



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

June 29, 2015

EA-15-075

Mr. Michael D. Skaggs  
Senior Vice President  
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Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2015604 AND NOTICE OF VIOLATION**

Dear Mr. Skaggs:

On May 16, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction and testing activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were initially discussed on May 28, 2015, with you and other members of your staff. The inspection results were discussed further on June 19, 2015, with Mr. O'Dell 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.

Based on the results of this inspection, one violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding this violation are described in detail in the enclosed report. The violation involved the failure to follow anchor bolt installation procedures. Although determined to be a Severity Level IV violation, it is being cited because the criteria, specified in Section VI.A.1 of the NRC Enforcement Policy, for a non-cited violation was not satisfied. Please note that you are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

Additionally, the enclosed report documents one self-revealing finding of very low safety significance. This finding did not involve a violation of regulatory requirements.

If you contest the violation or finding in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United

States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar Unit 2 Nuclear Plant. In addition, if you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at Watts Bar Unit 2 Nuclear Plant.

In accordance with 10 *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Enclosures: 1. Notice of Violation  
2. Inspection Report 05000391/2015604 w/ Attachment

cc w/encs: (See next page)

In accordance with 10 *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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/RA/

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2. Inspection Report 05000391/2015604 w/ Attachment

cc w/encls: (See next page)

\* Previous Concurrence

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Tennessee Valley Authority  
Electronic Mail Distribution

Letter to Michael D. Skaggs from Robert C. Haag dated June 29, 2015.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2015604

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## NOTICE OF VIOLATION

Tennessee Valley Authority  
Watts Bar Nuclear Plant – Unit 2  
Spring City, TN  
EA-15-075

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

During an NRC investigation completed on April 9, 2015, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

- A. 10 CFR 50, Appendix B, Criterion V, *Instructions, Procedures, and Drawings*, states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

TVA Procedure MAI-5.1B, Wedge Bolt (WB) Anchor Installation, Revision 21, is the implementing/controlling procedure for anchor bolt installation and includes the requirements for drilling the hole to be used for anchor bolt installation.

MAI-5.1B, Revision 21, Section 6.2.5.A.3, states that unless specifically permitted, reinforcing steel shall not be cut or drilled to install anchors. Site Engineering approval is required to drill through the reinforcing bar.

Contrary to the above, on or about December 1, 2011, contract employees assigned to drill holes for anchor bolt installation willfully drilled into the reinforcing steel of the steam generator housing, a safety related structure, without notifying Site Engineering, or obtaining their approval as required by TVA Procedure MAI-5.1B. Specifically, the contract employees damaged reinforcing steel in at least five locations associated with holes drilled under work order 111335067 and work order 111335073.

This is a Severity Level IV violation (Enforcement Policy Sections 2.2.1.d, 2.3.2, 6.5).

Pursuant to the provisions of 10 CFR 2.201, Tennessee Valley Authority is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation. This reply should be clearly marked as a "Reply to a Notice of Violation; EA-15-075" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the construction permit should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

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

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

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

Dated this 29th day of June, 2015



U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2015604

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: April 1, 2015 – May 16, 2015

Inspectors: T. Nazario, Senior Resident Inspector, Construction Projects Branch (CPB) 3, Division of Construction Projects (DCP), Region II (RII)  
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N. Coover, Reactor Inspector, Engineering Branch 1, Division of Reactor Safety (DRS), RII, Sections O.1.1, O.1.2, O.1.3, and OA.1.11  
G. Crespo, Senior Construction Inspector, Construction Inspection Branch (CIB) 1, Division of Construction Inspection (DCI), RII, Sections OA.1.1, OA.1.6, OA.1.7, and OA.1.8  
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Approved by:

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

## EXECUTIVE SUMMARY

### Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by Tennessee Valley Authority (TVA) associated with the Watts Bar Nuclear Plant (WBN) Unit 2 construction project. This report covered a seven-week period of inspections in the areas of quality assurance (QA), identification and resolution of construction problems, engineering and construction activities, preoperational testing, and follow-up of other activities. The inspection program for Unit 2 construction activities is described in Nuclear Regulatory Commission (NRC) Inspection Manual Chapter (IMC) 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

- A self-revealing finding of very low safety significance was identified for the applicant's failure to take appropriate measures during the removal of an abandoned cable in the common unit main control room radiation monitor cabinet (0-M-12) in accordance with Section 3.2.5 of MMDP-15, "Conduct of Maintenance – Expectations and Standards." The performance deficiency was determined to be more than minor because it represented an improper work practice that impacted safety-related structures, systems, and components (SSCs) resulting in unplanned actuations of the B train control room isolation and high radiation in refueling area (HRR) ventilation systems. This issue was entered into the applicant's corrective action program under problem evaluation report (PER) 1019007. This finding has a cross-cutting aspect in the Work Management aspect of the Human Performance area because individuals did not follow processes, procedures, and work instructions [H.8]. (Section C.1.1)
- The NRC identified a SL IV violation (VIO) of Title 10 to the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, *Instructions, Procedures, and Drawings*, for the failure to follow TVA Procedure MAI-5.1B, "Wedge Bolt (WB) Anchor Installation." The applicant identified damaged reinforcing steel in at least five locations associated with holes drilled under work order 111335067 and work order 111335073. The inspectors determined that the failure to follow anchor bolt installation procedures was a performance deficiency. This violation is considered to be more than minor because it represents an inadequate work process that if left uncorrected, could adversely affect the quality of the construction, testing, analysis, or records of a safety-related SSC. The applicant initiated PER 83861 to address this issue. The damages were evaluated by the applicant and determined not to require repair due to the safety margin designed into the walls. The inspectors reviewed this finding against cross-cutting area components as described in IMC 0310, "Components Within the Cross-Cutting Areas," and determined that no cross-cutting aspect applied. (Section OA.1.12)
- The inspectors concluded that issues pertaining to several open items, including nine inspection procedures (IPs), two Three Mile Island (TMI) Action Items, two unresolved items (URIs), one generic letter (GL), one temporary instruction (TI), and one supplemental safety evaluation report (SSER) Appendix HH item have been appropriately addressed for WBN Unit 2. These items are closed.

- Other areas inspected were adequate with no findings identified. These areas included QA; preoperational testing activities; motor operated valve (MOV) testing; and various NRC inspection procedures.

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## REPORT DETAILS

### **Summary of Plant Status**

During the inspection period covered by this report, Tennessee Valley Authority (TVA) performed construction completion and preoperational testing activities on safety-related systems and continued engineering design activities of the Watts Bar Nuclear Plant (WBN), Unit 2 (U2).

## **I. QUALITY ASSURANCE PROGRAM**

### **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 also reviewed and followed up on the corrective actions of several PERs discussed throughout various sections of this report.

#### **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 during the current inspection period included work associated with:

- Work Order (WO) 116311349 – Implement wiring change per EDCR 55801 in 0-M-12 for Unit 2
- WO 110841294 – Install sample tubing and support for SIS pump per EDCR 53917
- WO 110841293 – Install sample tubing and support from 2A-A and 2B-B RHR pump min flow per EDCR 53917
- WO 114676213 – Land 1PL4728A for Unit 2 SIS to CCS pump
- WO 114676288 – Land 2PL4736B & 2PL4741B for Unit 2 SIS to normal breaker on CCS pump

Specific work activities that the applicant had screened out as not affecting Unit 1 included, but were not limited to, work activities as noted in this inspection report.

b. Observations and Findings

The following finding was identified:

Introduction: A self-revealing finding of very low safety significance was identified when unplanned actuations of the B train control room isolation (CRI) and high radiation in refueling area (HRRA) ventilation systems occurred as a result of Unit 2 construction activities in Cabinet 0-M-12. Personnel performing work inside Cabinet 0-M-12 failed to take the necessary steps to insulate circuits and potential ground points and maintain positive control of the leads in accordance with procedure MMDP-15, "Conduct of Maintenance – Expectations and Standards," Section 3.2.5 Field Work Performance.

Description: On April 24, 2015, during removal of an abandoned cable in the common unit main control room radiation monitor cabinet (0-M-12) as part of WO 116311349, the metal shielding protecting the cable made contact with an active terminal block. The cable bundle was tie-wrapped in the back corner of the lower portion of the 0-M-12 cabinet, making it difficult for personnel performing work to gain access. When construction personnel cut the tie-wrap holding the cable bundle, the cable bundle with metal shielding fell from its attached position, making contact with the terminal block. This caused a momentary electrical short, opening a breaker on the 120V vital instrument power board 1-II that feeds several in-service radiation monitors on Unit 1. The loss of power to these radiation monitors resulted in HRRA actuation and a B train CRI actuation. As a result of the event, Unit 1 entered several Technical Specifications (TS) limiting conditions for operation (LCOs). B train CRI and HRRA actuations were reset in accordance with standard operating instructions at the time of the event and all LCOs were exited appropriately.



The inspectors reviewed Section 3.2.5 of MMDP-15, "Conduct of Maintenance – Expectations and Standards," covering field work performance which stated the following:

- If during the performance of troubleshooting or maintenance activities it becomes necessary to lift and land leads, the following applies:
  - For energized leads, necessary steps shall be taken to insulate circuits and potential ground points such as terminal boxes and chassis in the near vicinity of those circuits requiring lifting and landing
- For de-energized leads, all lifted wires shall require positive control until they are either insulated or landed.

Contrary to the standards above, personnel did not insulate potential ground points in the near vicinity of the work, nor did they maintain positive control of the wires.

The inspectors determined this issue to be a performance deficiency because the applicant did not meet a self-imposed standard where the cause was reasonably within the applicant's ability to foresee and correct and could have been prevented. Specifically, the applicant failed to take appropriate measures during the removal of an abandoned cable in the common unit main control room radiation monitor cabinet (0-M-12) in accordance with Section 3.2.5 of MMDP-15, "Conduct of Maintenance – Expectations and Standards." The performance deficiency was determined to be more than minor in accordance with Inspection Manual Chapter (IMC) 2517 because it represented an improper work practice that impacted safety-related SSCs resulting in unplanned actuations of the B train CRI and HRRRA ventilation systems. Specifically, actuation of systems caused alarms in the Unit 1 control room, B train CRI, and entrance into several TS LCOs. All systems responded as designed and there was no significant impact to the operating unit (Unit 1).

This issue was entered into the applicant's corrective action program under PER 1019007. Immediate corrective actions were taken to exit all LCOs. Additional corrective actions for work planning, work processing, and work performance have been implemented. This finding has a cross-cutting aspect in the Procedure Adherence aspect of the Human Performance area, as defined in NRC IMC 0310, because individuals did not follow processes, procedures, and work instructions [H.8].

Enforcement: The inspectors concluded that personnel failed to comply with the standards and expectations for field work performance contained in Section 3.2.5 of MMDP-15, "Conduct of Maintenance – Expectations and Standards." This self-revealing finding; however, does not constitute a violation of NRC requirements. Specifically, the inspectors determined that the "Conduct of Maintenance – Expectations and Standards," procedure is an administrative procedure and not covered under the QA requirements set forth in 10 CFR 50, Appendix B. This finding is identified as construction item finding CIF 05000391/2015604-01, "Failure to Comply with Conduct of Maintenance – Expectations and Standards."

c. Conclusions

Overall, management oversight and controls were in place for observed construction activities that could potentially impact the operating unit with the exception of the

example noted above where a Unit 2 construction activity affected Unit 1; however, there was no significant impact to the operating unit (Unit 1).

### **C.1.2 Reactor Vessel and Internals Work Observation (Inspection Procedure 50053)**

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

The inspectors continued to monitor in-place storage of the reactor pressure vessel. The reactor pressure vessel, internals, core barrel, and reactor head continued to be in their assembled state during the second quarter of 2015. The inspectors were able to view the reactor head and the control rod drive mechanisms due to missile shield blocks having been removed. In-place and installed storage inspections of these components continued to be limited and the inspections listed in IP 50053 could not be accomplished in their entirety due to the inaccessibility of the reactor pressure vessel components during this time. However, the inspectors did review access controls to ensure authorized entry of tools, equipment, and personnel; and also cleanliness controls were adequate to verify that cleanliness requirements were being met. Work around the reactor pressure vessel and inside the reactor building during the inspection period was limited.

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

No findings were identified.

#### **c. Conclusions**

This quarterly inspection of the reactor pressure vessel storage was limited due to inaccessibility as a result of the components having been assembled. For the areas inspected, adequate controls were in place to protect the exterior portions of the reactor vessel and internals.

### **C.1.3 (Closed) Structural Concrete Work Observation (Inspection Procedure 46053)**

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

**Background:** As described in IMC 2517, TVA addressed WBN Unit 1 construction quality issues as part of the implementation of its Nuclear Performance Plan (NPP). The results of the NRC inspection program were published in NUREG-1528, "Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1." In 1985, construction on Watts Bar Unit 1 and Watts Bar Unit 2 was stopped due to the identification of multiple construction QA issues. TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to finish the Unit 2 plant. As part of confirming that all issues and inspection requirements will be completed for Unit 2, a review of all NRC inspection reports was initiated to determine the status of the required IPs, contained in NRC IMC 2512, in effect at the time construction was stopped. This effort was called the reconstitution process. The NRC used the results of the reconstitution process to identify areas which require additional inspections. Integrated Inspection Report (IIR) 05000391/2009602 (Agency-Wide Documents Access and Management System (ADAMS) Accession No. ML091210420), Attachment 2, documented the reconstitution results for IP 46053. As stated in the IIR,

by July of 1983, 98 percent of concrete had been placed at Watts Bar and consequently the level of concrete activities since the applicant resumed construction in 2008 had been limited to minor modifications. As a result, because most of the concrete had been placed for both Watts Bar Unit 1 and Unit 2 and because the number of samples collected from NRC inspections prior to 2007 exceeded those required, the IIR concluded that the requirements of the IP 46053 were met for Unit 2 with the exception of samples associated with the observations of the laboratory. However, per the IIR, these samples were considered satisfactory based on record reviews documented under IP 46055 as well as the Concrete Quality Special Program documented in Section OA.3 of IIR 05000391/2009603 (ADAMS Accession No. ML092120326).

Inspection Activities: The purpose of IP 46053 is to determine by direct observation and independent evaluation whether work and inspection performance relative to structural concrete are being accomplished in accordance with specifications and procedures, as well as to determine whether inadequacies in work activities associated with structural concrete indicate a management control problem or generic weakness. In addition, this IP confirmed concrete placements were properly performed and that the materials and concrete testing activities at the onsite test laboratory were being controlled as required. This included rebar and embedment placement, rebar splices, liner plate erection and fabrication, concrete batching and delivery, placement, in process testing, curing, interviews, acceptance, personnel qualification, evaluation of test results, observation of testing, calibration, special considerations such as hot and cold weather, concrete pumping, and large placements.

The reconstitution effort, documented in IIR 05000391/2009602, Attachment 2, concluded all requirements for this IP had been previously met, and the inspection reports documenting these samples are listed within that report. Section 02.06 of IP 46053 states that additional inspections may be conducted in the inspection areas covered by IP 46053 at the discretion of regional management. As a result, additional inspections were performed since construction of Watts Bar Unit 2 resumed in 2008 and are documented in the following inspection reports:

- 05000391/2008007 Section C.1.1 (ADAMS Accession No. ML082110474)
- 05000391/2010603 Section C.1.4 (ADAMS Accession No. ML102170465)
- 05000391/2010604 Section C.1.5 (ADAMS Accession No. ML103060240)
- 05000391/2010605 Section C.1.5 (ADAMS Accession No. ML110410680)
- 05000391/2011602 Section C.1.5 (ADAMS Accession No. ML110800483)
- 05000391/2011603 Section C.1.2 (ADAMS Accession No. ML111370702)
- 05000391/2013612 Section C.1.2 (ADAMS Accession No. ML13088A066)
- 05000391/2013604 Section C.1.2 (ADAMS Accession No. ML13179A079)

This IP remained opened for the purpose of inspecting reinforced concrete repair activities associated with the auxiliary building secondary containment enclosure (ABSCE). These repairs would have consisted of reconstructing the reinforced concrete sections of an 8'x4' and 4'x4' opening that were created for access associated with construction activities. TVA however decided to modify this repair with a steel structure in lieu of a reinforced concrete section. The inspector reviewed design drawings, design calculations, field change requests, and conducted interviews with plant personnel. As a

result, the inspector gained reasonable assurance that this modification could adequately perform its design basis function once constructed.

These concrete openings provided the inspector the opportunity to visually examine the cross section and current condition of the historically constructed reinforced concrete. As a result of this examination, the inspector concluded that there were no indications observed that would indicate unacceptable aging or degradation of the concrete or reinforcement. Furthermore, the inspector concluded that the concrete had been maintained in a condition at least as adequate as assumed in design documentation.

