination by Ivey Cooper, Inc.

The inspectors also observed PT examination performed by Ivey Cooper, Inc., personnel. Ivey Cooper, Inc., provides NDE examination services to Bechtel for construction completion activities.

The inspectors observed PT examination of the following weld:

- FW-2-068A-D145-02C1, ASME Class 1 – four-inch pipe weld

The following samples were inspected:

- IP 57060 Section 02.01 – two samples
- IP 57060 Section 02.02 – two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

PT examination activities, records, and procedures met the requirements of 10 CFR 50, Appendix B; the ASME Code; and other regulatory requirements.

C.1.14 Radiograph Film Interpretation of Safety-Related Welds (IP 57090)

a. Inspection Scope

The inspectors reviewed completed radiographs for four completed welds on safety-related piping. These welds represented new ASME Section III Class 1 welds which required new radiograph examinations (RT). RT film and examination reports were reviewed to determine whether they were prepared, evaluated, and maintained in accordance with applicable commitments and/or requirements.

Specific radiographs reviewed included the following:

<u>Weld ID</u>	<u>Component</u>
2-068G-W001-05	3-inch diameter pipe weld (Loop 1)
2-068G-W002-05	3-inch diameter pipe weld (Loop 2)
2-068G-W003-05	3-inch diameter pipe weld (Loop 3)
2-068G-W004-05	3-inch diameter pipe weld (Loop 4)

All four stainless steel butt welds were located in ASME Section III Class I piping in the Unit 2 RCS.

The inspectors reviewed the new RT film and examination reports. The records were compared to the ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition with Addenda through Summer 1973 to verify compliance.

The following samples were inspected:

- IP 57090 Section 02.03.a - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the reviewed radiographs met applicable ASME code requirements and other regulatory requirements.

C.1.15 Magnetic Particle Examination of Safety-Related Welds (IP 57070)

a. Inspection Scope

The inspectors observed magnetic particle (MT) examination for a completed pipe weld on safety-related piping as part of the ongoing ice condenser drain piping modification activities performed under WO 08-956218-026. This weld examination was an ASME

Section III Class 3 piping weld performed by Bechtel in the Unit 2 ice condenser associated with EDCR 52813, Redesign and Reinstall Ice Condenser Drain Piping. MT 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.

The inspectors reviewed procedures 25402-000-GPP-0000-N3701, Welding Program, Revision 3, and 254-000-GMX-GCE-00001, Special Processes Manual, Revision 1. For the examination, the inspectors reviewed the qualification records of the Ivey Cooper, Inc. examination personnel, and reviewed the applicable measuring and test equipment calibration records. These records were compared to the contractor's written practice for qualification and procedures for calibration. The observed examinations were compared with the contractor's procedures for MT examination of ASME Code welds.

Specific MT examination observed included the following:

<u>Weld ID</u>	<u>Component</u>
2-061B-T019-09	12-inch diameter pipe weld

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 57070 Sections 02.02 - one sample
- IP 57070 Sections 02.03 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

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

C.1.16 Inservice Inspection - Review of Program (IP 73051)

a. Inspection Scope

The inspectors conducted a review of the applicant's preservice inspection (PSI) program related to the Unit 2 steam generator (SG) tubes. The inspectors evaluated the applicant's PSI of the SG tubes to the following industry guidelines: (1) Nuclear Energy Institute (NEI) 97-06, Steam Generator Program Guidelines; and (2) Section 3.2, SG PSI Requirements, of Electrical Power Research Institute (EPRI) Report TR-107569, PWR Steam Generator Examination Guidelines.

The inspectors held discussions with applicant representatives regarding the primary and secondary data analysis, quality of the eddy current data, the resolution of indications, and other relevant SG inspection program issues.

The inspectors reviewed the applicant's PSI plan, degradation assessment, and SG tubing examination scan plan. The inspectors compared these documents to the industry guidance documents referenced above. Specific documents reviewed are listed in the attachment.

Further, the inspectors reviewed surveillance report number 25402-WBN-SR-10-0834, dated January 29, 2010. This surveillance was performed by Westinghouse, and was an evaluation of personnel certification for eddy current testing activities.

The following samples were inspected:

- IP 73051 Section 02.01.a – one sample
- IP 73051 Section 02.01.c – one sample
- IP 73051 Section 02.03 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The applicant's SG tube PSI program reflected operating experience at similarly designed and operated units and was implemented in accordance with applicable industry guidance documents, the degradation assessment, and PSI scan plan.

C.1.17 Preservice Inspection – Observation of Work and Work Activities (IP 73053)

a. Inspection Scope

The inspectors observed the PSI of the Watts Bar Unit 2 SG tubes. The inspectors evaluated the applicant's PSI of the SG tubes to the following industry guidelines listed in Section C.1.17, Inservice Inspection Review of Program.

The inspectors observed eddy current data acquisition for a sample of SG tubes. During the data acquisition, the inspectors observed the independent tube verification process utilized by applicant inspection personnel.

