



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

August 7, 2013

Mr. Michael D. Skaggs  
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2013605**

Dear Mr. Skaggs:

On June 30, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on July 3, 2013, with Mr. Arent 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, the conditions of your construction permit, and fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel

No findings were identified during this inspection.

In accordance with 10 *Code of Federal Regulations* (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).

M. Skaggs

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Should you have questions concerning this letter, please contact us.

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000391/2013605 w/Attachment

cc w/encl: (See next page)

Should you have questions concerning this letter, please contact us.

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**/RA/**

Robert C. Haag, Chief  
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 Division of Construction Projects

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cc w/encl: (See next page)

\* Previous Concurrence

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Letter to Michael D. Skaggs from Robert C. Haag dated August 7, 2013.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2013605

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2013605

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: May 19 – June 30, 2013

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

Enclosure

## **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 six-week period of inspections in the areas of quality assurance (QA), identification and resolution of construction problems, construction activities, and follow-up of other activities. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter 2517, "Watts Bar Unit 2 Construction Inspection Program." Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/info-finder/reactor/wb/watts-bar.html>.

### **Inspection Results**

- The inspectors concluded that concerns pertaining to several open items, including eleven construction deficiency reports (CDRs), two unresolved items (URIs), two Temporary Instructions (TIs), one historical violation, one Generic Letter (GL), and one Bulletin (BL) have been appropriately addressed for WBN Unit 2. These items are closed.
- Other areas inspected were adequate with no findings identified. These areas included quality assurance; piping; mechanical systems and components; electrical systems and components; fire protection; pre-operational testing activities; various NRC inspection procedures; CDRs; and refurbishment activities.



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## REPORT DETAILS

### Summary of Plant Status

During the inspection period covered by this report, TVA performed construction completion activities on safety-related systems and continued engineering design activities of the Watts Bar Nuclear (WBN) Plant, Unit 2.

### I. QUALITY ASSURANCE PROGRAM

#### Q.1 Quality Assurance Oversight Activities

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

###### a. Inspection Scope

The inspectors continued to review problem evaluation reports (PERs), as part of the applicant's corrective action program, to verify that issues being identified under the corrective action program were being properly identified, addressed, and resolved by the applicant.

The inspectors reviewed applicant disposition and actions associated with:

- PER 658354, American Society of Mechanical Engineers (ASME) Related Hardware Non-Conformance - Valve Rework;
- PER 694497, Historical ASME Related System 70 FE Plugs for Flow Elements - 2-FE-070-0115, 0095, and 0124; and
- PER 694493 ASME III Flanges Refaced in Accordance with Engineering Evaluation Without Work Order Revision to verify they were in accordance with procedures.

Additionally, several PERs associated with the reactor pressure vessel were reviewed and discussed in Section C.1.3 of this report.

Documents reviewed are listed in the Attachment.

###### b. Observations and Findings

No findings were identified.

###### c. Conclusions

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

## II. MANAGEMENT OVERSIGHT AND CONTROLS

### C.1 Construction Activities

#### C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls

##### a. Inspection Scope

The inspectors independently assessed applicant controls, associated with Unit 2 construction work activities, to prevent adverse impact on Unit 1 operational safety. The inspectors attended routine Unit 1/Unit 2 interface meetings to assess the exchange and sharing of information between the two site organizations. Periodic construction and planning meetings were observed, at least once per week, to assess the adequacy of the applicant's efforts to identify those construction activities that could potentially impact the operating unit. This included the review of select work activities, which the applicant had screened as not affecting Unit 1, to verify the adequacy of that screening effort. Additionally, the inspectors independently assessed select construction activities to verify that potential impacts on the operating unit had been identified and adequately characterized with appropriate management strategies planned for implementation. Furthermore, the inspectors performed independent walkdowns of select construction work locations to verify that controls to protect the operating unit provided an adequate level of protection and had been properly implemented.

Specific work activities observed included work associated with:

- Work Order (WO) 111452196, SUT SYS 030A WBN-2-CLR-030-0182 CTN 2-030-01097-E02-000

Specific work activities that the applicant had screened out as not affecting Unit 1 included, but were not limited to, piping installation and refurbishment activities.

##### b. Observations and Findings

No findings were identified.

##### c. Conclusions

Overall, adequate management oversight and controls were in place for observed construction activities that could potentially impact the operating unit, and an adequate level of protection had been implemented.

#### C.1.2 Piping – Piping Work Observation and Verification of As-Builts (Inspection Procedures 49063 and 37051)

##### a. Inspection Scope

The inspectors observed safety-related piping hydrostatic tests for System 067, essential raw cooling water piping connected to the lower containment coolers LCC 2-CCU-30-78-2D-B and LCC 2-CCU-30-74-2A-A; and System 070, component cooling water piping from the reactor coolant thermal barriers to the flange connection welds for the thermal barrier booster pumps 2PMP-070-0130-B and 2PMP-070-0131-A. The inspections were

conducted to verify the tests were completed in accordance with procedure 25402-000-GPP-0000-N3506, "Pressure Testing of Piping, Tubing and Components," Revision (Rev.) 9, and the test acceptance criteria were observed and recorded in accordance with the test procedure. In addition, the inspectors interviewed quality control (QC) personnel and reviewed the training records for the test directors to verify the personnel completing the tests and inspections were qualified and knowledgeable of the procedure requirements. The inspectors reviewed measuring and test equipment (M&TE) calibration records for the test pressure gauges to verify that M&TE was labeled to indicate the due date, or interval of the next calibration, and were uniquely identified to provide traceability to its calibration data.

The inspectors also reviewed the design documents and observed construction completion walkdowns for the accessible piping sections of System 072, containment spray, at elevation 829 to determine if the design drawings reflected the actual as-built conditions and if the walkdowns were completed in accordance with procedure SMP-4.0, "System Completion and Turnover," Rev. 7. Piping as-built configuration, piping supports, valves, nozzles, and welds were inspected to verify that the as-built conditions met the design configuration, location, type, and orientation as specified in the design documents.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the hydrostatic tests were completed in accordance with the approved procedures and the test acceptance criteria were met. In addition, the inspectors determined that portions of the as-built piping for the containment spray system piping at elevation 829 were completed in accordance with the design.

### **C.1.3 Reactor Vessel and Internals Work Observation (Inspection Procedures 50053)**

a. Inspection Scope

The inspectors conducted inspections of the reactor pressure vessel (RPV) and reactor vessel internals storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and inspection (QC) procedures were being met. These activities are controlled by applicant procedure 25402-000-GPP-0000-N2102, "Housekeeping," Rev. 8. During the inspection period, the inspectors observed the reactor missile shields lift over the reactor cavity. In addition, the inspectors reviewed the rigging plan, the annual inspection of the Unit 2 polar crane, operator qualifications, and person-in-charge qualifications to verify the lift was completed in accordance with WO 0995547200. The inspectors completed the lift inspection to verify that the RPV was protected from foreign objects, the RPV was protected from construction damage, and that cleanliness requirements were being met. The core barrel and internals were inspected to verify storage locations were adequate and controls were in place to protect the components from construction damage.

The inspectors also reviewed the nine PERs including some nonconformance reports listed in the attachment to verify the following:

- Records included current status of these items;
- Records were legible, complete, reviewed by QC personnel, and readily retrievable; and
- Nonconformance reports included status of corrective action or resolution.

Additionally, inspectors had previously reviewed two PERs associated with the RPV as documented in integrated inspection report (IIR) 05000391/2009602, Section C.1.2; therefore, the minimum number of 10 samples for Section 02.02.c of IP 50055 has been met.

The following samples were inspected:

- Inspection Procedure (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
- IP 50055, Section 02.02.c - nine samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Adequate controls were in place to protect the reactor vessel and internals.

**C.1.4 Mechanical Component Structural Steel and Supports Work Observation and Record Review (Inspection Procedures 48053, 48055, 55050, and 50073)**

a. Inspection Scope

The inspectors observed non-destructive examination (NDE), and post-weld heat treatment (PWHT) activities for steam generators (SGs) 1 and 2 upper lateral support tang plates to verify that the work activities were completed in accordance with the ASME Boiler & Pressure Vessel (B&PV) Code Section III, Subsection NF, 1977 edition requirements. The inspectors also reviewed NDE, PWHT, and nonconformance report (NCR) records to determine whether the records for the SG upper lateral support tang plates were in compliance with the approved procedures, whether the records confirmed the supports were installed as specified, and whether the acceptance requirements for NDE were met. In addition, the inspectors reviewed the records to verify that the procedures specified adequate acceptance criteria, that proper calibration records were completed, and that NDE personnel were qualified in accordance with SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing Recommended Practice," 2011 edition. The inspectors interviewed one QC inspector, and one PWHT

technician to determine the adequacy of their knowledge of the NDE and PWHT approved procedures.

The following samples were inspected:

- IP 48053, Section 02.03d – one sample
- IP 48053, Section 02.04 – two samples

The inspectors also observed work in the north and south valve rooms for replacement of sections of the ASME Class II steam piping. Specifically the inspectors walked down the work and storage areas of new pipe sections to determine if work and materials storage met the requirements of the applicant's procedures and the QAPD (Quality Assurance Program Description). Also, the inspectors reviewed the welding procedures and the qualification records of one welder and a QC inspector involved in the work.

Documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The NDE and PWHT activities for the SG tang plate installation were completed in accordance with the approved procedures, and the records indicated the approved design specification acceptance criteria were met. The reviewed records and observed activities associated with the replacement of ASME Class II steam piping were found to meet the requirements of the applicable site procedures and the QAPD.

**C.1.5 Construction Refurbishment (IP 37002)**

a. Inspection Scope

The inspectors observed the refurbishment activities and the bench test associated with relief valve 2-RFV-070-6994 to verify that the valve was refurbished and tested in accordance with procedures 25402-00-GPP-000-N3525, "Valve Refurbishment," Rev. 3; 25402-00-GPP-000-N3112, "ASME Section II Design Interface Control," Rev. 6; and 25402-00-GPP-000-N3541, "Bench Setpoint Testing of Relief Safety Valves (SR/QR)," Rev. 2. The inspectors reviewed the WO, the associated test records, and the valve lapping refurbishment records to verify the activities met the acceptance criteria. In addition, the inspectors interviewed the qualified individual to verify that the qualified individual was competent to evaluate the valve refurbishment activities.

In addition, the inspectors observed field cleanliness and refurbishment activities associated with work on the filter upstream of the seal water heat exchanger, performed under WO 0113946298. Specifically the inspectors observed the boroscoping of accessible lines off the filter assembly. The inspectors then viewed the video results to verify that the cleanliness disposition was appropriate per project procedures.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Refurbishment activities were completed in accordance with the approved procedures and witnessed by a qualified individual.

**C.1.6 Reactor Coolant Pressure Boundary Piping Records Review (Inspection Procedure 49055)**

a. Inspection Scope

The inspectors reviewed a sample of safety-related reactor coolant pressure boundary piping records to determine if the applicant's records system is working properly and that the records reflect work accomplishment consistent with regulatory requirements. Specifically the inspectors chose and reviewed three work packages and three associated nondestructive examination reports to determine if the selected parts were installed as specified and if the required inspections were performed. The reviewed work packages were associated with the reactor coolant system, residual heat removal system, and safety injection system.

The inspectors also selected three personnel involved with work on the reactor coolant pressure boundary piping and reviewed their qualification records to determine if the records were stored and maintained adequately, were readily retrievable, and were sufficient to reasonably support qualification for the work done.

The following samples were inspected:

- IP 49055 Section 02.01b – three samples
- IP 49055 Section 02.02 – three samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The reviewed records were found to meet the requirements of the applicant's procedures and QAPD.



### **C.1.7 Containment Penetrations (Mechanical) Work Observation (Inspection Procedure 53053)**

#### **a. Inspection Scope**

Because fabrication and installation of mechanical penetrations was completed during the initial phase of WBN Unit 2 construction, it was decided to perform visual examination and record review of a sample of penetrations to determine if they were fabricated and installed in accordance with the applicable code and QAPD. Specifically the inspectors visually examined four mechanical piping penetrations (X9A, X68, X73, & X69) to determine the quality and material condition of the penetrations were adequate. The inspectors also reviewed a sample of associated records to verify:

- If records confirmed that material and procurement specification requirements were met;
- If records confirmed that the penetrations were installed and inspected as required; and
- If installation personnel qualification records were complete, current, and sufficient for the work done.

The inspectors also reviewed a sample of nonconformance reports related to mechanical penetrations to determine if they were legible, complete, retrievable, showed that the condition was assessed or repaired, and had been reviewed by QC for adequate completion and closure.

Because all mechanical containment penetrations were installed during the initial construction at WBN Unit 2, records of QA Audits and surveillances are no longer available for review.

The following samples were inspected:

- IP 53053 Section 02.01 – one sample

Documents reviewed are listed in the Attachment.

#### **b. Observations and Findings**

No findings were identified.

#### **c. Conclusions**

The reviewed records were found to meet the applicant's procedures and the QAPD. This procedure will remain open pending possible future repairs, tests, or other work done on mechanical containment penetrations such as local leak rate tests.

### **C.1.8 Safety-Related Piping- Records Review (Inspection Procedure 49065)**

#### **a. Inspection Scope**

The inspectors reviewed a sample of safety-related piping records to determine if the applicant's records system is working properly and that the records reflect work accomplishment consistent with regulatory requirements. Specifically the inspectors reviewed eight PERs related to nonconforming conditions on safety-related piping to verify that:

- They were legible, complete, and adequately reviewed;
- They were routinely processed through proper channels for resolution and determination of possible generic implications and trending;
- They were adequately identified, stored, and retrievable; and
- They included the status of corrective action or resolution and action taken to prevent recurrence if needed.

