UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 30, 2009

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

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED INSPECTION REPORT 05000391/2009604

Dear Mr. Bhatnagar:

On September 30, 2009, 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 October 2, 2009, 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.

An inspection of engineering and design activities associated with Unit 2 construction completion was also conducted, the results of which are documented in the inspection report.

This report documents one NRC-identified finding which was determined to involve a violation of NRC requirements. However, because this finding was a Severity Level IV violation and was entered into your corrective action program, the NRC is treating it as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the non-cited violation 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 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 05000391/2009604 w/attachment

cc w/encl: (See next page)

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Letter to Ashok S. Bhatnagar from Robert C. Haag, October 30, 2009

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED INSPECTION REPORT 05000391/2009604

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-391
Construction Permit No.:	CPPR-92
Report No.:	05000391/2009604
Applicant:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Unit 2
Location:	1260 Nuclear Plant Rd Spring City TN 37381
Dates:	July 1 – September 30, 2009
Inspectors:	W. Bearden, Senior Resident Inspector, Construction Projects Branch 3 (CPB3), Division of Construction Projects (DCP) Region II (RII) T. Nazario, Resident Inspector, CPB3, DCP, RII H. Abuseini, Resident Inspector, CPB3, DCP, RII A. Issa, Construction Project Inspector, CPB3, DCP, RII J. Baptist, Senior Construction Project Inspector, CPB3, DCP, RII A. Artayet, Senior Construction Inspector, Construction Inspection Branch 3 (CIB3) Division of Construction (DCI), RII C. Abbott, Construction Inspector, Construction Inspection Branch 2 (CIB2), DCI, RII R. Chou, Engineering Inspector, Division of Reactor Safety (DRS), RII G. Crespo, Senior Construction Inspector, CIB1, DCI, RII J. Fuller, Senior Construction Inspector, CIB3, DCI, RII C. Jones, Senior Construction Inspector, CIB1, DCI, RII L. Mellen, Senior Construction Project Inspector, CPB4, DCP, RII K. Miller, Reactor Inspector, DRS, RII P. VanDoorn, Consultant, CPB3, DCP, RII
Approved by:	Robert C. Haag, Chief Construction Projects Branch 3 Division of Construction Projects

Enclosure

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2
NRC Inspection Report 05000391/2009604

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; engineering activities; pre-service inspection (PSI) activities; training and qualification of plant personnel; fire protection; and follow-up of open inspection items. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter (IMC) 2517. Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at http://www.nrc.gov/reactors/plant-specific-items/watts-bar.html.

The inspection identified one NRC-identified Severity Level (SL) IV NCV.

Inspection Results

- A SL IV NCV of 10 CFR 50, Appendix B, Criterion III, “Design Control," was identified by the inspectors for failure to establish and correctly implement design control measures. The inspectors identified two examples where deviations from the Unit 1 design were not documented, reviewed, analyzed, or approved and, therefore, were not appropriately evaluated for suitability in the Unit 2 design package. The finding was entered into the applicant’s corrective action program to evaluate the extent of condition.

  The inspectors determined that the finding was more than minor because it represented an improper or uncontrolled work practice that could impact quality or safety and represented an inadequate process that, if left uncorrected, could adversely affect the quality of fabrication, construction testing, analysis or records of safety-related structures, systems, and components (SSCs). The items identified had potential impacts on the function of the safety-related Resident Heat Removal (RHR) system by altering the hard facing material and the flow coefficient of some vent and drain valves; however, the components were not installed. In addition, the Engineering Document Construction Release (EDCR) procedure did not have a feedback mechanism for changes that differed from the original design package scope. (Section E.1.1)

- Problem Evaluation Reports (PERs) reviewed during the three-month period implemented appropriate corrective actions. (Section Q.1.1)

- Walkdown activities associated with safety-related pipe hangers, supports, and Heating, Ventilation, and Air Conditioning (HVAC) duct supports were performed in accordance with applicable procedures and documentation; however, some packages contained minor dimensional discrepancies, skewed weld inconsistencies and a transposing error, all of which were entered into the applicant’s corrective action program. (Sections C.1.1 and C.1.2)

- Activities associated with the emergency raw cooling water (ERCW) modification, including welding and non-destructive examination (NDE), were performed in accordance with specified procedures and specifications. (Sections C.1.6 and C.1.8)

- The inspectors observed other construction activities including ice condenser basket inspections, electrical system work and environmental qualification (EQ) walkdowns, and found that work was being conducted in accordance with applicable procedures and specifications. (Sections C.1.7, C.1.9, and C.1.10)

- Activities associated with the pre-service inspection program were in conformance with the requirements of American Society of Mechanical Engineers (ASME) Section XI, 10 CFR 50.55.a, and with other applicant commitments. (Sections C.1.11, C.1.12, C.1.13, and C.1.14)

- Actions to date and planned for the Moderate Energy Line Break (MELB) Special Program (SP) cover design requirements and are equivalent to or exceed Unit 1 actions. Future NRC inspections will be required for related activities which are not yet complete. (Section E.1.2)

- An inspector follow-up item to address the resolutions of two PERs was closed in this report. (Section OA.1.1)

- Discussions were held with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with several Corrective Action Programs (CAPs) and SPs. (Section OA.1.2)

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REPORT DETAILS

Summary of Plant Status

During the current inspection period, TVA performed PSI activities, developed implementation plans for many CAPs and SPs and installed plant modifications during the WBN Unit 1 outage, that are required to support the construction completion of WBN Unit 2. In addition, engineering design activities and physical plant walkdowns to determine the existing status of SSCs continued during this inspection period.

I. Quality Assurance Program

Q.1 QA Oversight Activities

Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure (IP 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 one nuclear assurance (NA) audit as discussed in Section E.1.1 of this report, one assessment report, one observation report and several construction completion project quality surveillance reports associated with field work activities. Specific documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The PERs reviewed implemented appropriate corrective actions.

II. Management Oversight and Controls

C.1 Construction Activities

C.1.1 Pipe Supports (IP 46071 and 50090)

a. Inspection Scope

The inspectors conducted inspections of safety-related hangers and supports. The field walkdowns are one element of TVA's program to verify the field condition of safety-related hangers and supports. The walkdowns also provide a basis to determine the adequacy of the licensee's work control system implementation and to verify that safety-related pipe supports and restraints are in compliance with NRC requirements, licensee commitments, and applicable codes. The inspectors reviewed TVA procedures WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, and WDP-GEN-1,

General Walkdown Requirements, to determine whether QA plans, instructions, and procedures for safety-related pipe supports and restraints were established and implemented throughout the facility.

On July 13-14, the inspectors directly observed in-process field walkdowns inside Unit 2 upper containment on containment spray headers supports per work packages WBN2-PD-072-1614-10 and WBN2-PD-072-1614-19. In addition, from August 3-7, the inspectors conducted independent field verifications of 24 safety-related hangers and supports to determine if the as-built configuration of the piping supports reflected the completed walkdown piping support packages and drawings.

Specific supports inspected are listed in the attachment.

The following samples were inspected:

- IP 50090 Section 02.02.a - one sample
- IP 50090 Section 02.03.e - three samples
- IP 50090 Section 02.03.f - 26 samples
- IP 50090 Section 02.04.a - 24 samples
- IP 46071 Section 02.03 - 34 samples

b. Observations and Findings

No findings of significance were identified. Walkdown procedures reviewed were adequate and were properly implemented; however, there were several discrepancies identified in the packages reviewed. Specifically, minor dimensional discrepancies, skewed weld inconsistencies, and a transposing error were noted by the inspectors. These discrepancies did not involve non compliances with NRC regulatory requirements. PERs 178358, 178452, and 170025 were generated to address the inconsistencies. In addition, the applicant performed a preliminary stress load analysis for all pipe supports discussed in PERs 178358 and 178452 based on existing support calculations and support configurations including the identified walkdown deficiencies. The evaluation results which indicated that the identified minor discrepancies had no impact on the structural integrity of these supports were reviewed by the inspectors. In addition, the configurations of these supports may not be the final as-built configurations and may require modification once the final design has been completed.

c. Conclusions

The inspectors determined that, overall, the observed walkdown activities associated with safety-related pipe hangers and supports were performed in accordance with applicable procedures.

C.1.2 HVAC Walkdowns (IPs 50100)

a. Inspection Scope

The inspectors verified the as-built configurations of two seismic supports (Support ID No. 81-1525 and 81-1526) for ductwork associated with the HVAC system. The inspectors independently verified the data collected in Walkdown Package WBN2-C-

030-250-14 and confirmed the accuracy of the measurements obtained. This activity was part of TVA's program to validate the condition of the supports for the ductwork. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 50100 Section 02.04.c - two samples

b. Observations and Findings

No findings of significance were identified. The inspectors determined that the ductwork support measurements were properly measured and documented; however, the inspectors noted an example where a measurement obtained was inconsistent with the associated drawings. PER 203178 was initiated to address this observation.

c. Conclusions

Overall, the activities observed relative to the completed walkdowns of safety-related HVAC seismic supports were completed in accordance with applicable procedures.

