



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

September 29, 2015

EA-14-179  
EA-15-112

Mr. Michael D. Skaggs  
Senior Vice President  
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Tennessee Valley Authority  
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2015607 AND NOTICE OF VIOLATION**

Dear Mr. Skaggs:

On August 15, 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 discussed on September 3, 2015, with Paul Simmons 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 2.3.2.a.4.(c) 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 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 05000391/2015607 w/ Attachment

cc w/encls: (See next page)

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Robert Haag, Chief  
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cc w/encls: (See next page)

\* Previous Concurrence

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  SENSITIVE   
  NON-SENSITIVE  
 ADAMS:  Yes   
 ACCESSION NUMBER: ML15273A452   
  SUNSI REVIEW COMPLETE   
  FORM 665 ATTACHED

OFFICE	RII:EICS	RII:DCP	RII:DCP	RII:DFFI	RII:DCP	RII:DCP
SIGNATURE	Via E-mail	Via E-mail	Via Email	Via E-mail	/RA/	Via E-mail
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DATE	9/23/15	9/23/15	09/23/2015	9/22/15	09/29/2015	9/22/15
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DRS	RII: DCP	RII: DCP	RII: DCI	RII: DCI	RIII:DCP
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E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DRS	RII: DRS	RII: DRS	RII: DCI	RII:DCI	RII:DCI
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Letter to Michael D. Skaggs from Robert C. Haag dated September 29, 2015.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2015607

Distribution w/encls:

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PUBLIC

## NOTICE OF VIOLATION

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

Docket No. 50-391  
Construction Permit No.: CPPR-92  
EA-15-112

During a Nuclear Regulatory Commission (NRC) investigation completed on May 26, 2015, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

- A. Title 10 of the *Code of Federal Regulations* (10 CFR), section 50.9(a), Completeness and accuracy of information states, "Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects."

The Watts Bar Nuclear final safety analysis report (FSAR), Revision 113, Table 3.2-3, classifies the reactor coolant drain tank pumps as Seismic Category I(L) components.

TVA's Nuclear Quality Assurance Plan, Revision 31, Appendix C, section 4.0, paragraph B, states, in part, that those components or systems designated as Seismic Category I(L) in nuclear plant FSARs shall be classified as quality-related. Section 6.3.2.A requires that, "Sufficient records and documentation shall be prepared and maintained to provide evidence of the quality of items affecting quality. QA records shall be legible, complete, and identifiable to the item involved."

Contrary to the above, on or about August 30, 2011, the licensee failed to maintain complete and accurate quality-related work order documents covered by the TVA and Bechtel QA programs in all material respects. Specifically, a contract employee deliberately removed a quality control (QC) data sheet, which contained a valid QC rejection for a damaged anchor bolt, from work order (WO) 10-951093-000, which provided steps for grouting of the reactor coolant drain tank (RCDT) pump WBN-2-PMP-077-0006 base plate, essential for the seismic qualification of the RCDT pump. A new, blank QC data sheet was substituted for the data sheet that contained the QC rejection to allow grouting work to be completed without site engineering approval of the damaged anchor bolt. This caused the quality-related WO documentation to be incomplete and inaccurate in that the actual physical condition and properties of the anchor bolt, which is required information for Seismic Category I(L) calculations, were no longer represented in the WO. This documentation is material to the NRC in that it provides the basis for compliance with seismic and construction-related QA procedures and regulatory requirements.

This is a Severity Level IV violation (Enforcement Policy Sections 6.5 and 6.9).