Additionally, the inspector reviewed TVA's methodology, programs, and procedures for ensuring passive concrete structures such as floor slabs, walls, roofs, and columns will continue to perform their safety function. The majority of the Unit 2 SSCs are currently inspected under the Watts Bar Unit 1 Maintenance Rule Program and thus were not inspected under this IP as they are controlled by current operating procedures and regulations. The remaining civil/structural SSCs are verified and inspected by the Watts Bar Unit 2 Refurbishment Program, and include structures such as:

- Steel Containment Vessel
- Reactor Building (Interior Concrete Structures and Ice Condenser)
- Category I Water Tanks and Pipe Tunnels (Refueling Water Storage Tank Foundation)
- Miscellaneous Tanks Foundation

This program assesses pre-service degradation mechanisms such as physical damage, water damage due to freezing thaw cycles, and concrete spalling. The program also assesses the condition of concrete structures by identifying defects, and evaluating if necessary, attributes such as, exposed reinforcement, signs of corrosion staining, settlement, and cracking. Any defects classified as "acceptable with deficiencies" or "unacceptable" will be entered into the WBN Corrective Action Program.

Previously, TVA had submitted the Maintenance Rule and Refurbishment Plan to the NRC under Commitment No. 113148346 for review. The result of this review, as published in the NRC "Staff Evaluation by the Office of Nuclear Reactor Regulation, Regarding Program for Construction Refurbishment" (ADAMS Accession No. ML101720050) concluded that the program, when properly implemented, should adequately manage the identification of potential degradation effects and refurbishment activities. As a result of the review conducted during this inspection period, the inspector did not identify any attributes or examples that would invalidate the conclusions previously reached by NRC staff.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The structural concrete work previously observed met procedural, specification, and drawing requirements. IP 46053 is considered closed; however, if additional structural concrete work is performed, inspections may be performed at the NRC's discretion.

**C.1.4 (Closed) Verification of As-Builts (Inspection Procedure 37051)**

a. Inspection Scope

Background: The objective of this procedure is to determine whether (1) as-built design and construction drawings and specifications correctly reflect the as-built condition of the plant; (2) changes from the original design (or safety analysis report) were properly reviewed and approved; and (3) plant seismic and other stress calculations are based on as-built conditions. The reconstitution process, described in Section C.1.3 of this inspection report, determined that none of the inspection requirements for IP 37051 were previously satisfied.

Inspection Activities: The closure of IP 37051 will be described in nine parts, all of which must be satisfied for the successful completion of the IP. IP 37051 was implemented during the construction phase of Watts Bar Unit 2 and is documented in the following inspection reports:

- 05000391/2011605, Section C.1.8, (ADAMS Accession No. ML112201418)
- 05000391/2013605, Section C.1.2 and Section OA.1.9, (ADAMS Accession No. ML13220A640)
- 05000391/2013607, Section C.1.2, (ADAMS Accession No. ML13273A512)
- 05000391/2013608, Section C.1.5, (ADAMS Accession No. ML13316A776)
- 05000391/2014602, Sections E.1.1 and E.1.2, (ADAMS Accession No. ML14086A063)
- 05000391/2014603, Sections C.1.7 and E.1.1, (ADAMS Accession No. ML14129A381)
- 05000391/2014604, Sections C.1.3 and OA.1.26, (ADAMS Accession No. ML14177A214)
- 05000391/2014605, Section OA.1.4, (ADAMS Accession No. ML14226A049)
- 05000391/2014607, Section OA.1.8, (ADAMS Accession No. ML14274A076)
- 05000391/2014608, Sections C.1.6 and OA.1.4, (ADAMS Accession No. ML14322A182)
- 05000391/2014614, Sections C.1.2 and C.1.3, (ADAMS Accession No. ML14363A315)
- 05000391/2014615, Sections C.1.6 and OA.1.7, (ADAMS Accession No. ML15044A424)

Additionally, during the execution of IP 37055 "Onsite Design Activities" additional inspection attributes were performed that contributed to the successful completion of IP 37051. The closure of IP 37055 is documented in IIR 05000391/2014602, Section E.1.1 (ADAMS Accession No. ML14086A063).

Section 02.01.a of this IP required that, prior to the issuance of an operating license, the inspectors determine the adequacy of (1) the status of schedules for completion of as-built design documents and (2) the procedures governing generation and completion of as-built design documents including design modifications. Additionally, for design modifications, the inspection procedure required that prior to the modification(s) being declared operable, the inspectors verify that the controlled copy of all as-built documents used by the plant operators were either revised and distributed for design changes, or have been legibly marked-up on an interim basis to show all changes relating to the modification(s). Lastly, for design modifications, the inspectors were to verify that administrative controls and responsibilities have been clearly established. In addition, as previously described, the execution of IP 37055 provided additional inspection related samples that contributed to the successful completion of this inspection attribute. Inspection report 05000391/2013608 (ADAMS Accession No. ML13316A776) documents the inspection sample for IP 37051.

Section 02.01.b.1 of this IP required the selection of a representative sample of final design documents for piping systems, including detailed design drawings and construction specifications relative to the specified inspection items. The procedure required that, for the selected safety-related systems, the inspector select one (or one group of) isometric drawing(s) showing pipe welds, supports, and restraints and that the inspector examine a representative sample of (1) supports - location, type, and configuration; (2) pipe welds - location and identification; and (3) piping - location, size, configuration, component location, weight (valves), and valve orientation (including operators). By comparing final detailed construction drawings and specification requirements with the actual installation, the inspectors had previously determined that the final design drawings and specifications reflect as-built conditions for each item indicated below and is documented in the following inspection reports:

- System 62, chemical and volume control system (CVCS); IIR 05000391/2014604 (ADAMS Accession No. ML14177A214),
- System 63, safety injection system (SIS); IIR 05000391/2014604 (ADAMS Accession No. ML14177A214),
- System 67, essential raw cooling water (ERCW); IIR 05000391/2014602 (ADAMS Accession No. ML14086A063) and IIR 05000391/2013605 (ADAMS Accession No. ML13220A640),
- System 68, reactor coolant system (RCS); IIR 05000391/2014608 (ADAMS Accession No. ML14322A182),
- System 70, component cooling system (CCS); IIR 05000391/2014602 (ADAMS Accession No. ML14086A063),
- System 72, containment spray (CS); IIR 05000391/2014604 (ADAMS Accession No. ML14177A214),
- System 74, residual heat removal (RHR); IIR 05000391/2014604 (ADAMS Accession No. ML14177A214), and
- System 84 Flood Mode Boration; IIR 05000391/2013608 (ADAMS Accession No. ML13316A776).

In addition, during this inspection period, the inspectors compared final detailed construction drawings and specification requirements with the actual installation for

System 003B, auxiliary feedwater, to verify that the final design drawings and specifications reflect as-built conditions.

The inspectors performed inspection activities on the following mechanical systems, structures, or components:

System 003B, auxiliary feedwater:

- pipe section between node 42 and node 82, node 98 and 102, on drawing 2-47W427-205 including valves 2-FCV-3-136A, 2-FCV-3-136B, 2-FCV-3-179A, 2-FCV-3-179B, and 2-CKV-3-810
- pipe support 03B-2AFW-R029
- portions of pipe support 03B-2AFW-R032
- pipe section between node 1 and node 10a, node 16 and 16B, on drawing 2-47W427-208 including valve 2-CKV-3-864
- pipe support 03B-2AFW-V047
- portions of pipe support 03B-2AFW-R044
- pipe support 2-03A-370

Section 02.01.b.2 of this IP required the selection of representative sample of final design documents for electrical raceways, including detailed design drawings and construction specifications relative to the specified inspection items. The procedure required that from different electrical divisions and locations in the plant, the inspector select appropriate electrical drawings and specifications that include Class 1E conduit and Class 1E cable tray runs of appropriate length. The procedure required that the inspector examine the (1) location and routing; (2) supports; (3) separation and isolation; (4) cable loading (physical and thermal); and (5) identification (conduit and tray). By comparing final detailed construction drawings and specification requirements with the actual installation, the inspectors previously determined that the final design drawings and specifications reflect as-built conditions and are documented in the inspection reports listed below.

For Class 1E Conduits:

- 05000391/2014603 (ADAMS Accession No. ML14129A381)
- 05000391/2014604 (ADAMS Accession No. ML14177A214)
- 05000391/2014615 (ADAMS Accession No. ML15044A424)

For Class 1E Cable Trays:

- 05000391/2014607 (ADAMS Accession No. ML14274A076)
- 05000391/2014615 (ADAMS Accession No. ML15044A424)
- 05000391/2014614 (ADAMS Accession No. ML14363A315)

Section 02.01.b.3 of this IP required the selection of representative sample of final design documents for electrical cables, including detailed design drawings and construction specifications relative to the specified inspection items. The procedure required that the inspector review design and construction records (drawings, pull cards, etc.) which represent as-built cable routing. For each cable selected, the procedure required the inspector compare design with actual installation relative to routing, identification, protection/isolation, and separation from redundant cables. Additionally,

for each cable or group of conductors selected, the inspectors were required to compare design documents and as-built identification for each conductor at termination points. By comparing final detailed construction drawings and specification requirements with the actual installation, the inspectors determined the final design drawings and specifications reflect as-built conditions and are documented in the inspection reports listed below:

- 05000391/2014615 (ADAMS Accession No. ML15044A424)
- 05000391/2014614 (ADAMS Accession No. ML14363A315)

As-built inspections of electrical cables were also previously inspected as part of the activities performed for IP 51063, Electrical Cable Work Observation. IP 51063 was closed in IIR 05000391/2014615.

Section 02.01.b.4 of this IP required the selection of representative sample of final design documents for structures, including detailed design drawings and construction specifications relative to the specified inspection items. The procedure required the selection of structural steel assemblies from Seismic Category I structures. The procedure specified that each assembly selected should contain at least three welded and/or three bolted joints. The inspector was required to (1) determine whether the structural assembly configuration conforms to final design; and (2) determine whether joint location/orientation, dimensions, and configuration conform to the final design. During this inspection period the inspectors compared final detailed construction drawings and specification requirements with the actual installation and determined the final design drawings and specifications reflect as-built conditions for each item indicated below:

- RHR pump 2B-B steel pedestal – Seismic Category 1
- RHR heat exchanger 2B steel brace – Seismic Category 1
- CS heat exchanger 2B steel brace – Seismic Category 1
- CS pump 2B-B room cooler steel support shelf – Seismic Category 1
- Control rod drive mechanism cooler 2B-B steel pedestal – Seismic Category 1(L)

Section 02.01.c of this IP required the inspector to examine plant changes not yet incorporated into as-built drawings and to have the applicant verify (to the NRC inspector) the status of review, approval, and revision of these identified changes from the "original" design. In addition, as previously described, the execution of IP 37055 in IIR 05000391/2014602 provided additional inspection related samples that contributed to the successful completion of this inspection attribute. The portion of this inspection attribute that was previously examined is documented in the following inspection reports:

- 05000391/2013608 (ADAMS Accession No. ML13316A776)
- 05000391/2014604 (ADAMS Accession No. ML14177A214)

Section 02.01.d of this IP required the inspector to examine as-built changes on design/construction drawings which correctly reflect the as-built condition and have the applicant verify (to the NRC inspector) that the changes were properly reviewed and approved by appropriate personnel. In addition, as previously described, the execution of IP 37055 in IIR 05000391/2014602 provided additional inspection related samples that contributed to the successful completion of this inspection attribute. The portion of



this inspection attribute that was previously examined is documented in the following inspection reports:

- 05000391/2014607 (ADAMS Accession No. ML14274A076)
- 05000391/2014608 (ADAMS Accession No. ML14322A182)
- 05000391/2014605 (ADAMS Accession No. ML14226A049)
- 05000391/2014604 (ADAMS Accession No. ML14177A214)

Section 2.02.a of this IP required the inspector to select a representative sample from the drawings used for inspection in item 02.01.b where changes had been incorporated in safety-related systems. The inspector is required to determine whether the as-built condition of the plant was used as the input to the seismic analysis of the system or that the as-built condition conforms to the original seismic criteria, as applicable. The portion of this inspection attribute that was previously examined is documented in the following inspection reports:

- 05000391/2014604 (ADAMS Accession No. ML14177A214)
- 05000391/2014615 (ADAMS Accession No. ML15044A424)
- 05000391/2014607 (ADAMS Accession No. ML14274A076)
- 05000391/2014605 (ADAMS Accession No. ML14226A049)
- 05000391/2014603 (ADAMS Accession No. ML14129A381)
- 05000391/2014602 (ADAMS Accession No. ML14086A063)

As-built inspections for this inspection attribute were previously inspected as part of the activities performed for TI 2512/023, Inspection of the Watts Bar Nuclear Plant Hanger Update Corrective Action Program Plan, which was closed in IIR 05000391/2014608 (ADAMS Accession No. ML14322A182). Additional as-built inspections for this inspection attribute were also previously inspected as part of the activities performed for TI 2512/021, Inspection of the Watts Bar Nuclear Plant Equipment Seismic Corrective Action Program Plan, which was closed in IIR 05000391/2014615 (ADAMS Accession No. ML15044A424).

Section 2.02.b of this IP required that the inspector determine what action the licensee has taken to ensure that final as-built design documents (drawings, specifications, and calculations) will be readily available to site operations personnel when commercial operation is initiated. If certain as-built design documents (e.g., system analysis) are to be retained by the nuclear steam system supply (NSSS) vendor or architect-engineer (A-E) the inspector is required to examine the adequacy of applicant's timely access to such records for analysis of plant operating conditions. In addition, as previously described, the execution of IP 37055 in IIR 05000391/2014602 provided additional inspection related samples that contributed to the successful completion of this inspection attribute. The portion of this inspection attribute that was previously examined is documented in the following inspection reports:

- 05000391/2014604 (ADAMS Accession No. ML14177A214)
- 05000391/2014603 (ADAMS Accession No. ML14129A381)
- 05000391/2013607 (ADAMS Accession No. ML13273A512)

The following samples were inspected:

IP 37051 Section 02.01.b.1 – one sample  
 IP 37051 Section 02.01.b.4 – five samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

No findings were identified.

Below is a summary of each section of IP 37051:

- Section 02.01 – Complete
- Section 02.02 – Complete

c. Conclusion:

Based on the activities reviewed in this and previous inspections, the inspectors concluded that (1) as-built design and construction drawings and specifications correctly reflect the as-built condition of the plant; (2) changes from the original design (or safety analysis report) were properly reviewed and approved; and (3) plant seismic and other stress calculations are based on as-built conditions. IP 37051 is considered closed; however, additional activities may be performed at the NRC's discretion.

### **C.1.5 (Closed) Environmental Inspection-Periodic (Inspection Procedure 80210)**

a. Inspection Scope

The following inspection reports have documented inspection of the environmental activities associated with WBN Unit 2:

- IIR 05000391/2008010, Section C.1.4 (ADAMS Accession No. ML090291033)
- IIR 05000391/2010604, Section OA.1.4 (ADAMS Accession No. ML103060240)
- IIR 05000391/2013604, Section C.1.7 (ADAMS Accession No. ML13179A079)
- IIR 05000391/2014614, Section C.1.7 (ADAMS Accession No. ML14363A315)

These inspection results document the 18 month periodic inspection requirements specified in Section 02.02 of IP 80210.

b. Observations and Findings

No findings were identified.

c. Conclusions

Past inspection results have concluded that the environmental programs required for Unit 2 construction activities were properly implemented. The inspection requirements for IP 80210 specify that a periodic inspection be performed every 18 months. Further inspection of IP 80210 is not anticipated at this time. IP 80210 is closed. Additional inspection may occur if 18 months have elapsed since the time of the last inspection.

**C.1.6 (Closed) Inservice Inspection - Review of Program (Inspection Procedure 73051), Inservice Inspection - Review of Procedures (Inspection Procedure 73052), and Preservice Inspection - Observation of Work and Work Activities (Inspection Procedure 73053)**

a. Inspection Scope

For IP 73051 and IP 73052, the inspectors reviewed the Containment Preservice Inspection (CPSI) Program Plan and the Preservice Inspection Program Plan to verify those programs were in compliance with the 2001 Edition through 2003 Addenda of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, that they had been reviewed by an Authorized Nuclear Inservice Inspector (ANII), and were reviewed and approved by the applicant's designated representatives. Specifically, the inspectors reviewed the Program Plans to verify they met the requirements of Subsection IWE, Table IWE-2500-1 for the containment system, and Subsection IWF, Table IWF-2500-1 for snubbers; reviewed the ASME B&PV Code edition and addenda to verify the appropriate edition and addenda were being applied per 10 CFR Part 50.55a and the approved proposed alternative (ADAMS Accession No. ML110260025); reviewed comments provided by the ANII during their review of those programs; and reviewed Program Plans to ensure they were reviewed by the appropriate applicant representatives.

- IP 73051 Section 02.01 – one sample
- IP 73052 Section 02.01 – one sample

For IP 73053, the inspectors reviewed the qualifications and certifications of three Level II non-destructive examination (NDE) examiners and one Level III examiner, involved in the conduct of preservice inspection examinations, to ensure they met the requirements of Section XI of the ASME B&PV Code. Specifically the inspectors reviewed the certifications to ensure they contained the employer's name, person being certified, activity qualified to perform, level of qualification, and basis for certification. No Level 1 examiner certifications were available.