C.1.3 Protection of Installed Plant Equipment during Construction Activities (IPs 50053 and 50055)

a. Inspection Scope

The inspectors conducted inspections of the reactor pressure vessel (RPV) and upper internals storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and quality control (QC) inspection procedures were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, Housekeeping, Revision 4. On August 25, 2009, the inspectors entered the RPV to observe its condition and to ensure that appropriate housekeeping measures were in place. The core barrel and lower internals are in their storage locations in the refueling cavity protected with temporary protective waterproof material.

The following samples were inspected:

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

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate controls were in place to protect the RPV, core barrel, and lower internals at the time of inspection.

C.1.4 Concrete Activities (IP 46055)

a. Inspection Scope

The inspectors reviewed records and procedures associated with the concrete repair for the installation of sleeves for conduits 2PLC5098A, 2PLC5100A, 2PLC5101A, and 2PLC5102A, in transformer rooms A0, A11, and A12. This work was performed as part of design change notice (DCN) 53334, Replace ampacity and voltage drop cable breakages on Train A and B 480V shutdown boards, and was implemented utilizing WO WBN-2-BD-212-A001-A. The inspectors reviewed the certified materials test report; pre-placement, mixing, placement, and curing datasheets; and the work order (WO) to confirm the following:

- Concrete production, concrete placement, and installation of components were performed as specified
- Required inspections (including after form removal) were performed and acceptance criteria defined
- Production test results quantitatively indicated test results and acceptance criteria
- Required protection and curing conditions were provided after installation

The inspectors also reviewed activities associated with the DCN to verify that they were performed in accordance with modification addition instruction (MAI)-5.4, Concrete Repair, Grouting, and Dry Packing.

The following sample was inspected:

- IP 46055 Section 02.01.b - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The selected records reflected that work was accomplished in accordance with specifications and procedures.

C.1.5 Structural Steel and Supports - Work Observation (IPs 48053, 48055 and 55100)

a. Inspection Scope

The inspectors observed surface preparation, shielded metal arc welding (SMAW) or stick welding, and grinding activities on structural steel in lower containment associated with EDCR 52912, Connection Modifications on Existing Access Platforms in the Reactor Building. The inspectors reviewed WO 08-957071-001, Modify structural steel connection at elevation 745' and azimuth 212°, Plate MK 5A, and associated specifications and drawings. The inspectors conducted interviews with the field personnel to discuss the scope of work being performed. The inspectors observed ongoing welding activities and selected typical in-process operations to verify the following:

- That welding procedures, detailed drawings and instructions, if applicable, and weld data sheets were at the work station or readily available.
- That the welding technique and sequence requirements were specified.
- That weld joint geometry was as specified and that surfaces to be welded had been prepared, cleaned, and inspected in accordance with applicable procedures of instructions.
- That welding equipment, including power cables and gas lines, was in good condition.
- That interpass cleaning, grinding (especially starts and stops) and peening were conducted in accordance with applicable procedure.

The inspectors also reviewed records and independently verified weld measurements and attributes once the work was completed and QC-verified to ensure that work performed was in accordance with applicable specifications and drawings. Specific documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 48053 Section 02.02 - one sample
- IP 48053 Section 02.03 - one sample
- IP 48055 Section 02.01.b – one sample
- IP 55100 Section 02.04 - one sample
- IP 55100 Section 02.06 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The activities observed relative to structural steel erection and welding were adequate and completed in accordance with applicable drawings and specifications.

C.1.6 Safety Related Piping Work Observations (IPs 49061, 49063, 49065 and 55050)

a. Inspection Scope

The inspectors reviewed selected construction completion project procedures associated with work on safety-related piping to verify adequacy of ongoing work activities. Specifically, the inspectors reviewed activities associated with WO 08-822009-001 for the shop pre-fabrication of safety-related ASME Section III, Class III piping assemblies, including welding, and quality-related inspections, for DCN 52798, ERCW Modification. Additionally, the inspectors reviewed welder qualifications, the welding procedure specifications in use, and the control of weld filler metal for weld joint 2-067A-T134-18. Magnetic particle Testing (MT) examination records for welding of safety-related piping were also reviewed and discussed in Section C.1.8.

The following samples were inspected:

- IP 49061 Section 02.02.e - one sample

- IP 49063 Section 02.01 - one sample
- IP 49063 Section 02.02 - one sample
- IP 49065 Section 02.02 - one sample
- IP 55050 Section 02.01.a - one sample
- IP 55050 Section 02.01.c - one sample
- IP 55050 Section 02.02.b - one sample
- IP 55050 Section 02.03.d - one sample
- IP 55050 Section 02.04.a - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The activities observed relative to safety-related piping were adequate and completed in accordance with applicable drawings and specifications.

C.1.7 Safety Related Components Work - Ice Condenser System (IP 50071 and 50073)

a. Inspection Scope

The inspectors observed inspections of three ice baskets in the Unit 2 ice condenser system as part of WO 08-951021-000. The baskets were I-7 in Bay 1, D-8 in Bay 5 and C-1 in Bay 4. These inspections were conducted to visually inspect the ice baskets utilizing remote cameras and retrieve, when possible, any foreign material inside the ice baskets. The inspectors verified that personnel performing the work were cognizant of their responsibilities and the inspection activities met applicable specifications and established instructions included in the work order.

The following samples were inspected:

- IP 50071 Section 02.02.c - one sample
- IP 50073 Section 02.03 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspected activities associated with the ice condenser system and components were adequate.

C.1.8 Magnetic Particle Examination of Safety-Related Welds (IP 57070)

a. Inspection Scope

The inspectors reviewed MT records for completed welds on safety-related piping as part of the ongoing ERCW modification work performed under DCN 52798. This

modification was performed during the WBN Unit 1 outage in support of Unit 2 construction and is further discussed in Section C.1.6. These welds were ASME Section XI Class III piping welds performed as pre-outage activities by Bechtel in their fabrication shop located outside of the protected area. MT records were reviewed to determine whether they were prepared, evaluated, and maintained in accordance with applicable commitments and/or requirements. They were compared to the applicable code (ASME Boiler and Pressure Vessel Code (BPVC), Section XI, 2001 Edition with Addenda through Summer 2003) to verify compliance. Additionally, the inspectors reviewed qualification records and eye examination documentation for the associated NDE examiners.

The inspectors also observed magnetic particle testing of weld number 1-067A-T081-12 located downstream of the ERCW system 1B-B strainer.

A list of MT examination records is included in the attachment.

The following samples were inspected:

- IP 57070 Sections 02.01 - one sample
- IP 57070 Sections 02.02 - one sample
- IP 57070 Sections 02.03 - four samples

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.1.9 Electrical Systems and Components (IP 51051, 51053, 51055, 51061, 51063, and 51065)

a. Inspection Scope

The inspectors observed activities associated with electrical systems and components and reviewed the applicable records. Specifically, the inspectors observed the spooling of safety-related cable. This included: the observation of receiving inspection; the verification of cable procurement traceability; the visual inspection of the cable jacket for possible damage as the cable was removed from the spool; the measuring and cutting cable to required lengths for field installation; the coiling the cables to maintain the minimum bend radius; the labeling the cable with adhesive-backed cable identification numbering labels; and the storing the spooled cables in preparation for plant installation.

The inspectors conducted the following activities associated with DCN 52285 which was to add Unit 2 Vital Inverters including static switches and regulated by-pass transformers such that the Unit 2 vital instrument power boards can be powered from a dedicated inverter:

- Observed the spooling and storage of cables for Inverter System 235, Electrical Package 08-812562-003.
- Observed the installation (partial) of cables in accordance with WO 08-812562-003 and WO 08-812562-013).
- Observed cable terminations for Channel II inverter.
- Reviewed the incorporation of design input requirements into drawing change authorizations, test scoping documents, failure analysis, and performed a human factors review.
- Reviewed vendor literature and test documentation, to confirm design requirements were addressed.
- Reviewed WO 08-812562-019 to verify work was accomplished according to written and approved instructions. Inspectors noted that the work controls included use of quality and management hold points, documentation of completed work, control of M&TE, and implementation of the corrective action process when a damaged component was found (PER 178815).
- Observed the calibration of meters for Unit 2, channel 4 inverter, 2-INV-235-4 associated with WO 08-812562-048.

The inspectors conducted the following activities associated with DCN 53334 which replaced 480V cables that exhibited ampacity and voltage drop breakages.

- Verified incorporation of design requirements into the design output documents.
- Conducted direct observations of cable placements into trays and pulls through conduits including the splicing of cable 2PV363 for inverter 1-INV-235-4 using
- Raychem splicing and witnessed cable 2PL4885B 3-1/C being pulled through cable tray.
- Verified portions of the routing of 480 V cables 2PL4816A (CRD Mech. Clr. Fan A-A Mtr. 2) by observing the correct routing of cables in trays 4A2318, 4A2386, 4A2387, and Bay 7 of Panel 2-BD-212-A1.