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-15-112" 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 September, 2015



U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2015607

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: July 1, 2015 – August 15, 2015

Inspectors:

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- T. Stephen, Resident Inspector, Projects Branch 6, Division of Reactor Projects (DRP), RII, Section P.1.5
- K. Miller, Resident Inspector, Projects Branch 2, DRP, RII, Section P.1.5
- J. Draper, Resident Inspector, Projects Branch 3, DRP, RIII, Sections P.1.5 and P.1.16
- R. Monk, Senior Construction Project Inspector, CPB3, DCP, RII, Sections P.1.2 and SU.1.1
- J. Baptist, Senior Construction Project Inspector, CPB3, DCP, RII, Sections P.1.5, P.1.7, P.1.8, P.1.10, P.1.12, P.1.13, P.1.15, and OA.1.9
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- C. Julian, Senior Construction Inspector, CIB1, DCI, RII, Section P.1.5
- C. Jones, Senior Construction Inspector, CIB1, DCI, RII, Sections P.1.4, P.1.5, and OA.1.4
- J. Christensen, Construction Inspector, CIB3, DCI, RII, Sections P.1.16 and OA.1.3

- N. Covert, Senior Construction Inspector, CIB3, DCI, RII, Section P.1.16
- B. Davis, Senior Construction Inspector, CIB2, DCI, RII, Sections P.1.3, P.1.5, P.1.16, and OA.1.16
- A. Sengupta, Reactor Inspector, EB3, Division of Reactor Safety (DRS), RII, Section C.1.5
- B. Caballero, Senior Operations Engineer, Operations Branch (OB) 2, DRS, RII, Section O.1.1
- N. Lacy, Operations Engineer, OB1, DRS, RII, Section O.1.1
- J. Dymek, Reactor Inspector, EB2, DRS, RII, Sections OA.1.5, OA.1.6, OA.1.7, and OA.1.8

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 when Unit 2 construction activities inadvertently caused Unit 1 main control alarm 186-C and entrance into Technical Specification (TS) limiting conditions for operation (LCO) 3.3.7, Control Room Emergency Ventilation System Actuation Instrumentation. 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 actuation of alarms in the Unit 1 control room and entrance into a TS LCO. This issue was entered into the applicant's corrective action program under problem evaluation report (PER) 1062099. 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 C.1.1)
- The NRC identified a SL IV violation (VIO) of Title 10 to the *Code of Federal Regulations* (10 CFR) section 50.9(a), for a failure to provide information to the Commission that is complete and accurate in all material respects. Specifically, a contract employee deliberately removed a QC data sheet, which contained a valid QC rejection for a damaged anchor bolt, from WO 10-951093-000. A new, blank QC data sheet was substituted for the data sheet that contained the QC rejection to allow grouting work to be completed without site engineering approval of the damaged anchor bolt. The inspectors determined that the failure to maintain complete and accurate information for quality-related work following 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 involved willfulness. 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.1.17)
- The inspectors concluded that issues pertaining to several open items, including six inspection procedures (IPs), four construction deficiency reports (CDRs), one NRC bulletin (BL), two generic letters (GL), four temporary instructions (TI), and one violation 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; 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.

## I. QUALITY ASSURANCE PROGRAM

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

#### a. Inspection Scope

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

The inspectors reviewed the TVA quality assurance (QA) audit report NC1502, of the Watts Bar Unit 2 corrective action program, dated August 6, 2015. The inspection was conducted to verify that the periodic internal audit was conducted in accordance with QADP-2, Internal Audits, Revision (Rev) 9, and that the Watts Bar Unit 2 corrective action program elements had been effectively implemented in accordance with the QA program.

The inspectors also reviewed and followed up on the corrective actions of several CRs and PERs discussed throughout various sections of this report.

#### b. Observations and Findings

No findings were identified.

#### c. Conclusions

The issues identified in the CRs and 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 activity observed included work associated with:

- Work Order (WO) 115203575, Splice cables and complete all terminations,
- WO 115448018, 2-PTI-99-04 Reactor Protection System Testing,
- WO 116775957, Repair cable on the spent fuel pool Level Indicator as discussed in CR 1027859.

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 Unit 2 construction activities inadvertently caused Unit 1 main control alarm 186-C and entrance into Technical Specification (TS) limiting conditions for operation (LCO) 3.3.7, Control Room Emergency Ventilation System Actuation Instrumentation, action statement "a", one or more functions with one channel or train inoperable. Plant personnel installing cables in the vicinity of the breaker associated with 0-RM-90-125 inadvertently tripped the breaker because they did not take the necessary steps to establish an adequate work area or maintain it in order to prevent impact of areas outside of the work scope, in accordance with procedure MMDP-15, "Conduct of Maintenance – Expectations and Standards," Section 3.2.5, Field Work Performance.