The inspectors reviewed the eddy current testing equipment qualifications and techniques used by the applicant to acquire data. The inspectors also reviewed a sample of personnel qualifications for eddy current data analysts. These qualification records were compared to the applicant's procedures and the industry guidance documents referenced in Section C.1.17.

The inspectors reviewed the subcontractor's written practice, WEC 2.10, Addendum B: Certification of EPRI Qualified Data Analyst (QDA) Personnel. Further, the inspectors reviewed the applicant's acceptance of the contractor's written practice.

The following samples were inspected:

- IP 73053 Section 02.02 – one sample (Level II)
- IP 73053 Section 02.03 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The applicant's SG tube PSI program reflected operating experience at similarly designed and operated units and was performed in accordance with applicable industry guidance documents, the applicant's degradation assessment, and the PSI scan plan.

C.1.18 Instrument Components and Systems - Work Observations (IP 52053, TI 2512/035)

a. Inspection Scope

The inspectors observed activities associated with the Control Room Design Review (CRDR) corrective action program (CAP). This included the observation of the previously installed components, Quality Control (QC) validation of work performed, and in-progress work activities for Main Control Room (MCR) Panel 2-M-4. These components were re-located from MCR panel 2-M-3 as part of the resolution of historical human engineering discrepancies (HEDs) captured in the CRDR CAP. The activities were controlled under EDCR 52361, specifically for work order WO 08-951064-017, directing the installation of safety related handswitches and lights for the Steam Generator Blowdown system listed below. The activities were verified against the governing documentation which identified component procurement specifications, detailed work instructions, and physical installation, including but not limited to required spatial arrangement.

The inspectors reviewed 2-M-4 panel drawings, work scope statements, general work instructions, procurement documents, housekeeping logs, completed pre-job briefings, field change requests, QC data sheets, and Unit 1/Unit 2 interface documentation for adequacy and documented completion, as applicable. Interviews were conducted with engineering, QC, and craft personnel to verify that the scope of work activities, design requirements, and component quality were consistent with procedural requirements. Specific documents reviewed are listed in the attachment.

- Steam Generator Blowdown Isolation Valve switch 2-HS-1- 7/181
- Steam Generator Blowdown Isolation Valve switch 2-HS-1- 14/182
- Steam Generator Blowdown Isolation Valve switch 2-HS-1- 25/183
- Steam Generator Blowdown Isolation Valve switch 2-HS-1- 32/184

b. Observations and Findings:

No findings of significance were identified. The components were installed in the proper location and oriented by qualified craft using suitable components, tools, and procedures.

c. Conclusions

The inspected activities associated with the CRDR CAP were performed in accordance with procedures and engineering supporting documentation.

T.1 Training and Qualification of Plant Personnel

T.1.1 Craft Training (IPs 51063 and 64051)

a. Inspection Scope

The inspectors 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).

The inspectors also observed a classroom training session associated with electrical cable training, Modifications / Additions Instructions (MAI) 3.2, Cable Pulling. The training course covered TVA Cable Installation Specification G-38. The training sessions included discussions on cable support maximum spacing, use of "break links", acceptance of temporary supports, pullbys not allowed, cable tagging, and review of each section of the MAI.

Samples inspected are as follows:

- 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 related to hot work fire watches and cable pulling was adequate for the current level of construction activated being performed.

III. Operational Readiness Activities

F.1 Fire Protection (IP 64051)

a. Inspection Scope

The inspectors conducted a walkdown 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 activity. The inspectors interviewed fire watch personnel to verify knowledge of responsibilities as fire watches. The inspectors also verified that fire protection impairment permits (FPIPs) had been established for impairment of installed fire protection features and that hot work permits were posted at the location of any hot work. 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 02.04 – one sample
- 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 Moderate Energy Line Break Special Program (TI 2512/040)

a. Inspection Scope

The objectives of this inspection were to evaluate the applicant's and contractor's implementation of the Moderate Energy Line Break (MELB) Special Program. This program was established due to the fact that TVA determined that there was inadequate documentation to assure MELB criteria were met. The process consists of walkdowns to confirm field conditions relative to flood-related commodities (curbs, drains, doors, etc.), susceptible piping, and safe shutdown equipment locations coupled with calculation updating as required. The applicant also planned to review previous plant modifications for effects on MELB or the need to modify Unit 2 equipment similar to Unit 1. Specific documents reviewed are listed in the attachment.

An initial inspection was conducted to meet with the point of contact and review initial activities conducted to date (see NRC Inspection Report 05000391/2009604). The applicant's plans were shown to be equivalent to, or exceeded, those performed for Unit 1. During this inspection, the inspector reviewed six finalized walkdown packages and the associated calculation changes; the documentation of the previous modification review; the preliminary modification list; and the justification for the applicant not considering conduit and cable for MELB.

b. Observations

No findings of significance were identified. The MELB design criteria were appropriately revised for the areas reviewed. The applicant's review of previous modifications appeared thorough with appropriate actions initiated. The justification for not considering cable for MELB was reasonable; however, further review is warranted for MELB effects on devices connected to conduit since sealing of conduit is not considered warranted. The applicant plans to perform additional walkdowns of specific safe

shutdown equipment not previously covered by walkdowns, to complete the list of modifications and fieldwork to be performed, and complete the modifications and fieldwork. Additional NRC inspections are planned for these actions.

c. Conclusions

Plans and actions to date continue to be adequate and equivalent to, or exceed, those for Unit 1 except for conduit sealing which requires further review.