The inspectors also reviewed two sets of personnel qualification records to determine if:

- A system existed to track and maintain qualifications, and met the requirements of the QAPD; and
- They were sufficient to reasonably support qualification for the work performed.

The inspectors also reviewed two QA surveillances of work on safety-related piping and the associated PERs to verify that:

- The surveillances were performed as required by the QAPD and procedures;
- The surveillances were reported in sufficient detail to allow a meaningful assessment;
- The applicant had taken adequate corrective actions of unsatisfactory findings; and
- The corrective actions resolved the identified nonconforming conditions.

The following samples were inspected:

- IP 49065 Section 02.01 – eight samples
- IP 49065 Section 02.02 – two samples
- IP 49065 Section 02.03 – two samples

Documents reviewed are listed in the Attachment.

#### **b. Observations and Findings**

No findings were identified.

c. Conclusions

The reviewed records were found to meet the requirements of the applicant's procedures and the QAPD.

**C.1.9 Containment Penetrations (Mechanical) Record Review (Inspection Procedure 53055)**

a. Inspection Scope

The inspectors reviewed a sample of mechanical containment penetration records to determine if the applicant's records system is working properly and if they reflect work accomplishment meeting regulatory requirements. Specifically the inspectors reviewed receipt inspection records, material certification records, and personnel qualification records for the procurement and installation of one personnel hatch (el. 755) and two pipe penetrations (X115 & X74) to verify:

- If records confirmed that material and procurement specification requirements were met;
- If records confirmed that the penetrations were installed and inspected as required; and
- If installation personnel qualification records were complete, current, and sufficient for the work done.

The inspectors also reviewed a sample of nonconformance reports related to mechanical containment penetrations to determine if they were legible, complete, retrievable, showed that the condition was assessed or repaired, and had been reviewed by QA/QC for adequate completion and closure.

Because all mechanical containment penetrations were installed historically during the initial construction at Watts Bar Unit 2, records of QA Audits and surveillances are no longer available for review.

The following samples were inspected:

- IP 53055 Section 02.01 – three samples
- IP 53055 Section 02.03 – eight samples
- IP 53055 Section 02.04 – three samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The reviewed records were found to meet the applicant's procedures and QAPD.

## F.1 Fire Protection

### F.1.1 Fire Protection (Inspection Procedure 64051)

#### a. Inspection Scope

The inspectors performed a walkdown of construction areas to determine whether construction activities and areas met procedure requirements for fire protection. The inspectors took a limited set of field-verifiable attributes from preventive maintenance guidance into the field and evaluated 10 fire suppression devices. The inspectors reviewed labeling, accessibility, cartridge weight, extinguisher agent, and material condition of fire extinguishers to determine whether any evidence of deterioration was present, extinguisher agent was free of contamination and cartridge weight met the preventive maintenance specifications. The inspectors reviewed preventive maintenance instructions to determine whether records of these 10 fire suppression devices met procedure inspection requirements.

The inspectors observed one construction activity using ignition sources to determine whether fire prevention procedure requirements were met. This included the handling and use of flammable materials and the use of combustible materials relative to locations of flammable ignition sources. Specifically, the inspectors observed hot work activities related to:

- WO 114350260, CCM EDCR2 52492B SYS 063 WBN-2-HGR-063-RB

The following fire suppression devices were observed and associated records were reviewed:

- AB-18
- AB-20
- U2-FW-56
- U2-FW-37
- U2-FW-122
- U2-FW-78
- U2-FW-20A
- U2-FW-26
- U2-FW-27A
- U2-FW-29

The following samples were inspected:

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

#### b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant's firefighting staff was adequately maintaining fire prevention equipment for the purposes of suppressing fires within the auxiliary building and reactor building. The applicant implemented adequate fire protection measures and controls to support Unit 2 construction activities and minimize impact on Unit 1 operational activities.

#### IV. OTHER ACTIVITIES

##### OA.1.1 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 391/85-35: Support of Conductors Inside Vertical Conduit Runs (Inspection Procedure 35007)

a. Inspection Scope

Background: The Cable Issues Corrective Action Program (CAP) Sub-Issue: Supports in Vertical Conduits, and the CDR 391/85-35: Support of Conductors Inside Vertical Conduit Runs are similar issues, and have been inspected together.

The concern that long vertical conduit runs may not be adequately supported and that random failures due to cutting of the insulation and conductor creep may occur during normal service condition, especially silicone rubber insulated cables was initially reported to the NRC on September 6, 1985, in accordance with 10 CFR 50.55(e) as NCR W-262-P, and superseded by Condition Adverse to Quality Report (CAQR) Watts Bar Program (WBP) 890295 for Unit 1 and CAQR WBP 890269 for Unit 2. The follow-up final report associated with the notification (ADAMS Accession Number ML082401652) was transmitted by letter dated October 3, 1985, and identified apparent cause, safety implications, and planned or completed corrective actions.

TVA plans on addressing this sub-issue using the same approach that was used at WBN Unit 1 and using the requirements in General Construction Specification G-38, which meets current standards. TVA commitments in this regard (NCOs 850440002, 890140007) are to identify and evaluate all previously installed vertical conduit runs (exposed and embedded) containing Class 1E designated cables, in accordance with established criteria and complete any rework necessary.

Inspection Activities: Based on the information provided in the background section, the objective of this inspection was to gather and evaluate sufficient information to make a determination as to whether the applicant's cable support in vertical conduit sub-issue within the Electrical Cable Issues CAP had been adequately developed to address the concerns in the CDR. This was done to ensure that historical problems were being prevented and resolved for Unit 2 and current guidance for cable installation prevented recurrence. This inspection focused on a review of the adverse conditions involving vertical support of cables within safety-related conduit.

The inspectors reviewed General Engineering Specification G-38, Section 8.7, to verify that direction and acceptance criteria for the installation of supports for cables in long vertical runs had been appropriately incorporated. Additionally, the inspectors reviewed Design Criteria WB-DC-30-22, Section 5.2, to verify that provisions had been made for installation of cable supports in long vertical runs.

Calculation EDQ00299920090003, Rev. 000, was reviewed to ensure that methodology employed in Unit 1's reconciliation had been applied to the remaining Unit 2 cables and that no cables had been inadvertently excluded from consideration. The inspectors reviewed licensee QA assessments and audits of engineering activities associated with the cable issues CAP, and followed up on findings/recommendations.

Additional documents reviewed are included in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors were unable to observe sufficient completed work to evaluate the adequacy of field implementation and rework. Based on the above review, the inspectors concluded that the programmatic aspects of the applicant's implementation plan for this CAP were adequate to address the concerns in the CDR. This is generally the same conclusion reached in Section OA.1.12 as reported in IIR 05000391/2010605 (ADAMS Accession Number ML110410680). Additional inspections will be required to evaluate the adequacy of the field implementation for the CAP and CDR.

**OA.1.2 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Inspection Procedure 35007)**

a. Inspection Scope

Background: The Cable Issues CAP – Sub-Issue: Supports in Vertical Trays and CDR 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs are similar issues, and have been inspected together.

The concern that long vertical cable tray runs may not be adequately supported was initially reported to the NRC on May 26, 1989, in accordance with 10 CFR 50.55(e) as CAQR WBP 880575. The follow-up final report associated with the notification (ADAMS Accession Number ML073551053) was transmitted by letter dated September 7, 1990, and identified apparent cause, safety implications, and planned or completed corrective actions.

TVA's plans were to use the same approach as used at WBN Unit 1 and using the requirements in General Construction Specification G-38, which meets current standards. TVA commitments in this regard (NCOs 890140002, 890140007) are to: 1) report on support of Class 1E cables installed in long vertical cable tray runs in Unit 2 before Unit 2 fuel loading; and 2) complete calculations, walkdowns, evaluations, and rework for Unit 2, as required to address this issue, before Unit 2 fuel loading.

Inspection Activities: Based on the information provided in the background section, the objective of this inspection was to gather and evaluate sufficient information to make a determination as to whether the applicant's cable support in vertical tray sub-issue within the Electrical Cable Issues CAP had been adequately developed address the concerns

in the CDR. This was done to ensure that the Unit 1 historical problems were being prevented and resolved for Unit 2. This inspection focused on a review of the adverse conditions involving vertical support of safety-related cables within long vertical tray.

The inspectors reviewed General Engineering Specification G-38, Section 8.6.4, to verify that direction and acceptance criteria for the installation of cable supports for cables in long vertical runs had been appropriately incorporated. Additionally, the inspectors reviewed Design Criteria WB-DC-30-22, Section 5.2, to verify that provisions had been made for installation of cable supports in long vertical runs.

Calculation EDQ00299920090003, Rev. 000, was reviewed to ensure that methodology employed in Unit 1's reconciliation had been applied to the remaining Unit 2 cables and that no cables had been inadvertently excluded from consideration. The inspectors reviewed licensee QA assessments and audits of engineering activities associated with the cable issues CAP and followed up on findings/recommendations.

Documents reviewed are included in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors reviewed various completed actions associated with the Electrical Cable Issues CAP sub-issue of conductor support in vertical tray to verify the adequacy of the program. The inspectors concluded that the programmatic aspects of the applicant's implementation plan were adequate. Additional inspections will be required to evaluate the adequacy of the field implementation of supports and cable replacements associated with the corrective action.

**OA.1.3 (Discussed) Three Mile Island Item II.B.1: Reactor Coolant System Vent and SSER Appendix HH Item 69, U2 RCS Vent System Acceptable Pending Verification that Reactor Coolant System Vent System is Installed (Inspection Procedure 92717)**

a. Inspection Scope

Background: One action after the Three Mile Island (TMI) accident was for licensees/applicants to install a reactor coolant vent system to relieve non-condensable gases that could accumulate in the reactor head area. The NRC approved the TVA approach to this requirement in a letter dated April 28, 1993. The NRC's Safety Evaluation Report (SER), NUREG-847, Supplement 23, dated July 2011, indicated that TVA's approach for Unit 2 (which was similar to Unit 1) was acceptable. In addition to installation of the system to the quality requirements, required actions included demonstrating acceptable vibration behavior during preoperational testing, system testing, and incorporation into emergency procedures.

Inspection Activities: The inspectors reviewed documentation included in the applicant's engineering complete package which included the applicant's responses, the NRC staff's SER, and portions of engineering design packages. The inspectors reviewed

documentation confirming valve requirements were met for safety class, environmental qualification, and seismic qualification. In addition, the inspectors reviewed Unit 2 procedures to confirm these matched similar procedures for Unit 1 (included emergency procedures, alarm response procedures, and the associated technical requirements instruction). The inspectors also observed the newly installed valves and piping.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that documentation and procedures reviewed were considered acceptable and no problems were identified with field installation. Inspection of final installation and testing is recommended to close these items.

**OA.1.4 (Discussed) Generic Letter 88-14: Instrument Air Supply System Problems Affecting Safety-Related Equipment (Inspection Procedure 92717)**

a. Inspection Scope

Background: This generic letter (GL) highlighted industry generic problems with air quality and challenges to design function and required licensees/applicants to address air quality, maintenance practices, emergency procedures, training, and confirmation that design requirements were met. The Watts Bar system, called control air, consists of three subsystems, control air, service air and the safety-related portion, auxiliary control air system (ACAS). Most of this system was turned over under Unit 1 since the major components (e.g., compressors, dryers, and receivers) are shared between Unit 1 and Unit 2. TVA provided a final revised response for both units to this GL in a letter dated July 14, 1995. The NRC confirmed acceptance of the applicant's approach for both units in letters dated July 26, 1990, and July 27, 1995. The NRC regulatory framework letter dated January 29, 2008, confirmed the applicant's intended actions previously committed to were acceptable and Unit 2 implementation would satisfy this issue. Preventive maintenance practices, training, and system monitoring were developed and implemented under Unit 1. Unit 2 actions remaining included implementation of minor design changes, such as installation of upgraded pressure regulators for some components, development of the Unit 2 abnormal operating instruction (AOI), and system testing for dual unit operation.

Inspection Activities: The inspectors reviewed the applicant's engineering complete package which included the above described letters, reviewed portions of associated design change packages, and compared the Unit 2 AOI (2-AOI-10, Loss of Control Air, Rev. 0) with the equivalent Unit 1 AOI. The inspectors also reviewed the preventive maintenance status for the previously turned over equipment, reviewed the Unit 1 system health report, and observed three newly installed pressure regulators.

b. Observations and Findings

No findings were identified. While all field work is not complete, the remaining work is tracked for completion. The Unit 2 AOI was equivalent to the Unit 1 procedure. Documentation showed preventive maintenance was meeting the schedule



requirements on the major portions of the system belonging to Unit 1. The health report showed the system to be red due to multiple failures and equipment issues. All major compressor components were in need of replacement according to the report. The applicant planned to begin replacement of non-safety compressors in August 2013. The design for the ACAS compressor skids was not yet complete and the earliest projected replacement date was July 2016. The report showed the ACAS system remained operational with an estimated margin of about eight percent above the design minimum. Additional testing of ACAS compressors was planned. Procedures for dual unit operations testing were not yet developed.

c. Conclusions

The inspectors concluded that inspection of dual unit testing of the ACAS is recommended to close this item.

**OA.1.5 (Discussed) Inspector Follow-up Item 86-10-03: U2 Instrument Air Preoperational Test (Inspection Procedure 92701)**

a. Inspection Scope

Background: This issue involved the fact that the system testing on Unit 1 did not meet requirements, resulting in a Notice of Deviation. Individual valves were being tested rather than meeting Regulatory Guide (RG) 1.80 which required that a loss of instrument air supply test be conducted on all branches of the system simultaneously, if practicable, or on the largest number of branches of the system that can be adequately managed. This item was established to ensure inspection of the Unit 2 test for conformance to the RG. This item relates to GL 88-14 described in Section OA.1.4.