Description: On July 24, 2015, during cable pulling activities performed under WO 115203575, plant personnel inadvertently tripped the breaker associated with radiation monitor 0-RM-90-125. As a result, Unit 1 entered TS LCO 3.3.7, Control Room Emergency Ventilation System Actuation Instrumentation, action statement "a", one or more functions with one channel or train inoperable. Auxiliary unit operators were dispatched to the breaker and observed the breaker in the OFF position. The breaker was successfully reset and the malfunction cleared. Unit 1 subsequently exited the TS LCO.

The inspectors reviewed Section 3.2.5 of MMDP-15, Field Work Performance, which states, in part:

- Establish a work area, following program requirements to rope off and label work area.



Contrary to the standards above, plant personnel did not establish an adequate work area or maintain it in order to prevent impact of areas outside of the work scope.

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 cable pulling activities 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 actuation of alarms in the Unit 1 control room and entrance into a TS LCO. 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 CR 1062099. Immediate corrective actions were taken to exit the LCO. 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: 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 05000391/2015607-01, "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 as recommended by Inspection Procedure (IP) 50053 and 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 control records to ensure authorized entry of tools, equipment, and personnel; also cleanliness

controls were adequate to verify that cleanliness requirements were being met. Most of the 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

The 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 Structural Concrete Work Observation (Inspection Procedure 46053)

a. Inspection Scope

Background: Structural concrete work observations were closed in integrated inspection report (IIR) 05000391/2015604 (ADAMS Accession No. ML15181A446). In addition, the inspectors documented 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 structures, systems, and components (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 the reactor building (interior concrete structures and ice condenser).

This program assesses pre-service degradation mechanisms such as physical damage, water damage due to freeze 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.

Inspection Activities: The inspectors observed a sample of the pre-service structural concrete inspections for the concrete shield building to verify that the inspection was completed in accordance with 2-SI-88-5, Visual Inspection of Concrete Shield Building, Rev. 0. In addition, the inspectors interviewed two engineering inspectors and reviewed personnel qualification records to verify the personnel had the required skills to perform the inspections as a structural examiner for civil/structural systems.

b. Observations and Findings:

No findings were identified.

c. Conclusions:

The structural concrete inspections were completed in accordance with the approved procedures.

#### C.1.4 (Closed) Instrument Components and Systems – Records Review (Inspection Procedure 52055)

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 Unit 2. 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. IIR 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IP 52055 and determined that the inspection requirements were not met and the IP should be performed in its entirety. It was also noted that the applicant plans to rework or replace most instrumentation.

The purpose of IP 52055 is to confirm that the applicant’s system for preparing, reviewing, and maintaining records is functioning properly, that the records reflect work accomplishment consistent with NRC requirements and safety analysis report (SAR) commitments, and that the records indicate any potentially generic problems, management control inadequacies, or other weaknesses of safety significance. This IP covers record control and review, work and inspection records, personnel qualification records, change control records, and audit records.

Inspection Activities: The following table lists the previous inspections that were performed under this IP.

IP Section Sample Requirements	IIRs	ADAMS Accession Number
02.01 – Record Control and Review	<ul style="list-style-type: none"> <li>• 05000391/2010603 Section OA.1.1 (1 sample)</li> <li>• 05000391/2013607 Section C.1.9 (1 sample)</li> </ul>	<ul style="list-style-type: none"> <li>• ML102170465</li> <li>• ML13273A512</li> </ul>
02.02.a – Work	<ul style="list-style-type: none"> <li>• 05000391/2010604 Section C.1.16 (4</li> </ul>	<ul style="list-style-type: none"> <li>• ML103060240</li> </ul>