OA.1.2 Microbiologically Induced Corrosion Special Program (TI 2512/039)

a. Inspection Scope

The objectives of this inspection were to evaluate the applicant and contractor's implementation of the Microbiologically Induced Corrosion (MIC) Special Program. This program was established due to the fact that TVA had discovered MIC in Unit 1 piping and initiated special controls and monitoring. The applicant determined that similar actions were appropriate for Unit 2 piping not yet incorporated into the program. The applicant's planned actions include establishing minimum wall thickness requirements for those systems identified as potentially affected by MIC, determining MIC-susceptible locations, establishing grids for inspection locations, completing modifications to allow flushing similar to Unit 1, and updating program documents. The applicant justified not performing inspections prior to startup based on wall thinning studies of the raw cooling water (RCW) system which was considered bounding for any conditions in the plant. The inspector reviewed the applicant's implementation plan, discussed actions completed and planned with the MIC program owner, reviewed the RCW studies, and reviewed the most recent five Unit 1 program health reports. Specific documents reviewed are listed in the attachment.

b. Observations

No findings of significance were identified. The plan stated that all but one RCW projection was in excess of 15 years and projections were based on conservative assumed corrosion rates. However, several of the studies indicated projections of less than 15 years. Therefore, more review of this issue is required to clarify the plan statement. No significant problems have recently been identified on Unit 1 according to the health reports.

c. Conclusions

The planned actions are adequate and are equivalent to those performed for Unit 1 except that no current inspections are planned for Unit 2 systems based on previous corrosion studies.

OA.1.3 Seismic Analysis Corrective Action Program Review (TI 2512/030)

a. Inspection Scope

Background: The Unit 1 Seismic Analysis CAP included an independent review of the seismic analysis calculations for Seismic Category I structures as part of the civil calculation activity of the Design Baseline Verification Program (DBVP) CAP. The seismic analysis CAP issues were identified through employee concerns, conditions

adverse to quality reports (CAQRs), and review of seismic analysis calculations, criteria, and licensing requirements which required further evaluation and justification. The issues identified were grouped within the following areas:

- Integration time step used to perform time history analysis
- Soil properties and soil-structure interaction concerns
- Torsional modeling of structures
- Seismic analysis criteria for the additional diesel generator building
- The effects of floor and wall flexibility on design of systems and components in Seismic Category I structures

In NUREG-1232, Volume 4, "Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan," the staff determined that TVA's approach to resolve the CAP issues for Unit 1 was acceptable.

Section 3.7.1 of NUREG-0847, Supplement No. 9, "Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2," discussed the staff's reviews, inspections, and audits of the Seismic Analysis CAP. Based on these activities, the staff concluded that the Seismic Analysis CAP had been acceptably implemented for Unit 1.

In letters dated January 29, 2008, and September 26, 2008, TVA proposed their approach for resolving the CAPs and SPs for Watts Bar Unit 2. For the Seismic Analysis CAP, TVA stated that the Unit 1 approach will be used for Unit 2. NRC letter from P. D. Milano to Mr. Bhatnagar dated February 11, 2009, provided the staff's assessment of TVA's approaches for resolving the CAPs and SPs. The staff concluded there was reasonable assurance that, when implemented as described, the Seismic Analysis CAP will be appropriately resolved for Unit 2.

The Watts Bar Unit 2 Seismic Analysis CAP Closure Report, Revision 0, (final approval date November 19, 2009), contained TVA's bases for concluding the CAP had been properly implemented for Unit 2. As part of the Unit 2 effort, TVA completed an independent review of the seismic calculations. Seismic calculations and analyses originally developed for Unit 1 prior to the steam generator replacement were used to qualify Unit 2 structures. In order to verify that existing seismic analysis calculations are applicable to Unit 2, each calculation in the original Unit 1 Seismic CAP was reviewed by TVA to determine if a revision was necessary. This review was documented in the WB2 Closure Report.

Inspection Activities: Based on the information provided in the background section, the objective of this inspection was to evaluate the implementation of TVA's Seismic Analysis CAP for Unit 2. The inspection focused on reviewing the seismic analysis, disposition and applicability of issues identified by the original Unit 1 Seismic Analysis CAP, resolution of any additional concerns or issues identified during the implementation of Unit 2 Seismic Analysis CAP, and review of the computer software programs used for the seismic analysis.

i. Seismic Analysis

As stated in the background section, TVA did not perform any new calculations related to this Seismic Analysis CAP. However, following TVA's review of all the seismic analysis calculations, some minor revisions were made to several of the original

calculations in order to specify applicability to Unit 2. Also, after the SG replacement for Unit 1, several of the original Unit 1 seismic analysis calculations were no longer applicable to Unit 1 but could be qualified for Unit 2 because the Unit 2 site parameters and structural behavior were identical to Unit 1 prior to the SG replacement. Therefore, this inspection focused on reviewing a sample of the seismic analysis calculations and other records which TVA either revised or determined that no revision was necessary.