Inspection Activities: The inspectors reviewed the applicant's response to the Unit 1 deviation dated April 4, 1984, and reviewed the status of Unit 2 preoperational test procedures.

b. Observations and Findings

No findings were identified. The applicant is committed to conduct testing in accordance with the RG; however, test procedures were not yet developed.

c. Conclusions

This item should remain open pending review of adequate test procedures and preoperational testing.

**OA.1.6 (Discussed) VIO 391/87-19-01 Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 50090)**

a. Inspection Scope

Background: In October 1987, the NRC selected the Unit 2 North and South Valve rooms with the objective of performing a detailed inspection of completed work prior to the piping and equipment becoming inaccessible due to painting or insulation. A total of

13 discrepancies were identified by NRC inspectors and documented in inspection reports 50-390/87-19 and 50-391/87-19 (ADAMS Accession Number ML072530363).

TVA responded to the Notice of Violation (NOV) on August 4, 1988, committing to correct deficiencies associated with the violation by placing these issues in their Corrective Action Program. The following list describes the PER's that were opened to track the corrective actions for Unit 2:

- PER 143790: Spring can support 2-01B-172 did not have ID tag properly installed;
- PER 143791: Support 0-CSP-292-18684X was found to have several welding discrepancies and errors in the as-built dimensions;
- PER 143792 and 143939: These 2 PER's addressed 4 of the 13 issues associated with the violation. Platforms 48W1707-6, PD07-26, PD07-40, and PD07-28 contained several welding deficiencies associated with platform attachments;
- PER 143940: Discrepancies with full penetration weld associated with beam 1708-05;
- PER 143795: Failure to meet space separation requirements on safety-related conduits 2VC-2954-A and 2-PM-7418B; and
- PER 143796: Conduit supports 0-CSP-292-1178 and 0-CSP-292-1179 attachment welds were not in conformance with welding detail on drawing 47A056-04.

In addition to the corrective actions mentioned above, TVA made the following commitments in order to address the generic implications and to prevent recurrence of similar deficiencies:

- NCO880178022: TVA WBN Weld Task Group had to formulate the details for the Unit 2 welding re-inspection plan;
- NCO880178023: A Unit 2 hanger walkdown and Hanger Analysis Program (HAAUP CAP) similar to the program established for Unit 1 was developed; and
- NCO880178018: TVA decided, as appropriate, to apply lessons learned from the Vertical Slice Review (VSR) in Unit 1 to Unit 2.

Inspection Activities: The inspectors reviewed the engineering complete closure package to determine if the proposed actions addressed the issues documented in VIO 391/87-19-01. Specifically, the inspectors reviewed PER's 143792, 143791 and 143940 to verify that deficiencies associated with improper equipment installation were properly addressed. In addition, the inspectors reviewed the status of the Hanger Analysis and Update Program CAP and welding inspection program to determine if the respective corrective actions were established and properly documented as described in the commitment documents mentioned above.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Documentation and field walkdown verifications associated with conduit, equipment, and pipe supports are still in progress. Inspectors recommend performing walkdowns of completed field activities to close the violation.

**OA.1.7 (Discussed) VIO 391/87-19-02 Failure to Preserve Equipment Installed in North and South valve rooms (Inspection Procedure 50073, 50090, and 51053)**

a. Inspection Scope

Background: During an NRC inspection of North and South Valve rooms conducted on October 19 – 30, 1987, several examples of failure to control the preservation of equipment and general housekeeping deficiencies were found. This was identified as Violation 50-391/87-19-02, and documented in NRC Inspection Report 50-390/87-19 and 50-391/87-19 (ADAMS Accession Number ML072530421). TVA initiated a total of six PERs in order to address the maintenance and preservation issues found in the North and South Valve rooms. The issues are listed as follows:

- The bailey positioner for valve 2-PCV-1 had open fittings;
- Damaged instrument line adjacent to hanger 2-032-AB-000;
- Uncapped condulets with visible rust;
- Broken supply line fitting for valve 2-PCV-1-30;
- A temporary support was disconnected and jammed between a process pipe and valve 2-PCV-1-30;
- Hanger pins and loose electrical parts were found lying in the valve rooms;
- Water had collected in the beam pocket of structural steel;
- Corrosion was observed on devices and terminal points in electrical panel 2JB-292-1515A;
- Several instances of broken conduits and missing condulet covers were found in North and South Valve rooms;
- A wooden ladder was found against the motor terminal box cover of valve 2-FCV-1-15;
- Valve 2-PCV-1-12 was observed with a damaged air line from the operator diaphragm housing to the solenoid, frayed jackets on exposed wiring from the solenoid, and limit switches with missing covers and gaskets;
- Valves 2-FCV-3-033-A and 2-FCV-3-047-B had condensation and excessive corrosion on the rotors, rotor housings, torque switches wire terminals and wiring; and
- Spring can 47A427-3-9 had a bent rod.

In August 4, 1988, TVA sent a response letter to acknowledge the NOV and committed to place these deficiencies in their Corrective Action Program.

Inspection Activities: The inspectors reviewed TVA's engineering complete closure package to determine if the proposed actions would satisfy the concerns identified in VIO 50-391/87-19-02. Specifically, the inspectors reviewed the following PER's: 143794, 143928, 143938, 172756, 172758, and 172759, to determine if the corrective actions associated with the hardware deficiencies in the North and South valve rooms were established and were properly documented.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors confirmed the applicant placed the violation discrepancies in their corrective action program.

c. Conclusions

Field implementing activities have not been performed for this item; therefore, additional document review and walkdown verifications are recommended to close this violation.

**OA.1.8 (Discussed) Construction Deficiency Report (CDR) 391/87-18: Deficiencies in installation of electrical conduit and conduit supports (Inspection Procedure 51055)**

a. Inspection Scope

Background: On December 9, 1985, TVA reported a problem in accordance with 10 CFR 50.55(e) relative to various discrepancies on conduits and conduit supports of Unit 1 and Unit 2. An interim report was issued on January 29, 1986. The final report was issued on August 31, 1990. Various conduit support discrepancies identified as a result of employee concerns were documented in various condition adverse to quality reports, and reported to the NRC under CDR 390/86-14 and 391/87-18 for Unit 1 and 2, respectively. The following is a summary of the discrepancies reported by the CDRs:

- Installed components deviated from applicable drawings;
- Support type installed different from that specified on drawing;
- Required supports not installed in field;
- Supports installed in field where none required by drawings;
- Discrepancies in design basis;
- All design requirements not enveloped by the original design;
- Installed configuration and inspection documentation not consistent;
- Conduit overspan; and
- Flexible conduit deficiencies.

Inspection Activities: The inspectors reviewed the applicant's engineering complete open item closure report, including referenced documents and actions associated with PERs 143879, 144966, and 144177 which were issued to track required Unit 2 actions for CDR 391/87-18. The inspectors also interviewed responsible personnel in conjunction with the reviews to determine if the corrective actions associated with the hardware deficiencies in conduit and conduit supports were resolved and were properly documented.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

All documentation developed was adequate. Additional review of representative samples of completed work remains to be performed prior to closure to this CDR.

**OA.1.9 (Discussed) CDR 391/89-09, Significant Trend Associated with Damaged, Loose, or Missing Hardware (Inspection Procedure 37051)**

a. Inspection Scope:

Background: The applicant notified the NRC of a significant trend of deficiencies associated with loose and missing hardware on equipment/components documented as installation complete. The applicant also documented that walkdowns planned at the time the trend was identified did not totally envelope the population of these conditions. The adverse condition revealed a trend involving various hardware and components such as pipe supports, doors, valves, panels, junction boxes, conduits, and other items.

Inspection Activities: The inspectors reviewed the procedures that the applicant will use when verifying that components are installation complete to determine whether these procedures adequately addressed the deficiencies previously identified and documented. The inspectors also interviewed personnel to determine how and when the applicant plans on implementing the procedures.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings were identified.

c. Conclusions:

Additional inspection activities are still recommended prior to closure of the CDR 391/89-09; specifically, the inspectors plan to observe a sample of TVA's implementation of the procedures used to verify components are installation complete.

**OA.1.10 (Closed) NOV 05000391/94-04-01: Failure to Follow Procedure SSP-2.10 for Evaluation of Vendor Manual PM Deviations (Inspection Procedure 92702)**

a. Inspection Scope

Background: This issue involved the fact that the applicant had failed to implement or justify not implementing vendor-suggested preventive maintenance activities for the then deferred unit. Since the time of that violation, additional problems were noted and a

second violation was issued for similar problems during construction activities, see NOV 05000391/2012612-01 (ADAMS Accession Number ML12131A231).

Inspection Activities: The inspectors reviewed the applicant's response to the original NOV dated March 28, 1994 to verify that corrective actions adequately corrected the violation.

b. Observations and Findings

No findings were identified. The applicant responded to the first NOV by evaluating missed preventive maintenance (PM) activities and implementing appropriate PM activities. Since that time the applicant has also initiated a construction refurbishment program, in part, to evaluate potential deterioration of equipment. This program is being inspected by NRC in accordance with IP 37002, Construction Refurbishment Process – Watts Bar Unit 2. The applicant corrected the problem associated with the second NOV by developing an upgraded layout and preventive maintenance program, and the NOV was closed in NRC Report 05000391/2012608 (ADAMS Accession Number ML12319A368), Section OA.1.17

c. Conclusions

Based on the review of the final complete package, the inspectors concluded that the applicant's actions were adequate to close this item.

**OA.1.11 (Closed), Construction Deficiency Report 391/84-10: Target Rock Solenoid Valves on Post Accident Sampling Facility Do Not Meet Backpressure Requirements (Inspection Procedure 35007)**

a. Inspection Scope

The inspectors reviewed the engineering package for this issue and the associated design change package (engineering design change request 53920) to verify that the applicant's corrective actions adequately corrected the deficiency.

b. Observations and Findings

No findings were identified. In accordance with industry practice, the applicant has deleted the post accident sampling facility. The inspectors confirmed the deficient valves to be deleted were included in the design change package.

c. Conclusions

Based on the review of the engineering complete package, this item is closed since the deficient valves were deleted.

**OA.1.12 (Closed) Construction Deficiency Report 391/85-55: Flooding in Category I Structures Outside Containment (Inspection Procedure 35007)**

a. Inspection Scope

This issue involved the fact that the applicant could not ensure equipment remained functional after a moderate energy line break (MELB) outside containment. The inspectors reviewed documentation of the CDR and the applicant's committed actions to verify that the actions have been included in the MELB Special Program.

b. Observations and Findings

No findings were identified. This CDR described the problems that resulted in the applicant's MELB Special Program which is being inspected under Temporary Instruction 2512/040. The inspector confirmed the issues identified in the CDR are included in the MELB Special Program.

c. Conclusions

Based on the review of the engineering complete closure package, this issue is considered closed because the problems are adequately captured in the applicant's associated special program and this special program, MELB, is being inspected by the NRC.

**OA.1.13 (Closed), Bulletin 89-02, Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design (Inspection Procedure 92717)**

a. Inspection Scope

This issue was previously inspected and documented in NRC IIRs 05000391/2010605, Section OA.1.21 (ADAMS Accession Number ML110410680), 05000391/2011604, Section OA.1.6 (ADAMS Accession Number ML111810890), 05000391/2012602, Section OA.1.4 (ADAMS Accession Number ML12087A324), 05000391/2012608, Section OA.1.4 (ADAMS Accession Number ML12319A368), and 05000391/2013613, Section OA.1.1 (ADAMS Accession Number ML13158A115). The inspectors previously reviewed work instructions, design control documents, and field work. These inspections also included the applicant's actions associated with two NCVs related to this issue. During this inspection, the inspectors reviewed previous inspection activities to ensure adequate inspection and documentation of this issue had been completed. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. Previous inspections were adequate to ensure actions associated with the subject bulletin have been completed.

c. Conclusions

Based on the review of the final complete closure package, BL89-02 is considered closed because adequate actions have been completed to address the problems identified in the bulletin.

**OA.1.14 (Closed) Construction Deficiency Report 391/86-54 Use of Long Slotted Holes without Plate Washers (Inspection Procedures 48053, and 48055)**

a. Inspection Scope

Background: During an NRC inspection conducted April 21 – May 20, 1986, structural steel connections with long slotted holes were identified that did not have required plate washers on outer plies. These violations were captured in inspection reports 50-390/86-12 (ADAMS Accession Number ML072500278) and 50-391/86-13 (ADAMS Accession Number ML072500278) as violations 50-390/86-12-08 and 50-391/86-13-08, NCR W-431-P, significant condition report (SCR) 6835-S, and PER 143722. The plate washer requirement was specified in the American Institute of Steel Construction (AISC), 7<sup>th</sup> edition, 1970; however, ninety percent of bolted connections with long slotted holes were installed prior to this requirement being incorporated in the General Specification G-53 and site procedures.

Corrective actions for WBN Units 1 & 2 were implemented through the following actions:

- The final interim report, WBRD-390/86-57 for Unit 1 and WBRD 391/86-57 for Unit 2, documented the revision of General Specification G-53 and implementing procedures Modification and Additions Instruction (MAI) -9 and MAI-5.2, which was the successor to procedure WBN-QCP-142-3

Specifically, the changes included in procedure MAI-5.2 “Bolting for Structural Connections” were specific instructions on the dimensions and material conditions of the plate washers required. In addition, a table describing the nominal hole dimensions for long slotted holes according to bolt diameters was extracted from the AISC code, 7<sup>th</sup> edition, 1970, and incorporated on procedure MAI-5.2

- Engineering conducted a complete review of all structural steel drawings in order to determine bolted configurations where slotted holes were specified;
- Calculations WCG-1-260 and WCG-1-287 were issued to qualify connections where washers are not required;
- Connections in Unit 1 were re-worked to the standards of the revised specification G-53 and site procedures.