and Inspection Records, Receiving Inspection Records	<ul style="list-style-type: none"> <li>samples)</li> <li>• 05000391/2010605 Section OA.1.19 (2 samples)</li> <li>• 05000391/2011603 Section C.1.14 (1 samples)</li> <li>• 05000391/2013607 Section C.1.9 (2 samples)</li> </ul>	<ul style="list-style-type: none"> <li>• ML110410680</li> <li>• ML111370702</li> <li>• ML13273A512</li> </ul>
02.02.b – Work and Inspection Records, Storage Records	<ul style="list-style-type: none"> <li>• 05000391/2012608 Section OA.1.17 (2 samples)</li> <li>• 05000391/2013607 Section C.1.9 (6 samples)</li> </ul>	<ul style="list-style-type: none"> <li>• ML12319A368</li> <li>• ML13273A512</li> </ul>
02.02.c – Work and Inspection Records, Installation Records	<ul style="list-style-type: none"> <li>• 05000391/2010604 Section C.1.15 (2 samples)</li> <li>• 05000391/2011603 Section C.1.14 (1 sample)</li> <li>• 05000391/2011603 Section OA.1.16 (3 samples)</li> <li>• 05000391/2013607 Section C.1.9 (2 samples)</li> </ul>	<ul style="list-style-type: none"> <li>• ML103060240</li> <li>• ML111370702</li> <li>• ML111370702</li> <li>• ML13273A512</li> </ul>
02.02.d – Work and Inspection Records, Construction Testing and Calibration Records	<ul style="list-style-type: none"> <li>• 05000391/2010604 Section C.1.16 (1 sample)</li> </ul>	<ul style="list-style-type: none"> <li>• ML103060240</li> </ul>
02.03 – Personnel Qualification Records	<ul style="list-style-type: none"> <li>• 05000391/2013607 Section C.1.9 (9 samples)</li> </ul>	<ul style="list-style-type: none"> <li>• ML13273A512</li> </ul>
02.04 – Nonconformance and Deviation Records	<ul style="list-style-type: none"> <li>• 05000391/2010603 Section OA.1.1 (1 sample)</li> </ul>	<ul style="list-style-type: none"> <li>• ML102170465</li> </ul>
02.05 – Change Control Records	<ul style="list-style-type: none"> <li>• No previous inspections, see inspection items below</li> </ul>	
02.06 – Audit Records	<ul style="list-style-type: none"> <li>• 05000391/2010603 Section OA.1.1 (1 sample)</li> <li>• 05000391/2011603 Section C.1.14 (1 sample)</li> <li>• 05000391/2013607 Section C.1.9 (1 sample)</li> </ul>	<ul style="list-style-type: none"> <li>• ML102170465</li> <li>• ML111370702</li> <li>• ML13273A512</li> </ul>
02.07 – Additional Inspection	This section allowed for an expansion of scope according to the SALP process, which is no longer used. This section was considered not applicable for the Watts Bar Unit 2 reactivation inspection program.	

As part of inspections performed for Construction Deficiency Report (CDR) 05000391/89-08, which was closed in IIR 05000391/2015605 (ADAMS Accession No.

ML15226A345), Section OA.1.3, the inspectors reviewed qualification records for the qualified Kapton inspectors performing the two-party inspection process. The NRC inspectors reviewed personnel qualification records to ensure that the system of craft and inspection personnel qualification records met stated requirements and was being maintained in a current status, that the records were sufficient to reasonably support qualification in terms of certification, experience, proficiency, training, testing, etc., and that action had been taken by responsible applicant organizations to independently authenticate the record material.