The inspectors also interviewed personnel performing the work to verify their knowledge of proper installation equipment; proper handling, supporting and protection of cables and cable segments stored in place; approved methods for cable end protection; identification of requirements for the installation of safety-related cables; and approved methods for cable termination and splices. Lastly, the inspectors looked at installation records associated with the electrical CAP review. Specific documents reviewed are listed in the Attachment.

Samples inspected are as follows:

- IP 51051 Section 02.02.f – one sample
- IP 51053 Section 02.02.g – one sample
- IP 51055 Section 02.04 – one sample
- IP 51063 Section 02.02.a - seven samples
- IP 51063 Section 02.02.b - seven samples
- IP 51063 Section 02.02.c - five samples
- IP 51063 Section 02.02.d – one sample
- IP 51065 Section 02.02.c – one sample

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions

The inspected activities associated with electrical systems and components were conducted in accordance with approved specifications and procedures.

C.1.10 Environmental Qualification Special Program (IP 51053 and Temporary Instruction (TI) 2512/036)

a. Inspection Scope

The inspectors reviewed the EQ Special Program to determine the status of implementation. The inspectors reviewed limited scope walkdown request 1167, dated April 27, 2009, which was generated to determine the qualification status of safety-related equipment located in the harsh and essentially mild areas of Unit 2. The inspectors observed walkdown activities associated with the EQ program of safety-related electrical equipment located in harsh and mild areas of Unit 2. TVA performed this activity to determine the qualification status and gather data on specific components of safety-related equipment located in the harsh and essentially mild areas of Unit 2. The inspectors reviewed procedure WDP-E-4, Walkdown Procedure for Electrical, Revision 2, and observed work performed on two walkdowns.

The inspectors observed the EQ walkdowns for the following components:

- Junction box 2-JB-293-552-A for 2-FSV-030-0012-A, Annulus Purge Valve
- Namco Limit Switches ZS-030-12A and 12B for Annulus Purge Valve, 2-FSV-030-0012-A
- Namco Limit Switches ZS-030-9A and 9B for 2-FSV-030-009, Upper Containment Purge Isolation Valve, per WO 09-952118-008.
- Junction box 2-JB-292-1007-A per WO 09-952118-016

The following samples were inspected:

- IP 51053 Section 02.02.e - six samples

b. Observations and Findings

No findings of significance were identified

c. Conclusions

The observed walkdown activities associated with the EQ Special Program were completed in accordance with approved procedures.

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

a. Inspection Scope

The inspectors conducted a review of TVA's preservice inspection (PSI) program for WBN Unit 2 to determine whether the PSI program conformed to the applicable requirements of ASME, *B&PV*, 2001 edition including 2003 addenda, Section XI, Division 1, Inservice Inspection of Nuclear Power Plant Components, and Section 50.55a, "Codes and Standards," of Title 10 of the *Code of Federal Regulations* (10 CFR).

a.1 Program Approval (Section 02.01 of IP 73051)

The inspectors reviewed TVA's PSI Program Plan (WBN-2 PSI, Revision 1), which described the WBN Unit 2 areas subject to preservice inspection, responsibilities, provisions for accessibility and inspectability, examination methods and procedures, frequency of inspections, record keeping and report requirements, evaluation of inspection results, and subsequent disposition of evaluation results. This review was conducted to determine if the PSI program plan met the requirements of the ASME Section XI Code and 10 CFR 50.55a. As part of the PSI program review, the inspectors reviewed TVA's use of ASME Code Cases and relief requests.

a.2 Program Organization (Section 02.02)

The inspectors reviewed the organization of the TVA's PSI program to determine if commitments and regulatory requirements were appropriately tracked and monitored. Additionally, the inspectors reviewed the site administrative procedures to determine whether they defined the authority and responsibilities of persons and organizations involved with the final evaluation and acceptance of PSI results.

a.3 Quality Assurance Program and Records (Sections 02.03 and 02.06)

The inspectors reviewed TVA's QA program requirements related to PSI activities such as the control, maintenance, retention, and review of QA records to determine whether TVA had established and implemented measures to control PSI related QA records. The inspectors also reviewed a sample of corrective action records to determine if the licensee was properly documenting relevant indications that were identified during preservice inspections.

a.4 Qualification of Personnel (Section 02.07)

The inspectors reviewed the qualification and certification programs for TVA personnel and two of their contractors providing NDE personnel, to determine compliance with the requirements of ASME Section XI, IWA-2300, "Qualification of Nondestructive Examination Personnel," as modified by 10 CFR 50.55a. Specifically, the inspectors reviewed the written practice for TVA and a sampling of their contractors. The inspectors compared the written practices to the requirements of American National Standards Institute (ANSI) /ASNT CP-189, "Standard for Qualification and Certification of Nondestructive Testing (NDT) Personnel," 1995 edition.

a.5 Reporting Requirements (Section 02.08)

The inspectors reviewed TVA procedure NGDC PP-15, ASME Section XI, which described requirements for submittal of the PSI program plan, schedule, and summary report to the NRC. This review was conducted to determine whether TVA had established measures to ensure that the required reports would be submitted to the NRC prior to commercial operation.

a.6 Relief Requests (Section 02.09)

The inspectors reviewed TVA's program for the identification and processing of requests for relief from ASME Code requirements, to determine if the licensee had established measures to ensure that relief requests were in accordance with the requirements specified in 10 CFR 50.55a.

Specific documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. The following observations stem from inspection activities of sections a.1 and a.2 in the scope above.

b.1 Program Approval (Section 02.01)

The portions of the PSI program plan that were sampled by the inspectors were in compliance with the PSI requirements specified in ASME Section XI and 10 CFR 50.55a. For example, the inspectors determined that TVA's PSI program for WBN Unit 2 had appropriately committed to the 2003 addenda of ASME Section XI, as required by 10 CFR 50.55a.

The inspectors determined that TVA's PSI program plan was appropriate for the current scope of work. TVA has established measures to ensure that their PSI program plan, when complete, will be submitted to the NRC as required by ASME Section XI.

The inspectors determined TVA had appropriately procured the services of an authorized nuclear inservice inspector (ANII), and that the ANII had only reviewed the portions of TVA's plan that were considered complete. The inspectors also noted that additional review by the ANII will be required in accordance with ASME Section XI, IWA-2110, "Duties of the Inspector," when the PSI inspection plans and schedules are finalized. The inspectors confirmed that TVA had only implemented portions of the PSI plan that have been reviewed by the ANII.

b.2 Program Organization (Section 02.02)

The inspectors determined that commitments and regulatory requirements pertinent to PSI were tracked and documented by letter to the NRC, dated January 29, 2008 (ML080320443). Interviews with TVA personnel demonstrated that sufficient organizational staff was allocated to the PSI program to ensure that acceptable PSI work was being performed. The inspectors also noted that signature requirements for PSI results were delineated in each individual NDE procedure.

c. Conclusions

The inspectors determined that the sampled portions of the TVA's PSI program were in conformance with the requirements of ASME Section XI, 10 CFR 50.55a, and with other applicant commitments.

C.1.12 Inservice Inspection - Review of Procedures

a. Inspection Scope (Sections 02.02 and 02.03 of IP 73052)

The inspectors reviewed the PSI program to determine if TVA had established adequate procedures to implement the PSI requirements specified in ASME Section XI and 10 CFR 50.55a. The inspectors reviewed the PSI related procedures to determine whether they had the proper level of TVA review and, if required, were reviewed by the ANII. The inspectors also reviewed the NDE related procedures in detail to determine if they were in compliance with the requirements of B&PV ASME Section V, Nondestructive Examination, including 2003 addenda.

The inspectors reviewed NDE procedures for visual examination, surface examination, and volumetric examination. Specifically, the inspectors reviewed NDE procedures for magnetic particle examination, manual phased array ultrasonic examination of austenitic and ferritic pipe welds, conventional manual austenitic ultrasonic examination of austenitic pipe welds, visual examination, and liquid penetrant examination.

Specific documents reviewed are listed in the Attachment.

b. Observations and Findings (Sections 02.03 and 02.03)

No findings of significance were identified.

The inspectors determined that TVA had established adequate procedures to implement the PSI requirements described in their PSI Program Plan; however, the inspectors noted that the PSI Program Plan had not implemented all the PSI requirements required by ASME Section XI and 10 CFR 50.55a, Codes and Standards. The inspectors confirmed that TVA had not performed any work activities associated with the following programs:

- Repair and Replacement Program
- System Leakage Tests
- IWF-5000 Snubber Inspections
- IWE and IWL Inspections and Tests

The inspectors determined that TVA had established adequate NDE procedures for the PSI related examinations completed at the time of the inspection, in that the procedures adequately described: 1) the qualification requirements of NDE personnel; 2) the method to record, evaluate, and disposition indications; and 3) reporting and recording requirements. The inspectors confirmed that the NDE procedures had been reviewed by appropriate TVA personnel and by the ANII. The inspectors also noted that the NDE procedures used were the same TVA procedures that have been used and are currently

being used on WBN Unit 1 and the other TVA nuclear sites. Additionally, the inspectors determined that TVA had not used any contractor procedures.

c. Conclusions

The inspectors determined that TVA's procedures pertaining to PSI and NDE adequately covered the current scope of PSI activities.