- IP 73053 Section 02.02 – 4 samples

The following tables list the inspections that were performed under this IP and documented in earlier inspection reports.

IP 73051 Section	Inspection Reports	ADAMS Accession Number
02.01 Program Approval	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> <li>• 05000391/2010602, Section C.1.16</li> <li>• 05000391/2010604, Section C.1.11</li> <li>• 05000391/2012602, Section C.1.5</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML101230144</li> <li>• ML103060240</li> <li>• ML12087A324</li> </ul>

	<ul style="list-style-type: none"> <li>• 05000391/2013612, Section C.1.12</li> </ul>	<ul style="list-style-type: none"> <li>• ML13088A066</li> </ul>
02.02 Program Organization	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> </ul>
02.03 Quality Assurance Program	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> <li>• 05000391/2010602, Section C.1.16</li> <li>• 05000391/2011608, Section C.1.12</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML101230144</li> <li>• ML11311A082</li> </ul>
02.04 Repair Program	<ul style="list-style-type: none"> <li>• 05000391/2011605, Section C.1.10</li> </ul>	<ul style="list-style-type: none"> <li>• ML112201418</li> </ul>
02.05 Replacement Program	<ul style="list-style-type: none"> <li>• 05000391/2011605, Section C.1.10</li> </ul>	<ul style="list-style-type: none"> <li>• ML112201418</li> </ul>
02.06 Records	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> </ul>
02.07 Qualification of Personnel	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> </ul>
02.08 Reporting Requirements	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> </ul>
02.09 Relief Requests	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.11</li> <li>• 05000391/2010603, Section C.1.11</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML102170465</li> </ul>

<b>IP 73052 Section</b>	<b>Inspection Reports</b>	<b>ADAMS Accession Number</b>
02.01 Program Requirements	<ul style="list-style-type: none"> <li>• 05000391/2012602, Section C.1.5</li> </ul>	<ul style="list-style-type: none"> <li>• ML12087A324</li> </ul>
02.02 Procedure Approval	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.12</li> <li>• 05000391/2009603, Section C.1.5</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML092120326</li> </ul>
02.03 Non-Destructive Examination (NDE) Procedure Review	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.12</li> <li>• 05000391/2009603, Section C.1.5</li> <li>• 05000391/2010603, Section C.1.12</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML092120326</li> <li>• ML102170465</li> </ul>
02.04 Code Repair or Replacement Procedure Review	<ul style="list-style-type: none"> <li>• 05000391/2011605, Section C.1.10</li> </ul>	<ul style="list-style-type: none"> <li>• ML112201418</li> </ul>

<b>IP 73053 Section</b>	<b>Inspection Reports</b>	<b>ADAMS Accession Number</b>
02.01 Preservice inspection (PSI) plan review	<ul style="list-style-type: none"> <li>• 05000391/2012602, Section C.1.6</li> </ul>	<ul style="list-style-type: none"> <li>• ML12087A324</li> </ul>

02.02 Examiner qualification review	<ul style="list-style-type: none"> <li>• 05000391/2010602, Section C.1.17</li> </ul>	<ul style="list-style-type: none"> <li>• ML101230144</li> </ul>
02.03 Observe four different methods of examination of components	<ul style="list-style-type: none"> <li>• 05000391/2009604, Section C.1.13 (PT, UT)</li> <li>• 05000391/2009603, Section C.1.5 (UT)</li> <li>• 05000391/2010602, Section C.1.17 (ECT)</li> <li>• 05000391/2010603, Section C.1.13 (UT)</li> <li>• 05000391/2010605, Section OA.1.11 (UT)</li> <li>• 05000391/2013612, Section C.1.9 (MT)</li> </ul>	<ul style="list-style-type: none"> <li>• ML093030479</li> <li>• ML092120326</li> <li>• ML101230144</li> <li>• ML102170465</li> <li>• ML110410680</li> <li>• ML13088A066</li> </ul>
02.04 Pressure Boundary Repair	<ul style="list-style-type: none"> <li>• 05000391/2011605, Section C.1.11</li> <li>• 05000391/2013612, Section C.1.13</li> </ul>	<ul style="list-style-type: none"> <li>• ML112201418</li> <li>• ML13088A066</li> </ul>

b. Observations and Findings

No findings were identified. The inspectors observed that the interface between the basemat and containment vessel shell (679' elevation) is covered by an insulation package which includes stainless steel flashing and caulking, and acts as a barrier to protect the insulation underneath from moisture. Inspection of this barrier was performed as a non-ASME Code examination (i.e. an augmented exam). The inspectors questioned the applicant whether this barrier also acts to prevent moisture intrusion at the basemat to containment vessel shell interface and should be inspected per the ASME requirements, specifically Subsection IWE, Table IWE-2500-1, Category E-A, Item E1.30, "Moisture Barriers." The applicant subsequently revised their Containment Preservice Inspection Program Plan to include the barrier as an Item E1.30 ASME Code exam.

c. Conclusions

The inspectors determined that inspection procedures 73051, 73052, and 73053 have been completed based on this inspection and previous inspection activities documented in the inspection reports listed above. Inspection Procedures 73051, 73052, and 73053 are closed.

**P.1 Preoperational Activities**

**P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 71302)**

a. Inspection Scope

02.01 (Weekly Inspection Activities): The inspectors verified that the applicant's management control system was effectively discharging its responsibilities over the

preoperational testing program by facility record review, direct observation of activities, tours of the facility, interviews, and discussions with applicant personnel. Preoperational testing activities during the inspection period included the following systems or portions thereof:

- System 063 - Safety Injection
- System 003B - Auxiliary Feedwater
- System 070 – Component Cooling Water System
- System 072 – Containment Spray System

As systems became available for preoperational testing, inspectors toured the accessible areas of the facility to make an independent assessment of equipment conditions, plant conditions, security, and adherence to regulatory requirements. The inspectors also reviewed the following, as available and on a sampling basis, during the tours:

- general plant/equipment conditions;
- plant areas for fire hazards - examined fire alarms, extinguishing equipment, actuating controls, firefighting equipment, and emergency equipment for operability and also verified that ignition sources and flammable material were being controlled in accordance with the applicant's procedures;
- activities in progress (e.g., maintenance, preoperational testing, etc.) were being conducted in accordance with the applicant's procedures;
- watched for abuse of installed instrumentation such as stepping or climbing on the instrumentation that could affect the calibration or ability to function;
- listened for the public address system announcements to determine that blind spots do not exist; (i.e., cannot be heard clearly enough to be understood);
- construction work force was authorized to perform activities on systems or equipment; and
- looked for uncontrolled openings in previously cleaned or flushed systems or components.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The applicant's implementation of the preoperational test program was in accordance with procedures for those activities observed during the inspection period.

**P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300, 70336, 70338, 70343)**

a. Inspection Scope

Background: The purpose of preoperational test inspection is to verify through direct observation, personnel interviews, and review of facility records that:

- Systems and components important to the safety of the plant are fully tested to demonstrate that they satisfy their design requirements.
- Management controls and procedures, including quality assurance programs, necessary for operation of the facility have been documented and implemented.

IMC 2513 requires the procedural review of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspections were performed in relation to satisfying the required procedural reviews.

Inspection Activities: The inspectors reviewed procedures to verify that the test procedure adequately addressed NRC requirements and licensing commitments outlined in the final safety analysis report (FSAR), docketed correspondence, safety evaluation report (SER), Technical Specifications, and Regulatory Guide 1.68. The test procedures reviewed were:

- 2-PTI-003B-04, "Auxiliary Feedwater Pumps & Valves Logic Test," Rev. 0 and 1
- 2-PTI-003B-05, "Auxiliary Feedwater Dynamic Test," Rev. 1
- 2-PTI-072-01, "Containment Spray Pump and Valves Logic Test," Rev. 0 and 1
- 2-PTI-074-01, "Residual Heat Removal System Pump/Valves Logic," Rev. 1

Additionally, the inspectors reviewed preoperational test procedures to verify that the procedures contained the following administrative good practice attributes:

- the title described the purpose of the procedure;
- the cover page had appropriate information and approval signatures;
- each page had appropriate identification information;
- the last page was clearly identifiable by markings;
- a clear statement of procedure purpose/objectives;
- planning information such as prerequisites, precautions, required tools, reference documents, and coordination requirements;
- signoff requirements including concurrent and independent verification steps established where appropriate;
- equipment alignment instructions are clear and concise;
- equipment identifiers are accurate;
- actions to be taken within the steps are specifically identified;
- instrumentation units are consistent for data collection;
- graphs, charts, tables, data sheets, and work sheets are clearly usable;
- calculation sheets are technically accurate;
- clear coordination instructions exist for test activities involving multiple test personnel;
- clear instructions exist for system restoration;
- guidance for follow-up actions and points of contact;
- clear concise steps for testing with action critical (acceptance criteria) steps identified;
- clear quantitative acceptance criteria with acceptability and contingencies;
- overall sequence of the procedure is consistent with obtaining the intended result; and

- system boundaries were reviewed to verify adequate overlap exists between tests to ensure the entire system will be tested.

The inspectors also reviewed the procedure to verify that precautions or explanations were placed immediately ahead of the steps to which they applied. The inspectors performed a detailed review with the responsible test engineer to verify that the acceptance criteria met design requirements.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedures were written in a manner consistent with the guidance of procedure SMP-8.0, "Watts Bar Nuclear Plant Unit 2 Administration of Preoperational Test Instructions," Rev. 11. This completes the procedure review of preoperational test procedures 2-PTI-003B-04, 2-PTI-003B-05, 2-PTI-072-01, and 2-PTI-074-01. The preoperational testing procedure reviews for Systems 003B and 072 (IPs 70338 and 70343) are closed.

### **P.1.3 Preoperational Test Witnessing (Inspection Procedures 70302 and 70312)**

a. Inspection Scope

Background: The purpose of preoperational test inspection is to verify through direct observation, personnel interviews, and review of facility records that:

- systems and components important to the safety of the plant are fully tested to demonstrate that they satisfy their design requirements; and
- management controls and procedures, including QA programs, necessary for operation of the facility have been documented and implemented.

IMC 2513 defines the minimum inspection program for a finding of readiness for license issuance (IP 94302, Status of Watts Bar Unit 2 Readiness for an Operating License). IMC 2513 requires the preoperational test witnessing of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspection was performed in relation to satisfying the required preoperational test witnessing.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instructions 2-PTI-061-02, "Ice Condenser Ice Loading," Rev. 1, to verify that the testing was conducted in accordance with approved procedures, 0-MI-61.06 "Servicing Ice Condenser," Rev. 2; 2-MI-61.001 "Initial Ice Loading," Rev. 0; and 0-SOI-61.02 "Ice Charging System," Rev. 2. In addition, the inspections were completed to verify the adequacy of test program records and preliminary evaluation of the test results.

The inspectors assessed the following attributes associated with these test observations:



- all personnel were on station and had the latest revision of the procedure;
- prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed appropriately;
- administrative test controls were properly followed; and
- personnel were using approved procedures.

The inspectors observed the ice condenser preoperational tests to support the loading of the Unit 2 ice condenser to verify that the ice baskets met the TS weight requirements and the ice mixture chemistry requirements. The inspectors conducted a review with the responsible test engineer to ensure that the preliminary test evaluations were consistent with the inspector's observations. The inspectors observed the Unit 2 ice loading activities to ensure the ice basket weights and chemistry data were properly gathered and recorded. A cursory review of the data was performed to verify the adequacy of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the Unit 2 ice loading activities were completed in accordance with the approved procedures and the initial ice condenser basket weights and chemistry data was properly recorded and evaluated.

**P.1.4 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, and 70438)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-003B-05, "Auxiliary Feedwater System Dynamic Test," Rev. 1 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following components' logic tests were selected for inspection of this item:

- Section 6.1, 2-PMP-3-118, Auxiliary Feedwater Pump 2A-A, Hydraulic Performance Test
- Section 6.2, 2-PMP-3-118, Auxiliary Feedwater Pump 2A-A, 48 Hour Endurance Test

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5.

**P.1.5 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, and 70433)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-062-02, "Boric Acid Subsystem Logic Test," Rev. 1 to verify that the testing was conducted in accordance with approved

procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following component's logic test was selected for inspection of this item:

- Section 6.4, 2-FCV-62-140

The inspectors assessed the following attributes associated with this test observation:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5.

## **P.1.6 Preoperational Test Witnessing (Inspection Procedures 70302 and 70312)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-063-04, "Safety Injection System

RWST and Containment Sump Annunciators,” Rev. 0 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following components’ logic tests were selected for inspection of this item:

- Section 6.1, RWST Low-Low Level Annunciator
- Section 6.2, RWST Level Full and Startup Makeup Annunciators
- Section 6.4, RWST Temperature Annunciators

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector’s observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant’s test procedure was performed in a manner consistent with the guidance of procedure SMP-9, “Watts Bar Nuclear Plant Unit 2 Conduct of Test,” Rev. 5. This completes the planned test witnessing inspection of preoperational test procedure 2-PTI-063-04 associated with refueling water storage tank (RWST) and containment sump annunciator testing.

## **P.1.7 Preoperational Test Witnessing (Inspection Procedures 70302 and 70312)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-067-01, "ERCW Valve Functional Test," Rev. 1 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following components' logic tests were selected for inspection of this item:

- Section 6.2, 2-FCV-67-87
- Section 6.4, 2-FCV-67-89
- Section 6.5, 2-FCV-67-91
- Section 6.6, 2-FCV-67-95
- Section 6.7, 2-FCV-67-96
- Section 6.8, 2-FCV-67-97
- Section 6.10, 2-FCV-67-103
- Section 6.21, 2-FCV-67-138
- Section 6.22, 2-FCV-67-139
- Section 6.23, 2-FCV-67-141
- Section 6.25, 2-FCV-67-295
- Section 6.26, 2-FCV-67-296
- Section 6.27, 2-FCV-67-297
- Section 6.28, 2-FCV-67-298
- Section 6.38, 2-FCV-67-67

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data

was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5. This completes the planned test witnessing inspection of preoperational test procedure 2-PTI-067-01 associated with ERCW valve functional testing.

### **P.1.8 Preoperational Test Witnessing (Inspection Procedures 70302 and 70312)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-067-03, "ERCW Valve Logic Test," Rev. 1 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following components' logic tests were selected for inspection of this item:

- Section 6.1, 2-FCV-67-123
- Section 6.29, 2-FCV-67-143
- Section 6.30, 2-FCV-67-146

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5.

**P.1.9 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, and 70439)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-070-01, "Component Cooling Water Pump/Valve Functional Test," Rev. 1 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following component's logic tests were selected for inspection of this item:

- Section 6.4, 2-FCV-70-134
- Section 6.7, 2-FCV-70-92
- Section 6.9, 2-FCV-70-100
- Section 6.13, 2-FCV-70-156
- Section 6.16, 2-FCV-70-3-B
- Section 6.19, Thermal Barrier Booster Pump 2B-B Operational Test
- Section 6.22, Component Cooling Pump C-S Pump Logic (Train A)

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;

- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5. This completes the planned test witnessing inspection of preoperational test procedure 2-PTI-070-01 associated with component cooling water pump/valve logic testing.

#### **P.1.10 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, and 70443)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.3.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-072-01, "Containment Spray Pump Valve Logic Test," Rev. 1 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The following component's logic tests were selected for inspection of this item:

- Section 6.3, 2-FCV-72-22 and 2-FCV-72-44
- Section 6.6, 2-FCV-72-41
- Section 6.11, Containment Spray Pump 2A-A Flow Performance Test

The inspectors assessed the following attributes associated with these test observations:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;



- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

The inspectors observed the tests to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluations were consistent with the inspector's observations. During the tests, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test cursory review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 5. This completes the planned test witnessing inspection of preoperational test procedure 2-PTI-072-01, "Containment Spray Pump Valve Logic Test."

### **P.1.11 Preoperational Test Results Evaluation (Inspection Procedures 70562)**

a. Inspection Scope

Background: The purpose of preoperational test inspection is to verify through direct observation, personnel interviews, and review of facility records that:

- Systems and components important to the safety of the plant are fully tested to demonstrate that they satisfy their design requirements, and
- Management controls and procedures, including quality assurance programs. Necessary for operation of the facility have been documented and implemented.

IMC 2513 requires the pre-operational test results review of the mandatory tests defined in MC 2513 and five of the primal tests defined in MC 2513. IIR 05000391/2014608 (ADAMS Accession No. ML14322A182) documented the test witnessing inspection of the performance of IP 70462, "Preoperational Test Witnessing-Reactor Coolant System

Cold Hydrostatic Test.” The following inspection was performed using IP 70562 to satisfy the review of facility records of the mandatory test.

Inspection Activities: The inspectors reviewed test result package 2-PTI-068-14, “Unit 2 Cold Hydro Summary Report,” Rev. 1 dated January 15, 2015, to verify that the hydrostatic test was performed in accordance with the applicable procedure. Specifically, the inspectors reviewed the summary report to verify:

- changes were made in accordance with applicant’s administrative controls;
- the test procedure satisfied the commitments to testing made by the applicant;
- the system boundary contained all required components, pressure vessels, piping, pumps, and valves;
- the hydrostatic test met the requirements required by ASME Boiler and Pressure Vessel Code (BPVC) Section III;
- test deficiencies are resolved and retest requirements have been completed; and
- test results have been reviewed and approved by appropriate personnel.