During this inspection period, the inspectors reviewed the following nonconformance and deviation reports, in the form of test deficiency notices (TDNs) and CRs:

- TDN 15-0732, SG 1 NR level CH2 cable termination
- TDN 15-0836, RHR Hx A/B bypass flow control not engaging limit switch
- TDN 15-0953, Alarm window PORV-334 actuation verification
- TDN 15-1153, SG 1 TDAFW level control would not calibrate
- TDN 15-1171, MDAFW Pump SG1 LCV not fail open
- TDN 15-1390, Hi Flow indication light not lit for flow controller response set point
- CR 909794, Engineering "Use As Is" disposition for instruments listed
- CR 944730, Electronic housing seal broken on 2-FT-070-0081A
- CR 991936, Portions of 2-SENL-001-0281 not meeting minimum separation
- CR 1004901, Neutron detector input cables – loss of isolation from plant ground

The inspectors reviewed the listed TDNs and CRs to ensure that:

- records were legible, complete, and promptly reviewed by qualified personnel;
- reporting requirements of 10 CFR Part 21 and Part 50 were recognized during evaluation and appropriate action was taken;
- records had been routinely processed, evaluated in a timely manner, and controlled through established channels for resolution of the root cause as well as the immediate problem;
- records were properly identified, stored, indicate current status, and could be retrieved in a reasonable time; and
- nonconformance reports included the status of corrective action or resolution and adequate justification was provided for any use-as-is disposition.

The inspectors also reviewed the following change control records (engineering document construction releases (EDCRs)):

- EDCR 52356, Component wiring mods to aux control room panel 2-L-11A;
- EDCR 52709, Replace Foxboro equipment with Eagle 21 rack 1-13 and 28;
- EDCR 53597, Install/inspect instrument lines and instruments for 2-L-136;
- EDCR 53919, Modify, inspect, and/or install sample lines to process/root valves of containment sump and Rx coolant hot legs 1 and 3; and
- EDCR 54070, Replace RTDs for 2-TE-72-6 and 2-TE-72-31 and add annunciator inputs for 2-FCV-72-44-A and 2-FCV-72-45-B.

The inspectors reviewed the listed EDCRs to ensure that records associated with design and field changes, as well as related work and inspection procedure changes to ensure that they:

- reflected timely review and evaluation by qualified personnel and were of the type approved for that purpose;
- assured that only the most recently approved documents, including design changes, were used in the field;
- were subject to adequate design control, including consideration of the impact of the change on the overall design and on as-built records; and
- included preparation of a nonconformance report record of nonconformances to design requirements, even if the nonconformance was resolved through the design change process.

The inspectors selected the following records of recent audits associated with instrumentation:

- WBN QA Observation 73041, Calibration for pressure transmitter steam generator 2 pressure loop WBN-2-LPP-003-0050, 4/21/2015;
- WBN QA Oversight Report for January – March 2015 – NC-WB-15-007, 4/30/2015;
- WBN Unit 2 Construction Completion Project Quality Surveillance Report 25402-WBN-SR-10-1091 Installed Instrument transmitters, 6/19/2010; and
- WBN QA Assessment Report – EDCR 52419, Installation of containment sump level transmitters - NGDC-WB-10-001, 2/17/2010.

The inspectors reviewed the listed audit records to ensure that records were sufficient to verify that the intended purpose and scope of the audits were achieved; that findings were reported in sufficient detail to permit a meaningful assessment by those responsible for corrective action, final disposition and trending; and that the applicant had taken proper and timely follow-up action on those matters in need of correction. In addition, the inspectors documented, in IIR 05000391/2013609 (ADAMS Accession No. ML13353A599), Section Q.1.15, that the applicant had an approved QA program for performing audits and the applicant completed periodic independent QA audits in accordance with regulatory requirements.

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- Section 02.03 – One sample
- Section 02.04 – Ten samples
- Section 02.05 – Five samples
- Section 02.06 – Four samples

b. Observations and Findings

No findings were identified.

Below is a summary of each section of IP 52055:

- Section 02.01 – Complete
- Section 02.02 – Complete
- Section 02.03 – Complete

- Section 02.04 – Complete
- Section 02.05 – Complete
- Section 02.06 – Complete
- Section 02.07 – NA

c. Conclusion

Based on the records reviewed in this, and previous inspections, the inspectors concluded that the applicant's system for preparing, reviewing, and maintaining records is functioning properly; that the records reflect work accomplishment consistent with NRC requirements and SAR commitments; and that the records indicate any potentially generic problems, management control inadequacies, or other weaknesses of safety significance. IP 52055 is considered closed; however, additional inspections may be performed at the NRC's discretion.