The remaining corrective actions for Unit 2 were tracked on SCR WBN 6835 SSSA which was converted to PER 143722. Calculation WCG-2-440 documented the remaining Unit 2 drawings with connections requiring disposition as determined by engineering change notice (ECN) 6495. In addition, calculation WCG -2-440, summarized all actions taken for the Unit 2 locations of connections on the remaining drawing list. Inspection Reports 50-390/95-24 and 50-391/95-24 (ADAMS Accession



Number ML072760218) document the closure of VIO 50-390/86-12-08 and 50-391/86-13-08.

Inspection Activities: The inspectors performed the following for Unit 2:

- Reviewed the applicant's engineering complete open item completion form including the corrective actions associated with PER 143722. This PER was used to track required Unit 2 corrective actions associated with the addition of plate washers for long slotted hole connections;
- Ensured closed work orders were complete and that the appropriate signatures and inspections were documented;
- Reviewed General Specification G-53 and implementing procedure MAI-5.2 to determine if the requirements of the AISC Code 7<sup>th</sup> edition, 1970, were incorporated;
- Interviewed TVA's personnel in charge of installation and modification of structural connections to verify they were properly trained to the requirements of structural bolting procedure MAI-5.2;
- Performed a walk down of re-designed and re-worked structural connections to determine if the modifications performed were in accordance with construction drawings and design specifications.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The implementing procedures, design specifications, and construction drawings reviewed were in conformance with the requirements of the AISC Code 7<sup>th</sup> edition, 1970. Based on the review of the engineering complete closure package, CDR 391/86-54 is closed.

**OA.1.15 (Closed) Construction Deficiency Report 391/86-57, Deficient Concrete Pullout Capacity for Embedded Plates (Inspection Procedures 48053, 48055)**

a. Inspection Scope

Background: In June 1986, during the review of embedded plate design calculations for the WBN concrete quality evaluation, the applicant identified one plate for which the original calculation package for a reactor coolant pipe restraint in the reactor cavity wall did not have a check for the concrete pullout capacity. Calculations were performed which revealed that the embedment did not have an adequate capacity for the originally specified concrete strength. This condition adverse to quality was initially documented as Significant Condition Report (SCR) WBN CEB 8669.

For Unit 1, TVA performed an evaluation of concrete pullout by using a worst-case methodology and was documented in calculation WCG-1-580. SCR WBN CEB 8669, which corrective actions apply to Unit 1 and Unit 2, was submitted for closure to the NRC and was closed via NRC Inspection Reports 50-390/94-61 and 50-391/94-61 (ADAMS Accession Number ML072980626).

Inspection Activities:

The inspectors performed the following for Unit 2:

- Reviewed the applicant's engineering complete open item completion form including the actions associated with PER 144972, which was used to track required Unit 2 actions;
- Reviewed the corrective actions of SCR WBN CEB 8669 to verify that they properly addressed the design requirements for the embedded plates concrete pull out capacity;
- Performed a review of calculation WCG-1-580 to determine if TVA included a worst case methodology similar to that used for Unit 1;
- Reviewed a sample of calculations for embedded plates to determine if the concrete pullout capacity properly addressed the effects of loads from attachments, adjacent embedded plates, and seismic events;
- Walked down a sample of baseplates to verify that the as-installed configuration was in accordance with construction and design drawings;
- Reviewed closed work orders to ensure they were complete and that appropriate signatures and inspections have been performed.

Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors reviewed the engineering complete closure package and determined that the applicant had plans to implement the corrective actions committed in SCR WBN CEB 8669 in accordance with design specifications. Based on the actions completed and those proposed, CDR 391/86-57 is closed.

**OA.1.16 (Closed) Unresolved Item 05000391/2012607-01: Discrepancies Associated with Training Records and Requirements of Conduit CAP Personnel (Inspection Procedure 51055)**

a. Inspection Scope

Background: As a result of the inspection of the Electrical Conduit and Conduit Supports Corrective Action Program (Conduit CAP), documented in inspection report 05000391/2012607 (ADAMS Accession Number ML12276A028), the inspectors identified an unresolved item (URI) dealing with the qualification of personnel to perform walkdown activities in accordance with procedural requirements. Evidence to show that several engineering personnel, walkdown engineers, and walkdown personnel, including personnel used to measure weld data, were previously trained or qualified in accordance with Calculation WCG-2-308, "Engineering Walkthrough and Evaluation of Conduit and Conduit Supports," Rev. 1, WDP-GEN-1, "Walkdown Procedure for General Walkdown Requirements," Rev. 14, and WDP-C-3, "Walkdown Procedure for Civil," Rev. 3 was not available. The applicant initiated PER 592709 to address the issues of concern identified by the inspectors. The inspectors determined that additional information was required to verify that the Conduit CAP personnel were adequately trained and qualified, as required by the procedures, for the scope of these activities.

Inspection Activities: The inspectors reviewed licensee documentation to evaluate the licensee's actions to address this concern. Specifically, inspectors reviewed PER 592709 and its attachments, walk-down packages including limited scope walk-downs, procedures, and training records, to verify that the training of personnel performing activities associated with the Conduit CAP was achieved and maintained as required by program procedures.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the issues of concern associated with URI 05000391/2012607-01 were adequately addressed by the applicant. Based on the inspection of these items, URI 05000391/2012607-01, Discrepancies Associated with Training Records and Requirements of Conduit CAP Personnel, is closed.

**OA.1.17 (Closed) Construction Deficiency Report 391/80-06, Auxiliary Feedwater Design Deficiency (IP 51063, and 51065)**

a. Inspection Scope:

This CDR was previously reviewed and discussed in IIR 05000391/2012605, Section OA.1.3 (ADAMS Accession Number ML12220A536). The inspectors determined that field verification of completed work was not required to close this item, because there was sufficient design information available to reach a conclusion. The inspectors reviewed data from the Integrated Cable and Raceway Design System on the terminal

connections of the control power for the turbine driven auxiliary feedwater (TDAWF) and motor driven auxiliary feedwater (MDWFW) pumps to verify that the TDAFW pump and the MDAFW pump received control power from independent electric channels. The inspectors also performed a field walkdown of the control power cabinets to verify that the proposed actions were adequate to meet the design.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions:

Based on the review of the applicant's engineering complete closure report, engineering documents, and field walkdowns, the inspectors concluded that the applicant adequately addressed the issues identified in the CDR. CDR 391/80-06 is closed.

**OA.1.18 (Closed) Construction Deficiency Report 391/83-08, Valve Indication Problems with EMD Gate Valves (IP 50073 and 50075)**

a. Inspection Scope:

This CDR was previously reviewed and discussed in IIR 05000391/2012608, Section OA.1.5 (ADAMS Accession Number ML12319A368). The inspectors reviewed a sample of valves that were installed in the field to verify that the valve actuators were the actuators specified in the design. The inspectors also reviewed procedures and interviewed personnel on TVA's testing of the valves to verify that the design change sufficiently corrected the deficiency documented in the CDR.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings were identified.

c. Conclusions:

Based on the review of the applicant's engineering complete closure report, engineering documents and field work the inspectors concluded that the applicant adequately addressed the issues identified in the CDR. CDR 391/83-08 is closed.

**OA.1.19 (Closed) Construction Deficiency Report 391/87-27, Potential Failure of Operator-to-Valve Engagement on XOMOX Supplied Valves (IP 50073, and 50075)**

a. Inspection Scope:

This CDR was previously reviewed and discussed in IIR 05000391/2012608, Section OA.1.7 (ADAMS Accession Number ML12319A368). The inspectors reviewed the post

maintenance test results to verify that the test adequately bounded the deficiency documented in the CDR.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions:

Based on the review of the applicant's final closure report, engineering documents and field work, the inspectors concluded that the applicant adequately addressed the issues identified in the CDR. CDR 391/87-27 is closed.

**OA.1.20 (Closed) Vendor Information Corrective Action Program (TI 2512/031)**

a. Inspection Scope:

Background: The Vendor Information CAP was established to resolve issues identified in TVA Conditions Adverse to Quality Reports, employee concerns, TVA audit findings, and NRC inspection findings, regarding the use of vendor information at Watts Bar. Specifically, vendor information was not adequately evaluated for implementation, vendor information did not match the plant configuration, vendor information was inconsistent with associated TVA-developed design input/output documents, vendor documents were incorrect or out of date, vendor document control was inadequate, vendor manuals were lost or were uncontrolled, and the incorporation of the Vendor Information Program was not approved by TVA Engineering. To resolve these issues on Unit 2, TVA committed to using the same approach used to resolve the Unit 1 CAP. This CAP was previously reviewed and discussed in IIR 05000391/2012604, Section OA.1.8 (ADAMS Accession Number ML12167A212), and in IIR 05000391/2012603, Section OA.1.11 (ADAMS Accession Number ML12123A156).

Inspection Activities: The inspectors reviewed TVA's corrective actions in PER 541641 from the NCV on Stow remote valve operators (05000391/2012603, Section C.1.2 (ADAMS Accession Number ML12123A156)) to verify that the PER was categorized in accordance with the significance of the condition, and that corrective actions taken were effective in resolving the condition adverse to quality. This review was performed as part of the Problem Identification and Resolution inspection documented in IIR 05000391/2013613 (ADAMS Accession Number ML13158A115).

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions:

Based on the review of the applicant's engineering complete closure report, engineering documents, and corrective action documents, the inspectors concluded that the applicant adequately addressed the issues identified in the CAP. Vendor Information CAP is closed.

**OA.1.21 (Closed) Construction Deficiency Report 391/85-26: Failure of Coating on Containment Vessel Interior and Coatings Program Review (Inspection Procedures 48051, 48053 and 48055)**

a. Inspection Scope

Background: Deficiencies with the coatings on the containment vessel interior were originally reported to the NRC on July 27, 1985. At that time, it was identified that the existing coating on the interior of the Unit 2 containment vessel, from elevation 819 to 830, had demonstrated multiple failures. The types of coating failures included poor adhesion, delamination, excessive dry film thickness, peeling and cracking. The apparent cause of the failures was due to improper application of a secondary coating. Past corrective actions included repair of the affected areas in addition to re-certifying applicators.

Inspection Activities: The inspectors reviewed the coatings program and observed coating activities in the interior of the containment vessel. Specifically, the inspectors reviewed activities associated with WO 113996597, the Service Level 1 coatings program, and observed activities that were critical to the QC aspects of the coatings. As part of the WO, interior containment vessel coatings located from elevation 819 to 847 were being removed and replaced based upon previously identified coating failures separate from the CDR. In addition to the review of WO 113996597, and in order to ensure that current coating activities inside containment were adequate, inspectors performed a review of the Service Level 1 coatings program. As part of the review, inspectors observed Service Level 1 coating activities at both the site paint shop and inside containment. Observed activities included quality control inspections for: proper surface profile; controlled mixing of Service Level 1 coatings; measurement of dry film thickness; and visual inspection for coating defects. Additional activities included observations of: paint supplier audit history; applicator and QC inspector qualifications; coating system qualification; abrasive blasting and blast media; M&TE control; coating storage conditions; and surface preparation, atmospheric, and surface conditions prior to application activities to verify they were in accordance with design specifications, and regulations.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the results of the inspection activities described above, the inspectors determined that the applicant resolved the original construction deficiency. CDR 391/85-26 is closed.

**OA.1.22 (Closed) Construction Deficiency Report 391/81-93: Loading Criteria for Structural Steel and Supports (Inspection Procedure 92701)**

a. Inspection Scope

Background: This deficiency was initially reported to the NRC in September 1981 as NCR 3659 for both Unit 1 and Unit 2 in accordance with 10CFR 50.55e.

NCR 3659 Rev. 0 and Rev. 1 (Units 1 and 2) documents that attachments to platforms only considered the individual attachment to the platform, cable trays, and base plates for supports, and did not consider the cumulative loading affect applied to each platform by multiple attachments. This NCR was subsequently revised to include additional attachments to building steel. In addition WBNSWP8216 identified that some platforms were designed to Sequoyah Nuclear Station design criteria rather than Watts Barr design criteria, some platforms had no seismic design performed, and no calculations could be found for some platforms.

Unit 1 Corrective Actions

WBNSWP 8216 was initiated to identify platforms and attachments to heavily loaded platforms and transmit that information to engineering for load evaluation. Engineering evaluations were performed under NCR 3659R and any platform that required drawing revision and modification was performed under ECN 3255. For platforms not heavily loaded, Watts Bar design criteria was used for redesign and platform drawing revisions and modifications were performed under ECN 3726. Corrective action for cable tray support seismic issues included a special program to insure adequate design. Calculation WCG-1-1419 identifies the actions taken to resolve cable tray support issues related to the following areas:

- Installed configurations did not comply with design output documentation;
- Original design basis did not envelop all design requirements for supports;
- Documentation was lacking for verification of previous support inspections;
- The design basis for cable trays, fittings and covers was not fully documented.

The methodology for cable tray supports included: design basis review and upgrade documentation, inspection of 3000 supports, case evaluations of 1700 supports, and evaluations of supports attached to the steel Containment Vessel. Platforms were addressed for attachment loads not included in the design basis, torsional stresses on members, and inadequate design of welded and bolted connections. The technical adequacy of the platforms was confirmed by the worst case evaluation of selected platform groups and walkdowns of platforms to confirm that they were bounded by the worst case group. The worst case evaluation consisted of a walkdown of the total population for attachment weld loads, potential to be affected by changes in response spectra curves, and Sequoyah Nuclear Plant experience. Walkdowns of worst case

platforms were performed to document existing conditions and structural evaluations were performed. The results were documented in Calculation WCG 1-496.