The inspectors reviewed a sample of seismic records and calculations, which included foundation engineering analyses, determination of earthquake ground motions, design basis of seismic analyses, and evaluation of building interaction under seismic loads for Unit 2 containment building and shared/common buildings. The inspectors held technical discussions about soil characteristics used in the calculations, adjacent structure interactions, structural configuration differences between Unit 1 and Unit 2, ground and floor response spectra, and modal truncation.

ii. Disposition and Applicability of Previous Issues

During the review of these seismic documents, the inspectors verified that the major issues listed in the background section that led to the Seismic Analysis CAP for Unit 1 were also resolved for Unit 2. The inspectors reviewed the EDCR procedure to verify that a process was in place to support the assumption that the design of Unit 2 matches the design of Unit 1 and that the Unit 1 modifications performed by DCNs were being implemented into Unit 2. The inspectors conducted interviews with design personnel and performed additional document reviews to verify whether the conclusions made, corrective actions implemented, and actions taken during Unit 1 structure evaluation, prior to the SG replacement, were performed and applicable to Unit 2.

During the Unit 1 Seismic CAP assessment, TVA determined that the root cause of the issues identified in the original seismic analysis was the use of engineering judgments without supporting documentation. The inspectors reviewed TVA Procedure NEDP-2 Design Calculation Process Control, and Bechtel Procedure 25402-3DP-G04G-00037 Design Calculations. The inspectors reviewed Bechtel Procedure 25402-3DP-G04G-00027, Design Verification, Revision 3, to verify that adequate controls for checking, verifying, and approving engineering design documents were established. The inspectors also reviewed a sample of documents related to the Seismic Analysis CAP completion for Unit 2 to verify that the design verification of those documents was in accordance with the procedure. These procedures were also compared to the requirements and controls that were in use during the original Unit 1 seismic analysis development to establish a consistent level of control similar to what was approved during the Unit 1 Seismic Analysis CAP. The inspectors also reviewed QA surveillance and audit reports on the Seismic Analysis CAP.

iii. Resolution of Any New Issues or Concerns

The inspectors conducted interviews with Bechtel and TVA staff responsible for employee concerns and reviewed the employee concerns database. Three employee concerns records pertaining to seismic analysis were sampled and further reviewed to determine if the concern and issues were adequately addressed and resolved for Unit 2.

iv. Computer Software and Data Review

Since the NRC approved TVA's proposed action of using the Unit 1 approach to resolve the Seismic Analysis CAP issues for Unit 2, the inspectors reviewed a sample of documents related to various computer programs used for the seismic analyses performed for Unit 1. A sample of three computer programs was selected for review: STARDYNE; Time-History Strip (TSTRIP); and Bechtel Structural Analysis Program (BSAP). Computer program documentation was reviewed to determine that the computer programs documentation was in accordance with procedures.

Specific documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

The inspectors verified that TVA adequately reviewed the seismic analysis calculations and records and agreed with their assessment of applicability to Unit 2. The inspectors determined that all the Seismic Analysis CAP issues were resolved and verified that controls were established for the preparation, verification, and approval of calculations related to SSCs. Based on the sample of calculations reviewed, the inspectors verified that assumptions and engineering judgments were adequately documented. Based on technical discussions and interviews with management and engineering staff, the inspectors determined the staff had an adequate level of experience and qualifications to perform the seismic analyses and reviews.

Interviews with Bechtel and TVA staff responsible for employee concerns and review of the employee concerns database revealed no concerns regarding the seismic analysis program were reported since 1989. The inspectors confirmed that previously documented concerns pertaining to the seismic analysis were adequately addressed through the CAP closure. Additional discussions with various Bechtel engineering staff did not reveal any unresolved concerns or issues. The inspectors also determined that the findings and conclusions resulting from TVA Quality Assurance (QA) surveillances and audit reports on the Seismic Analysis CAP were adequately addressed.

The inspectors reviewed the validation records of the sampled computer programs and confirmed that the programs were validated through documented tests and that the test results were independently reviewed and compared with benchmark results that were known to be correct. The inspectors also verified that validation documentation demonstrated that the capabilities of the programs worked correctly.

c. Conclusions

The actions performed to resolve the issues associated with the Seismic Analysis CAP for Unit 2 were found to be adequately planned and implemented. The inspectors' review determined that TVA had taken adequate corrective actions to resolve the concerns about the seismic analysis program, therefore, this CAP is closed. However, future inspections may be conducted for new related design and construction activities.