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

a. Inspection Scope

The inspectors reviewed and observed a selected sample of PSI related activities to determine whether the onsite preservice inspection of ASME Class 1, 2 and 3 pressure retaining components was performed in accordance with ASME Section XI and 10 CFR 50.55a requirements. Specifically, the inspectors reviewed the qualification and certification records for one Level III and three Level II inspectors performing PSI-related NDE examinations (Section 02.02 of the IP). The inspectors noted that the TVA had not employed any Level I examiners.

In addition, the inspectors observed selected ongoing preservice examinations performed on ASME Section III, Class 1, safety-related, stainless steel piping welds in the safety injection (SI) and RHR systems (Section 02.03 of the IP). NDE activities observed included eight liquid penetrant and four ultrasonic examinations. This review was conducted to determine if the examinations were performed in accordance with approved procedures and consistent with ASME Code requirements. Examination records were reviewed to determine whether they were prepared, evaluated, and maintained in accordance with TVA's QA program requirements and the requirements specified in ASME Section XI.

Qualification and certification records for examiners, inspection equipment, and consumables along with the applicable NDE procedures for the pre-service examination activities were reviewed and compared to requirements of ASME Section V, ASME Section XI, and 10 CFR 50.55a.

The observed examinations are listed in the attachment.

The following samples were inspected:

- IP 73053 Section 02.02 – 4 samples (1 Level III and 3 Level II)
- IP 73053 Section 02.03 – 12 samples (2 NDE methods)

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the observed NDE activities and qualification records for examination personnel met applicable ASME code and 10 CFR 50.55a requirements.

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

a. Inspection Scope (Section 02.02)

The inspectors reviewed a selected sample of completed PSI examinations for the reactor coolant (RCS) and SI systems. For each examination, as appropriate, the inspectors reviewed the examination results and data sheets, calibration data sheets, required examination coverage calculations, examiner qualifications and certification records, certification records for consumables, and measuring and test equipment. The inspectors reviewed the following PSI examinations:

Report #	NDE Method	Weld # / Component #	Description	ASME Class	Diameter
R-P0340	Phased Array UT	SIS-095	Elbow to Pipe	1	6.0”
R-P0081	Conventional UT	RCS-4-4	Pipe to Elbow	1	27.5”

The inspectors also reviewed a selected sample of PSI examination records (listed below) that identified rejectable indications or had limited coverage. The inspectors also reviewed TVA’s PERs that were generated for each of the PSI examinations that identified rejectable indications.

Report #	NDE Method	Weld # / Component #	Description	ASME Class	Diameter
R-P0579	PT	SIF-B-T142-12	Elbow to Pipe	1	1.5”
R-P0240	PT	RCF-D144-11	Elbow to Nozzle	1	6”
R-P0469	PT	SIF-D199-14	Valve to Elbow	1	6”

b. Observations and Findings

No findings of significance were identified.

The inspectors determined that the PSI examination activities reviewed met the requirements of ASME Section XI and 10 CFR 50.55a. The inspectors reviewed TVA’s process for ensuring that identified PSI indications were corrected and determined that it was adequate.

c. Conclusions

The inspectors determined that the PSI data reviewed met applicable ASME Code, 10 CFR 50.55a, and PSI Program requirements. The inspectors also determined that the PSI data was complete and was either within the prescribed acceptance criteria or documented in a corrective action document to restore compliance with acceptance criteria.

E.1 Engineering Activities

E.1.1 Engineering Design Activities and Design Control (IPs 35100 and 37055)

a. Inspection Scope

The inspectors conducted an inspection of engineering activities of WBN Unit 2 from August 10-14. The inspection was conducted in support of the WBN Unit 2 completion/reactivation project. The inspectors reviewed 14 issued EDCRs packages which included design modifications similar to modifications performed on Unit 1. During the review of the design packages, the following attributes were evaluated:

- Reason/need for the change
- Change does not appear to compromise original design intent
- Change was reviewed subject to controls commensurate with the original design
- The review did consider impact on overall design by review of the adequacy of the change, impact on other disciplines, and changes necessary to prior analysis
- Design drawings are updated/revised to reflect new design changes
- Design input is adequately controlled and assured
- Design was verified by an independent reviewer
- Required approval was received
- Adequacy of documentation and document control
- Activities were performed as described by the QA manual

The inspectors also conducted interviews with design personnel and performed document reviews to verify design activities were conducted in compliance with the technical and quality assurance requirements described in the project procedures. In addition, these procedures were reviewed to ensure that design changes were subject to design control measures commensurate with those applied to the original design.

The inspectors reviewed Bechtel QA audit report of engineering activities number 25402-WBN-AR-09-0003, Revision 0, and verified implementation of the QA elements of the programs functional areas.

Specific documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 37055 Section 02.03.b - 14 samples
- IP 37055 Section 02.05.a - 14 samples
- IP 37055 Section 02.05.c - one sample
- IP 35100 Section 02.02 - one sample
- IP 35100 Section 02.11- one sample

b. Observations and Findings

The inspectors identified the following violation of NRC requirements:

Introduction: The inspectors identified a Severity Level (SL) IV NCV of 10 CFR 50, Appendix B, Criterion III, “Design Control," for failure to establish measures to assure that appropriate quality standards were specified and included in

design documents and that deviations from such standards were controlled. In addition, measures were not effectively established and implemented for the selection and review for suitability of application of materials, parts, equipment, and processes that were essential to the safety-related functions of the SSCs.

Description: The inspectors reviewed EDCR 52637, Revision A, "Incorporate Unit 1 historic changes into the Unit 2 RHR system and install various components determined to be missing from the RHR system." The inspectors identified two examples associated with this design package where design changes that differed from Unit 1, as stated in the design package scope, were not addressed or evaluated in the design package and, therefore, not appropriately evaluated for suitability of application.

The first example introduced a design change in EDCR 52637 to replace Stellite hard facing material with non-stellite material on several Unit 2 RHR vent and drain valves. The Stellite is currently installed in some of the Unit 1 vent and drain valves in the RHR system. The impact of removing stellite for vent and drain valve applications is minimal since the valves are normally closed and therefore, the likelihood of an increase in seat leakage is minimal. However, the scope of the EDCR did not recognize the design change and provide a justification. PER 178763, Effects of Stellite Elimination, was written to review the entire process associated with the removal of Stellite.

The second example altered the flow coefficient (Cv) of some of the RHR valves in EDCR 52637 without analyzing the effects of this change. Since the valves in the EDCR were either drain or vent valves, the alteration of the flow characteristics was not significant; however, this was another example that represented a failure to appropriately address deviations that differed from Unit 1. PER 178713, Control of Valve Data Sheets for EDCRs, was written to determine how this occurred and to correct the process that allowed this situation to exist.

The finding was more than minor because it represented an improper or uncontrolled work practice that could impact quality or safety and represented an inadequate process that, if left uncorrected, could adversely affect the quality of fabrication, construction testing, analysis or records of safety-related SSCs. The items identified had potential impacts on the function of the safety-related RHR system by altering flow and replacing the hard surfacing material. However, the components were not installed. In addition, the EDCR procedure did not have a feedback mechanism for changes that differed from the original design package scope. In the case of the EDCR reviewed, this led to unapproved design changes. The cause of this finding was not directly related to any of the cross-cutting area components as defined in IMC 0305, "Operating Reactor Assessment Program."

Enforcement: 10 CFR 50, Appendix B, Criterion III, "Design Control," states that measures shall be established to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Criterion III further states that measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the SSCs.

Contrary to the above, on August 14, 2009, the inspectors identified two examples where deviations from the Unit 1 design were not documented, reviewed, analyzed, or approved and, therefore, were not appropriately evaluated for suitability in the Unit 2

design package. The applicant and Bechtel initiated four PERs to address these issues and evaluate the extent of condition. 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 178640, 178763, 178713 and 200105, this violation is being treated as a non-cited violation consistent with Section VI.A of the NRC Enforcement Policy: NCV 5000391/2009604-01.

In addition, the inspectors noted examples of inattention to details, lack of justification, incorrect answers on technical evaluation forms, procedure enhancements, and outdated documentation contained in seven of the reviewed EDCRs. In response, the applicant entered these issues into their corrective action program by initiating PERs. None of these observations constituted a violation of NRC requirements.

c. Conclusions

The inspectors identified a design control non-cited violation as discussed above. Implementation of corrective actions associated with the non-cited violation will be reviewed at a later time to ensure that the issues have been addressed appropriately. In addition, some discrepancies associated with engineering design activities were identified during the inspection, all of which were entered into the applicant's corrective action program.