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 hydrostatic test results package, the inspectors determined that the test was performed in accordance with the appropriate procedure and met the requirements invoked by NRC regulations and ASME B&PV Code Section III. IP 70562 is considered closed based on this review.

### III. OPERATIONAL READINESS ACTIVITIES

#### O.1 Operations

##### O.1.1 (Closed) Quality Assurance Program - Procurement Control (Inspection Procedure 35746)

a. Inspection Scope

Background: This IP provided guidance to the inspectors in reviewing QA program documentation to verify that the applicant had developed and implemented a QA Program related to the control of procurement activities that was in conformance with regulatory requirements, commitments in the application and industry guides and standards. This inspection was a follow-up from the inspection that was documented in IIR 05000391/2014607 (ADAMS Accession No. ML1427A076). With respect to Unit 1 operations, these controls had been previously established and implemented by the licensee, and are inspected under the NRC reactor oversight process (ROP).

Inspection Activities: This inspection was performed in accordance with IMC 2513, titled “Light Water Reactor Inspection Program – Preoperational Testing and Operational

Preparedness Phase,” dated August 5, 2008, and based upon an NRC letter to TVA, dated November 8, 2013, titled “Watts Bar Nuclear Plant Unit 2 Construction – Operational Preparedness Inspection Plan,” (ADAMS Accession No. ML13312A082) which described the scope of inspections for the inspection procedures listed in Appendix B of IMC 2513. Specifically, this inspection was performed to satisfy the requirements for Section II.2.b of IP 35746, “Procurement Control,” dated October 1, 1976; which required a sampling of Unit 2 safety-related items that had been received, stored, and handled by the organization that would support Unit 2 once it became operational.

The inspectors reviewed a sample of procurement orders for recently purchased safety-related items that had been received on-site. The sample included items from the following categories: mechanical, electrical, instrument/electronic, and consumables. The inspectors verified that the associated procurement documents were prepared in accordance with administrative controls; the items were purchased from qualified vendors; and the procurement documents contained requirements for the vendor/supplier to supply appropriate documentation of the quality, including component traceability. The inspectors also verified that the documentation was located with the procured items in the correct storage locations, and that the items were stored in accordance with the documentation requirements.

The inspectors also reviewed the open issues previously documented in IIR 05000391/2014607. The inspectors reviewed the construction contractor’s “Evaluated Suppliers List” and the TVA “Acceptable Supplier List” (ACL) that had been identified as being different from each other, specifically that some of the vendors used for WBN Unit 2 construction were not on TVA’s ACL. The inspectors reviewed supplier lists and interviewed Procurement and QA personnel, both from the applicant and the construction contractor. The inspectors noted that although the lists were different, no supply parts purchased for Unit 2 construction came from suppliers that were not on the TVA ACL. The extra suppliers on the contractors’ list were not used for Unit 2 construction. In addition, the inspectors reviewed the procurement procedures that were required to qualify suppliers if they would be used for future purchases. The inspectors also reviewed “Watts Bar Nuclear Plant Operational Spares Strategy Document,” and noted that it had been revised since the last inspection. The critical spares for WBN Unit 2 had been identified based upon the differences between WBN Unit 1 and WBN Unit 2. Purchases were being performed for those spares necessary for WBN Unit 2 startup and operation.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based upon the review of the sample and the programmatic process review, the inspectors concluded that TVA had adequately planned to transition from a single unit to a dual unit procurement control program. No further inspection is required for adequate implementation of IP 35746. IP 35746 is closed.

### **O.1.2 (Closed) Quality Assurance Program - Maintenance (Inspection Procedure 35743)**

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

Background: This IP provided guidance to the inspectors to verify the applicant had developed and implemented a QA Program, relating to maintenance activities, that was in conformance with proposed TS, regulatory requirements, commitments in the application, and applicable industry guides and standards. This inspection was a follow-up from the inspection that was documented in IIR 05000391/2015603 (ADAMS Accession No. ML15124A921). With respect to Unit 1 operations, these controls had been previously established and implemented by the licensee, and are inspected under the NRC ROP.

Inspection Activities: This inspection was performed in accordance with IMC 2513, dated August 5, 2008, and based upon an NRC letter to TVA, dated November 8, 2013. Specifically, this inspection was performed to satisfy the requirements for Section II.2.c of NRC IP 35743, "Maintenance," dated January 1, 1982; which required the inspectors to verify that Unit 2 equipment was on a preventive maintenance master schedule and to verify that the required maintenance activities were performed and documented.

The inspectors reviewed the associated program documents and procedures for TVA nuclear power group (NPG) and for Unit 2 construction, which included the quality assurance plans, preventative maintenance, on-line work control, and the corrective action program. The inspectors performed interviews, reviewed program documents, and reviewed the work management schedules of preventive maintenance activities (PMs) for systems that had been completed and turned over to the operations department. The inspectors reviewed a sampling of Unit 2 equipment and systems as documented in the master list and verified that the PMs had been completed or credited as complete based upon previous work performed and documented as required per the applicant's work management process. The inspectors verified that the PMs were consistent with the vendors' recommendations.

Documents reviewed are listed in the Attachment.

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

No findings were identified.

#### **c. Conclusions**

Based upon the review of the sample and the programmatic process review, the inspectors concluded that TVA had adequately planned to transition from a single unit to a dual unit maintenance program. No further inspection is required for adequate implementation of IP 35743. IP 35743 is closed.

### **O.1.3 (Closed) Quality Assurance Program – Surveillance Testing and Calibration Control (Inspection Procedure 35745)**

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

Background: This IP provided guidance to the inspectors to verify the applicant had developed and implemented programs for control and evaluation of: (1) surveillance testing, calibration, and inspection required by proposed TS, in-service inspection of pumps and valves as described in 10 CFR 50.55a.(g); and (2) calibration of safety-related instrumentation not specifically controlled by TS. This inspection was a follow-up from the inspection that was documented in IIR 05000391/2015603 (ADAMS Accession No. ML15124A921). With respect to Unit 1 operations, these controls have been previously established and implemented by the licensee, and are inspected under the NRC ROP.

Inspection Activities: The inspection was performed in accordance with IMC 2513, dated August 5, 2008, and based upon an NRC letter to TVA, dated November 8, 2013. Specifically, this inspection was performed to satisfy Sections II.1.b and II.2.b of IP 35745, "Surveillance Testing and Calibration Control," dated April 1, 1979, which required the inspectors to verify: (1) Unit 2 surveillance tests required by TS were included in a master schedule and that the planned schedule was in accordance with the requirements of the TS; and (2) safety-related plant instruments which were not specifically required to be calibrated by TS had been included in a master calibration program, calibration procedures had been prepared and approved, and that calibration of the instruments had been performed.

For Section II.1.b., the inspectors verified that a master schedule for Unit 2 surveillance tests required by TS had been established. The inspectors also verified that the surveillance frequency and applicable Mode tied to surveillance completion was consistent with the applicable TS. The inspectors verified that the surveillance procedures were consistent with the requirements of the TS. For Section II.2.b., the inspectors verified that the calibration requirements had been established for safety-related plant instruments which were not specifically required to be calibrated by TS. The inspectors verified safety-related instruments were included in a master calibration program. The inspectors verified that the calibration procedures have been prepared, approved, and consistent with vendors' requirements. The inspectors also verified that the calibration of the instruments had been performed and documented in accordance with the applicant work management process. For both IP sections, the inspectors performed interviews with the dual-unit work control center personnel and verified that the surveillances and calibrations were on the work management schedule for their next scheduled performance.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based upon the review of the sample and the programmatic process review, the inspectors concluded that TVA had adequately planned to transition from a single unit to a dual unit surveillance testing and calibration program. No further inspection is required for adequate implementation of IP 35745. IP 35745 is closed.

#### IV. OTHER ACTIVITIES

##### OA.1.1 (Discussed) Electrical Issues CAP - Sub-issue: Cable Separation and Electrical Isolation (Temporary Instruction 2512/020)

###### a. Inspection Scope

Background: The bases for the cable separation requirements for WBN are the Institute of Electrical and Electronics Engineers (IEEE) 279-1971, IEEE 308-1971, and Regulatory Guide (RG) 1.6. The applicant determined that examples of redundant divisions of enclosed raceways existed with less than the minimum required 1-inch separation. This sub-issue was divided into three categories:

- Separation between redundant divisions of Class 1E raceways,
- Internal panel separation between redundant enclosed divisions of Class 1E cables,
- Coil-to-contact and contact-to-contact isolation between Class 1E and non-Class 1E circuits.

In prior NRC inspections, IIR 05000391/2011602 – Section OA.1.5 (ADAMS Accession No. ML110800483), IIR 05000391/2011608 – Section OA.1.8 (ADAMS Accession No. ML11311A082), and IIR 05000391/2013604 – Section OA.1.29 (ADAMS Accession No. ML13179A079), NRC inspectors gathered a limited sample demonstrating adequate separation internal to control panels and between raceways containing redundant divisions of Class 1E circuits. However, in IIR 05000391/2014605 – Section OA.1.2 (ADAMS Accession No. ML14226A049), inspectors observed that the completed installation for conduit 2VC6034A installed under closed WO 113325528 failed to maintain the required 1-inch minimum separation with different divisional conduits.

Inspection Activities: The inspectors reviewed work orders to verify that documented work activities ensured compliance with separation requirements identified in TVA design criteria WB-DC-30-4, "Separation / Isolation". The inspectors conducted walk-downs of the proximity between conduit pairs to verify that reworked conduits were properly installed in relation to separation between redundant divisions of Class 1E raceways.

The inspectors reviewed the following conduit pairs and WO packages in order to assess their quality and adequacy and to ensure that physical separation requirements were implemented:

- 2VC2039A/2PM6396G (WO 113325343)
- 2VC4456B/2PM6396G (WO 114655552)
- 2VC4432B/2PM6619A (WO 113427588)
- 2PM7214D/MC635A (WO 111123610)
- 2VC4432B/2VC4421A (WO 113427588)

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Additional field observations of completed work are recommended to demonstrate that physical separation and electrical isolation requirements have been met. Therefore, the inspectors concluded that this Sub-Issue will remain open until a larger sample of conduits can be inspected.

**OA.1.2(Discussed) Construction Deficiency Report 05000391/89-08: Kapton Insulated Pigtail Insulation Damage (Inspection Procedure 51053)**

a. Inspection Scope

Background: The historical concern that primary containment electrical penetrations containing Kapton insulated pigtails were found with nicks in the insulation, such that their ability to support the safety function of the serviced load or signal, was initially reported to the NRC on August 25, 1989, in accordance with 10 CFR Part 50.55(e) as a condition adverse to quality report (CAQR) WBP 890302 for Unit 1 and CAQR WBP 89436 for Unit 2. The follow-up final report associated with the notification (ADAMS Accession No. ML073551006) was transmitted by letter dated September 25, 1989, and identified the apparent cause, safety implications, and planned or completed corrective actions. By letter dated April 30, 1993 (ADAMS Accession No. ML073241164), the applicant changed the original commitment, which required quality control (QC) inspection of all penetration pigtail wires for damage, to state that appropriately trained modifications personnel utilizing a two-party inspection process would be used instead.

The background on this issue is discussed in further detail in Section OA.1.4 of IIR 05000931/2014607 (ADAMS Accession No. ML14274A076).

Inspection Activities: The inspectors observed qualified Kapton inspectors performing quality inspections of the individual strands comprising the Kapton insulation system for 2-PENT-293-0038-D (inboard and outboard) and 2-PENT-293-0008-A (inboard). The inspectors also observed repairs resulting from the inspections to verify that proper procedures were followed.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that the inspection performed and the portions of the repairs observed were adequate. Additional samples will be inspected.

**OA.1.3 (Discussed) Generic Letter 89-10: Safety-Related Motor Operated Valve Testing and Surveillance (Temporary Instruction 2515/109 and Inspection Procedure 51053)**

a. Inspection Scope

The inspectors observed applicant activities in response to GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The inspectors performed Part 2 inspections as documented in TI 2515/109. The inspectors performed these reviews to determine if the applicant had established and was implementing a program that will ensure the proper performance of MOVs in safety-related systems. The inspectors observed dynamic MOV diagnostic tests for the following GL 89-10 MOVs:

- 2-FCV-63-0006;
- 2-FCV-63-0007;
- 2-FCV-63-0008;
- 2-FCV-63-0011; and
- 2-FCV-63-0047.

For these MOVs the inspectors reviewed the test activities to determine if they were properly controlled and handled. To make those determinations, the inspectors reviewed work instructions, applicable design specifications, calculations, system descriptions, work packages, and approved procedures. The inspectors reviewed applicable MOV sizing calculations to determine if the applicant adequately sized the MOVs in accordance with GL 89-10 and if the switch settings were consistent with the expected design basis conditions for operation of the valve.

During the observance of these tests, the inspectors determined if:

- test personnel accomplished activities in accordance with the applicable test procedure and work instructions;
- fluid pressure, differential pressure, and flow adequately replicated applicable design basis conditions;
- measuring and test equipment used during the test was properly identified, traceable, and within the current calibration interval;
- measuring and test equipment was suitable for the application, was used within the calibrated range, and was recorded in the applicable work orders;
- test results were recorded during the activity; and
- test discrepancies were properly identified for resolution.

The inspectors reviewed MOV thrust and torque capability engineering calculations for five MOVs listed above to determine if the:

- actuator selections were in compliance with applicable site specifications and design requirements;
- design inputs for design basis operating conditions (such as temperature, flow, and pressure – including differential pressure) were consistent with the applicable system description and the Final Safety Analysis Report;



- calculations complied with design standard DS-M18.2.22, TVA Mechanical Design Standard for MOV Design Basis and Joint Owner's Group (JOG) Review Methodologies, Revision 6; and
- calculations complied with design standard DS-M18.2.21, Mechanical Design Standard for Motor Operated Valve Thrust and Torque Calculations, Revision 21.

The inspectors previously reviewed applicant actions to address GL 89-10; therefore, this inspection was a limited scope inspection of the requirements of this TI. In accordance with requirements of TI 2515/109, Revision 4, the inspectors evaluated and answered the questions for Part 2 of the TI as documented in the Observations and Findings section below: Questions 04.04 through 04.11.

The following samples were inspected:

- IP 51053, Section 02.02.g – 5 samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

In accordance with requirements of TI 2515/109, Revision 4, the inspectors evaluated and answered the following questions for Part 2 of the TI:

*Part 2, Verification of Program Implementation:*

For a sample of MOVs from the population of MOVs in the generic letter program:

- 04.04 Select a sample of MOVs for detailed review from the population of MOVs in the generic letter program.

The inspectors sampled five GL 89-10 MOVs, 2-FCV-63-0006, 2-FCV-63-0007, 2-FCV-63-0008, 2-FCV-63-0011, and 2-FCV-63-0047, to review as part of this inspection. Based on the previous samples obtained as documented in IIRs 05000391/2011608 (ADAMS Accession No. ML11311A082, 2 samples), 05000391/2013610 (ADAMS Accession No. ML14049A158, 2 samples), 05000391/2014615 (ADAMS Accession No. ML15044A424, 1 sample), and this report (5 samples), the inspectors determined that the sample requirements contained in Section 05.02.k of the TI have been met.

- 04.05 Verify that the licensee has performed design-basis reviews of the sampled MOVs consistent with the generic letter or its commitments (where accepted under Part 1), as appropriate.

The inspectors determined that the applicant's design basis review was adequate for the sampled valves.

- 04.06 Verify that the licensee has adequately sized the sampled MOVs in accordance with the generic letter or its commitments (where accepted under Part 1), as

appropriate. Verify that switch settings are consistent with the expected design conditions for operation of the valve.

The inspectors verified that the applicant properly sized the sampled MOVs and that the limit and torque switch settings were appropriate. The inspectors verified the adequacy of the engineering design was completed in accordance with applicable site specifications and design criteria. The inspectors reviewed the applicable thrust/torque and actuator capability engineering calculations for the sampled MOVs to ensure that the applicant had appropriately sized the actuators. The inspectors observed dynamic MOV testing on the sampled valves and determined that the applicant appropriately set the limit and torque switches.

- 04.07 Verify that the licensee has demonstrated the design-basis capability of the sampled MOVs and the adequacy of the licensee's program applied to the sampled MOVs in accordance with the generic letter or its commitments (where accepted under Part 1), as appropriate.

The inspectors reviewed the reconciled MOV calculation(s) for the sampled MOV(s) and determined that the applicant adequately incorporated the dynamic test results into the calculation(s). The valve factor and rate of loading used in the calculations exceeded the values obtained during dynamic testing. Design assumptions were conservative and the applicant effectively demonstrated adequate margin for actuator capability under worse case accident scenarios.