OA.1.4 Corrective Action Plans and Special Programs Reviews (TI 2512/016, 020, 024, 027, 028, 032, 039, 040)

The inspectors held discussions with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with the following CAPs and SPs:

- Heat Code Traceability CAP; TI 2512/024
- Replacement Items CAP; TI 2512/027
- Quality Assurance Records CAP; TI 2512/028
- Welding CAP; 2512/032
- Microbiologically Induced Corrosion SP; TI 2512/039
- Moderate Energy Line Break SP; TI 2512/040

The actions discussed covered the following areas as applicable:

- Walkdowns
- 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 or SPs, 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.

The inspectors also continued discussions and reviews of TI2512/016, Cable Issues CAP and TI 2512/020, Electrical Issues. Initial meetings associated with these two CAPs were held during previous inspection periods; however, the inspectors reviewed applicable documentation to plan future inspections in these areas.

OA.1.5 Historical Document Reviews (IP 92701 and 35060)

a. Inspection Scope

Certain TVA historical documents that could impact the licensing of WBN2 remained open at the time its construction ceased and others were initiated after its construction ceased. In order to address these concerns, TVA established the Historical Document Review (HDR) process to identify such documents, assess their applicability to WBN2 (Phase 1) and manage their resolution (Phase 2). The NRC performed an inspection of Phase 1 HDR activities to determine the adequacy of the scope of historical documents reviewed and the determinations of their applicability to WBN2.

The inspectors reviewed WBN2 project procedure NGDC PP-19, Revision 2, Closure of Commitments/Open Items Required for Licensing, and Bechtel procedure 25402-3DP-G04G-00501, Revision 003, Historical Document Review Process; and held discussions with TVA licensing personnel and the Employee Concerns Program manager. In addition, the inspectors independently sampled 71 open historical documents of various types to confirm the adequacy of the determinations of their applicability to WBN2.

b. Observations and Findings

No findings of significance were identified.

Bechtel's HDR group defined the scope of the HDR project and completed the Phase 1 review of HDR documents. Over 31,000 documents of various types were identified and reviewed. The types of documents reviewed included employee concerns documented in Corrective Action Tracking Documents (CATDs); Historical WBN1 Vertical Slice Review Discrepancy Reports (VSR-DRs); Historical Conditions Adverse to Quality (CAQRs); Historical electronic Corrective Action Program (eCAP) issues; Program For Assurance of Completion And Assurance of Quality (PAC/AQ) issues; and Unit 1 PAC/AQ Potential Areas of Concern/Recommendation (PACRs). TVA licensing performed an independent verification of the reviews using statistical sampling techniques from NUREG 1475, published February 1994. This NUREG allows a lot to be accepted if failures do not exceed a predetermined number. The number of failures allowed depends on the number of items reviewed. For example, for a sample size of 124 items reviewed, the lot can be accepted if 0, 1 or 2 items fail. The lot is rejected if 3 or more items fail. TVA found the lots for all the document types reviewed to be acceptable. Failed samples identified by TVA were sent to the responsible departments for disposition (Phase 2). The NRC inspectors' independent review of additional samples confirmed TVA's findings.

During the inspection, the NRC inspectors found that TVA did not independently confirm the scope of all HDR document types to be reviewed. TVA responded to the inspectors' questions by conducting this effort satisfactorily. In addition, the NRC inspectors inquired about the review of employee concerns not documented using the CATD process. These concerns have been partially reviewed. Since the completion of this review is not formally controlled, TVA initiated PER 215725 to track this review.

c. Conclusions

TVA identified all historical documents pertinent to the HDR process and adequately assessed their potential impact on WBN2 construction and licensing.

V. Management Meetings

X.1 Exit Meeting Summary

On April 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

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
T. Moran, MELB and MIC Special Program Owner
B. Briody, Maintenance and Modifications Manager, TVA, Unit 2
P. Byron, Licensing Engineer
B. Crouch, Lead Mechanical Engineer, TVA, Unit 2
M. Das, Principal Engineer, Bechtel
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
S. Hilmes, Lead Electrical Engineer, TVA, Unit 2
M. Lackey, ECP Rep, TVA, Unit 2
R. Kuhn, Quality Assurance Manager, Bechtel
D. Malone, Quality Assurance, TVA, Unit 2
D. Myers, Quality Assurance Manager, TVA, Unit 2
L. Davenport, Contracts/Procurement Manager, TVA, Unit 2
D. Osborne, Lead Civil Engineer, TVA, Unit 2
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
B. Newton, General Manager- Welding Technology and Programs, PCI Energy Services
C. Ankeny, Quality Assurance Manager, PCI Energy Services
J. Moseley, Westinghouse Site Director
M. Easter, Westinghouse Joint Test Team Manager