E.1.2 Inspection of WBN Nuclear Plant Moderate Energy Line Break Special Program (TI 2512/40)

a. Inspection Scope

The objectives of this inspection were to evaluate TVA's and Bechtel's initial implementation of the 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 an iterative process 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 plans to review previous plant modifications for affects on MELB or the need to modify Unit 2 equipment similar to Unit 1. Appropriate modifications are to be initiated as necessary to provide protection of safe shutdown equipment.

This initial inspection was conducted to meet with the point of contact and review activities conducted to date. The primary objective of this review was to obtain an understanding of activities planned to assure these matched or exceeded those conducted for Unit 1 and these activities supported the objectives of the program, i.e. were all attributes for MELB design criteria adequately covered. The inspector reviewed TVA's implementation plan, design criteria documents, walkdown guidance, walkdown training plans, training records of personnel involved with MELB walkdowns, and eight initial walkdown data packages. The inspector also walked down the following three areas: Room A13, RHR Pump Room 2B-B; Room A22, Charging Pump 2B-B; and Room A20, Volume Control Tank Room, which had been previously walked down to provide further understanding of the process and to observe for any significant differences in observations.

Specific documents reviewed are listed in the Attachment.

b. Observations

Plans and actions to date were shown to be equivalent to or exceeded those for Unit 1. MELB design criteria were being covered, although this was not clear from a review of the implementation plan alone. A thorough process was demonstrated to assure the appropriate areas were walked down and appropriate criteria were included. Appropriate calculations were considered for revision. Walkdown personnel met training requirements and no significant differences were noted during independent walkdowns. Walkdown personnel were thorough during field observations. Outstanding actions included calculation revisions, final approval of walkdown packages, review of Unit 1 modifications, initiation of Unit 2 modification packages, and implementation of field modifications.

c. Conclusions

Actions to date and planned for the MELB Special Program cover design requirements and are equivalent to or exceed Unit 1 actions. However, future NRC inspections will be required to address related activities which are not yet complete.

T.1 Training and Qualification of Plant Personnel

T.1.1 Craft Training (IPs 49061, 50071, 51061 and 51063)

a. Inspection Scope

The inspectors observed elements of the training program by attending and observing a portion of Mechanical Maintenance Initial Training, Course MME050, Mechanical Torquing, reviewing the associated procedures and lesson plans, and holding discussions with the instructors.

Additionally, the inspectors observed a training session on cable signal tracing using a commercially available cable locator. Training included a review of the manufacturer's instructions for the device, reviewing a video instructional presentation prepared by the manufacturer, and a hands-on demonstration in the classroom using a long length of electrical cable of the type used in the plant. The purpose of this training was to prepare attendees for tracing of safety related cables installed in cable trays and conduits in the plant. The inspectors also attended and observed a portion of Electrical Maintenance Initial Training, Course EME033.001, Cable Splicing and Terminations, reviewed the associated procedures and lesson plans, and held discussions with the instructors. The training sessions were conducted to provide guidance on implementing procedures 25402-000-GPP-0000-N3303, Revision 1 for cable installation and MAI-3.3, Cable Terminating, Splicing, and Testing for Cables Rated up to 15,000 Volts, Revision 24. The training sessions included discussions on crimping techniques, the use of tools and required procedures.

The following samples were inspected:

- IP 49061 Section 02.04 - one sample
- IP 50071 Section 02.04 - one sample

- IP 51063 Section 02.02.c - three samples
- IP 51061 Section 02.02.f - three samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Observed training of newly hired personnel was conducted in accordance with approved lesson plans and procedures.

III. Operational Readiness Activities

F.1 Fire Protection (IP 64051)

a. Inspection Scope

The inspectors reviewed the following TVA fire protection procedures for Unit 2 applicability:

- 0-FPS-510-EXT/INSP, File 01, Rev. 10 (Portable Fire Extinguishers Inspection (Construction Areas) - Quarterly)
- 0-FPS-510-EXT/INSP, File 02, Rev. 7 (Portable Fire Extinguishers Inspection (Construction Areas) - Annual),
- 0-FPS-026-0004, File 01, Rev. 18 (Quarterly Inspection of Fire Hose Station)

The inspectors conducted a visual inspection of fire suppression equipment and the temporary standpipe system in the Unit 2 reactor containment building and anulus. The inspectors also conducted a walkdown of TVA's established fire protection/prevention controls for areas of the plant affected by Unit 2 construction activities. The inspectors met with TVA fire protection personnel and reviewed the staging and availability of manual fire fighting equipment including bunker gear, self-contained breathing apparatus (SCBA), portable radios, portable ventilation equipment, handlines (hoses), and hose nozzles. The inspectors were given a demonstration of a newly acquired TVA fire extinguisher training simulator for use in training fire watch personnel.

The following samples were inspected:

- IP 64051 Sections 02.02 - 3 samples
- IP 64051 Sections 02.07 - 10 samples

b. Observations and Findings

No findings of significance were identified. The inspectors observed a construction activity that could potentially affect Unit 1 fire protection features. This involved retardant waterproof fabric installed by Unit 2 craft workers to protect installed Unit 1 electrical equipment and the possible impact on fire sprinkler heads. This condition was pointed out to a Bechtel construction superintendent and the material was promptly removed. PER 176749 was initiated to address this observation. The inspectors

concluded that, overall, the level of fire protection provided was adequate for the current level of construction activities being performed. The inspectors verified that TVA inspected the fire suppression devices at the prescribed intervals per site procedural requirements..

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 (Closed) Inspector Follow-up Item (IFI) 05000391/2009603-001, Resolution of PERs 159447 and 160814

During the Problem Identification and Resolution (PI&R) inspection conducted in June 2009 and documented in Integrated Inspection Report (IIR) 05000391/2009603, the inspectors initiated inspector follow-up item (IFI) 05000391/2009603-01 to resolve open questions associated with PERs 159447 and 160814.

During the PI&R inspection, the inspectors had questions on PER 159447 regarding the problem description and the lack of justification for removing the code editions from the design criteria for vendor-supplied analyses. The inspectors reviewed the changes to the design criteria, Final Safety Analysis Report (FSAR), Sections 3.7 thru 3.10, and procedure NEDP, Design Basis and Design Input Control, Revision 5, and interviewed applicant's and Bechtel's personnel involved with the design criteria changes.

In addition, the inspectors had questions on PER 160814, which dealt with an ASME valve data sheet that was inserted into an ASME design specification after the specification had been certified. The design specification applied to both Units 1 and 2. The inspectors questioned whether the PER had to be reviewed against Unit 1 requirements such as ASME Section XI and 10CFR50.59. The inspectors reviewed the actual change made to the valve data sheet against Unit 1 and ASME III Code requirements.

The inspectors determined that the interviews clarified the problem description of PER 159447. In addition, the changes made to the design criteria were consistent with the FSAR. The change made to the valve data sheet described in PER 160814 was administrative and did not affect Unit 1 requirements nor did it invalidate the ASME PE certification of the design specification. All questions associated with PERs 159447 and 160814 were resolved, and IFI 0500391/2009603-01 is closed.

OA.1.2 Corrective Action Plans and Special Programs Reviews (TI 2512/16, 17, 19, 20, 21, 22, 24, 25, 26, 29, 30, 31, 32, 35, 43)

a. 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:

- Instrument lines; TI 2512/026
- Q-List; TI 2512/029

- Seismic analysis; TI 2512/030
- Equipment seismic qualification (ESQ); TI 2512/021
- Vendor information; TI 2512/031
- Use-As-Is; TI 2512/043
- Welding; TI 2512/032
- Control room design review (CRDR); TI 2512/035
- Adhesive backed cable supports; TI 2512/020
- Cable separation; TI 2512/016
- Computerized Cable Routing System (CCRS); TI 2512/016
- Silicone rubber insulated cables; TI 2512/016
- Torque switch and overload relay bypass capability; TI 2512/020
- Design baseline verification; TI 2512/019
- Fire protection; TI 2512/022
- Heat code traceability; TI 2512/024
- HVAC; TI 2512/025
- Cable Tray and Supports; TI 2512/017
- Mechanical Equipment Qualification (MEQ); TI 2512/038

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 a specific CAP or SP in order to help them develop inspection plans and preliminary inspection schedules. No specific inspection activities were performed. Rather the inspectors conducted initial CAP and SP discussions only. 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.