Upon completion of the above actions TVA issued Technical Instruction TI-206, which controls the effect of cumulative loads to civil features and issued MAI-3.1, which controls attachment of field routed conduit supports. TVA also issued MAI-4.2, which controls attachment of field routed piping and tubing supports.

#### Unit 2 Corrective Actions

PER 144958 includes Unit 2 actions to resolve cable tray support and platforms issues identified in this CDR. Cable tray supports were evaluated and documented in Calculation WCG 11419. These included a design basis review and upgrade documentation for 727 supports that were not evaluated by Unit 1 evaluations identified above, critical case evaluations for these 727 supports, and critical case evaluations of supports attached to the steel containment vessel. Platforms were included in the population addressed in Calculation WCG 2412. The inspectors performed a walkdown of the platforms to verify that they were bounded by previous evaluations. If the platforms were not bounded by previous evaluations, the inspectors reviewed modifications made to the platforms to verify that the as-built met the design requirements. ECNs for platform modifications were initiated to address the following: platform deficiencies similar to Unit 1, platform redesigns as a result of the uniqueness of Unit 2, or modifications to platforms that have not been installed.

Inspection Activities: Inspectors reviewed NCRs, engineering calculations, ECNs, engineering design change requests (EDCR), and Technical Instruction TI-206 to verify that the worst case conditions were bounded by calculations. If platforms were outside of the analyzed worst case conditions, the inspectors reviewed the associated modifications. Specifically, the inspectors performed field walkdowns of modifications installed by several WOs to verify that the installed configuration was in accordance with design specifications.

Documents reviewed are listed in the attachment.

#### b. Observations and Findings

No findings of significance were identified.

#### c. Conclusions

Based on the inspectors' review of the engineering complete closure package and the above actions, the inspectors determined that the applicant resolved the deficiency and CDR 391/81-93 is closed.

### **OA.1.23 (Closed) Construction Deficiency Report 391/84-07: Support Modifications on Westinghouse System Piping (Inspection Procedure 92701)**

#### a. Inspection Scope

Background: This deficiency was initially reported to the NRC in April 1984 as NCR WBNWBP8408 in accordance with 10CFR 50.55e. Pipe support designs for bottom mounted instrument lines and pressurizer surge lines were not in agreement with stress



analysis performed by Westinghouse. NCRWBNWBP8408, WBRD-50-390/84-07 and WBRD -50-391/84-07 identified that support designs were not in agreement with the Westinghouse load analysis and that supports were required to be modified at various locations in the Reactor Coolant system.

#### Unit 1 Corrective Actions

Unit 1 CDR 390/84-07 involved Westinghouse load analysis for the bottom mounted instrument system and the Reactor Vessel level instrumentation system. Also Engineering Change Notice 4759 was issued to correct the deficiency for Unit 1 and was closed on June 13, 1986. Corrective actions completed were identified and accepted in NRC Inspection Report No. 50-390/84-45 (ADAMS Accession Number ML082390472).

#### Unit 2 Corrective Actions

Unit 2 in-core monitoring system piping was walked down to collect the as-built piping and pipe support data. Piping stress analysis was performed considering as-built piping data and current design and code requirements and was documented in problem report N3-94-01R, N3-94-02R, N3-94-03R, and N3-94-04R. Reactor coolant system, and pressurizer surge line stress was evaluated by Westinghouse considering as-built piping and support data and was documented in 0600250-13-1. ECN 4759, EDCR 54251, and EDCR 52521 were issued to implement various pipe support modifications.

Inspection Activities: The inspectors reviewed NCRWBNWBP8408, WBP 84-0202 102, and NRC Inspection Report 50-390/84-45 for Unit 1 to verify that corrective actions were consistent with Unit 1 and adequate to correct the identified deficiency. Inspectors also reviewed TVA's Final Report for Unit 2 for NCRWBNWBP8408, ECN 4759, EDCR 54251, Rev. A, and EDCR 52521, Rev. A for Unit 2. The inspectors also performed field walk-downs of the implementation of WO 09-954024 to verify that the installed configuration was in accordance with design specifications.

Documents reviewed are listed in the attachment.

#### b. Observations and Findings

No findings were identified.

#### c. Conclusions

Based on the engineering complete closure package and the above actions, the inspectors determined that the applicant resolved the deficiency and CDR 391/84-07 is closed.

### **OA.1.24 (Closed) Construction Deficiency Report 391/87-24: Hydrogen Recombiner and Steam Generator Lower Lateral Supports (Inspection Procedure 92701)**

#### a. Inspection Scope

Background: Deficiencies were noted in some Hydrogen Recombiner access platform support calculations as identified in Unit 1 CAQR WBP870759 and CAQR WBP871084 for Unit 2. These deficiencies included: torsional stresses were not included, code check parameters were not correctly specified, deflections were not checked in the design, effects of seismic acceleration of live load were not included, factor of safety for pullout

of embedded plate did not meet code, and structural steel details for weld size did not have adequate calculations. Deficiencies were also noted in calculations for the Steam Generator Lower Lateral Supports in CAQR WBP870760 for Unit 1 and CAQR WBP871174 for Unit 2. These deficiencies included: torsional stresses were not included, vendor stress ratios were misinterpreted, and applicable forces from attachments were not included in the analysis. The root cause for these deficiencies was determined to be inadequate design criteria and a lack of an independent design review.

#### Unit 1 Corrective Actions

Design criteria was revised, field procedures were revised, calculations were generated to capture design methodology, and to ensure similar structures were adequately addressed, a design instruction, WCG-1-684 was issued. Completed corrective actions were reviewed in NRC Report No. 50-390/91-31 and 391/91-31 (ADAMS Accession Number ML073580103).

#### Unit 2 Corrective Actions

Design criteria in WB-DC-20-21 was revised to implement the requirements for Unit 2. An extent of condition review of the deficiency for the population of Unit 2 platforms was performed and documented in revision to calculation WCG-1-1419. Calculation WCG-2-313, documents an initial checklist that identifies attributes for each platform. A walk down of Unit 2 platforms was performed using these attributes. The worst case Unit 1 platforms were determined to bound the Unit 2 platforms and the differences between the Unit 1 and Unit 2 platforms structural issues were documented in Calculation 1-1419. Walkdowns of worst case platforms were not performed since they had already been walked down for Unit 1. PER 143929 and PER 143948 were generated to track resolution and closure of these issues.

Inspection Activities: Inspectors reviewed TVA's Final Report for Unit 2 for NCRWBNWBNBP8408, NRC Inspection Report 50-390/84-45, EDCR 54251 and EDCR 52521 to verify that corrective actions were consistent with Unit 1 and adequate to correct the identified deficiency. Inspectors also performed field walk-downs of the implementation of WO 09-954024 to verify that the installed configuration was in accordance with design specifications.

Documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the engineering complete closure package and the above actions, the inspectors determined that the applicant resolved the deficiency and CDR 391/87-24 is closed.

**OA.1.25 (Closed) Construction Deficiency Report 391/90-11: Potential For Gas Accumulation of Emergency Core Cooling System Piping; Generic Letter 2008-01: Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems; and Temporary Instruction 2515/177 for Generic Letter 2008-01 (IP 92701, IP 92717, and TI 2515/177)**

a. Inspection Scope:

Background: The subject deficiency was initially reported to the NRC on January 8, 1991, in accordance with 10 Code of Federal Regulations (CFR) 50.55(e) as Condition Adverse to Quality Report CAQR WBP 900556. After initial review and investigation by TVA, the issue was elevated to Significant Corrective Action Report (SCAR) WBP 900556SCA as stated in TVA's final report for WBRD-50-390,391/90-11.

The deficiency was first identified when the Sequoyah Nuclear Plant experienced gas accumulation in the centrifugal charging pump (CCP) piping which caused the CCP pump to become gas bound when started. As WBN is similar in design to Sequoyah, it was determined that the potential also existed for gases to accumulate in CCP suction piping which could adversely affect pump performance. This gas accumulation has the potential for common-mode failure of the CCPs during a loss of coolant accident (LOCA) due to gas binding. The root cause was determined to be that the design of the chemical volume control system (CVCS) and the emergency core cooling system (ECCS) piping configuration downstream of the volume control tank, as specified on the physical piping drawings, did not anticipate gas desorption and accumulation at system high points.

TVA initially committed to modify the CVCS system to incorporate loop seals and a vent valve to provide proper venting and preclude CCP binding; however, TVA determined that a more effective solution would be to install a continuous venting arrangement to the volume control tank (VCT) as documented in TVA's revised report. DCN M-20638-A was issued for the continuous venting arrangement. A complete review of system interfaces, piping configurations, and probable gas generation mechanisms was performed by engineering to identify any additional areas of piping that could be susceptible to gas accumulation. The review determined that the potential for gas accumulation in other plant areas and piping did not exist as documented in SCAR WBP900556SCA. The NRC reviewed TVA's response for adequacy, effectiveness of root cause determination, extent of condition, corrective action, recurrence control, and performed field inspections to verify implementation of DCN M-20638-A. The NRC concluded that the corrective actions implemented were adequate and closed the CDR in NRC Inspection Report 50-390/94-45 and 50-391/94-45 (ADAMS Accession Number ML072980549).

Subsequently, based on a continuation of gas accumulation events with significant safety implications across the industry, Generic Letter (GL) 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (ADAMS Accession No. ML072910759) was issued on January 11, 2008. GL 2008-01 was issued to request applicable licensees to (1) submit information to demonstrate that the subject systems were in compliance with the current licensing and design bases and applicable regulatory requirements, and that suitable design, operational, and testing control measures were in place for maintaining this compliance and (2) to collect the requested information to determine if additional regulatory action was required. By letters dated April 10, 2008 (ADAMS Accession Number ML081050481), April 30, 2008 (ADAMS Accession Number ML081160547), May 9,

2008 (ADAMS Accession Number ML081360101), June 6, 2008 (ADAMS Accession Number ML081630086), July 11, 2008 (ADAMS Accession Number ML081970084), July 29, 2008 (ADAMS Accession Number ML082000014), October 11, 2008 (ADAMS Accession Number ML082890540), January 19, 2010 (ML 100250237), January 12, 2011 (ADAMS Accession Number ML 110140585), and January 14, 2011 (ADAMS Accession Number ML110210110), Tennessee Valley Authority submitted information in response to GL 2008-01 for Watts Bar Nuclear Plant, Unit 1. The NRC staff reviewed the submitted information and concluded that, for WBN Unit 1, TVA's response to the GL was acceptable and considered closed.

To provide background information and guidance for NRC inspectors to verify that the onsite documentation, system hardware, and licensee actions are consistent with the information provided in the licensee's response to GL 2008-01, the NRC published Temporary Instruction (TI) 2515/177 (ADAMS Accession Number ML100261300). This TI was inspected and closed for WBN Unit 1 in IIR 05000390/2011005 (ADAMS Accession Number ML120310076), Section 4OA5, dated January 31, 2012.

### Unit 2 Actions

The corrective action for the corresponding Unit 2 CDR 391/90-11 is addressed by work scope number 5 of EDCR 52945. The issued EDCR installs three connections at high points in the CCP suction piping to alleviate gas buildup concerns. Similar to the corrective action on Unit 1, these high points are continuously vented to the VCT.

In addition to the above specific EDCR and CDR, it was noted that WBN, Unit 2 was a holder of a construction permit and as such was not an addressee of GL 2008-01. However, in support of its operating license application TVA, in letter dated January 29, 2008 (ADAMS Accession Number ML080320443), provided an "Open Action Required for Licensing" to respond to GL 2008-01. TVA submitted information in response to GL 2008-01 for WBN Unit 2 as documented in TVA letter to the NRC dated March 11, 2011 entitled, "WBN Unit 2 -- Response after completion of the engineering for the ECCS, RHR (residual heat removal system), and CCP systems in Unit 2 to GL 2008-01. Enclosure 3 of this letter contains a list of seven specific commitments that serve as the actions necessary to preclude operability impacts due to the accumulation of gas in the three systems listed in the GL. (The individual commitments numbers are: 112054436, 112054439, 112054441, 112054445, 112054449, 112054454, and 112054461). By NRC letter to TVA, dated August 23, 2011 (ADAMS Accession Number ML112232205), the NRC concluded that for WBN Unit 2, TVA responded to the requested information and the GL response is considered closed.

Also, as part of the overall WBN program to prevent gas accumulation in system piping, two additional EDCRs have been issued to install additional vents. EDCR 53311 installs high point vents on the Safety Injection System and EDCR 52637 installs high point vents on the Residual Heat Removal System.

### Remaining Unit 2 Actions

All engineering actions have been completed. The remaining actions for closure are:

1. Preparation and issuance of WO for EDCRs 52945 and 53421
2. Implement WO
3. Close WO and all associated documents

Inspection Activities: To address Unit 2 actions, the inspectors performed the following:

- The applicant's engineering complete closure package was reviewed to understand the applicant's proposed approach to resolving the deficiency.
- Unit 1 documents (i.e. System Health Reports, Surveillance Instructions, System Operating Instructions, Drawings) were reviewed to ensure Unit 2 considered Unit 1 operating experience in the scoping of Unit 2 construction activities.
- NRC inspection reports and correspondence between the applicant and the NRC were reviewed to verify that applicable proposed actions were captured as commitments for Unit 2.
- Unit 2 governing work documents (i.e. WOs, EDCRs, Drawings) were reviewed to verify that Unit 1 design was adequately captured in Unit 2 construction work instructions.
- Personnel were interviewed to verify that the proper controls were established for the implementation of storage, installation, quality control, protection from other construction activities, and capturing and resolution of nonconforming items/actions.
- Completed work and work in progress documentation was reviewed to ensure that construction quality records were present, legible, and supported the work that had been performed.
- Unit 2 completed and in-process work was reviewed to verify that it satisfied construction design documentation.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings were identified.

c. Conclusions:

Based on the previous review of the applicant's methodology for addressing this concern and the actual completed work observed this inspection period, the inspectors determined that the remaining work activities are contained within a controlled program and CDR 50-391/90-11, GL 2008-01, and TI 2515/177 are closed.