**C.1.5 (Closed) Heat Sink Performance (Inspection Procedure 71111.07)**

a. Inspection Scope

Background: Initial review by NRC staff resulted in listing NRC generic letter (GL) 89-13, Service Water System Problems Affecting Safety-Related Equipment; and temporary instruction (TI) 2515/118, Service Water System Operational Performance Inspection (SWSOPI), Rev. 2 as recommended for inspection at Watts Bar Unit 2. This inspection area has been considered significant enough, since these requirements were initiated, as ongoing inspections of operating reactors through the implementation of IP 71111.07, Heat Sink Performance. Review of the above documents, indicated that IP 71111.07 sufficiently covers the key elements of GL 89-13 and TI 2515/118, primarily via the triennial inspection requirements. It was determined that inspection of the ultimate heat sink using specific portions of IP 71111.07 could satisfy the intent of the key elements outlined in GL 89-13 and TI 2515/118 as they relate to WBN Unit 2.

Specifically, for this item, the inspection is limited to the triennial review requirements of section b.1 (a) as outlined below, as it applies to the component cooling system (CCS) at WBN Unit 2:

*Inspection Procedure Section 02.02 b1 Triennial Review*

b. For the selected heat exchangers that are directly cooled by the service water system, verify that testing, inspection, maintenance, and monitoring of biotic fouling and macrofouling programs are singularly, or in combination, adequate to ensure proper heat transfer.

1. Review the method and results of heat exchanger performance testing, or equivalent methods to verify performance.
  - (a) The selected test methodology is consistent with accepted industry practices, or equivalent.

Inspection Activities: The inspectors reviewed the CCS procedures, calculations, health reports, design basis, corrective action reports, and performance test results for the CCS

B heat exchanger provided by the licensee, and compared those results to the requirements of the test procedure.

The inspectors also performed a walkdown inspection of select components and piping related to the CCS system, to observe any visible signs of component degradation and system leakage.

Documents reviewed are in the Attachment.

b. Observations and Findings

No findings were identified. Review of the CCS B heat exchanger performance test results showed that the licensee's test procedure provided an acceptance criteria for tested parameters. The tests also provided direction for reporting discrepancies, should the testing results fall outside required acceptance criteria. The reviewed sample test results showed that the test point parameters were within the established test acceptance criteria ranges. The monitoring of these parameters, and comparison to the acceptance criteria contained within the performance test procedure, provided reasonable assurance that the CCS B heat exchanger was being tested in accordance with the requirements of the station procedures, and was consistent with accepted industry practice.

c. Conclusions

The activities and reviews were completed relative to the CCS performance testing, as described in the IP 71111.07, Section 2.02 b.1(a). Based on the activities reviewed, the inspectors concluded that the inspection effort associated with IP 71111.07, Section 2.02 b.1(a) can be 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 003B - Auxiliary Feedwater
- System 074 – Residual Heat Removal
- System 068 – Reactor Coolant
- System 030 – HVAC (air return fans)
- System 099 – Reactor Protection

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:

- 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.

02.02 (Monthly Inspection Activities) During this inspection period, the inspectors reviewed the Unit 2 planned/completed surveillances to ensure required preventative maintenance was incorporated into a schedule for accomplishment.