V. Management Meetings

X.1 Exit Meeting Summary

On October 2, 2009, 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
J. Atwell, Project Director, Bechtel
M. Bajestani, Vice President, Unit 2
M. Bali, Electrical Design Manager, Bechtel
R. Baron, Nuclear Assurance Project Manager, TVA, Unit 2
B. Briody, Maintenance and Modifications Manager, TVA, Unit 2
P. Byron, Licensing Engineer
B. Crouch, Lead Mechanical Engineer, TVA, Unit 2
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
J. McCarthy, Licensing Engineer, Unit 2
R. Moll, Preop Startup Manager, 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, Acting Engineering Manager, Bechtel
S. Sawa, Training Manager, Bechtel
J. Schlessel, Construction Manager, TVA, Unit 2
P. Theobold, Radcon Supervisor, TVA, Unit 2
A. Aldridge, Acting Construction Manager, Bechtel
D. Tinley, Quality Assurance, TVA, Unit 2

INSPECTION PROCEDURES USED

IP 35100	Review of QA Manual
IP 37055	Onsite Design Activities
IP 40504	Part 52, Identification and Resolution of Construction Problems
IP 46055	Structural Concrete Record Review
IP 46071	Concrete Expansion Anchors
IP 48053	Structural Steel and Supports Work Observation
IP 48055	Structural Steel and Supports Record Review
IP 49061	Safety-Related Piping – QA Review
IP 49063	Safety-Related Piping Work Observation
IP 49065	Safety-Related Piping Record Review
IP 50051	Reactor Vessels and Internals QA Review
IP 50053	Reactor Vessel and Internals Work Observation
IP 50055	Reactor Vessel and Internals Record Review
IP 50090	Pipe Support and Restraint Systems
IP 50071	Safety-Related Components – Procedure Review
IP 50073	Mechanical Components – Work Observation
IP 50100	Heating, Ventilation, and Air Conditioning Systems
IP 51051	Electrical Components and Systems Procedure Review
IP 51053	Electrical Components and Systems Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51061	Electrical Cable – Procedure Review
IP 51063	Electrical Cable Work Observation
IP 51065	Electric Cable - Record Review
IP 55050	Nuclear Welding General
IP 55100	Structural Welding General Inspection Procedure
IP 57070	Nondestructive Examination - MT
IP 64051	Procedures - Fire Prevention/Protection
IP 73051	Inservice Inspection - Review of Program
IP 73052	Inservice Inspection - Review of Procedures
IP 73053	Preservice Inspection – Observation of Work and Work Activities
IP 73055	Preservice Inspection Data Review and Evaluation
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/017	Inspection of Watts Bar Nuclear Plant Cable Tray and Supports Corrective Action Program Plan
TI 2512/019	Inspection of Watts Bar Nuclear Plant Design Baseline Corrective Action Program Plan
TI 2512/020	Inspection of Watts Bar Nuclear Plant Electrical Issues Corrective Action Program Plan
TI 2512/021	Inspection of Watts Bar Nuclear Plant Equipment Seismic Corrective Action Program Plan
TI 2512/022	Inspection of Watts Bar Nuclear Plant Fire Protection Corrective Action Program Plan
TI 2512/024	Inspection of Watts Bar Nuclear Plant Heat Code Traceability Corrective Action Program Plan
TI 2512/025	Inspection of Watts Bar Nuclear Plant HVAC Duct and Supports Corrective Action Program Plan
TI 2512/026	Inspection of Watts Bar Nuclear Plant Instrument Lines Corrective Action Program Plan

TI 2512/030	Inspection of Watts Bar Nuclear Plant Seismic Analysis Corrective Action Program Plan
TI 2512/031	Inspection of Watts Bar Nuclear Plant Vendor Information Corrective Action Program Plan
TI 2512/032	Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan
TI 2512/035	Inspection of Watts Bar Nuclear Plant Control Room Design Review Special Program
TI 2512/036	Inspection of WBN Nuclear Plant Environmental Qualification Special Program
TI 2512/040	Inspection of WBN Nuclear Plant Moderate Energy Line Break Special Program
TI 2512/043	Inspection of Watts Bar Nuclear Plant Use-As-Is CAQRS Special Program

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000391/2009604-001	NCV	Design Changes Not Addressed or Evaluated (Section E.1.1)

Closed

05000391/2009603-001	IFI	Resolution of PERs 159447 and 160814 (Section OA.1.1)

Discussed

None

LIST OF DOCUMENTS REVIEWED

I. Quality Assurance Program

Q.1.1 Identification and Resolution of Construction Problems

Procedures/Programs

25402-MGT-000, Corrective Action Program, Rev. 4

Oversight/Self-Assessment Documents

NA Observation Report 45809, Cable Reeling in warehouse for DCN 52285, Inverter Modifications
NA Audit 25042-WBN-AR-09-0003, Engineering Activities
NA Assessment Report NA-WB-09-007, Alignment of NA Plans and Procedures
NA Surveillance Report 25402-WBN-SR-09-0592, In process work order, 08-951021-000, Ice basket screw inspections
NA Surveillance Report 25402-WBN-SR-09-0593, In process work order, 08-951021-000, Ice basket screw inspections
NA Surveillance Report 25402-WBN-SR-09-0623, In process work order, 08-951021-000, Ice basket screw inspections

II. Management Oversight and Controls

C.1.1 Piping Support Walkdowns

Procedures and Standards

WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, Rev. 6

Hangers and Supports

Hanger/Support #47A437-5-38
Hanger/Support #47A437-5-35
Hanger/Support #H-555-18-25-5 (WBN2-PD-062-1469-00)
Hanger/Support #47A060-62-48 (WBN2-PD-062-1501-08)
Hanger/Support #47A060-67-135 (WBN2-PD-067-1541-03)
Hanger/Support #63-2SIS-R24 (WBN2-PD-063-2400-03)
Hanger/Support #47A462-12-24 (WBN2-PD-061-1503-03)
Hanger/Support #2-63-004 (WBN2-PD-063-2334-02)
Hanger/Support #2-62A-809 (WBN2-PD-062-1498-04)
Hanger/Support #2-63-044 (WBN2-PD-063-2340-03)
Hanger/Support #47A465-1-91 (WBN2-PD-068-2351-02)
Hanger/Support #2-70-257 (WBN2-PD-070-1872-57)
Hanger/Support #470450-25-71 & 47A4 (WBN2-PD-067-2329-0050-25-75)
Hanger/Support #2-70-272 (WBN2-PD-070-1872-63)
Hanger/Support #47A406-12-45 (WBN2-PD-062-1831-09)
Hanger/Support #2-62A-275 & 2-62A-27 (WBN2-PD-062-2369-116)
Hanger/Support #H-450-16-9-74 (WBN2-PD-067-1640-04)
Hanger/Support #437-7-3-72 (WBN2-PD-072-1878-02)

Hanger/Support #462-12-104-70 (WBN2-PD-061-2300-00)
Hanger/Support #H-432-1-39-70 (WBN2-PD-074-1645-00)
Hanger/Support #63-2SIS-R115 (WBN2-PD-063-1835-11)
Hanger/Support #H-437-7-14-71 (WBN2-PD-072-1914-02)
Hanger/Support #2-68-356 (WBN2-PD-068-1569-04)
Hanger/Support #2-68-351 & 2-68-352 (WBN2-PD-068-1569-00)
Hanger/Support #47A450-25-140 (WBN2-PD-067-2282-04)
Hanger/Support #2-70-350 & 2-70-860 (WBN2-PD-070-1720-01)

C.1.2 HVAC Walkdowns

WDP-PD-2, Walkdown Procedure for Civil, Rev. 3

C.1.5 Structural Steel and Supports – Work Observation

Procedures and Standards

25402-000-GPP-0000-N3221, Structural Steel Erection, Rev 2
25402-000-GPP-0000-N3701, Welding Program, Rev 2
C.1.8 Magnetic Particle Examination of Safety-Related Welds

Procedures and Standards

N-MT-6, Magnetic Particle Examination for ASME/ANSI Code Components and Welding, Rev 32

MT Exam Reports

Weld 1-067A-T136-9-C0R0, ERCW System, ASME Class 3, 24” CS Pipe to 24” Tee
Weld 1-067A-T136-10-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T136-11-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T136-12-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T136-13-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 1” Half Coupling.
Weld 2-067A-T134-9-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 2-067A-T134-10-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 2-067A-T134-11-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 2-067A-T134-12-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 2-067A-T134-13-C0R0, ERCW, ASME Class 3, 1” Half Coupling to 24” CS Pipe.
Weld 1-067-T134-17-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 1-067-T134-18-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067-T136-17-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 1-067-T136-18-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067-T135-17-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 1-067-T135-18-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067-T137-17-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 1-067-T137-18-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T137-9-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Tee.
Weld 1-067A-T137-10-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T137-11-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.
Weld 1-067A-T137-12-C0R0, ERCW, ASME Class 3, 24” CS Pipe to 24” Flange.