## **V. MANAGEMENT MEETINGS**

### **X1 Exit Meeting Summary**

An exit meeting was conducted on July 3, 2013, to present inspection results to Mr. Arent and other members of your staff. The inspectors identified that no proprietary information had been received during the inspection and none would be used in the inspection report. The applicant acknowledged the observations and provided no dissenting comments.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Applicant personnel**

J. Adair, TVA - Engineering  
D. Charlton, TVA – Licensing  
J. Cockrell, TVA - Licensing  
R. Hruby, TVA – General Manager  
M. McGrath, TVA – Licensing  
J. O'Dell, TVA - Regulatory Compliance  
G. Scott, TVA – Licensing  
E. Taylor, Bechtel – Mechanical Field Engineer  
L. Thompson, Bechtel - Procurement Engineering Group  
N. Welch, TVA - Startup Manager  
O. J. Zeringue, TVA - General Manager Engineering and Construction WBN Unit 2  
B. Enis, TVA – Engineer  
M. Malloy, Site Coatings Specialist, Bechtel  
R. Phillips, Senior Metallurgical Engineer, Bechtel  
M. Payne, Supervisor, Williams  
H. Baldner, Licensing, TVA, Unit 2

### **INSPECTION PROCEDURES USED**

IP 35007	Quality Assurance Program Implementation During Construction and Pre-Construction Activities
IP 37002	Construction Refurbishment Process - Watts Bar Unit 2
IP 37051	Verification of As-Builts
IP 48051	Structural Steel and Supports Procedure Review
IP 48053	Structural Steel and Supports Work Observation
IP 48055	Structural Steel and Supports Record Review
IP 49055	Reactor Coolant Pressure Boundary Piping Record Review
IP 49063	Piping - Work Observation
IP 55050	Nuclear Welding General Inspection Procedure
IP 50053	Reactor Vessel and Internals Work Observation
IP 50073	Mechanical Components – Work Observation
IP 50075	Mechanical Components – Record Review
IP 50090	Pipe Support and Restraint Systems
IP 51055	Electrical Components and Systems – Record Review
IP 51063	Electrical Cable – Work Observation
IP 51063	Electrical Cable – Record Review
IP 53053	Containment Penetrations (Mechanical) Work Observation
IP 53055	Containment Penetrations (Mechanical) Record Review
IP 64051	Procedures - Fire Prevention/Protection
IP 92701	Follow-up
IP 92702	Follow-up on Corrective Actions for Violations and Deviations
IP 92717	IE Bulletins for Information and IE Information Notice Follow-up
TI 2512/031	Vendor Information CAP
TI 2515/177	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

None

Closed

94-04-01	VIO	Failure to Follow Procedure SSP-2.10 for Evaluation of Vendor Manual PM Deviations (Section OA.1.10)
391/84-10	CDR	Target Rock Solenoid Valves on Post Accident Sampling Facility Do Not Meet Backpressure Requirements (Section OA.1.11)
391/85-55	CDR	Flooding in Category I Structures Outside Containment (Section OA.1.12)
89-02	BL	Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350 Swing Check Valves or Valves of Similar Design (Section OA.1.13)
391/86-54	URI	Use of Long Slotted Holes Without Plate Washers (Section OA.1.4)
391/86-57	CDR	Deficient Concrete Pullout Capacity for Embedded Plates (OA.1.15)
05000391/2012607-01	URI	Discrepancies Associated with Training Records and Requirements of Conduit CAP Personnel (OA.1.16)
391/80-06	CDR	Auxiliary Feedwater Design Deficiency (OA.1.17)
391/83-08	CDR	Valve Indication Problems with EMD Gate Valves (OA.1.18)
391/87-27	CDR	Potential Failure of Operator-to-Valve Engagement on XOMOX Supplied Valves (OA.1.19)
2512/031	TI	Vendor Information CAP (OA.1.20)
391/85-26	CDR	Failure of Coating on Containment Vessel Interior and Coatings Program Review (OA.1.21)
391/81-93	CDR	Loading Criteria for Structural Steel and Supports (OA.1.22)

391/84-07	CDR	Support Modifications on Westinghouse System Piping (OA.1.23)
391/87-24	CDR	Hydrogen Recombiner and Steam Generator Lower Lateral Supports (OA.1.24)
391/90-11	CDR	Potential For Gas Accumulation of Emergency Core Cooling System Piping (OA.1.25)
2008-01	GL	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (OA.1.25)
2515/177	TI	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (OA.1.25)
<u>Discussed</u>		
391/85-35	CDR	Cable Support in Vertical Conduit CAP (Section OA.1.1)
391/89-04	CDR	Cable Support in Vertical Tray CAP (Section OA.1.2)
II.B.I	TMI	Reactor Coolant Vent System (Section OA.1.3)
Item 69	SSER Appendix HH	U2 RCS Vent System Acceptable Pending Verification that RCS Vent System is Installed (OA.1.3)
88-14	GL	Instrument Air Supply System Problems Affecting Safety-Related Equipment (OA.1.4)
86-10-03	IFI	U2 Instrument Air Preop Test (OA.1.5)
391/87-19-01	VIO	Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (OA.1.6)
391/87-19-02	VIO	Failure to Preserve Equipment Installed in North and South Valve Rooms (OA.1.7)
391/87-18	CDR	Deficiencies in Installation of Electrical Conduit and Conduit Supports (OA.1.8)
391/89-09	CDR	Significant Trend Associated with Damaged, Loose, or Missing Hardware (OA.1.9)



## LIST OF DOCUMENTS REVIEWED

### I. QUALITY ASSURANCE (QA) OVERSIGHT ACTIVITIES

#### Q.1.1 Identification and Resolution of Construction Problems

##### Procedures

25402-000-GPP-000-N3520, Selection/Inclusion of Quality Control & Field Engineer Verifications for Construction Refurbishment Activities, Appendix D and E, Rev. 2  
 25402-000-GPP-000-N3112, ASME Section III Design Interface Control, Attachment B, Rev. 3  
 MSS SP-120-2011, Flexible Graphite Packing System for Rising Stem Valves –Design Requirements, October 2011  
 25402-00-GPP-000-N3521, Enhanced Valve Packing (SR/QR), Rev. 3

##### Drawings

115E003, Motor OP Gate Valve MOD 0600GM82FBB008 6-150 ASME CL.1 Assembly, Rev. 0  
 DRA 52988-01, Drawing Revision Authorization Engineering requirements for Generic packing substitution, Rev. 0  
 DRA 53537-NEW(2), Replace plugs for 2-FE-70-115 with ASME SA105 plugs, Rev. 0  
 FSK-M-5746, Weld Map 2-FD-070-124 plugs, Rev.1  
 FSK-M-5745, Weld Map 2-FD-070-115 plugs, Rev.2  
 FSK-M-5747, Weld Map 2-FD-070-095 plugs, Rev.1

##### Miscellaneous

S.O. 220, NPV-1 ASME Data Report for 2-63-FCV-47, 5/23/1978  
 T02 090922 001, Summary of August 6, 2009, Meeting with TVA Regarding Watts Bar Unit 2 construction Refurbishment Program, NRC Question 8, September 22, 2009  
 25402-011-VIA-MG00-04010-001, Replacement valve stems for Westinghouse Supplied ASME III valves for the Watts Bar Unit 2 completion, 12/10/2010

##### Work Orders

08953174-000, Disassemble valve 2-FCV-063-0047A, repack, and inspect internals  
 112271847, Reactor coolant Pump 1 upper oil cooler, system 70 WBN-2-070-0116A Flex Hose Flange  
 112272037, Reactor coolant Pump 2 upper oil cooler, system 70 WBN-2-070-0106B Flex Hose Flange  
 112273280, Reactor coolant Pump 1 thermal barrier, system 70 WBN-2-070-0117A Flex Hose Flange

##### Field Change Requests

60893-A AA-06, Bill of material change for flow element plugs for 2-FE-070-0115, 0095, and 0124, 3/11/2013  
 60893-A AA-07, Weld Size for flow element plugs for 2-FE-070-0115, 0095, and 0124, 3/12/2013  
 60893-A-AA-08, Plug material for flow element plugs for 2-FE-070-0115, 0095, and 0124, 3/13/2013

## II. MANAGEMENT OVERSIGHT AND CONTROLS

### C.1.2 Piping – Piping Work Observation and verification of As-Builts

#### Work Orders

WO 113986057 Hydro Test Package 2-067-47WB45-3-2-B13

WO 114097867 Hydro from RCP thermal barrier flex connections to pipe welds for 2PMP-070-0130-B and 0131-A

#### Procedures

WBN-VTD-B250-0020 Hydraulic diaphragm metering pumps series 1700

#### Data Sheets

2-070-47W859-3-20-B5-4-Retest 1, 6/10/2013

2-067-47W845-3-2-B13-Retest 1, 6/14/2013

2-067-47W845-3-2-B13-Retest 2, 6/20/2013

MAI 4.2B Flange Torque Data Sheet, 2-PMP-084-0016 Suction, 6/25/2013

MAI 4.2B Flange Torque Data Sheet, 2-PMP-084-0016 Discharge, 6/25/2013

MAI 4.2B Flange Torque Data Sheet, 2-PMP-084-0021 Suction, 6/25/2013

MAI 4.2B Flange Torque Data Sheet, 2-PMP-084-00121 Discharge, 6/25/2013

#### Weld Traveler

Weld No. 2-067-T623-66-C1R0, 2/28/2013

Weld No. 2-067-T623-70-C1R0, 2/28/2013

Weld No. 2-067-T623-71-C1R0, 2/28/2013

Weld No. 2-067-T623-72-C1R0, 2/28/2013

Weld No. 2-070A-D126-07-C0-R0, 4/26/2013

Weld No. 2-072B-D046-07-C2-R5, 10/1/2010

#### PER

730896, NRC identified ASME Related, Hardware Non-conformance

#### NDE Records

MT-310, Weld No. 2-070A-D126-07-C0-R0, 5/1/2013

RT-31, Weld No. 2-072B-D046-07-C2-R5, 7/10/2010

UT-295, Weld No. 2-072B-D046-07-C2-R5, 4/19/2013

#### M&TE

E43715 Pressure Gauge, 11/24/2013

E47994 Pressure Gauge, 11/24/2013

E43815 Pressure Gauge, 12/18/2013

E44057 Pressure Gauge, 8/1/2013

E49900 Torque Wrench, 7/31/2013

E45714 Torque Wrench, 7/19/2013

#### Drawings

FSK-M-5885 FBOS 2-070-F-22-34

FSK-M-5886 FBOS 2-070-F-22-35

2-47W859-3 CCW system diagram Rev 24

FSK-M-5198, Weld Map Containment spray header, Rev. 0

FSK-M-4631, Weld Map, Containment Spray Header nozzles, Rev. 0

FSK-M-4626, Weld Map, Containment Spray Header nozzles, Rev. 0

FSK-M-4625, Weld Map, Containment Spray Header nozzles, Rev. 0  
 FSK-M-2582, Weld Map, Containment Spray Repair Weld No. 2072BD04607, Rev. 3  
 47W437-4, System 072 Containment Spray, Rev. 2  
 2-47W432-206, System 074 RHR Piping Stress Problem No. N3-74-11A, Rev. 0  
 2-47W432-204B, System 072 Containment Spray Piping Stress Problem No. N3-72-06A, Rev. 0  
 2-47W432-205, System 074 RHR Piping Stress Problem No. N3-74-15, Rev. 0  
 2-47W432-204A, System 072 Containment Spray Piping Stress Problem No. N3-72-03A, Rev. 1  
 DRA 53590-126, System 074 RHR Piping Stress Problem No. N3-74-11A, Rev. 0  
 DRA 53344-138, System 074 RHR Piping Stress Problem No. N3-74-11A, Rev. 0  
 DRA 54851-127, System 072 Containment Spray Piping Stress Problem No. N3-72-06A, Rev. 0  
 DRA 53590-127, System 074 RHR Piping Stress Problem No. N3-74-10A, Rev. 0  
 DRA 53590-105, System 072 Containment Spray Piping Stress Problem No. N3-72-03A, Rev. 0  
 DRA 54851-128, System 072 Containment Spray Piping Stress Problem No. N3-72-03A, Rev. 0  
 47W437-5, 1" Spray Nozzles 10" Containment Spray Header 2A, Rev. 3  
 47W437-4, 1" Spray Nozzles 8" Containment Spray Header, Rev. 12

### **C.1.3 Reactor Vessel and Internals Work Observation**

#### Miscellaneous

TVA 20403, TVA Rigging Plan 6/25/2013

#### Work Orders

114408587, Unit 2 Polar Crane Annual Inspection  
 09954272000 Missile Shield Lift

#### Miscellaneous

PER 572414, Clarification of NDE requirements for RPV sleeve  
 PER 549165, Reactor Vessel Sleeves not marked per drawing  
 PER 548422, Reactor flange surface flatness  
 PER 543277, Scattered staining on Reactor Vessel Interior Surface  
 PER 543267, Reactor Vessel Stud Hole Sleeve Surface Machining Depth  
 PER 491518, Reactor Vessel Stud Hole 20 Thread Removal  
 PER 347160, Incorrect Reactor Vessel Stud Hole Numbering Scheme  
 PER 297712, Reactor Vessel and Closure Head Clad Thickness PER 226096, Foreign Material in the Reactor Vessel