- 04.08 Verify that the licensee has established a method for periodic verification of adequate capability of the sampled MOVs in accordance with the generic letter or its commitments (where accepted under Part 1), as appropriate.

This will be verified during inspection activities for GL 96-05.

- 04.09 Verify that the licensee has analyzed MOV failures which have occurred and has an effective corrective action plan to prevent reoccurrence and the licensee trends failures of MOVs in accordance with the generic letter or its commitments (where accepted under Part 1), as appropriate.

The applicant maintained established procedures, which were common to all TVA nuclear units including Watts Bar Unit 2, to analyze MOV failures. The inspectors determined that these procedures were adequate.

- 04.10 Verify that the licensee is meeting the program schedule in accordance with the generic letter or its commitments (where accepted under Part 1), as appropriate.

This item is not applicable for Watts Bar Unit 2 because the unit is under construction.

- 04.11 Verify quality assurance program implementation in the design control and testing of the sampled MOVs.

Based on the activities inspected, the inspectors determined that the applicant was properly implementing their quality assurance program with regards to Unit 2 GL 89-10 MOVs.

Based on the results of this inspection and previous inspections documented above, the inspectors concluded that all inspection activities for Part 2 of this TI are complete.

c. Conclusions

Based on the activities reviewed, MOV testing was conducted by qualified individuals using qualified procedures, design calculations were performed in accordance with applicable specifications, and the applicant was adequately implementing GL 89-10 requirements. Because Watts Bar Unit 2 has not operated yet, the applicant has not fully established a GL 89-10 program; therefore, the requirements of GL 89-10 have not been fully implemented and additional inspection activities are required to complete this TI. These activities include additional samples for Part 3 requirements of this TI. Based on this limited review and the remaining actions by the applicant, no additional conclusion is warranted for this inspection.

**OA.1.4 (Discussed) Generic Letter 2004-02 - Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors and Pressurized Water Reactor Containment Sump Blockage (Temporary Instruction 2515/166)**

a. Inspection Scope

Background: GL 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors", requested licensees to evaluate the emergency core cooling system (ECCS) and containment spray systems (CSS) recirculation functions and take actions, if appropriate. Pressurized water reactor recirculation sump screens have been identified to be potentially susceptible to debris blockage during design basis accidents requiring recirculation operation of ECCS or CSS and on the potential for additional adverse effects due to debris blockage of flow paths necessary for ECCS and CSS recirculation and containment drainage.

In response to the generic letter mentioned above, WBN determined that they would remove the outer trash racks provided on each side of the sump and install a new Sure-Flow® strainer. The new strainer has an available flow area of 4600 ft<sup>2</sup> compared to the original screen area of approximately 200 ft<sup>2</sup>. The new strainer openings are 0.085 inches in diameter compared to the 0.25 inch mesh that cover the outer trash racks. The Sure-Flow® strainer has an advanced configuration intended to be much more resistant to potential sump blockage.

Unit 2 containment is a mirror image to Unit 1's containment. Therefore, the results of debris generation, transport analyses, and downstream effects will be the same for Unit 2 as for Unit 1. The WBN Unit 2 letter to the NRC dated March, 4, 2011 (ADAMS Accession No. ML110680248) stated that Unit 2 actions are to replace containment sump intake screens with an advanced design containment sump strainer arrangement under Engineering Document Construction Release (EDCR) 53580. The design is the same as that used for Unit 1 except that the strainer stack to plenum opening was increased in size. This change reduces the strainer pressure drop, thus increasing the margin to plugging the strainer when compared to Unit 1.

Inspection Activities: The inspectors performed a walkdown of the containment sump strainer assembly 2-STN-063-0200. Specifically, the inspectors reviewed WOs associated with the installation of the containment sump strainer assembly, plenum, and support beams as well as their respective construction drawings to determine if:

- the maximum 0.085" gap, allowed by design, was attained throughout the components and instrument penetrations of the strainer assembly;
- the as-built configuration of the strainer was in conformance with the construction sequence described on the work orders;
- as-built dimensions were within the tolerances required by construction drawings and specifications; and
- installation and torquing of connections was properly documented and controlled by quality control inspections.

In addition, the inspectors reviewed certificates of conformance, installation procedures, and EDCRs to verify if construction activities were completed and programmatically controlled in response to GL 2004-02.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the activities reviewed, the inspectors concluded that the installation of the containment sump strainer assembly was completed in accordance with the as-built configurations reflected in construction drawings and specifications. This item will remain open pending review of related calculations, review of the final coatings walkdown report, review of drawings and calibration reports associated with the sump level indicator and sump radiation monitoring device, and a final walkdown of the containment sump.

**OA.1.5(Closed) Temporary Instruction 2515/191: Followup on Fukushima Orders for Watts Bar and Inspection of the Licensee's Responses to Mitigation Strategies Order EA-12-049, Spent Fuel Pool Instrumentation Order EA-12-051 and Emergency Preparedness Information Requested in NRC March 12, 2012**

a. Inspection Scope

Background: On March 12, 2012, the NRC issued Mitigation Strategies Order EA-12-049, (ADAMS Accession No. ML12054A735) requiring all U.S. nuclear power plants to implement strategies that will allow them to cope without their permanent electrical power sources for an indefinite amount of time.

The Order was issued in response to the Fukushima accident. The NRC created a task force of senior NRC staff that reviewed the circumstances of the event to determine what lessons could be learned. In July 2011, the task force provided recommendations to

enhance U.S. reactor safety; these became the foundation of the NRC's post-Fukushima activities.

These diverse and flexible coping strategies (also known as FLEX) are expected to use a combination of currently installed equipment (e.g., steam-powered pumps), additional portable equipment that is stored on site, and equipment that can be flown in or trucked in, to maintain the proper cooling temperature for the reactor core and spent fuel.

On July 15, 2013, TVA submitted a letter (ADAMS Accession No. ML13206A383) to the NRC updating their FLEX strategy plans to comply with NRC Order EA-12-049.

Since that time, TVA has implemented several of these actions, made modifications to the plant, and introduced new equipment. The NRC has witnessed and inspected a sampling of these modifications as noted below. The inspections centered on critical design and structural attributes. Additionally, inspections were performed of as-built and completed modifications to verify that specifications, drawings, requirements, and standards were met.

Several of these inspections for Unit 2 have been documented in IIRs:

- 05000391/2014604 (ADAMS Accession No. ML14177A214)
- 05000391/2014605 (ADAMS Accession No. ML14226A049)
- 05000391/2014607 (ADAMS Accession No. ML14274A076)

Inspection Activities: Recent inspections for TI 2515/191 were conducted from March 30 to April 3, 2015 and documented in a separate inspection report numbered 05000390/2015609 and 05000391/2015616 (ADAMS Accession No. ML 15173A317). The inspectors reviewed the NRC inspection report which concluded that the inspection team had verified that plans for complying with NRC Orders EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (ADAMS Accession No. ML12229A174) and EA-12-051, Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation (ADAMS Accession No. ML12056A044) are in place and are being implemented by the applicant. The inspection team had also verified that the applicant had implemented staffing and communications plans provided in response to the March 12, 2012, request for information letter and multi-unit dose assessment information provided per COMSECY-13-0010, Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned, dated March 27, 2013 (ADAMS Accession No. ML12339A262).

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on completion of earlier inspections of plant modifications to implement diverse/flexible coping strategies and the completion of TI 2515/191, the NRC has completed its inspection of post Fukushima activities as related to construction inspections for Unit 2.

**OA.1.6 (Discussed) Generic Letter 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Inspection Procedure 92701)**

a. Inspection Scope

Background: GL 2006-02 “Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power” (ADAMS Accession No. ML060180352) was issued on February 1, 2006, to determine if compliance was being maintained with regulatory requirements governing electric power sources and associated personnel training. The NRC completed a safety evaluation (ADAMS Accession No. ML100080768) of TVA’s response to GL 2006-02 for Unit 2. The SER, dated January 20, 2010, concluded that TVA’s response and regulatory commitments made for GL 2006-02 were acceptable. The report also indicated that prior to closing out the review of TVA’s response to this GL for Unit 2, the following would be required:

- independent verification that the regulatory commitments discussed have been met, and
- a review of the associated electrical design calculations for WBN Unit 2.

IIR 05000391/2014608 Section OA.1.5 (ADAMS Accession No. ML14322A182) previously addressed this issue.

Inspection Activities: The inspectors reviewed the current version of calculation EDQ00099920070002 Rev. 43 to verify the adequacy and functionality of the auxiliary power system to support dual unit operations. The inspectors reviewed TVA-SPP-10.010, Rev. 4, NERC Standard Compliance Processes Shared by TVA’s Nuclear Power Group and Transmission Organizations, dated March 24, 2014, to understand operation protocols in place between WBN and the power system operator (PSO).

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors identified that additional inspection is required. Specifically, inspection of the updated PSO offsite power grid analysis, WB2/PSO protocols and implementing procedures, and procedures for offsite power restoration. This item will remain open.

**OA.1.7 (Closed) Three Mile Island Action Item II.D.3 – Direct Indication of Relief-and Safety-Valve Position and Supplemental Safety Evaluation Report Appendix HH Item 074: Installation of the Acoustic Monitoring System for the Power Operated Relief Valves (Inspection Procedure 92701)**

a. Inspection Scope

Background: This Three Mile Island (TMI) action item requires that RCS relief and safety valves have positive indication of valve position in the main control room and that

indication is derived from a reliable valve-position detection device or a reliable indication of flow in the discharge pipe. The inspectors had previously documented their review of actions to address this item in IIR 05000391/2014608 (ADAMS Accession No. ML14322A182).

Inspection Activities: During this inspection period, the inspectors reviewed the overall status of the actions to comply with the subject TMI action item. The inspectors reviewed drawings and conducted walkdowns with responsible staff to verify the installation of the acoustic monitoring system components and pressurizer relief tank (PRT) condition sensors, and to verify indications are provided in the main control room; in accordance with TVA's overall response to this TMI action item. This review included:

- temperature downstream of the power-operated relief valves (PORVs)
- PORV direct valve position indication light
- PRT temperature
- PRT pressure
- PRT fluid level
- acoustic monitoring display
- sealed piezoelectric accelerometers
- charge converters
- control room display components

The inspectors reviewed the work performed under WOs 110800410, 114834946, 114853758, 113474274, 113576853, and 116574299 associated with the acoustic monitoring system of the pressurizer safety relief valves and PORVs to verify installed wiring for the monitoring and indication systems. The inspectors used drawing 2-47W813-1, Rev. 33 to identify installed components. The inspectors visually verified the completed installation of the sealed piezoelectric accelerometers on the downstream piping of the two pressurizer PORVs: 2-XE-68-334 and 2-XE-38-68-340A. Installed components for PRT temperature 2-TE-68-309, pressure 2-PT-68-301/2-PT-68-311C and tank level 2-LT-68-300/2-LT-68-312C indications were visually verified. The inspectors reviewed manufacturer drawings and installation instructions to verify the adequacy of installed equipment configurations.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. All components necessary to drive the signals for these indications were installed.

c. Conclusions

The inspectors determined that TVA had completed the installation, including wiring and connections for WBN Unit 2 TMI action item II.D.3 – Direct Indication of Relief and Safety Valve Position and SSER Appendix HH Item 074: Installation of the Acoustic monitoring system for the Power Operated Relief. Therefore, these items are closed.

### **OA.1.8 (Closed) Generic Letter 79-36, Adequacy of Station Electric Distribution System Voltages (Inspection Procedure 92701)**

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

Background: As indicated in the NRC GL 79-36, all licensees are required to review the electric power systems at each of their nuclear power plants to determine analytically if, assuming all onsite sources of alternating current power are not available, the offsite power system and the onsite distribution system is of sufficient capacity and capability to automatically start as well as operate all required safety loads. This includes the protection of safety loads from undervoltage conditions, designed to provide the required protection without causing voltages in excess of maximum voltage ratings of safety loads and without causing spurious separations of safety buses from offsite power. In order to address dual unit operation a separate analysis should be performed for each unit assuming (1) an accident in the unit being analyzed and simultaneous shutdown of all other units at the station; or (2) an anticipated transient in the unit being analyzed and simultaneous shutdown of all other units at the station, whichever presents the largest load demand situation.

Inspectors previously reviewed several calculations and documents associated with electrical distribution system voltages for dual unit operations with followup interviews with responsible staff from the electrical and mechanical design groups to address required clarifications. The previous reviews were documented in IIR 05000391/2011612, Section E.1.1 (ADAMS Accession No. ML11348A081), 05000391/2014605, Section OA.1.5 (ADAMS Accession No. ML14226A049), and 05000391/2014608, Section OA.1.8 (ADAMS Accession No. ML14322A182).

Inspection Activities: The inspectors reviewed and discussed voltage drop studies, calculations, maximum distribution equipment loading, motor block starting during safety injection (SI) signal loading for containment phases A and B isolation conditions, feeder and circuit wire sizes, cable temperature ratings and current capacities, control circuit protection integrity, motor block starting under SI signal with concurrent degraded voltage conditions, load shedding and load restoration from degraded voltage and loss of voltage conditions. This review was to verify equipment performance to maintain adequate station electric distribution system voltages and to establish the adequacy and functionality of the auxiliary power system to support dual unit operation.

Documents reviewed are listed in the Attachment.

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

No findings were identified.

#### **c. Conclusions**

The inspectors concluded that the calculations and information provided for dual unit operation analysis with a unit experiencing accident conditions and simultaneous shutdown of the other unit as required by the GL were addressed adequately. GL 79-36 is closed.



**OA.1.9 (Closed) Unresolved Item 05000391/2014614-01, Potential failure to comply with 10 CFR 50.55a and Properly Implement the Scope of the ASME OM Code, Associated with Generic Letter 89-04: Guidance on Developing Acceptable In-Service Testing Programs; Temporary Instruction 2515/114: Inspection Requirements for Generic Letter 89-04, Acceptable In-Service Testing Programs; Temporary Instruction 2515/110: Performance of Safety-Related Check Valves**

a. Inspection Scope

Background: During the initial inspection of TVA's inservice testing (IST) program to support dual unit operations, inspectors identified URI 05000391/2014614-01 (ADAMS Accession No. ML14363A315), Potential Failure to Comply with 10 CFR 50.55a and Properly Implement the Scope of the ASME Operation and Maintenance (OM) Code. The inspection noted that the safety injection cold leg accumulator isolation valves and nitrogen charging isolation valves (FCV-63-67, FCV-63-80, FCV-63-98, FCV-63-118, FCV-63-63, FCV-63-87, FCV-63-107, and FCV-63-127) were classified as passive in the TVA IST program. As a result of this classification, the program planned to verify position of these valves remotely every two years. Valves classified as active, however, per ASME OM Code 2004, 2006 Addenda, are required to be stroke time tested. TVA's IST program did not include a justification for classifying these valves as passive instead of active. In addition, the inspectors identified several emergency operating procedures where the valves are required to be repositioned in order to prevent excessive quantities of nitrogen from being injected into the RCS during a post-accident condition. Furthermore, the emergency response guidelines, provided by the vendor, documented that the injection of nitrogen could inhibit natural circulation or lead to RCS pressure control difficulties. As a result, further review was required for clarification/interpretation of the existing application of the ASME OM code.

Inspection Activities: The NRC Office of Nuclear Reactor Regulation (NRR) staff reviewed TVA's IST program to determine if the ECCS accumulator isolation valves met the requirements of 10 CFR Part 50.36, 50.55a, and the ASME OM Code, to be classified under a maintenance designation of passive. The NRC NRR staff documented their review in a letter to the NRC regional staff (ADAMS Accession No. ML15140A441).

In addition, the NRR staff reviewed the Watts Bar Unit 2 TS, the normal operating procedures, the safe shutdown requirements, the Watts Bar Updated Final Safety Analysis Report, and the Westinghouse analysis WCAP-9601, "Report on Small Break Accidents for Westinghouse NSSS Systems," Volumes I – III. The review was conducted to verify the potential nitrogen gas injection into the RCS system, while the plant was cooling down from MODE 3 to MODE 4 at a fixed rate with an open accumulator isolation valve, was properly analyzed. The staff reviewed the WCAP-9601 analysis to verify that the non-condensable gas, caused by the nitrogen addition into the RCS through the open accumulator valves, would not disrupt core cooling from either a hydraulic or thermal perspective.

b. Observations and Findings

No findings were identified.

The inspection reviewed TVA's position that the accumulator isolation valves were passive due to the valves being in their open safety position with power removed. These valves are included in the TS surveillance requirements (SRs) for Watts Bar Unit 2 and verify that the accumulator isolation valves are fully opened every two hours and that power is removed from each accumulator isolation valve when the pressurizer pressure is greater than 1000 psig every 31 days. The SRs indicate that the accumulator isolation valves are to remain open and de-energized while in MODE 1 and while transitioning to MODE 3. Therefore, the inspection determined that in order to reach hot standby (the safe shutdown condition) the accumulator isolation valves are not required. The IST program met the requirement of 10 CFR Part 50.36, 50.55a, and the classification of the valves met the definition of the ASME OM Code for passive valves.