Weld 1-067A-T137-13-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 1" Half Coupling.
Weld 2-067A-T135-9-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Tee.
Weld 2-067A-T135-10-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 2-067A-T135-11-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 2-067A-T135-12-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 2-067A-T135-13-C0R0, ERCW, ASME Class 3, 1" Half Coupling to 24" CS Pipe.
Weld 0-067C-T239-1-C1R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 0-067C-T239-2-C1R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.
Weld 0-067C-T239-3-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.
Weld 0-067C-T239-5-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Elbow.
Weld 0-067C-T239-6-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.
Weld 0-067C-T239-7-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.
Weld 0-067C-T239-8-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 0-067C-T239-9-C0R0, ERCW, ASME Class 3, 1" Half Coupling to 24" CS Pipe.
Weld 0-067C-T239-11-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Elbow.
Weld 0-067C-T239-12-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.
Weld 0-067C-T240-1-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 0-067C-T240-2-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" 90 deg EL.
Weld 0-067C-T240-3-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" 45 deg EL.
Weld 0-067C-T240-5-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" 45 deg EL.
Weld 0-067C-T240-6-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Elbow.
Weld 0-067C-T240-7-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24"Elbow.
Weld 0-067C-T240-8-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Flange.
Weld 0-067C-T240-9-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 1" Half Coupling.
Weld 0-067C-T240-11-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Elbow.
Weld 0-067C-T240-12-C0R0, ERCW, ASME Class 3, 24" CS Pipe to 24" Pipe.

C.1.9 Electrical Systems and Components

Procedures and Standards

PMTI-52285-08, Rev. 0, 120V Vital Inverter 2-IV Initial Startup and Testing

Work Orders

WO 08-812562-019, Implement DCN 52285 Pre-outage Stage 8, Terminate Cables
WO 09-812367-009, Route Cables to 480VAC Shutdown Board WBN-2-BD-212-A1

Problem Evaluation Reports
PER 176179, Cable Tray Bolting Deficiencies
PER 178815, Damaged Capacitor Found In Inverter IV
PER 202476, Three Class 1E 480VAC Cables Sustain Scuffs to Insulation
PER 200629, Failure to Document Approvals for Welds at Inverters

Design Packages

DCN 52285, Rev. A, Add New Unit 2 Vital Inverters
DCN 53334, Rev. A, Replace 480V Cables That Exhibit Ampacity and Voltage Drop Breakages

Miscellaneous Documents

SOI-235.01, 120 VAC Vital Power System 1-I
WB-DC-30-4, Rev. 22, Separation / Isolation
WB-DC-30-27, Rev. 28, AC and DC Control Power Systems (Unit 1/ Unit 2)
WBN-EEB-MS-TI07-0018, Rev. 69, 120VAC Short Circuit, Coordination Study and Protection
WBN-EEB-MS-TI08-0008, Rev. 134, 480VAC 1E Coordination / Protection
WBN-EEB-MS-TI12-0016, Rev. 122, 120VAC Vital Inverter Loading
Wyle Laboratories Test Report 51133-1, Seismic Testing of a 20 KVA UPS System, dated August 24, 2004

C.1.11 Inservice Inspection - Review of Program

Procedures/Programs

Program Number WBN-2 PSI, Preservice Inspection Plan for WBN Nuclear Power Plant Unit 2, Revision 1
IEP-200, Qualification and Certification Requirements for TVA Nuclear Power Group Nondestructive Examination Personnel, Revision 10
IEP-300, Qualification and Certification of Ultrasonic TVA Nuclear Power Group Personnel for Preservice and Inservice ASME Section XI Examinations, Revision 3
IEP-301, NDE/QC Personnel Eye Examination Procedure, Revision 2
N-GP-8, Weld Reference System, Revision 5
25402-MGT-0003, WBN Unit 2 Construction Completion Project Corrective Action Program, Revision 4
NGDC PP-3, WBN Unit 2 Corrective Action Program, Revision 4
NGDC PP-15, WBN Unit 2 ASME Section XI, Revision 0
SPP-2.4, Records Management, Revision 8
SPP-2.0, Procedures and Document Control, Revision 2
SPP-9.1, ASME Section XI, Revision 8
TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan, Revision 20

Contractor Procedures/Programs

Washington Group International; NDE-1, Procedure for Training, Examination, and Certification of Nondestructive Examination Personnel, Revision 19
IveyCooper; Procedure QOP 18-1, Training, Qualification, and Certification of NDT Personnel, Revision 5
C.1.12 Inservice Inspection - Review of Procedures

Procedures/Programs

IEP-100, Administration of Nondestructive Examination Procedures, Revision 6
N-MT-6, Magnetic Particle Examination for ASME and ANSI Code Components and Welds, Revision 31
N-UT-84, Procedure for the Phased Array Ultrasonic Examination of Austenitic and Ferritic Pipe Welds, Revision 0
N-VT-1, Visual Examination Procedure for ASME Section XI Preservice and Inservice, Revision 44

N-UT-64, Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds, Revision 11
N-PT-9, Liquid Penetrant Examination of ASME and ANSI Code Components and Welds Revision 33
N-UT-33, Manual Ultrasonic Examination of Static and Centrifugally Cast Stainless Steel Piping Welds, Revision 11
N-GP-18, Ultrasonic Testing Supplements, Revision 17
N-GP-28, Calculation of ASME Code Coverage for Section XI NDE Examinations, Revision 6
N-GP-31, Calculation of ASME Code Coverage for Section XI, Appendix VIII Ultrasonic Examinations, Revision 2

C.1.13 Preservice Inspection – Observation of Work and Work Activities

Procedures/Programs

Drawing ISI-2074-W-01, Residual Heat Removal System 074 (RHR) – Weld Locations

Observed Examinations:

Report #	NDE Method	Weld # / Component #	Description	ASME Class
R-P0614	PT	SIF-B-T107-16	Pipe to Elbow	1
R-P0615	PT	SIF-B-T107-17	Elbow to Pipe	1
R-P0616	PT	SIF-B-T107-22	Pipe to Elbow	1
R-P0617	PT	SIF-B-T107-23	Elbow to Pipe	1
R-P0620	Phased Array UT	SIF-D197-11A	Valve to Pipe	1
R-P0621	Phased Array UT	SIF-D197-12	Pipe to Elbow	1
R-P0622	Phased Array UT	SIF-D197-13	Elbow to Branch	1
R-P0735	Phased Array UT	RHRS-008	Pipe to Elbow	1
R-P0729	PT	RHRS-008	Pipe to Elbow	1
R-P0730	PT	RHRF-D031-17	Pipe to Pipe	1
R-P0731	PT	RHRF-D031-09	Pipe to Pipe	1
R-P0732	PT	RHRS-011	Pipe to Elbow	1

E.1 Engineering Activities

E.1.1 Engineering Design Activities and Design Control

Procedures

CCPP 25402-000-GPP-0000-N3105, Rev. 0005, Field Change Requests
EDPI 25402-3DP-G04G-00001, Rev. 005, Design Criteria Documents

EDPI 25402-3DP-G04G-00027, Rev. 002, Design Verification
EDPI 25402-3DP-G04G-00049, Rev. 001, Engineering Specifications
EDPI 25402-3DP-G04G-00081, Rev. 002, Engineering Document Construction Release
Unit 2 Construction Completion Project Procedure (CCPP) 25402-000-GPP-0000-N1204 – Engineering Document Construction Release (EDCR) Process Revision 0005, dated 02/18/2009
Unit 2 Construction Completion Project Procedure (CCPP) 25402-3DP-G04G-00081 – Engineering Document Construction Release (EDCR) Revision 002, dated 07/27/2009
Procedures
0-TI-2, Criteria for Issuing Engineering Document Construction Releases (EDCR) Potentially Impacting WBN Unit 0 And/Or Unit 1 Design
DS-E2.0.2, Single Point Failure for Power Generation Reliability
N3-3B-4002, Rev. 0015, Auxiliary Feedwater System
NEDP-2, Rev. 0012, Design Calculation Process Control

Problem Evaluation Reports

PER 167983, Piping walkdown results not incorporated into DRAs in EDCR
PER 178864, Technical Evaluation Question 3 was not answered on EDCR 52366
PER 178868, Material compatibility evaluation was not performed
PER 178926, Removal of 2-XX-55-0009C is delineated in two design documents
PER 178724, EDR 52339 incorrectly listed open items
PER 178900, Technical evaluation error for EDCR 52709
PER 01-014170-000, Problem evaluation report
WBPER 01-014170-000, KT problem analysis

Design Packages (EDCR)

EDCR 52337, Rev. A, Replace Valve Trim, Actuator Springs, and Missing Components on System 003B Auxiliary Feedwater Level Control Valves
EDCR 52436, Rev. A, Modify Pipe Supports on the Main Feedwater and Auxiliary Feedwater Systems to Implement NRC Bulletins BL 79-02 and BL 79-14
FCR 53838, Rev. A, Incorporate Pipe Support Walkdown Data for DRAs in EDCR 52436
EDCR 52339 dated 2/10/09, Install a workable ladder with extended platforms to access the south side of the AFW motor driven LCV mezzanine
EDCR 52709 dated 10/27/08, Removing Foxboro equipment from racks 1-13 & 28 to make room for Eagle 21 installation
EDCR 52862 dated 10/1/08, Issue U2 control and logic diagrams for Systems 062, 063, 0068, 072, 074, 088, 094, and 099
EDCR 52637, Incorporate Unit 1 historic changes into the Unit 2 RHR system and install various components determined to be missing from the RHR system, Revision A
EDCR 52612, Replace a 12 inch section of 6 inch schedule 40 piping in the Ice Condenser System near penetration 47A, Revision A.
EDCR 53344-A, Install missing valves and piping and replace sections of Unit 2 Containment Spray, Revision A
EDCR 53226, Rev. A, Add seal-in feature to MDAFWP start circuits
EDCR 52366, Modifications of Main Control Room (MCR) Panel 2-M-9