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 37002	Construction Refurbishment Process – Watts Bar Unit 2
IP 40504	Part 52, Identification and Resolution of Construction Problems
IP 49051	Reactor Coolant Pressure Boundary Piping QA Review
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 50053	Reactor Vessel and Internals Work Observation
IP 50071	Safety-Related Components – Records Review
IP 50073	Mechanical Components – Work Observation
IP 51053	Electrical Components and Systems Work Observation
IP 51063	Electrical Cable Work Observation
IP 52053	Instrument 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 57090	Nondestructive Examination - RT
IP 64051	Procedures - Fire Prevention/Protection
IP 73051	Inservice Inspection Review of Program
IP 73053	Preservice Inspection – Observation of Work and Work Activities
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 2512/020	Plant Electrical Issues Corrective Action Program
TI 2512/024	Inspection of Watts Bar Nuclear Plant Heat Code Traceability Corrective Action Program Plan
TI 2512/027	Replacement Items Corrective Action Program
TI 2512/028	QA Records Corrective Action Program
TI 2512/030	Inspection of Watts Bar Nuclear Plant Seismic Analysis Corrective Action Program Plan
TI 2512/032	Plant Welding Corrective Action Program
TI 2512/035	CRDR SP
TI 2512/039	Microbiologically Induced Corrosion Special Program
TI 2512/040	Medium Energy Line Break Special Program

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

2010602-01	NCV	Protection of Safety-Related Cable During Construction Activities (Section C.1.1)
2010602-02	NCV	Failure to Specify Requirements for Safety-related Conduit Supports (Section C.1.4)

Closed

2512/030	TI	Inspection of Watts Bar Nuclear Plant Seismic Analysis Corrective Action Program (Section OA.1.3)
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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

Oversight/Self-Assessment Documents

NA Assessment Report NGDC-WB-10-001, EDCR 52419, Installation of Containment Sump Level Transmitters

NA Assessment Report NGDC-WB-09-029, Quality Assurance Corrective Action Program

NA Oversight Analysis Report NGDC-WB-09-001, February – December 2009

NA Assessment Report NGDC-WB-10-003, Internal Pipe Cleanliness Records

II. Management Oversight and Controls

C.1.1 Protection of Plant Equipment During Construction Activities

Procedures

Watts Bar Unit 2 – Construction Completion Project – Bechtel – Project Nuclear Quality Assurance Manual Rev. 4 and 5

25402-000-GPP-0000-N2102, Housekeeping, Rev. 6

Work Orders

WO 09-812367-008, 480V Shutdown Board 2A1-A per DCN 53334

WO 09-812367-010, 480V Shutdown Board 2A1-A per DCN 53334

Problem Evaluation Reports

PER 217958, Unit-2 Annulus cable pull operations where there were footprints on safety-related cables 2PL4816A and 2PL4775A.

C.1.2 Electrical Cable - Work ObservationProcedures

TVAN Standard Programs and Processes (SPP)-4.2, Material Receipt and Inspection, Rev. 22
SPP-4.3, Material Storage and Handling, Rev. 7 and 8

Receipt Inspection Reports

Material Inspection Form (MIF) – MIF No. 00001768, Doc. No. T-49304 date: 9-12-08

C.1.3 Electrical Cable and Cable Tray Supports - Work ObservationWork Order

WO 08-957127-002, Modify/Install Supports

C.1.4 Electrical Systems and Components - Work ObservationsProcedures/Programs

MAI-5.9, Fabrication and Installation of Structural and Miscellaneous Steel, Rev. 8
VT-AWS-D1.1, Bechtel Nondestructive Examination Standard Visual Examination, Rev. 0
Bechtel Welding Procedure P1-A-Lh(Structural), Rev. 0
MAI-3.1, Installation of Electrical Conduit Systems and Conduit Boxes, Rev. 17
SPP-4.2, Material Receipt and Inspection, Rev. 22

Purchase Orders

PO 77410, Purchase of Safety-Related Conduit Supports, dated May 7, 2009
PO 78077, Purchase of Safety-Related Conduit Supports, dated June 25, 2009
PO 63330, Purchase of Safety-Related Conduit Supports, dated January 12, 2010

Problem Evaluation Reports

PER 215932, Level transmitter in 2A containment spray pump room with no Unit 1 protective equipment sign in the area of the transmitter
PER 219039, Conduit Support Deficiencies
PER 210510, Conduit Supports Not Built Per Detail
PER 222975, Unit 1 Follow-Up to NRC Questions on Conduit Supports
PER 217415, Two Heat Trace Numbers Found on One Support

Miscellaneous

TVA Audit No. 2007N-62, QA Vendor Audit Report, dated November 2, 2007

C.1.6 Refurbishment

Problem Evaluation Reports

PER 216839, Containment Spray Pump 2B-B motor has damage to the insulation
 PER 217499, Containment Spray Pump 2A-A bearing fit too tight

Miscellaneous

EDCR 53344, Refurbish Containment Spray System, Rev. A
 WBN-VTD-W120-0060, Instruction Manual for Westinghouse Containment Spray Pumps and Drivers
 WBN-VTD-W120-0440, Motor Data and Motor Curves for Westinghouse Containment Spray Pumps
 MI-72.001, Containment Spray Pump Disassembly, Inspection, and Repair, Rev. 6
 Surveillance Report 25402-WBN-SR-10-0833, Containment Spray Pump Motor 2 A Refurbishment
 Surveillance Report 25402-WBN-SR-10-0853, Containment Spray Pump Motor 2 A-A and 2B-B Refurbishment
 PSS-JI-RA.GEN.03.50.2, Refurbishment Horizontal Motors with Babbit Bearings, Rev. 5

C.1.9 Reactor Coolant Pressure Boundary Piping – Work Observation

The documents reviewed in this section are listed under Nuclear Welding, General.