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 Overall Startup Test Program Review (Inspection Procedure 72400)**

a. Inspection Scope

The purpose of this inspection was to verify that the applicant had established adequate administrative controls over startup testing in accordance with commitments and regulatory requirements. Requirements for the startup test program are contained in the final safety analysis report (FSAR) Chapter 14, Initial Test Program; The TVA NQA Plan TVA-NQA-PLN89-A; Regulatory Guide (RG) 1.68, "Initial Test Programs for Water Cooled Nuclear Power Plants," Rev. 2; and American National Standards Institute (ANSI) 18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants." Areas which are covered by Unit 1 programs, such as maintenance after turnover to operations and chemistry controls, were previously reviewed and not re-inspected. In addition, controls for drawings and manuals and the design control process were previously inspected and were not re-inspected. The inspectors reviewed compliance of FSAR Chapter 14, Initial Test Program with the requirements specified in RG 1.68, Rev. 2 and the applicant's procedures for the startup test program to verify that controls were in place for the areas below:

- planned test program is consistent with FSAR commitments and RG 1.68, Rev. 2;
- format and content of test procedures were consistent with FSAR, Chapter 14 description;
- test organization including responsibilities for key personnel;
- test program administration including requirements for pre-test briefings, criteria for terminating testing, changes to procedures and testing prerequisites for beginning or recommencing testing;
- formal methods have been established for control of scheduling of test activities;
- formal program for evaluation of test results has been established;
- document control describing how procedures are maintained current and specification of records to be retained;
- requirements for documentation of equipment deficiencies; and
- requirements for Measuring and Test Equipment (M&TE).

The following procedures were reviewed to verify they contained Test Objectives, Test Method (Summary of Test), Prerequisites, and Acceptance Criteria.

- 2-PAT-8.6, Plant Trip From 100% Power, Rev. 0000
- 2-PET-201, Initial Criticality and Low Power Physics Testing, Rev. 0000
- 2-PAT-5.2, Turbine Generator Trip With Coincident Loss Of Offsite, Power Test, Rev. 0000
- 2-PAT-3.10, Reactor Trip System, Rev. 0000
- 2-PAT-8.5, Shutdown From Outside the Control Room, Rev. 0000
- 2-PAT-3.2, Pressurizer Spray Capability and Continuous Spray Flow Setting, Rev. 0000
- 2-PET-105, Initial Core Loading, Rev. 0000
- NPG-SPP-06.4, Measuring and Test Equipment, Rev. 3

b. Observations and Findings

No findings were identified.

c. Conclusions

The requirements were met for establishment of programmatic controls over the startup test program.

**P.1.3 Comparison of As-Built Plant to FSAR Description (Inspection Procedure 37301)**

a. Inspection Scope

Background: The purpose of IMC 2513, Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase, issue date January 1, 1984, 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 defines the inspection program that supports the issuance of an Operating License. IMC 2513 requires through IP 37301, that a sample of technical specification systems be inspected to verify that the as-built plant conforms to the commitments contained in the FSAR. The following inspection was performed in relation to satisfying the required comparison of the as-built plant to the FSAR description.

Inspection Activities: The inspectors performed the following to verify that the as-built condition and technical specification function of Systems 002 and 003A, condensate and main feedwater systems, respectively, conform to the commitments in the FSAR, amendment 113:

- reviewed the latest revision of the mechanical configuration control drawings to verify agreement with the current FSAR information,
- reviewed the latest revision of the control and logic instrumentation configuration control drawings for to verify agreement with the description of instrumentation and controls contained in the FSAR, and
- performed a limited scope walkdown to verify that significant components, including control and logic instrumentation, are as described in drawings, technical specifications, and the FSAR.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the as-built condition of the technical specification portions of System 002, condensate system, and System 003A, main feedwater system, conform to the commitments and descriptions contained in the FSAR.

**P.1.4 (Closed) Engineered Safety Features and Loss of Offsite Power Test - Preoperational Test Procedure Review (Inspection Procedures 70304 and 70306)**

a. Inspection Scope

Background: The purpose of the inspections of preoperational test activities 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 defines the inspection program that supports the issuance of an Operating License. IMC 2513 requires the procedural review of the preoperational test procedures to ensure they are consistent with regulatory requirements and applicant commitments. The following inspection was performed in relation to satisfying the required procedural reviews.