### **C.1.4 Mechanical Component Structural Steel and Supports Work Observation and Record Review**

#### Work Orders

WO 114423285 WBN-2-SGEN-068-SG1ASME Section III remove and replace Tang Plates  
 WO 114423315 WBN-2-SGEN-068-SG2 ASME Section III remove and replace Tang Plates  
 WO 114765858 WBN-2-GEN-068-SG2 Repair Weld on Steam Generator 2 at Tang Plate "D"

#### Weld Traveler

904441 SG Lateral Supports, 4/3/2013

#### Miscellaneous

Weld Log Data sheet, Heat Input Tang Plate L, 5/31/2013  
 425A86, Steam Generator Lateral Support (Tang Plate) Design Specification, Rev. 2  
 PT-90441-024, Liquid Penetrant Report Tang L, 6/5/2013  
 PT-90441-023, Liquid Penetrant Report Tang D, 6/3/2013

PT-90441-038, Liquid Penetrant Report Tang D, 6/10/2013  
 06062-011, PWHT Strip Chart Tang A, 6/20/2013  
 06062-012, PWHT Strip Chart Tang B, 6/20/2013  
 06062-013, PWHT Strip Chart Tang C, 6/20/2013  
 06062-014a, PWHT Strip Chart Tang D-R1, 6/20/2013  
 06062-015, PWHT Strip Chart Tang E, 6/20/2013  
 06062-016, PWHT Strip Chart Tang F, 6/20/2013  
 06062-018, PWHT Strip Chart Tang H, 6/20/2013

#### Procedures

WPS 1SA-GMAW-P1HT, Rev. 0  
 WPS 904441-01, Weld Specific PWHT Requirements, Rev. 0  
 GQP-9.7, Liquid Penetrant Examination and Acceptance Standards, Rev. 15  
 WCP-8, Preheating and Postweld Heat Treatment, Rev. 9

#### NCRs

90441-09, Tang D, 6/5/2013

#### M&TE

100530, Super Heat Control Unit Calibration 14047, 8/19/2013  
 100627, Super Heat Control Unit Calibration 15004, 7/7/2013  
 100684, Super Heat Control Unit Calibration 15020, 9/2/2013  
 100629, Super Heat Control Unit Calibration 10216, 11/20/2013

### **C.1.5 Construction Refurbishment**

#### Work Orders

WO 114798138 PER654404, inspect valve 2-RFV-070-0694 to confirm previously performed refurbishment activities

#### PER

654404 ASME package review failure to include ANI in ASME work order revisions that involve NPV-1 data reports

### **C.1.6 Reactor Coolant Pressure Boundary Piping Records Review**

#### Work Orders

09-954020-001  
 10-951164-000  
 111914701

#### NDE records

PT-2054  
 PT-1924  
 PT-1941  
 PT-2053  
 PT-093  
 PT-078  
 PT-028  
 PT-033  
 PT-263  
 PT-221  
 PT-246

PT-221  
 RT-ASME III Report # 34  
 RT-ASME III Report # 15  
 RT-ASME III Report # 42

### **C.1.7 Containment Penetrations (Mechanical) Work Observation**

#### Miscellaneous

Selected portions of Unit 2 containment vessel procurement & receipt records including ASME Code data report, receipt inspection, & material certifications (MEDS Accession Number B48 850408 322, 75320, W850507K0010)

Welding Operation Sheet for Weld # 2-067C-T600-05 (Pen. X73)  
 Fit-up, Visual, and PT inspection report for weld # 2-067C-T600-05 (Pen. X73)  
 Field Welding Checklist for Weld # 2-067C-T600-06 (Pen. X73)  
 PT inspection report#PT-2227 for weld # 2-067C-T600-06 (Pen. X73)  
 Welding Operation Sheet for Weld # 2-067C-T590-05 (Pen. X69)  
 Fit-up, Visual, and PT inspection report for weld # 2-067C-T590-05 (Pen. X69)  
 Welding Operation Sheet for Weld # 2-067C-T590-06 (Pen. X69)  
 Fit-up, Visual, and PT inspection report for weld # 2-067C-T590-06 (Pen. X69)  
 Welding Operation Sheet for Weld # 2-067C-T672-09 (Pen. X68)  
 Fit-up, Visual, and PT inspection report for weld # 2-067C-T672-09 (Pen. X68)  
 Welding Operation Sheet for Weld # 2-067C-T672-10 (Pen. X68)  
 Fit-up, Visual, and PT inspection report for weld # 2-067C-T672-10 (Pen. X68)  
 Field Weld Operation Sheet for Weld # 2-030A-T010-02 (Pen. X9A)  
 Visual examination record 30787 for Weld # 2-030A-T010-02 (Pen. X9A)  
 Radiographic examination report 4496 for Weld # 2-030A-T010-02 (Pen. X9A)  
 Field Weld Operation Sheet for Weld # 2-030A-T010-01 (Pen. X9A)  
 Visual examination record 30787 for Weld # 2-030A-T010-01 (Pen. X9A)  
 Radiographic examination report 4522 for Weld # 2-030A-T010-01 (Pen. X9A)

### **C.1.8 Safety-Related Piping- Records Review**

#### PERs

708462, 314909, 238178, 220058, 160884, 241062, 393882, 224434, 258398

#### Surveillances

25402-WBN-SR-11-1483  
 25402-WBN-SR-10-1295

### **C.1.9 Containment Penetrations (Mechanical) Record Review**

#### Nonconformance Reports

3008R  
 1338R  
 1047R  
 1179R  
 1272R  
 1273R  
 1271R  
 6748  
 965R

Other

ASME N-1A Data Report for El. 755 personnel hatch

Selected portions of Unit 2 containment vessel procurement & receipt records including ASME Code data report, receipt inspection, & material certifications (MEDS Accession Number B48 850408 322, 75320, W850507K0010)

Welding operation sheet for weld # 2-016B-T002-11 (Pen. X115)

Fit-up, visual, and PT inspection record for weld # 2-016B-T002-11 (Pen. X115)

Welding operation sheet for weld # 2-016B-T002-12 (Pen. X115)

Fit-up, visual, and PT inspection record for weld # 2-016B-T002-12 (Pen. X115)

Field weld operation sheet for weld # 2-061B-T002-14 (Pen. X115)

Visual and PT inspection report 25195 for weld # 2-061B-T002-06 (Pen. X115)

Fit-up, visual and PT examination report for Weld # 2-067C-T605-05 (Pen. X74)

Welding Operation Sheet for Weld X 2-067C-T605-06 (Pen. X74)

Fit-up, Visual, and PT inspection report for weld # 2-067C-T605-06 (Pen. X74)

Welding Operation Sheet for Weld X 2-067C-T605-05 (Pen. X74)

Selected Welder Performance Qualification Records

**OA.1.1 Construction Deficiency Report 391/85-35: Cable Support in Vertical Conduit CAP**Miscellaneous

PER 144105, Class 1E Cables Installed in Long Vertical Conduit Runs Do Not Have Cable Supports Installed Per the Required Spacing, 5/3/2008

PER 145108, SCAR Initiated Due To Repetitive Problems Associated With Support of Cable, 5/14/2008

EDQ00299920090003, Evaluation and Disposition of U2 Class 1E Cables for Support in Vertical Conduits and Cable Trays, Rev. 000

EDCR 55116, Support Cables in Vertical Trays and Conduits Identified by Calculation EDQ 00299920090003, Rev. A

G-38, Installation, Modification and Maintenance of Insulated Cables Rated Up To 15,000 Volts, Rev. 20 through Specification Revision Notice SRN-G-38-201

WB-DC-30-22, Electrical Raceways, Rev. 7

25402-SA-ENG-10-08, Cable Support in Vertical Conduit Self-Assessment, 6/27/2010

25402-WBN-SR-09-0751, Cable CAP – Support in Vertical Conduits and Cable Trays, 11/12/2009

National Electric Code Article 300.19, Supporting Conductors in Vertical Raceways, 1987

**OA.1.2 Construction Deficiency Report 391/89-04: Cable Support in Vertical Tray CAP**PERs

PER 144052, Class 1E Cables Installed In Long Vertical Cable Tray Runs Do Not Have Supports Installed Per Required Spacing, 5/3/2008

PER 145108, SCAR Initiated Due To Repetitive Problems Associated With Support of Cable, 5/14/2008

Miscellaneous

EDQ00299920090003, Evaluation and Disposition of U2 Class 1E Cables for Support in Vertical Conduits and Cable Trays, Rev. 000

EDCR 55116, Support Cables in Vertical Trays and Conduits Identified by Calculation EDQ 00299920090003, Rev. A

G-38, Installation, Modification and Maintenance of Insulated Cables Rated Up To 15,000 Volts, Rev. 20 through Specification Revision Notice SRN-G-38-201

WB-DC-30-22, Electrical Raceways, Rev. 7

25402-SA-ENG-10-09, Cable Support in Vertical Trays Self Assessment, 6/27/2010  
25402-WBN-SR-09-0751, Cable CAP – Support in Vertical Conduits and Cable Trays,  
11/12/2009  
National Electric Code Article 300.19, Supporting Conductors in Vertical Raceways, 1987

**OA.1.6 VIO 391/87-19-01 Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms**

Work Orders

113718457, CCI EDCR 53178 FCR 55741 AA03 PER 327971 SYS 001 WBN-2-PCV-001-0005-T

**OA.1.7 VIO 391/87-19-02 Failure to Preserve Equipment Installed in North and South valve rooms**

Work Orders

111123666, CCE EDCR 55125 SYS 292-2-MISC-292

PERs

143792

143791

**OA.1.8 Construction Deficiency Report 391/87-18: Deficiencies in installation of electrical conduit and conduit supports**

Design Change Notice (DCNs):

DCN P-00351A

DCN 18804

PERs:

PER 144177, "6 Conduits are not seismically installed in accordance with 47A056 series drawings"

Walkdown Packages:

WBN2-C-292-817-09

WBN2-C-292-817-21

WBN2-C-292-817-32

WBN2-C-292-817-34

WBN2-C-292-817-35

WBN2-C-292-817-37

WBN2-C-292-817-38

Limited Scope Walkdown Packages (LSWDs):

LSWD-1394

LSWD-489

LSWD-488

LSWD-492

LSWD-495

LSWD-497

Closure Reports/Packages:

Open Items/Commitment Completion Form for: PERs 143879. Partial Closure (Engineering Complete), 6/11/2012

Open Items/Commitment Completion Form for: PERs 144966. Partial Closure (Engineering Complete), 2/13/2012

Open Items/Commitment Completion Form for: 111032056. Partial Closure (Engineering Complete), 6/19/2012

### **OA.1.9 Construction Deficiency Report 391/89-09, Significant Trend Associated with Damaged, Loose, or Missing Hardware**

#### Procedures

25402-000-GPP-0000-N1213, Walkdown Verification for Construction Area Completion and Damaged, Loose, or Missing Hardware, Rev. 0

WDP-GEN-1, Walkdown Procedure for General Walkdown Requirements, Rev. 14

WDP-E-4, Walkdown Procedure for Electrical, Rev. 2

WDP-I-6, Walkdown Procedure for Instrumentation, Rev. 2

25402-011-V1A-MG00-04027-001, Watts Bar Unit 2 RCL Piping, Surge Line Piping, and Primary Equipment Support As-Build Condition Walkdown Procedure, Rev. 0

WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, Rev. 9

WDP-C-3, Walkdown Procedure for Civil, Rev. 3

### **OA.1.14 Construction Deficiency Report 391/86-54 Use of Long Slotted Holes without Plate Washers**

#### Drawings

2-48W904-8, Miscellaneous Steel Steam Generator Access Platform, R0

48W904-2, Miscellaneous Steel Steam Generator Access Platform, R9

2-48W905-8, Miscellaneous Steel S. G., R.C. Pump & Press. Rel. Tank Access Platform, R0

2-48W905-7, Miscellaneous Steel S. G., R.C. Pump & Press. Rel. Tank Access Platform, R0

2-48W904-7, Miscellaneous Steel Steam Generator Access Platform Reactor Bldg. Unit 2, R0

#### Work Orders

08-954513-003, INSTALLATION OF PLATFORM 48W905-04PF04U2 LOCATED IN LOOP 4, ELEVATION 715'-8 3/8" IN ACCORDANCE WITH EDCR 52633

08-957071-002, MODIFY STRUCTURAL CONNECTION AT ELEVATION 745' AND AZ 143 DRG. MK 1, IN ACCORDANCE WITH 52912

### **OA.1.15 Construction Deficiency Report 391/86-57 Deficient Concrete Pullout Capacity for Embedded Plates**

#### Drawings

WBN2-C-271-2071-01, Reactor Building Embedded Plate, R0

WBN2-C-271-2071-05, Reactor Building Embedded Plates, R0

#### Drawing Review Authorizations

48W1701-03, Structural Steel Sections & Details Inside Containment, R3

48W1701-07, Structural Steel Sections & Details Inside Containment, R4

48W1701-09, Structural Steel Sections & Details Inside Containment, R4

#### Calculations

48W930-B-107, Calculation for Unique Embedded Plate 48W930-B-107, R0

48N913-5B-201, Calculation for Unique Embedded Plate 48N913-5B-201, R0

#### Work Orders

110-851394, CCC EDCR 54304 SYS 667 WBN-2-MISC-667- REPLACE BOLTS



08-957127-004, THE FOLLOWING SUPPORTS SHALL BE MODIFIED IN ACCORDANCE WITH DRA 52934-004, 2-CSTP-293-0348, 0350, 0352, 0355, 0365, AND 0411