C.1.10 Reactor Coolant Pressure Boundary Piping Record Review

Procedures and Specifications

Westinghouse Equipment Specification Number 679170, Equipment Specification – Reactor Coolant Piping Fabrication, ASME III Class 1, Safety Class 1, Rev. 8
 PO 4500318857, Watts Bar Unit 2 RTD Bypass Elimination, Change Notice 5
 EDCR Number 52987, RTD Bypass Engineering, Rev. A

Nonconformance Reports

PCI Energy Services NCR 901099-01
 PCI Energy Services NCR 901099-04
 PCI Energy Services NCR 901099-05
 PCI Energy Services NCR 901099-06

Audits and Surveillances:

25402-WBN-SR-10-0844, RTD Bypass Elimination Work
 25402-WBN-SR-09-0739, PCI Energy Services Welder Qualification
 25402-WBN-SR-09-0748, Control of Welding Filler Material

C.1.11 Nuclear Welding General Inspection Procedure

Drawings

PCI Energy Services Cap Installation, 3 Crossover Leg Nozzle Modification WBR-1012, Rev. 1
 PCI Energy Services Cold Leg Nozzle Machining & Thermowell Installation, 2 Cold Leg Nozzle Modification WBR-1013, Rev. 1
 PCI Energy Services Cold Leg, Loop 2, 2 Cold Leg Nozzle & Cold Leg Modification WBR-1202, Rev. 1
 PCI Energy Services Crossover Leg, Loop 3, 3 Crossover Leg Nozzle Modification WBR-1301, Rev. 1

Procedures and Program Manuals

PCI Energy Services Welding Manual, Rev. 27
 GQP-9.0, Training, qualification, examination, and certification of NDE inspection and testing personnel in accordance with SNT-TC-1A
 GQP-9.6 Visual Examination of Welds, Rev. 9
 GQP-9.7 Solvent Removable Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials and Cladding, Rev. 12
 PCI Energy Services Work Plan 901099-01A, Rev. 0 - Watts Bar Unit 2 RTD Bypass Elimination for Loop 4
 PCI Energy Services Work Plan 901099-01B, Rev. 0 - Watts Bar Unit 2 RTD Bypass Elimination for Loop 2
 PCI Energy Services Work Plan 901099-01C, Rev. 0 - Watts Bar Unit 2 RTD Bypass Elimination for Loop 3
 PCI Energy Services Work Plan 901099-01D, Rev. 0 - Watts Bar Unit 2 RTD Bypass Elimination for Loop 4

Other Records

PCI Energy Services: ER316 weld filler metal COCs and CMTRs for Lots CF8056 and DF8056
 PCI Energy Services Welding Procedure Specification 8 MN-GTAW/SMAW, Rev. 17
 PCI Energy Services Procedure Qualification Records 063, Rev. 3 and 600, Rev. 1-4
 PCI Energy Services Welder Performance Qualification Records 9998 and V217
 PCI Energy Services approved Suppliers List - Effective 1/18/10
 PCI Energy Services Report of Nondestructive Examination Visible, Solvent Removable Liquid Penetrant Examination, Numbers 901099-01, 901099-03, 901099-04

Problem Evaluation Reports and Nonconformance Report

PER # 215471 – As found condition on Loop 2 prior to RTDBE work, 2/1/10
 PER # 215474 – As found condition on Loop 3 prior to RTDBE work, 2/1/10
 PER # 215484 – Unattended weld rod stubs, 2/1/10
 PER # 211911 – Existing condition – water and obstructions inside RCS Loop 1 piping, 1/4/10
 PER # 170933 – Re-review of Unit 2 TVA-produced radiographs, 5/11/09
 PER # 214040 – Westinghouse design specifications issue for RTD bypass elimination, 1/20/10
 PER # 177436 – Foreign substance on RHR piping, 12/18/09
 PER # 217399 – ASME re: Cold Leg 1 Thermowell zero deg boss nozzle bore out of plumb condition, 2/18/10
 PER # 216634 – NRC identified multiple locations where carbon steel tools in direct contact with stainless steel piping/components, 2/17/10
 PER # 216520 – PCI employee observed without picture badge, 2/9/10

PCI NCR 901099-02 – 2/5/10

C.1.12 Structural Welding General Inspection Procedure

Procedures and Specifications

Bechtel General Welding Standard GWS-1, Rev. 5

Bechtel Welding Specification, Welding Filler Material Control WFMC-1, Rev. 3

Other Records

Bechtel Material Receiving Report for PO 19398 with COCs and CMTRs for E7018 welding electrodes with heat numbers 083295 and 10439, Rev. 0