The inspection reviewed the impacts of the accumulator isolation valves on the RCS. The inspection found that when the reactor is in hot standby, Mode 3, the accumulator isolation valves will remain open, the accumulators would not inject into the RCS. This is due to the RCS pressure remaining above the pressure of the accumulators.

The inspection reviewed the impacts of the accumulator isolation valves on the emergency operating procedures (EOPs) for emergency shutdown. In the EOPs, the accumulator isolation valves are listed as needed for emergency shutdown, but not all of those procedures are required for safe shutdown. The requirements for safe shutdown do not credit or list the accumulator isolation valves. Therefore, the accumulator isolation valves are not required for safe shutdown for Watts Bar Unit 2.

The inspection identified that while the plant is in a controlled shutdown condition, cooling down at a fixed rate, there was a potential for an open accumulator isolation valve to inject cold borated water and nitrogen gas into the RCS when going from MODE 3 to MODE 4. It was found that prior to entry into MODE 4, the operators would take the action to isolate the accumulator isolation valves. Furthermore, in the event the operators were unable to isolate the accumulator isolation valves, the plant could safely remain in MODE 3, the safe shutdown condition.

The inspection identified that, when in MODE 4, the RCS pressure would be low enough to allow accumulator injection into the RCS. The inspectors reviewed the potential for pressurized thermal shock (PTS) and the potential for impacts resulting from nitrogen addition into the RCS. The inspection determined the injection of cold water from the accumulators would not result in a PTS event as defined by 10 CFR 50.61. The inspection also reviewed the Westinghouse analysis WCAP-9601. This analysis used a variety of break sizes with the assumption that accumulator nitrogen emptied into the RCS in a similar manner to the pressurizer vapor space calculation. The analysis also showed that most of the non-condensable gas dissolved in the accumulator water. As a result, the WCAP-9601 analysis concluded that a small amount of non-condensable gas would not disrupt core cooling from either a hydraulic or thermal perspective. Therefore, injection of nitrogen into the RCS from the accumulators would not disrupt core cooling during small break accidents.

c. Conclusions

URI 05000391/2014614-01, Potential Failure to Comply with 10 CFR 50.55a and Properly Implement the Scope of the ASME OM Code, is closed. The inspectors

concluded that based on (1) the appropriate application of the ASME OM code, (2) the safe shutdown conditions for Watts Bar Unit 2, and (3) the review of the Westinghouse analysis WCAP-9601, the accumulator isolation valves can be designated as passive, and the concern for PTS and injection of nitrogen into the RCS from the accumulators was adequately analyzed.

GL 89-04 and associated TIs will remain open. TVA will complete preservice testing for each component in the IST program in accordance with the ASME OM code, and additional observations of these tests will be witnessed by the inspectors in order to close the GL and TIs.

**OA.1.10 (Closed) Three Mile Island Action Item I.C.7 Nuclear Steam Supply System Vendor Review of Procedures (Inspection Procedure 92701)**

a. Inspection Scope

Background: TMI Action Item I.C.7 required the NSSS vendor (Westinghouse) review the licensee's startup test program, low power and power ascension procedures, and plant emergency procedures. This commitment was documented in TVA framework letter dated January 29, 2008, Watts Bar Nuclear Plant Unit 2 – Regulatory Framework for the Completion of Construction and Licensing for Unit 2 (ADAMS Accession No. ML080320443). The commitment was contained in Enclosure 2, Item 106, I.C.7, "NSSS Vendor Revision of Procedures" – Revise power ascension and emergency procedures which were reviewed by Westinghouse.

For Unit 1, Action Item I.C.7 was closed in NRC Inspection Reports 50-390/85-08 and 50-391/85-08 (ADAMS Accession No. ML082190701). The inspectors documented that the applicant had implemented the Westinghouse Owner's Group generic emergency procedures, which had been approved by NRC staff. Unit 1 actions were further explained in TVA letter to NRC dated July 27, 1992 (ADAMS Accession No. ML073520471). This letter explains that the WBN EOPs conform to the Westinghouse generic guidelines and that WBN no longer depends on EOPs developed by identifying differences between Sequoyah Nuclear Plant and WBN. In Supplement 10 to the Safety Evaluation Report for Watts Bar Nuclear Units 1 and 2 (ADAMS Accession No. ML072060473) dated October, 1992, the NRC staff indicated that WBN procedures conformed to the Westinghouse Owner's Group guidelines and that the license condition was no longer necessary.

Inspection Activities: The inspectors reviewed the applicant's final closure package to verify that the intent of TMI Action Item I.C.7 had been met for WBN Unit 2. The inspectors reviewed a list of the 39 power ascension and low power procedures required for Unit 2 start-up. Procedures had been developed, had independent qualified reviews, and had been approved by the Plant Operating Review Committee Test Review Group (TRG). The inspectors reviewed an audit report created for each procedure to verify reviews were performed, and had Westinghouse representation. The inspectors reviewed technical instruction 2-TI-439, "Test Review Group", Rev. 2, to verify that a Westinghouse representative is required to be a review member of the TRG.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the above activities and review of the final closure package, the inspectors determined that the NSSS vendor has provided reviews of low power and power ascension test procedures. In addition, WBN emergency procedures conform to the Westinghouse Owner's Group guidelines. TMI Action Item I.C.7 is closed.

**OA.1.11 (Closed) Unresolved Item 05000391/2015603-4, Boric Acid Tank C Design Control**

a. Inspection Scope

Background: The inspectors identified discrepancies with control room alarm response procedure, 2-ARI-109-115, Rev. 5U2 for annunciator 112-A, "BAT C Level Hi/Lo," and calculation CN-SUA-10-07, "Watts Bar Unit 2 Boric Acid Tank Level Setpoint and Scaling Document (SSD) Supporting Calculation Note," Rev. 1. This error applied to Unit 1 and Unit 2.

In addition, the inspectors also identified discrepancies with calculation EPMPDM071197, "Boric Acid Concentration Analysis for BAT and RWST," Rev. 8, Appendix E, "Justification of Applicability to Unit 2 Operation," and Calculation CN-SUA-10-7, "Watts Bar Unit 2 Boric Acid Tank Level Setpoint and Scaling Document Supporting Calculation Note." This issue was documented as URI 05000391/2015603-4, "Boric Acid Tank C Design Control." (ADAMS Accession No. ML15124A921)

Inspection Activities: The inspectors performed interviews and reviewed corrective action documents, revised calculations, and procedures to determine the impact of the calculation errors.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

The inspectors determined that the errors identified in the calculations and annunciator procedures did not impact safety-related equipment or personnel safety.

c. Conclusions

The applicant captured this concern in their corrective action program under PERs 1007729, 1008723, and 1009641 and subsequently revised the alarm response procedures and calculation to correct the errors. There was no violation of NRC requirements identified. No further inspection is required; URI 05000391/2015603-4 is closed.

### OA.1.12 Followup and inspection of NRC Office of Investigation Report 2-2014-017

#### a. Inspection Scope

The inspectors reviewed the NRC Office of Investigations (OI) Report 2-2014-017, which was related to compliance with anchor bolt installation procedures.

#### b. Observations and Findings

Introduction: On April 9, 2015, the NRC OI completed an investigation to determine whether on or about December 1, 2011, Bechtel employees, while working at WBN Unit 2, deliberately failed to follow anchor bolt installation procedures. The OI investigation concluded that two Bechtel employees, former pipefitters at WBN Unit 2, deliberately violated TVA procedural guidelines when they damaged rebar during drilling activities.

Description: On November 13, 2013, the NRC received information that procedural requirements associated with the installation of anchor bolts were being violated at WBN2. Specifically, Bechtel pipefitters had damaged rebar by drilling through or into the rebar to install the anchor bolts. The area of concern was associated with the holes drilled into the steam generator (SG) housing walls for anchor bolt installation associated with unistrut supports for SG snubber oil reservoir lines.

TVA Procedure MAI-5.1B, Wedge Bolt (WB) Anchor Installation, Revision 21, is the implementing/controlling process for anchor bolt installation, and includes the requirements for drilling the hole to be used for anchor bolt installation. MAI-5.1B, Revision 21, Section 6.2.5.A.3, states that unless specifically permitted, reinforcing steel shall not be cut or drilled to install anchors. Site Engineering approval is required to drill through the reinforcing bar. Based on the evidence developed during the investigation, NRC OI substantiated that Bechtel employees deliberately failed to follow procedure MAI-5.1B. The NRC review found that during anchor bolt installation associated with unistrut supports for SG snubber oil reservoir lines, a Bechtel employee had encountered rebar when drilling. Employees with knowledge of this incident did not report to Site Engineering for approval to drill into the reinforcing bar. The employees reconfigured the drill by obtaining a drill bit that could intentionally drill through the reinforcing steel without engaging the drill stop. The incident was not documented in TVA work orders.

After receiving information from the NRC about this issue, the applicant initiated PER 83861 to address this concern. TVA removed the suspect anchor bolts associated with WO 111335067 and confirmed damage to rebar in three locations. As part of the extent of condition evaluation, TVA reviewed a list of WOs performed by the same individuals. TVA determined that rebar was also damaged in two locations associated with WO 111335073. Each were evaluated by Engineering and determined not to require repair due to safety margin designed into the walls being enough to 'accept' the damage. In addition, TVA also 'accepted' possible damage to 25 other locations as a conservative measure even though there is no evidence that damage has occurred. This is because if TVA excavated these and there was evidence of damage, the engineering disposition would be to accept the damage without repair, thus the repair effort would not provide any safety benefit.

The inspectors determined that the failure to follow anchor bolt installation procedures was a performance deficiency. The performance deficiency is considered to be more than minor in accordance with IMC 2517 because it represents an inadequate work process that if left uncorrected, could adversely affect the quality of the construction, testing, analysis, or records of a safety-related SSC. Specifically, unreported or unanalyzed damage to reinforcing bar could adversely affect the quality of construction of a safety-related SSC. The inspectors reviewed this finding against cross-cutting area components as described in IMC 0310, "Components Within the Cross-Cutting Areas" and determined that no cross-cutting aspect applied.

Enforcement: 10 CFR 50, Appendix B, Criterion V, *Instructions, Procedures, and Drawings*, requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

TVA Procedure MAI-5.1B, Wedge Bolt (WB) Anchor Installation, Revision 21, is the implementing/controlling process for anchor bolt installation, and includes the requirements for drilling the hole to be used for anchor bolt installation.

MAI-5.1B, Revision 21, Section 6.2.5.A.3, states that unless specifically permitted, reinforcing steel shall not be cut or drilled to install anchors. Site Engineering approval is required to drill through the reinforcing bar.

Contrary to the above, on or about December 1, 2011, contract employees assigned to drill holes for anchor bolt installation willfully drilled into the reinforcing steel of the steam generator housing, a safety-related structure, without notifying Site Engineering, or obtaining their approval as required by TVA Procedure MAI-5.1B. Specifically, the contract employees damaged reinforcing steel in at least five locations associated with holes drilled under work order 111335067 and work order 111335073.

As discussed in the NRC Enforcement Policy, willful violations are a particular concern to the NRC. In this case, the NRC concluded that the actions of the pipefitters were willful. In reaching this conclusion, the NRC noted that during transcribed interviews with NRC's OI representatives, both individuals involved were trained in the anchor bolt installation procedures and did not lack an understanding or knowledge of the procedure. The involved individuals acted deliberately when they violated the procedure to drill into rebar.

In consideration of the fact that the individuals were craft laborers with no supervisory responsibilities, and that the damage to the structure was evaluated and determined not to require repair, the NRC concluded that this violation should be characterized at Severity Level IV. Furthermore, because this violation was not the result of an isolated action of one employee, and was not identified by the applicant, the non-cited violation criteria of paragraph 2.3.2.a.4.(a) and (c) were not satisfied, such that this violation will be cited.

This is identified as violation (VIO) 05000391/2015604-02, Failure to Follow Anchor Bolt Installation Procedure.

c. Conclusions

Further inspection of this issue will be required after receipt of the applicant's written response to the NOV.

**V. MANAGEMENT MEETINGS**

**X1 Exit Meeting Summary**

An exit meeting was conducted on May 28, 2015, to present inspection results to you and other members of your staff. Further discussion was conducted on June 19, 2015, with Mr. O'Dell. 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**

A. Bangalore, Bechtel - Electrical Engineer  
D. Blaylock, Bechtel  
T. Blount, Bechtel – Field Engineer  
C. Boudreaux, Startup Testing Engineer – TVA  
M. Bowman, Electrical Engineer – TVA  
J. Calle, TVA – Dual Unit Transition Manager  
G. Carroll, TVA – Engineering  
D. Colvin, Bechtel  
C. Deblok, TVA - WBN2 Surveillance Program Coordinator  
M. Dick, Bechtel  
M. Griger, Crane Nuclear Services  
A. Hasty, Bechtel  
M. Hennessy, Bechtel  
S. Hilmes, TVA - Electrical Engineer  
J. Kepler, TVA - Engineering Group Supervisor  
T. Lund, TVA – Engineering  
K. McCormack, Startup Testing Engineer – TVA  
S. Michael, Startup Testing Engineer - TVA  
D. Myers, Senior QA Manager  
J. Myers, Bechtel – Quality Assurance  
J. O'Dell, TVA - Regulatory Compliance  
G. Peterson, Electrical Engineer – Bechtel  
L. Peterson, WBN2 Site Support Manager  
R. Phipps, Bechtel – Test Engineer  
G. Scott, TVA – Licensing  
D. Shutt, TVA - Licensing  
M. Skaggs, TVA – Senior Vice President  
T. Wallace, WBN2 Senior Manager Operations Unit 2 Construction  
T. Womack, Electrical Engineer – TVA  
O. J. Zeringue, TVA - General Manager Engineering and Construction



### INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction and Pre-Construction Activities
IP 35743	QA Program (Maintenance)
IP 35745	QA Program (Surveillance Testing and Calibration Control)
IP 35746	QA Program (Procurement Control)
IP 37051	Verification of As-Builts
IP 46053	Structural Concrete Work Observation
IP 50053	Reactor Vessel and Internals Work Observation
IP 51053	Electrical Components and Systems – Work Observation
IP 70300	Preoperational Test Procedure Review
IP 70302	Preoperational Test Program Implementation
IP 70312	Preoperational Test Witnessing
IP 70338	Auxiliary Feedwater System Test- Preoperational Test Procedure Review
IP 70433	Chemical Control System Test - Preoperational Test Witnessing
IP 70343	Containment Spray System Test- Preoperational Test Procedure Review
IP 70438	Auxiliary Feedwater System Test – Preoperational Test Witnessing
IP 70439	Component Cooling Water System Test – Preoperational Test Witnessing
IP 70443	Containment Spray System Test – Preoperational Test Witnessing
IP 70562	Reactor Coolant System Hydrostatic Test Results Evaluation
IP 71302	Preoperational Test Program Implementation Verification
IP 73051	Inservice Inspection – Review of Program
IP 73052	Inservice Inspection – Review of Procedures
IP 73053	Preservice Inspection – Observation of Work and Work Activities
IP 80210	Environmental Inspection-Periodic
IP 92701	Followup
TI 2512/020	Inspection of Watts Bar Nuclear Plant – Electrical Issues Corrective Action Program Plan
TI 2515/109	Safety Related MOV Testing and Surveillance
TI 2515/110	Performance of Safety-Related Check Valves
TI 2515/114	Inspection Requirements for Generic Letter 89-04, Acceptable Inservice Testing Programs
TI 2515/166	Containment Sump Blockage
TI 2515/191	Inspection of the Licensee's Responses to Mitigation Strategies Order EA-12-049, Spent Fuel Pool Instrumentation Order EA-12-051 and Emergency Preparedness Information Requested in NRC March 12, 2012

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000391/2015604-02	VIO	Failure to Follow Anchor Bolt Installation Procedure (Section OA.1.12)
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### Opened and Closed

05000391/2015604-01	CIF	Failure to Comply with Conduct of Maintenance – Expectations and Standards (Section C.1.1)
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### Closed

46053	IP	Structural Concrete Work Observation (Section C.1.3)
37051	IP	Verification of As-Builts (Section C.1.4)
80210	IP	Environmental Inspection-Periodic (Section C.1.5)
73051	IP	Inservice Inspection Review of Program (Section C.1.6)
73052	IP	Inservice Inspection Review of Procedures (Section C.1.6)
73053	IP	Preservice Inspection - Observation of Work and Work Activities (Section C.1.6)
70338	IP	Auxilliary Feedwater System Test- Preoperational Test Procedure Review (Section P.1.2)
70343	IP	Containment Spray System Test- Preoperational Test Procedure Review (Section P.1.2)
70562	IP	Reactor Coolant System Hydrostatic Test Results Evaluation (Section P.1.11)
35746	IP	Quality Assurance Program - Procurement Control (Section O.1.1)
35743	IP	Quality Assurance Program - Maintenance (Section O.1.2)
35745	IP	Quality Assurance Program – Surveillance Testing and Calibration Control (Section O.1.3)
2515/191	TI	Followup on Fukushima Orders for Watts Bar and Inspection of the Licensee's Responses to Mitigation Strategies Order EA-12-049, Spent Fuel Pool Instrumentation Order EA-12-051 and Emergency

Preparedness Information Requested in NRC March 12, 2012 (Section OA.1.5)

II.D.3	TMI Action Item	Direct Indication of Relief-and Safety-Valve Position (Section OA.1.7)
Open Item 74	SSER Appendix HH	Installation of the Acoustic Monitoring System for the Power Operated Relief Valves (Section OA.1.7)
79-36	GL	Adequacy of Station Electric Distribution System Voltages (Section OA.1.8)
05000391/2014614-01	URI	Potential Failure To Comply With 10 CFR 50.55a and Properly Implement the Scope of the ASME OM Code (Section OA.1.9)
I.C.7	TMI Action Item	Nuclear Steam Supply System Vendor Review of Procedures (Section OA.1.10)
05000391/2015603-04	URI	Boric Acid Tank C Design Control (Section OA.1.11)
<u>Discussed</u>		
2512/020	TI	Electrical Issues CAP - Sub-issue: Cable Separation and Electrical Isolation (Section OA.1.1)
391/89-08	CDR	Kapton Insulated Pigtail Insulation Damage (Section OA.1.2)
1989-10	GL	Safety Related Motor Operated Valve Testing and Surveillance (Section OA.1.3)
2515/109	TI	Safety Related Motor Operated Valve Testing and Surveillance (Section OA.1.3)
2004-02	GL	Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors and Pressurized Water Reactor Containment Sump Blockage (Section OA.1.4)
2006-02	GL	Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Section OA.1.6)

## LIST OF DOCUMENTS REVIEWED

### II. MANAGEMENT OVERSIGHT AND CONTROLS

#### C.1 Construction Activities

##### C.1.3 Structural Concrete Work Observation

###### Calculations

WCG-2-301, Temporary Construction Opening in Slab at El. 729'-0" in Unit 2 Auxiliary Building, Rev.3

###### Drawings

2-48W895-1, Concrete El. 729.0' Construction Opening Closure, Rev. 0

2-48W1210-41. Misc. Steel Surface Mounted Plates Elevations, Section & Details, El. 763.5', Rev 2.