EDCR 52367, Modifications of Main Control room (MCR) Panel 2-M-10

Design Packages

DCN D52763, Rev. A, Modify the Trim on the 4" MDAFW LCVs to Gain Closing Margin
DCN 51125, Rev. A, Modify MDAFP start circuit to improve seal in function

Drawings

2-47W610-90-4 dated 4/07/09, Unit 2 – Electrical Control Diagram Radiation Monitoring Sys, Revision 1
2-47W610-62-1 dated 4/17/09, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 1
2-47W610-62-2 dated 4/16/09, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 1
2-47W610-62-3 dated 10/09/08, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 0
2-47W610-62-4 dated 07/14/09, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 1
2-47W610-62-5 dated 04/27/09, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 1
2-47W610-62-6 dated 04/27/09, Unit 2 – Electrical Control Diagram Chemical and Volume Control Sys, Revision 1
TVA Drawing TVD-D-9954- (2) Revision 0, ¾ inch Series 1500 Globe Valve, Revision 0
TVA Drawing TVD-D-9954- (2) Revision 1, ¾ inch Series 1500 Globe Valve Revision 1
TVA Drawing TVD-D-9954- (2) Revision 2, ¾ inch Series 1500 Globe Valve Revision 2
TVA Drawing TVD-D-9954- N - (2) Revision 2, ¾ inch Series 1500 Needle Valve Revision 2
TVA Drawing 2-47W810-1, Flow Diagram Unit 1 RHR System, Revision 1
TVA Drawing 2-47W810-1, Flow Diagram Unit 2 RHR System, Revision 1
TVA Drawing 2-47W462-8, Mechanical Ice Condenser, Revision 23
TVA Drawing 47W605-192, Panel 2-M-9 Unit 1 Associated Devices, Revision 4
TVA Drawing 1-47W605-58, Electrical Layout of Control Board Panel 1-M-10, Revision 4
TVA Drawing 47W605-35, Electrical Layout of Control Board Panel 2-M-9, Revision 16
TVA Drawing 47W605-032, Electrical layout of Control Board Panel 1-M-9, Revision 5
2-45W760-63-1, Wiring Diagrams Safety Injection System Schematic Diagram
1-45W760-63-1, Wiring Diagrams Safety Injection System Schematic Diagram
1-45W724-3, Wiring Diagrams 6900V Shutdown Board 2A-A Single Line
1-45W724-4, Wiring Diagrams 6900V Shutdown Board 2B-B Single Line

Drawing Revision Authorization:

Drawing Revision Authorization, 52637-001, "47W810-1, Revision 23," Revision 0
Drawing Revision Authorization, 52637-002, "47W810-1, Revision 23," Revision 0
Drawing Revision Authorization, 52637-003, "47W810-1, Revision 23," Revision 0
Drawing Revision Authorization, 52637-004, "47W810-1, Revision 23," Revision 0
Drawing Revision Authorization, 52637-005, "47W810-1, Revision 23," Revision 0

Drawing Revision Authorization, 52637-006, “47W810-1, Revision 23,” Revision 0
Drawing Revision Authorization, 52637-007, “47W432-1, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-008, “47W432-1, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-009, “47W432-1, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-0010, “47W432-1, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-0011, “47W432-2, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-0012, “47W432-2, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-0013, “47W432-2, Revision 22,” Revision 0
Drawing Revision Authorization, 52637-0014, “47W432-4, Revision 29,” Revision 0
Drawing Revision Authorization, 52637-0015, “47W432-5, Revision 13,” Revision 0
Drawing Revision Authorization, 52612-001, Revision 0
Drawing Revision Authorization, 52612-002, Revision 0
Drawing Revision Authorization, 52612-003, Revision 0

Calculations

MDQ 001 0032 002 0070, Rev. 5, Component Level Review Calculation for WBN Auxiliary Feedwater (AFW) Air Operated Valves (AOVs)
048 018 UNB, Rev. 3, Evaluation of Required Thrust for AFW Motor Driven Large LCVs (Unbalanced Disk Globe AOVs) at WBN Nuclear Power Station
47A427 02 044, Rev. 1, Calculation for Pipe Supports Nos. 47A427-2-44
03B2AFWR111, Rev. 1, Calculations for Pipe Support 03B-2AFW-R111
WCG-ACQ-0320, Welding Requirements for Panel 2-M-9
WCG-ACQ-0436, Welding Requirements for Panel 2-M-10
WBNAPS3048, Identify Regulatory Guide 1.97 Type E Variables Measured by WBN Post-Accident Monitoring

Miscellaneous Documents

07-816411-000, 18 Month Channel Calibration of Steam Generator 3 Auxiliary Feedwater Level Loop 1-LPL-3-148
WBN2-PD-003-1595-02, Rev. 0, (Walkdown Package), As Built Walkdown of Pipe Supports, System 003, Stress Problem Number N3-03-17A, Hanger Number 47A427-2-44
WBN2-PD-003-1593-11, Rev. 0, (Walkdown Package), As Built Walkdown of Pipe Supports, System 003, Stress Problem Number N3-03-17A, Hanger Number 03B-2AFW-R111
SAL 0150, Rev. 001, Request for attachment to structural features – Calculation 03B2AFWR107 (EDCR 52436)
SMP-1.0, Rev. 000, WBN Nuclear Plant Unit 2 Startup Manual Introduction
TVA-22, Rev. 5, Unit 1 Test Scoping Document for Auxiliary Feedwater System 3B
Safety Assessment Form – Document No: DCN-D-50483-A – Delete the Continuous Air Monitors 1-RE-90-014, 1-RE-90-062, 1-RE-90-016, and 0-RE-90-138/ System 90.
SAR Change Request No: 1557 – Radiation Monitor changes to FSAR.
Change Request Form 53020 – Determinate cables at Unit 1 due to deletion of Unit 2 Radiation Monitors dated: 2/27/09
WBN – Updated Final Safety Analysis Report (UFSAR) Change Package 1630 dated: 5/3/00
WBN Nuclear Plant –Final Safety Analysis Report (FSAR) Transmittal Package 1557 dated: 11/9/1998
Procurement Request, WBN-09-0067, Revision 0
25402-MGMT-0002, Valve Data Sheet, Revision 5
Material Requisition, 25402-011-MRA-PV-00001, Revision 001
ASME Code Case, 1635-1, August 12, 1974

Valve Data Sheet 47VD432-5 Revision 0, Anderson Greenwood Crosby or Equal Procurement Data Sheet, RIMS/EDMS T4908514 826,

E.1.2 Moderate Energy Line Break Special Program

Procedures

WDP-GEN-1, Walkdown Procedure for General Walkdown Requirements, Rev. 13
WDP-M-5, Walkdown Procedure for Mechanical, Rev. 0

Miscellaneous Documents

Implementation Plan for Completion of the Moderate Energy Line Break (MELB) Flooding SP, dated 05/07/2009
Design Criteria Document WB-DC-40-31.50, Evaluating the Effects of a Pipe Failure Inside and Outside Containment, Rev. 12
Design Criteria Document WB-DC-40-31.51, Evaluating the Effects of Flooding due to Moderate Energy Pipe Failures Inside and Outside Containment, Rev. 4
Calculation WBNOSG4101, MELB Safe Shutdown Logic Diagram and Equipment List, Rev. 5
Lesson Plan (WDP-GEN-1), Rev. 0
Lesson Plan (WDP-M-5), Rev. 0

LIST OF ACRONYMS

ANII	Authorized Nuclear Inservice Inspector
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BPVC	Boiler and Pressure Vessel Code
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DCN	Design Change Notice
EDCR	Engineering Document Construction Release
EQ	Environmental Qualification
ERCW	Essential Raw Cooling Water
HVAC	Heating, Ventilation, and Air Conditioning
IP	Inspection Procedure (NRC)
MAI	Modification Addition Instruction
MELB	Moderate Energy Line Break
MT	Magnetic Particle examination
NA	Nuclear Assurance
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NRC	Nuclear Regulatory Commission
PER	Problem Evaluation Report
PSI	Pre-Service Inspection
QA	Quality Assurance
QC	Quality Control
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
SI	Safety Injection
SP	Special Program
TI	Temporary Instruction (NRC)
TVA	Tennessee Valley Authority
SMAW	Shielded metal arc welding
SSC	Structures, Systems, and Components
TVA	Tennessee Valley Authority
WBN	WBN Nuclear Plant
WO	Work Order