08-957127-005, THE FOLLOWING SUPPORTS SHALL BE MODIFIED IN ACCORDANCE WITH DRA 52934-004, 2-CSTP-293-0431, 0432, 0433, 0435A, 0445 AND 0451

08-957127-006, THE FOLLOWING SUPPORTS SHALL BE INSTALLED AS DESIGNED IN ACCORDANCE WITH MK 22 ON DRA 52394-004, (2-CSTP-293-0559)

08-957127-008, EDCR 52394, RE-TORQUING WEDGE BOLTS TO OBTAIN PROPER THREAD ENGAGEMENT. IN ACCORDANCE WITH DRA 52934-002. 2-CSTP-293-0305, 0309, 0338, AND 0516

**OA.1.16 Unresolved Item 05000391/2012607-01: Discrepancies Associated with Training Records and Requirements of Conduit CAP Personnel**

Procedures, Standards and Specifications:

Calculation WCG-2-308, "Engineering Walkthrough and Evaluation of Conduit and Conduit Supports," Rev. 1

WDP-GEN-1, "Walkdown Procedure for General Walkdown Requirements," Rev. 14

WDP-C-3, "Walkdown Procedure for Civil," Rev. 3

Design Change Notice (DCNs):

DCN P-00351A

DCN 18804

PERs:

PER 592709, "NRC ID'd: Training Records Not Retrievable"

Walkdown Packages:

WBN2-C-292-817-09

WBN2-C-292-817-21

WBN2-C-292-817-32

WBN2-C-292-817-34

WBN2-C-292-817-35

WBN2-C-292-817-37

WBN2-C-292-817-38

Limited Scope Walkdown Packages (LSWDs):

LSWD-1394

LSWD-489

LSWD-488

LSWD-492

LSWD-495

LSWD-497

Closure Reports/Packages:

Open Items/Commitment Completion Form for: PERs 143879. Partial Closure (Engineering Complete), 6/11/2012

Open Items/Commitment Completion Form for: PERs 144966. Partial Closure (Engineering Complete), 2/13/2012

Open Items/Commitment Completion Form for: 111032056. Partial Closure (Engineering Complete), 6/19/2012

**OA.1.17 Construction Deficiency Report 391/80-06, Auxiliary Feedwater Design Deficiency**

Miscellaneous

ICRDS data for cable 2PV593A  
ICRDS data for cable 2PV591B4  
2-45N2638-13, Wiring Diagram, Rev. 17

**OA.1.18 Construction Deficiency Report 391/83-08, Valve Indication Problems with EMD Gate Valves**

Miscellaneous

ICRDS data for cable 2PV593A  
ICRDS data for cable 2PV591B4  
2-45N2638-13, Wiring Diagram, Rev. 17

**OA.1.19 Construction Deficiency Report 391/87-27, Potential Failure of Operator-to-Valve Engagement on XOMOX Supplied Valves**

Work Orders

WO 111484982  
WO 111485144, SUT SYS 067,  
WO 112374881

**OA.1.20 Vendor Information Corrective Action Program**

PER

PER 54164, NRC Concern Regarding Remote Valve Operators (NCV 2012603-02)

**OA.1.21 Construction Deficiency Report 391/85-26: Failure of Coating on Containment Vessel Interior and Coatings Program Review**

Procedures, Standards and Specifications

25402-000-GPP-0000-N3222, Field Painting and Coating, Rev. 004  
25402-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 010  
25402-3DP-G04G-00090, Engineering Evaluation for Commodity Refurbishment, Rev. 008  
G-55, Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants, Rev. 018  
MAI-5.3, Protective Coatings, Rev. 018  
MAI-5.7, Painting and Coating, Rev. 004  
N3A-932, Special Coating and Color Requirements for Watts Bar Nuclear Plant, Rev. 014  
IEP-201, Qualification and Certification of Nuclear Quality Control Inspectors, Rev. 008

Work Orders

WO#112287871  
WO#112290929  
WO#112307558  
WO#114220681  
WO#113996597

Problem Evaluation Reports

PER 730922, "Coating applicator certification un-verified"

PER 706224, "Paint is turning loose on wall"  
 PER 604351, "Paint is peeling off of walls that were painted a year ago"  
 PER 580012, "Documentation issues in closing work order 08-953828-000"  
 PER 578036, "Blast Shop"  
 PER 543259, "Paint work orders have incorrect signature sign-off"  
 PER 622426, "Conduit Support has a visible run on it"  
 PER 683828, "U2 Polar Crane came in contact with temporary staged material on the ice deck"  
 PER 708411, "Painted Trip Sensitive areas require repainting"  
 SR 739417, "NRC Identified issue with documentation of SL1 paperwork"  
 SR 739555, "To address QC involvement identified in SR 739417"

Closure Reports/Packages:

T02-110203-001, PP-19 Closure Package for CDR 391/85-26, Failure of Coating on Containment Vessel Interior

QC Inspector Certifications for

B. Allison  
 D. Hoffman  
 D. Hall  
 H. Little

Applicator Certifications

D. Elliot  
 R. Brown

**OA.1.22 Construction Deficiency Report 391/81-93: Loading Criteria for Structural Steel and Supports**

Engineering Documents

NCRWBNWBP8408, Final Report for Unit 2  
 ECN 4759, Engineering Change Notice Pipe Supports Unit 2  
 EDCR 54251, Modification of Pipe Supports Unit 2  
 EDCR 53114, Install platform modifications to the North and South Main Steam Valve Room steel  
 Technical Instruction TI-206, Documentation and Evaluation for Attachments to Civil Features  
 Calculation WCG2342, Walk Through Assessment of Unit 2 Structural Steel  
 Calculation WCG2343, Walk Through Criteria for Unit 2 Structural Steel  
 Modification and Addition Instruction MAI-4.2A, Piping/Tubing Supports

Other

NRC Inspection Report 50-309/84-45, Watts Bar Unit 1 Integrated Inspection Report  
 NRC Inspection Report 50-390/84-15 and 50-391/84-12, Watts Bar Integrated Inspection Report  
 NCRWBNWBP8408, Final Report for Unit 2  
 Work Order 09-954482-002, Installation of Platform 48W905-02PF06U2  
 Work Order 09-954482-001, Installation of Platform 48W905-02PF05U2  
 Work Order 110836017, Modification of SG RC Pump & Pressurizer Relief Tank Platform and Accumulator Room #4 Platform  
 Work Order 09-951328, SYS 604-2-STRU-604-001 Install platform mods to the south Main Steam Valve Room Steel.  
 Work Order 10-951083, Install platform bracing in the south main steam valve room at El 740ft 11inches.

### **OA.1.23 Construction Deficiency Report 391/84-07: Support modifications on Westinghouse system piping**

#### Engineering Documents

NCRWBNWBP8408, Final Report for Unit 2  
 ECN 4759, Engineering Change Notice Pipe Supports Unit 2  
 EDCR 54251, Modification of Pipe Supports Unit 2  
 EDCR 53114, Install platform modifications to the North and South Main Steam Valve Room steel  
 Technical Instruction TI-206, Documentation and Evaluation for Attachments to Civil Features  
 Calculation WCG2342, Walk Through Assessment of Unit 2 Structural Steel  
 Calculation WCG2343, Walk Through Criteria for Unit 2 Structural Steel  
 Modification and Addition Instruction MAI-4.2A, Piping/Tubing Supports

#### Other

NRC Inspection Report 50-309/84-45, Watts Bar Unit 1 Integrated Inspection Report  
 NRC Inspection Report 50-390/84-15 and 50-391/84-12, Watts Bar Integrated Inspection Report  
 NCRWBNWBP8408, Final Report for Unit 2  
 Work Order 09-954482-002, Installation of Platform 48W905-02PF06U2  
 Work Order 09-954482-001, Installation of Platform 48W905-02PF05U2  
 Work Order 110836017, Modification of SG RC Pump & Pressurizer Relief Tank Platform and Accumulator Room #4 Platform  
 Work Order 09-951328, SYS 604-2-STRU-604-001 Install platform mods to the south Main Steam Valve Room Steel.  
 Work Order 10-951083, Install platform bracing in the south main steam valve room at El 740ft 11inches.

### **OA.1.24 Construction Deficiency Report 391/87-24: Hydrogen Recombiner and Steam Generator Lower Lateral Supports**

#### Engineering Documents

NCRWBNWBP8408, Final Report for Unit 2  
 ECN 4759, Engineering Change Notice Pipe Supports Unit 2  
 EDCR 54251, Modification of Pipe Supports Unit 2  
 EDCR 53114, Install platform modifications to the North and South Main Steam Valve Room steel  
 Technical Instruction TI-206, Documentation and Evaluation for Attachments to Civil Features  
 Calculation WCG2342, Walk Through Assessment of Unit 2 Structural Steel  
 Calculation WCG2343, Walk Through Criteria for Unit 2 Structural Steel  
 Modification and Addition Instruction MAI-4.2A, Piping/Tubing Supports

#### Other

NRC Inspection Report 50-309/84-45, Watts Bar Unit 1 Integrated Inspection Report  
 NRC Inspection Report 50-390/84-15 and 50-391/84-12, Watts Bar Integrated Inspection Report  
 NCRWBNWBP8408, Final Report for Unit 2  
 Work Order 09-954482-002, Installation of Platform 48W905-02PF06U2  
 Work Order 09-954482-001, Installation of Platform 48W905-02PF05U2  
 Work Order 110836017, Modification of SG RC Pump & Pressurizer Relief Tank Platform and Accumulator Room #4 Platform

Work Order 09-951328, SYS 604-2-STRU-604-001 Install platform mods to the south Main Steam Valve Room Steel.

Work Order 10-951083, Install platform bracing in the south main steam valve room at El 740ft 11inches.

**OA.1.25 Construction Deficiency Report 391/90-11: Potential For Gas Accumulation of Emergency Core Cooling System Piping; Generic Letter 2008-01: Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems; and Temporary Instruction 2515/177 for GL 2008-01**

Work Instructions

WO 112164481  
 WO 112167363  
 WO 112164661  
 WO 112165168  
 WO 08-957278-001  
 WO 08-957278-002  
 EDCR 53311 Rev. B  
 EDCR 52945 Rev. B  
 EDCR 52637 Rev. A

Procedures

TI-437, Operational Readiness Turnover Process for Unit 2 Systems  
 Unit 1 Surveillance Instruction: 1-SI-63-10.1-A, ECCS Discharge Pipes Venting- Train A Inside Containment, Rev.0009  
 Unit 1 Surveillance Instruction: 1-SI-63-10.2-A, ECCS Pumps and Discharge Pipes Venting- Train A Outside Containment, Rev.0008  
 Unit 1 System Operating Instruction: 1-SOI-63.01, Safety Injection System, Rev. 0000  
 Unit 2 Surveillance Instruction: 2-SI-63-10.1-A, ECCS Discharge Pipes Venting- Train A Inside Containment, Rev.0000

Miscellaneous

Drawing 1-47W809-1, Chemical Volume Control System, Rev.1  
 Drawing 1-47W811-1, Safety Injection System, Rev.56  
 Drawing Revision Authorization 53311-403, Rev.0  
 Drawing Revision Authorization 53311-020, Rev.0  
 Drawing Revision Authorization 52637-002, Rev.1  
 Drawing Revision Authorization 52637-017, Rev.1  
 Drawing FSK-M-824, Valve WBN-2-VTV-074-0041 Weld Map, Rev.3  
 Drawing FSK-M-825, Valve WBN-2-VTV-074-0042 Weld Map, Rev.3  
 Drawing FSK-M-861, Valve WBN-2-VTV-074-010 Weld Map, Rev.3  
 Drawing FSK-M-862, Valve WBN-2-VTV-074-020 Weld Map, Rev.3  
 PER 517196, Pressurization of ECCS system  
 Operational Decision Making Issue Evaluation, TVA 40966  
 Unit 1 System Health Report, Chemical & Volume Control and RCP Seals, 10/1/2012-1/31/2012  
 Unit 1 System Health Report, Safety Injection, 10/1/2012-1/31/2012  
 Unit 1 System Health Report, Residual Heat Removal, 10/1/2012-1/31/2012

## LIST OF ACRONYMS

ACAS	auxiliary control air system
ADAMS	Agencywide Documents Access and Management System
AISC	American Institute of Steel Construction
AOI	abnormal operating instruction
ASME	American Society of Mechanical Engineers
B&PV	Boiler & Pressure Vessel
CAP	Corrective Action Plan
CAQR	condition adverse to quality report
CCP	centrifugal charging pump
CDR	Construction Deficiency Report
CFR	<i>Code of Federal Regulations</i>
CVCS	chemical volume and control system
ECCS	emergency core cooling system
ECN	engineering change notice
EDCR	Engineering Document Construction Release
GL	Generic Letter
ICRDS	Integrated Cable & Raceway Design System
IIR	integrated inspection report
IP	Inspection Procedure (NRC)
LOCA	loss of coolant accident
MAI	Modification/Addition Instruction
MDAFW	motor driven auxiliary feedwater
MELB	moderate energy line break
M&TE	measuring and test equipment
NCR	Non-Conformance Report
NDE	non-destructive examination
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
PER	Problem Evaluation Report
PM	preventative maintenance
PWHT	post-weld heat treatment
QA	Quality Assurance
QAPD	Quality Assurance Program Description
QC	Quality Control
Rev.	Revision
RG	regulatory guide
RHR	residual heat removal
RPV	reactor pressure vessel
SCAR	Significant Corrective Action Report
SCR	Significant Condition Report
SER	safety evaluation report
SG	steam generator
TDAFW	turbine driven auxiliary feedwater
TMI	Three Mile Island
TVA	Tennessee Valley Authority
URI	Unresolved Item
VIO	violation
VCT	volume control tank
WBN	Watts Bar Nuclear Plant
WBP	Watts Bar Program
WO	Work Order