###### Procedures

0-TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65, Rev. 1

0-TI-445, Examination of Structures for Maintenance Rule, Rev.2

25402-3DP-G04G-00090, Engineering Department Procedure Instruction, Engineering Evaluation for Commodity Refurbishment, Rev. 9

###### Miscellaneous

DCN 55050, ABSCE Boundary, Rev. 1

##### C.1.4 Verification of As-Builts

###### Drawings

Final Assembly CRDM Air Cooling Unit, 30396, Rev. B

Miscellaneous Steel Tank & Equipment Supports, 48N1231-1, Rev. 20

Miscellaneous Steel Tank & Equipment Supports, 48N1231-2, Rev. 18

TDAFW Supply, 2-47W427-205 R2

TDAFW Discharge, 2-47W401-212 R2

TDAFW Discharge, 2-47W427-208 R2

###### Weld Maps:

TDAFW Supply, WBN-E-2882-IC-113 R5

TDAFW Discharge, WBN-E-2882-IC-101 R4

###### ASME Code Data Reports:

NPV-1, 2-CKV-003-810B

NPV-1, 2-CKV-003-864

NPV-1, 2-FCV-003-0136A

NPV-1, 2-FCV-003-0136B

NPV-1, 2-FCV-003-0179A

NPV-1, 2-FCV-003-0179B

NPP-1, 03B-AF-2

###### Pipe Supports:

DRA 52433, 03B-2AFW-R029

DRA 52433, 03B-2AFW-R032

DRA 52433, 03B-2AFW-R044  
DRA 52433, 03B-2AFW-V047

## **P.1 Preoperational Activities**

### **P.1.1 Preoperational Test Program Implementation Verification**

WO 112645542 - 2-SI-70-702, Containment Isolation Valve Local Leak Rate Test Component Cooling  
WO 114675788 – SUT System 70 WBN-1-FCV-070-0153-B Land OPL6888B  
WO 114806910 - Perform 2-PTI-072-01, Rev. 1

### **P.1.2 Preoperational Test Procedure Review**

#### Drawing:

2-47W803-2; Flow Diagram Auxiliary Feedwater System; Rev. 31  
2-47W812-1, Flow Diagram Containment Spray System, Rev. 26

2-45W760-72-1, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 9  
2-45W760-72-2, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 8  
2-45W760-72-3, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 5  
2-45W760-72-4, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 5

#### Procedures:

2-PTI-003B-05, Auxiliary Feedwater System Dynamic Test, Rev. 1  
2-PTI-003B-04, Auxiliary Feedwater Pumps & Valves Logic Test, Rev. 0 and 1  
2-PTI-072-01, Containment Spray Pump Valves Logic Test, Rev. 0 and 1  
2-PTI-074-01, Residual Heat Removal System Pump/Valves Logic, Rev. 1

#### Test Scoping Documents:

2-TSD-3B-5; Auxiliary Feedwater System Pumps Rev. 5  
2-TSD-72-1, Containment Heat Removal Spray System Rev. 4  
2-TSD-74-1, Residual Heat Removal System Component Testing, Rev. 3

#### System Descriptions:

WBN2-3B-4002; Auxiliary Feedwater System; Rev. 2  
WBN2-74-4001 System Description for Residual Heat Removal System, Rev. 5  
WBN2-72-4001 System Description for Containment Heat Removal Spray System, Rev. 3

### **P.1.11 Preoperational Test Results Evaluation**

#### Report:

Unit 2 Cold Hydro Summary Report 2-PTI-068-14, Revision 1 dated January 15, 2015

## **III. OPERATIONAL READINESS ACTIVITIES**

### **O.1.1 Quality Assurance Program - Procurement Control (IP 35746)**

#### Specifications

NESSD 2-02-070-130B-B, NE Setpoint and Scaling Document, Rev.0  
NESSD 2-F-63-91B, NE Setpoint and Scaling Document, Rev. 0  
NESSD, 2-PD-3-132C, NE Setpoint and Scaling Document, Rev. 0  
WBN-VTM-D232-0050, Dragon Valves, Rev. 20

WBN-VTM-W120-5019, Common Q System Requirement Specification, Rev. 0

#### Drawings

45N2641-9, Control Board Panel 2-M-1 and 2-M-2, Rev. 9  
 45N2642-4, Unit Control Board Panel 2-M-3, Rev. 12  
 47W427-231, AFW Pump Turbine Steam Supply Loops 1 & 4 Mainsteam Lines to Turbine & Exhaust From Turbine to Atmosphere, Rev. 5  
 47W610-68-8, Reactor Coolant System, Rev 10  
 47W610-68-9, Reactor Coolant System, Rev. 8

#### Misc.

FSAR Change Sections 5.5-15a & 5.5-15b, EDCR 55707, Amendment 100, dated 08/02/2010  
 FSAR Change, Section 10.4.7.1, EDCR 53876, Amendment 97, dated 01/07/2010  
 FSAR Change Section 11.4, EDCR-2 52340, Amendment 95, dated Nov. 24, 2009

#### Procedures

0-TI-02, Criteria for Issuing Engineering Document Construction Releases (EDCR) Potentially Impacting WBN Unit 0 and/or Unit 1 Design, Rev. 0005  
 2-AOI-7.05, Flood Mode Cold Leg Accumulator Venting and Filling, Rev. 0000B  
 2-AOI-20, Malfunction of Reactor Control System, Rev. 0000A  
 2-SI-3-66, 18 Month Channel Calibration of Post Accident/ Remote Shutdown Monitoring AFW Loop 2-LPF-3-170A, Rev. 0001  
 2-TMI-30.127, Calibration of Annulus Differential Pressure/AB EGTS Air Difference Purge, Rev. 0000A  
 25402-ADM-0001, Watts Bar Nuclear Plant Unit 2 Construction Completion Project, Document Control, Rev. 14  
 NC PP-10, Watts Bar Nuclear Plant Unit 2 Changes to Final Safety Analysis Report, Technical Specifications (TS), TS Bases, Technical Requirements Manual (TRM) and TRM Bases, Rev. 5  
 NPG-SPP-31.0, Procedures and Document Control, Rev. 0002  
 NPG-SPP-31.1, Document Control, Rev. 0003  
 NPG-SPP-31.2, Records management, Rev. 0004  
 0-TI-441, Operational Readiness Process for Unit 2 Systems, Rev. 0002  
 25402-3DP-G04G-0081, WBN2 Construction Completion Project, Engineering Document Construction Release, Rev. 020  
 NC-PP-37, System Turnover to Operations, Rev. 0001  
 NPG-SPP-01.2, Administration of Site Technical Procedures, Rev. 0008 and Rev. 011  
 SMP-4.0, Watts Bar Nuclear Plant Unit 2 System Completion and Turnover, Rev. 0014  
 TVA-NPG-PLN89-A, Nuclear Quality Assurance Plan (NQAP) (Quality Assurance Program Description), Rev. 0030  
 Watts Bar Unit 2 Construction Completion Project, Bechtel Project Nuclear Quality Assurance Manual, Rev. 1

### **O.1.2 Quality Assurance Program – Maintenance (IP 35743)**

#### Preventative Maintenance (PMs) and PM Work Instructions

620610032, Glycol Supply Header Bypass Check Valve Inspection and Rebuild in accordance with 0-MI-0.007 and Attachment A, MEQ Required (>40Y), ACTIVE  
 620610034, Glycol Cooled Floor Supply Bypass Check Valve Inspection and Rebuild in accordance with 0-MI-0.007 and Attachment A, MEQ Required (>40 Y), ACTIVE  
 620610043, 2-CKV-061-0684, Glycol Cooled Floor Pump 2A Discharge Check Valve, Rebuild Check Valve, in accordance with 0-MI-0.017 and Attachment A, ACTIVE

620610044, 2-CKV-061-0748, Glycol Cooled Floor Pump 2B Discharge Check Valve, Rebuild Check Valve, in accordance with 0-MI-0.017 and Attachment A, ACTIVE

620720030, WBN-2-MVOP-072-0002-B, Containment Spray Header B Isolation Valve Operator, Perform the routine inspection and maintenance of a Limitorque Motor Actuator in accordance with Master PM M1380V and Attachment A, ACTIVE

620720031, 2-MVOP-072-0021-B, Radwaste to Spray Header B Flow Control Valve, Perform the routine inspection and maintenance of a Limitorque Motor Actuator in accordance with Master PM M1380V and Attachment A.

#### Procedures

25402-000-GPP-0000-N2303, Watts Bar Nuclear Plant Unit 2 Construction Completion Project, Construction Equipment Maintenance, Rev. 0

NC-PI-5, Watts Bar Nuclear Plant Unit 2 Instruction Validation, Rev. 0005

NC PP-28, Watts Bar Unit 2, PM Project, Procedure Review and Approval, Rev. 001

NC-PP-32, Watts Bar Nuclear Plant Unit 2 Development and Issue of Operating and Technical Instructions, Rev.0006

NPG-SPP-06.2, Preventive Maintenance, Rev. 0010

25402-000-GPP-0000-N2303, Watts Bar Nuclear Plant Unit 2 Construction Completion Project, Construction Equipment Maintenance, Rev. 0

TI-434, Power Ascension Testing

### **O.1.3 Quality Assurance Program – Surveillance Testing and Calibration Control (IP 35745)**

#### Surveillances

2-SI-0-24, Measurement of the At-Power Moderator Temperature Coefficient, Rev. 1

2-SI-32-901-A, Valve Full Stroke Exercising During Cold Shutdown Control Air (Train A), Rev. 3

2-SI-57-1-B, 18 Month Unit 2 B Train ESF Load Sequence and Reset Timer Test, Rev. 11

2-SI-61-1, Determination of Boron and Ph on Ice Condenser Ice, Rev. 2

2-SI-61-901-B, Valve Full Stroke Exercising During Plant Operation Ice Condenser System (Train B), Rev. 1

2-SI-62-901-A, Centrifugal Charging Pump 2A-A Quarterly Performance Test, Rev. 1

2-SI-63-1, 18 Month Channel Calibration Cont. Sump Lvl Channel I, LP-63-180 (L-920), Rev. 3

2-SI-63-5, RWST Boron Determination, Rev. 0

2-SI-63-7, ECCS Throttle Valve Position Verification, Rev. 1

2-SI-63-10-B, ECCS Pumps Venting Train B, Rev. 1

2-SI-63-907, RHR Hot Leg and Cold Leg Injection Check Valve Testing During Refueling Outages, Rev. 1

2-SI-63-917, Testing of Cold Leg Accumulator Check Valves, Rev. 0

2-SI-65-9-A, 18 Month Emergency Gas Treatment System Pressure Test – Train A Rev. 0

2-SI-67-61, 18 Month Channel Calibration Remote Shutdown Monitoring ERCW Supply Header B Flow Loop 2-LPF-67-62C, Rev. 8

2-SI-68-24, Verification of Reactor Subcriticality for 100 Hours Before Movement of Irradiated Fuel, Rev. 0

2-SI-68-110, 184 Day Channel Operational Test Pressurizer Level Channel II Loop 2-LPL-68-320 (L-461), Rev. 0

2-SI-70-62, 18 Month Channel Calibration Remote Shutdown Monitor RHR Heat Exchanger 2B-B Supply Header Flow Loop 2-LPF-70-165C, Rev. 1

2-SI-72-1-B, Air Test of Containment Spray Nozzles Train B, Rev. 1

2-SI-72-901-B, Containment Spray Pump 2B-B Quarterly Performance Test, Rev. 1

2-SI-74-63-B, 18 Month Channel Calibration Remote Shutdown Control RHR Heat Exchanger B Outlet Flow Loop 2-LPF-74-28, Rev. 1

2-SI-74-902-A, Quarterly Valve Full Stroke Exercising - RHR System (Train A), Rev. 1

2-SI-99-643-B, Response Time Test Containment Spray Slave Relay K643 Train B, Rev. 0

Preventative Maintenance (PMs) and PM Work Instructions

620720020, 2-PI-72-33, Containment Spray Pump '2A-A' Suction Pressure Indicator Calibration in accordance with 0-IMI-201 and SSD-2-PI-72-33, ACTIVE  
 620810014, PM 620810014: 2-LPL-081-0001, (Primary Water Storage Tank Level), Perform Loop Calibration in accordance with SSD-2-LPL-81-1 and IMI-200, ACTIVE  
 620720019, 2-PI-72-16, Containment Spray Pump '2B-B' Suction Pressure Indicator Calibration in accordance with 0-IMI-201 and SSD-2-PI-72-16, ACTIVE  
 620720022, WBN-2-LPF-072-0013-G, Containment Spray Pump '2B' Flow Loop Calibration in accordance with 2-IMI-72.013 (Channel Calibration Containment Spray Header B Flow Loop 2-LPF-72-13) (F-999), ACTIVE  
 620720027, 2-LPT-72-31 - Containment Spray Heat Exchanger '2A-A' Outlet Temperature Loop Calibration, ACTIVE  
 620610013, 2-TIS-61-99A/B, Temp Ind. Switch on Glycol Supply to Floor Cooler, Perform Switch Cal per 0-IMI-200, AND SSD 2-TIS-61-99A/B, ACTIVE

**IV. OTHER ACTIVITES**

**OA.1.1 Electrical Issues CAP - Sub-issue: Cable Separation and Electrical Isolation**

Miscellaneous:

WB-DC-30-4 Revision R22 WATTS BAR NUCLEAR PLANT UNIT 1/UNIT 2  
 "SEPARATION/ISOLATION", dated: 7/3/2008  
 Drawing Revision Authorization (DRA) 55125-23, Drawing Number 45W874-4 Rev. 31, dated: 5/16/2014  
 Drawing Revision Authorization (DRA) 55125-24, Drawing Number 45W874-4 Rev. 31, dated: 4/23/2014  
 Drawing Revision Authorization (DRA) 55125-29, Drawing Number 45W872-10 Rev. 36, dated: 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-042, Drawing Number 45W826-9 Rev. 53, dated: 4/23/2014  
 Drawing Revision Authorization (DRA) 55125-053, Drawing Number 45W826-37 Rev. 31, dated: 4/23/2014  
 Drawing Revision Authorization (DRA) 55125-069, Drawing Number 45W826-25 Rev. 7, dated: 4/23/2014  
 Drawing Revision Authorization (DRA) 55125-121, Drawing Number 45W872-10 Rev. 36, dated: 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-139, Drawing Number 45W828-9 Rev. 31, dated: 11/30/2012  
 Drawing Revision Authorization (DRA) 55125-140, Drawing Number 45W828-9 Rev. 31, dated: 11/30/2012  
 Drawing Revision Authorization (DRA) 55125-157, Drawing Number 45W826-8 Rev. 57, dated: 2/13/2013  
 Drawing Revision Authorization (DRA) 55125-158, Drawing Number 45W828-7 Rev. 40, dated: 2/13/2013

Work Orders:

WO# 113325343 - CCE BC COND PER 366694 PER 224892 EDCR2 52938 55125 55233 SYS 030 293 2VC2039A 2VC2041A 2VC2042A, dated: 4/14/2015  
 WO# 114955552 - CCE BC CONDUIT EDCR2 55125 52938 SYS 03 068 285 293 WBN-2-MISC-293 2PM6396G, dated: 4/14/2015



WO# 113427588 - CCE BC PER 366694 CONDUIT BC0716R56 EDCR 55125 SYSTEM 068  
293 WBN-2-MISC-293 2VC4432B, dated: 4/14/2015  
WO# 111123610 - CCE EDCR2 55125 SYS 068 001 099 0275 043 003 030 090 070 285 072  
067 065 292 2-MISC-292, dated: 4/14/2015  
WO# 111504205 - CCE SYS 292 067 070 074 WBN-0-XSW-070-0051-S, dated: 5/28/2014  
WO# 114216892 - CCE BC CONDUIT PER 224748 EDCR2 54636 55125 54632 55523 55233  
SYSTEM 068 099 275 285 292 WBN-2, dated: 5/28/2014  
WO# 114955061 - CCE BC CONDUIT EDCR2 55125 SYS 068 292 WBN-2-MISC-292  
2PS703E, dated: 4/14/2015

### **OA.1.2 Construction Deficiency Report (CDR) 05000391/89-08: Kapton Insulated Pigtail Insulation Damage**

#### Work Orders

WO 115788202, CCE EDCR 54918 PER 766444 SYS 293 2-PENT-293-0008-A (inboard)  
WO 115788149, CCE EDCR 54918 PER 766444 SYS 293 2-PENT-293-0038-D (outboard)  
WO 115788453, CCE EDCR 54918 PER 766444 SYS 293 2-PENT-293-0038-D (inboard)

### **OA.1.3 Generic Letter 89-10: Safety Related Motor Operated Valve Testing and Surveillance**

#### Calculations

MDQ0020632008-0233, "Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-006", revision 007  
MDQ0020632008-0234, "Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-007", revision 006  
MDQ0020632008-0235, "Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-008", revision 007  
MDQ0020632008-0236, "Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-011", revision 007  
MDQ0020632008-0240, "Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-0047", revision 004

#### Work Orders

114900446  
114900454  
114900744  
114900755  
114976204  
114976208

#### Training Records

Selected Personnel Training Records for MOVATS Test Equipment setup/hookup to MOV Actuator  
Crane Nuclear Representative Diagnostic Test Engineer and Diagnostic Test Technician qualification record

#### Miscellaneous

0-MI-0.006, "MOVATS Testing of Motor Operated Valves", revision 5 dated 09/09/2014

2-TI-85.009, "Dynamic Test of Safety Injection Pump Suction and Associated ECCS Motor Operated Valves

**OA.1.4 Generic Letter 2004-02 - Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors and Pressurized Water Reactor Containment Sump Blockage**

Work Orders

111606951, Installation of Containment-Sump Strainer Assembly

111083539, Installation of Plenum for Containment-sump Strainer Assembly

111627598, Installation of I-Beam Supports for Containment-Sump Strainer Assembly

Purchase Order

69810

Procedures

MAI-5.1B, Wedge Bolt Anchor Installation

EDCR

53580, Containment Sump Strainer Installation

Drawings

SFS-WB2-GA-00, General Arrangement, Rev. 0

SFS-WB2-GA-01, General Notes, Rev. 2

SFS-WB2-GA-03, General Arrangement, Rev. 0

SFS-WB2-GA-04, General Arrangement, Rev. 0

SFS-WB2-GA-10, General Arrangement – Top Cover, Rev. 3

SFS-WB2-PA-7100, Module Assembly 6 Disk, Rev. 0

SFS-WB2-PA-7101, Module Assembly 7 Disk, Rev. 2

SFS-WB2-PA-7151, Lower Deck, Rev. 0

SFS-WB2-PA-7156, Support Beams-Anchor Mounting Details, Rev. 0

**OA.1.7 Three Mile Island Action Item II.D.3 – Direct Indication of Relief-and Safety-Valve Position and Supplemental Safety Evaluation Report Appendix HH Item 074: Installation of the Acoustic monitoring system for the Power Operated Relief Valves**

Work Orders:

WO#116574299 Start-up Testing for system 068 2 Tank 068 Pressure Relief Tank, Dated: 3/11/2015

WO#113474274 CCE EDCR 55174 SYS 068 PER 595068 CT#2M2762 WBN-2-@W-068-2762, dated: 11/26/2013

WO#114624225 CCE EDCR 55174, 55006, 54154, 55233 SYS 068 293 BC Cable Terminations, dated: 2/5/2014

WO#114874716 WIL PER 876407 EDCR2 53760, 55174 SYS 068 293 BC Cable Terminations, dated: 4/25/2014

WO#114877483 CCE EDCR 55174, 55006 FCR 62387, 59368 SYS 068 293 BC Cable Terminations, dated: 11/23/2013.

Drawings:

FLOW DIAGRAM REACTOR COOLANT SYSTEM, 2-47W813-1 R33, dated: 09/14/09

ELECTRICAL LAYOUT OF CONTROL BOARD PANEL 0-M-4, 2-47W605-53 R3, dated: 04/08/13

ELECTRICAL LAYOUT OF CONTROL BOARD PANEL 0-M-25, 0-47W605-162 R0, dated: 03/11/14

NAMEPLATE TABULATION CONTROL PANEL 0-M-25, 1-47W605-164 R2, dated: 06/14/01

ELECTRICAL CONTROL DIAGRAM REACTOR COOLANT SYSTEM, 2-47W610-68-6 R9, dated: 10/09/08

ELECTRICAL INSTRUMENTS AND CONTROLS, 2-47W600-44 R3, dated: 10/06/08

Miscellaneous:

WBN-VTD-T068-0020 General Description and Specifications for TEC 1414 Valve Flow Monitor System, Rev. 1, dated: 1/4/1995.

**OA.1.8 Generic Letter 79-36, Adequacy of Station Electric Distribution System Voltages**

Calculations:

EDQ00099920080014 Rev. 23, Appendix A – Diesel Generator Load List (Loading and Starting Times)

EDQ00099920070002 Rev. 43, AC Auxiliary Power System Analysis, dated 12/16/2014

EDQ00299920080003 Rev 11, Class 1E MCC Control Circuit Voltage Analysis and Transformer Sizing, dated: 8/4/2014

WBNEEBMSTI060029 Rev 37, Degarded Voltage Analysis, dated: 10/15/2014

WBPE2119202001 Rev 11, 6.9kV Shutdown & Logic Boards Undervolatge Relays Requirement / Demonstrated Accuracy Calculation, Dated: 10/25/2012

MDQ0020032008-0210 Rev 004, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-03-116A, Dated: 3/16/2015

MDQ0020032008-0213 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-03-126B, Dated: 10/31/2014

MDQ0020032008-0215 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-03-136B, Dated: 4/23/2014

MDQ0020622008-0228 Rev 002, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-62-138, Dated: 2/22/2014

MDQ0020632008-0229 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-001, Dated: 1/15/2014

MDQ0020632008-0230 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-003, Dated: 3/14/2014

MDQ0020632008-0240 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-63-047, Dated: 3/14/2014

MDQ0020672008-0259 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-67-097, Dated: 6/24/2014

MDQ0020672008-0267 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-67-113, Dated: 7/7/2014

MDQ0020722008-0290 Rev 004, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-72-021, Dated: 4/4/2014

MDQ0020722008-0295 Rev 004, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-72-41, Dated: 2/11/2015

MDQ0020742008-0300 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-74-003, Dated: 6/24/2014

MDQ0020742008-0304 Rev 003, Documentation of Design Basis Review, Required Thrust/Torque Calculations and Valve and Actuator Capability Assessment for Valve 2-FCV-74-021, Dated: 6/24/2014

MDQ0029992009-0310 Rev 007, Generic Letter 89-10 MOV Population for Watts Bar (Unit 2), Dated: 12/29/2014

#### Miscellaneous:

TVA Electrical Engineering / Electrical Design Guide DG-E2.4.6, dated: 12/09/1994

TVA Design Criteria WB-DC-30-28 Low and Medium Voltage Power Systems – Unit 1 / Unit 2, dated: 9/11/2012

Problem Evaluation Report (PER) #1016375 – NRC Identified updates to Unit 1 Calculations, dated 4/21/2015.

Problem Evaluation Report (PER) #1016464 – NRC Identified updates to Unit 2 Calculations, dated 5/5/2015.

Limiterorque Maintenance Update 92-01 (NER No. 92 0380), dated: 10/15/1992

Limiterorque Maintenance Update 92-02, transmitted on date: 1/13/1993

Unit 0 Surveillance Instruction 0-SI-82-3, 18 Month Loss of Offsite Power with Safety Injection – DG 1A-A, Rev 000U2 (Draft)

Unit 1 Surveillance Instruction 0-SI-82-4, 18 Month Loss of Offsite Power with Safety Injection – DG 1B-B, Rev 000U2 (Draft)

Unit 2 Surveillance Instruction 0-SI-82-5, 18 Month Loss of Offsite Power with Safety Injection – DG 2A-A, Rev 000U2 (Draft)

Unit 2 Surveillance Instruction 0-SI-82-6, 18 Month Loss of Offsite Power with Safety Injection – DG 2B-B, Rev 000U2 (Draft)

Service Request SR#1013555 – NRC Identified updates to Unit 1 and Unit 2 Calculations, dated 4/16/2015.

Limiterorque Technical Update 93-03, Reliance 3-phase Limitorque Corporation Actuator Motors (Starting Torque @ Elevated Temperature), dated: 9/17/1993

Analysis Print of test for valve 2-063-0001-A (14" Gate Valve), dated 4/8/2015

Limiterorque Motors Bulletin – calc. no. EDQO-248-2002-0042, Rev. 0

TVA Branch Technical Instruction – Setpoint Calculations BTI-EEB-TI-28 Rev. 0011, dated: 12/31/2014

TVA Electrical Design Guide DG-E2.4.6 R2 Equipment Typical Data, dated: 12/9/1994

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DAT-A Rev. 1 dated: 3/15/2002.

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DAT-B Rev. 1 dated: 3/15/2002.

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DBT-A Rev. 1 dated: 3/15/2002.

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DBT-B Rev. 1 dated: 3/15/2002.

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DCT-A Rev. 1 dated: 3/15/2002.

Engineering and Materials Setpoint and Scaling Document SSD Number: 2-27-211-DCT-B Rev. 1 dated: 3/15/2002.

#### Drawings:

1-45W760-212-4, R24 Unit 1 & 2, Wiring Diagrams 480V Shutdown Power Schematic Diagrams, date: 2-11-93.  
 1-45W760-212-4A, R10 Unit 1, Wiring Diagrams 480V Shutdown Power Schematic Diagrams, date: 8-13-94.  
 2-45W760-212-4, R1 Unit 2, Wiring Diagrams 480V Shutdown Power Schematic Diagrams, date: 1-29-13.  
 2-45W760-212-4A, R3 Unit 2, Wiring Diagrams 480V Shutdown Power Schematic Diagrams, date: 5-11-15.  
 1-45W724-1, R28 Units 1 & 2, Wiring Diagrams 6900V Shutdown Board 1A-A Single Line, original release date: 9-21-90.  
 1-45W751-1, R51, Unit 1, Wiring Diagrams 480V REAC MOV BDS 1A1-A Single Line SH-1, original release date: 9-22-90.  
 1-45W751-7, R56, Unit 1, Wiring Diagrams 480V REAC MOV BDS 1B1-B Single Line SH-1, original release date: 9-22-90.  
 2-45W751-1, R13, Unit 2, Wiring Diagrams 480V REAC MOV BD 2A1-A Single line SH-1, dated: 3-17-15.  
 2-45W751-7, R13, Unit 2, Wiring Diagrams 480V REAC MOV BD 2B1-B Single line SH-1, dated: 12-15-08.  
 1-45W756-1, R65, Unit 1, Wiring Diagrams 480V CONT & AUX BLDG VT BD 1A1-A Single Line SH-1, original release date: 9-22-90.  
 1-45W756-1A, R2, Unit 2, Wiring Diagrams 480V CONT & AUX BLDG VT BD 2A1-A Single Line SH-1, original release date: 8-8-11.  
 1-45W756-6, R78, Unit 1, Wiring Diagrams 480V CONT & AUX BLDG VT BD 1B1-B Single Line SH-2, original release date: 9-22-90.  
 2-45W756-5, R2, Unit 2, Wiring Diagrams 480V CONT & AUX BLDG VT BD 2B1-B Single Line SH-1, dated: 8-4-14.

#### **OA.1.10 (Closed) Three Mile Island Action Item I.C.7 Nuclear Steam Supply System Vendor Review of Procedures**

##### Miscellaneous

Final Closure Package; Tracking Number: 114961176

##### Procedure

2-TI-439; Test Review Group (PORC Subcommittee Charter); Rev. 2

#### **OA.1.11 URI 05000391/2015603-4, Boric Acid Tank C Design Control**

##### Surveillances

1-IMI-62.242, Calibration of Boric Acid Tank C Level Loop 1-LPL-62-242-G (L-106), Rev. 06  
 2-IMI-62.242, Calibration of Boric Acid Tank C Level Loop 2-LPL-62-242-G (2L-106), Rev. 01

##### Calculations

CN-SUA-10-7, Watts Bar Unit 2 Boric Acid Tank Level SSD Supporting Calculation, Rev. 002  
 EPMPDM071197, Boric Acid Concentration Analysis for BAT and RWST, Rev. 008  
 ETNSLSSLWAT110, Eagle 21 Setpoint and Scaling Supporting Calculation Demonstrated Accuracy Calculation, Rev. 40

##### Drawing

0-47W600-1006, Units 1 and 2 Electrical Instruments and Controls, Rev. 2  
 1682C30, Watts Bar Units 1 and 2 Boric Acid Tank, Sheet B7, Rev. 4  
 2-47W600-16, Unit 2 Electrical Instruments and Controls, Rev. 1  
 2-47W600-18, Unit 2 Electrical Instruments and Controls, Rev. 1

Specifications

SSD-2-L-62-242, NE Setpoint and Scaling Document, Rev. 3

SSD-1-L-62-242, NE Setpoint and Scaling Document, Rev. 4

Misc.

FSAR, Chapter 3, Reactivity Holddown Capability, dated 04/17/13

FSAR, Chapter 9, Boric Acid Tanks, dated 04/17/13

Technical Requirements (TR) 3.1.5, Borated Water Sources, Shutdown, Unit 1, Rev. 9, 33, 37

TR 3.1.6, Borated Water Sources, Operating, Unit 1, Rev. 9, 33

## LIST OF ACRONYMS

ABSCE	Auxiliary Building Secondary Containment Enclosure
ACL	Acceptable Supplier List
ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
ANII	Authorized Nuclear Inservice Inspector
ASME	American Society of Mechanical Engineers
B&PV	Boiler and Pressure Vessel
BPVC	Boiler and Pressure Vessel Code
CAP	Corrective Action Program
CAQR	Condition Adverse to Quality Report
CCS	Component cooling system
CPSI	Containment preservice inspection
CRI	Control Room Isolation
CS	Containment spray
CSS	Containment spray system
CVCS	Chemical and volume control system
ECCS	Emergency core cooling system
EDCR	Engineering Document Construction Releases
EOP	Emergency Operating Procedure
ERCW	Essential Raw Cooling Water
FSAR	Final Safety Analysis Report
GL	Generic Letter
HRRA	High Radiation in Refueling Area
IEEE	Institute of Electrical and Electronics Engineers
IR	Inspection Report
IIR	Integrated Inspection Report
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IST	In-Service Testing
JOG	Joint Owner's Group
LCO	Limiting Condition of Operation
MOV	Motor Operated Valve
NDE	Non-Destructive Examination
NOV	Notice of Violation
No.	Number
NPG	Nuclear Power Group
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam System Supply
OI	Office of Investigations
OM	Operation and Maintenance
PER	Problem Evaluation Report
PMs	Preventive maintenance activities
PORV	Power Operated Relief Valve
PRT	Pressurizer Relief Tank
PSI	Preservice Inspection
PSO	Power System Operator
PTI	Preoperational Test Instruction
PTS	Pressurized thermal shock
QA	Quality Assurance

QC	Quality Control
RCS	Reactor Coolant System
Rev.	Revision
RG	Regulatory Guide
RHR	Residual Heat Removal
ROP	Reactor Oversight Process
RWST	Refueling Water Storage Tanks
SER	Safety Evaluation Report
SG	Steam generator
SI	Safety Injection
SIS	Safety Injection System
SL	Severity Level
SR	Surveillance Requirement
SSC	Structures, Systems, and Components
SSD	Setpoint and Scaling Document
SSER	Supplemental Safety Evaluation Report
TI	Temporary Instruction (NRC)
TMI	Three Mile Island (Nuclear Plant)
TRG	Test review group
TS	Technical Specifications
TVA	Tennessee Valley Authority
URI	Unresolved Item
U2	Unit 2
VIO	Violation
WBN	Watts Bar Nuclear Plant
WO	Work Order
10 CFR	Title 10 to the Code of Federal Regulations