Bechtel Material Receiving Report for PO 00073140 with COCs and CMTRs for ER316/316L for heat number 735354, Rev. 0

C.1.16 Magnetic Particle Examination of Safety-Related Welds

Nuclear Assurance Observation Reports

MT activities 2/22/2010

MT activities 2/24/2010

MT activities 2/25/2010

MT activities 3/03/2010

MT activities 3/09/2010

MT activities 3/11/2010

C.1.17 Inservice Inspection - Review of Program and C.1.18 Preservice Inspection – Observation of Work and Work Activities

Audits and Surveillances

25402-WBN-SR-10-0834, dated January 29, 2010

Procedures and Specifications

WEC 2.10, Qualification, Training, and Certification of Nondestructive Testing Personnel, Rev. 0

WEC 2.10.2 Addendum B: Certification of EPRI QDA Personnel, Rev. 0

Preservice Degradation Assessment for Unit 2 Original Steam Generators, Rev. 1

Watts Bar Nuclear Plant Unit 2 Cycle 0, Steam Generator Tubing Examination Baseline Pre-Service Inspection Scan Plan, Rev. 1

C.1.19 Electrical Systems and Components - Work Observations

Procedures/Programs

EDCR 52361, Control Room Design Review (Panel 2-M-4 Phase III), Rev. A

25402-000-GPP-0000-N2102, Housekeeping, Rev. 6

Work Order 08-951064-017, Steam Generator Blowdown Handswitches, Rev. 0

Miscellaneous

Drawing Revision Authorization (DRA) 52361-46, Rev. 0
 DRA 52361-48, Rev. 0
 Field Change Request 54885-A, EDCR 52361
 Pre-Job Briefing (STARRT Card), WO 08-951064-017
 Daily Work Area Housekeeping Log, Job Number 25402
 General Work Instructions 300-1 for WO 08-951064-017
 Procurement Document, 17710-4906, WO 08-951064-017
 Material Traceability and Transfer Record for WO 08-951064-017
 Various MAI Data Sheets

III. Operational Readiness ActivitiesF.1 Fire ProtectionProcedures 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 ActivitiesOA.1.1 Moderate Energy Line Break Special Program

Calculation WBNOSG4099, Moderate Energy Line Break Flooding Study, Rev. 10 (partial)
 WP WBN2-M-605-1005-00, Walkdown Package for Containment Spray Pump Room 2A-A,
 Rev. 1
 WP WBN2-M-605-0109-00, Walkdown Package for Safety Injection Pump Room 2B-B, Rev. 1
 WP WBN2-M-605-0112-00, Walkdown Package for Charging Pump Room 2C, Rev. 1
 WP WBN2-M-605-0124-00, Walkdown Package for Valve Gallery Unit 2, Rev. 1
 WP WBN2-M-605-0150-00, Walkdown Package for Auxiliary Control Instrument Room 2A,
 Rev. 1
 WP WBN2-M-605-0154-00, Walkdown Package for 480V Transformer Room 2A, Rev. 1
 RIMS T33 950707 911, White Paper on Cable Submergence dated July 7, 1995

OA.1.2 Microbiologically Induced Corrosion Special Program

Watts Bar Program Health Report-Raw Water dated 04/24/2008
 Watts Bar Program Health Report-Raw Water dated 06/30/2008
 Watts Bar Program Health Report-Raw Water dated 10/31/2008
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OA.1.3 Seismic Analysis CAP

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 TVA Procedure SPP-2.6, Computer Software Control, Rev. 12
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 SEP-9.5.5 “Computer Software System Acceptance Form, Rev. 0 – STARDYNE 4.4/Windows”
 STARDYNE Version 4.4 “System Design Description Document & Systems Requirements Specification & Verification and Validation Plan & Verification and Validation Report”, Rev. 0
 NEP-3.5 “Computer Software System Acceptance Form – Time-History Strip (TSTRIP) V3.0”
 TSTRIP Version 3.0 “Systems Requirements Specification & Verification and Validation Plan & Verification and Validation Report”, Rev. 0
 TSTRIP Version 3.0 “Systems Design Description Document”, Rev. 0
 Form 00306 Program Control Form for Program CE800 Bechtel Structural Analysis Program (BSAP)

Bechtel Structural Analysis Program (BSAP) CE800 Validation Report, Rev. 13
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LIST OF ACRONYMS

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
CAP	Corrective Action Program
CAQ	condition adverse to quality
CET	core exit thermocouple
CFR	<i>Code of Federal Regulations</i>
CMTR	certified material test report
DCN	design change notice
ECP	Employee Concerns Program
EDCR	engineering document construction release
FPIP	fire protection impairment permit
HDR	Historical Document Review
IMC	Inspection Manual Chapter (NRC)
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
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
WBN	WBN Nuclear Plant
WBNPP	Watts Bar Nuclear Performance Plan
WO	work order