Inspection Activities: The inspectors reviewed preoperational test instruction (PTI) 2-PTI-262-01, Rev. 0, "Train 2A Unit 2 Integrated Safeguards Test." The inspectors verified the preoperational test instruction adequately implemented the requirements of FSAR chapters 7, 8, and 14; Technical Specifications 3.3.2; RGs 1.41 and 1.68; and Supplement 23 to NUREG 0847 (Watts Bar 2 Safety Evaluation Report).

The inspectors evaluated the adequacy of:

- test scope;
- acceptance criteria;
- precautions, including considerations for interfaces with the operating unit;
- prerequisites, including identification of M&TE requirements and system alignments;
- information about expected responses during testing;
- criteria for terminating test evolutions;
- identification of equipment/controls/status indicators/alarms;
- actions for restoration from test evolutions; and
- procedure structure and flow, including title and approvals, pagination, statement of purpose, provisions for documenting verifications/test data, and identification of action-critical steps.

The inspectors interviewed the responsible startup test engineer and startup program management, and reviewed the preoperational test instruction to determine:

- whether the procedure provided verifications of correct engineered safety function component operation with and without normal power available; and
- whether the procedure provided verifications of (1) emergency diesel generator (EDG) operability and reliability relating to loss of offsite power (LOOP), including load shedding and sequencing, and (2) adequate capacity of the designated common station service transformer.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based upon the inspection sample, the inspectors determined that the preoperational test instruction for integrated testing of the engineered safety features actuation system and the emergency electrical power system implemented a methodology that conformed to NRC requirements and the applicant's program guidance. This completes the procedure review of preoperational test procedure 2-PTI-262-01.

**P.1.5 Hot Functional Testing Witnessing (Inspection Procedure 70314)**

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 inspection program that supports the issuance of 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 Hot Functional Test (HFT) instruction 2-PTI-068-01, "HFT – Heatup and Cooldown," 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 test sections were selected for inspection:

- Section 6.4, 450<sup>0</sup>F;
- Section 6.5, 557<sup>0</sup>F;
- Section 6.6, Plant Cooldown to Ambient.

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;
- minimum crew requirements were met;
- 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.

Specific inspection efforts dedicated to the witnessing of the aforementioned test sections of 2-PTI-068-01 were as follows:

- adherence to temperature limits through heatup using reactor coolant pumps (RCPs) and pressurizer heaters/spray using 2-TOP-068-05, "Plant Heatup;"
- acceptable thermal expansion of system components and piping through performance of 2-PTI-999-02, "Thermal Expansion" (as discussed in Section P.1.16) and Bechtel execution of WDP-DATA-1148 and WDP-DATA-1149, "Data Walkdown Gap Measurements" inspections;
- isothermal cross-calibration of reactor coolant system (RCS) resistance temperature detectors and thermocouples using 2-PTI-085-01, "Rod Control Functional Testing;"
- chemical and volume control system (CVCS) (System 62) capabilities to charge water and the pressurizer pressure control system to maintain RCS/Pressurizer pressure within limits via 2-SI-68-44, "Temperature/Pressure and Pressurizer Temperature Limits;"
- proper operation of steam generators' instrumentation to changes in steam generator water level;
- proper operation of the main steam isolation and bypass valves through performance of 2-PTI-001-01, "Main Steam Isolation Valves and Bypass Isolation Valves Functional Test;"
- proper duration of RCP flow to satisfy NRC RG 1.20 guidance regarding vibration of reactor internals;
- proper operation of reactor head vent system through performance of 2-PTI-068-09, "Reactor Vessel Head Vent System;"
- ability to cooldown the plant in a controlled manner from within the Main Control Room and from the Auxiliary Control Room (Outside the Main Control Room) in accordance with NRC RG 1.68.2;
- proper operation of the auxiliary feedwater system (System 003B) through performance of 2-PTI-003B-05, "Auxiliary Feedwater System Dynamic Test;"
- vibration monitoring through performance of 2-PTI-999-01, "Operational Vibration Testing" and TI-31.02, "Plant Equipment Vibration Monitoring Program;" and
- proper operation of the steam dump control system.

b. Observations and Findings

No findings were identified. Throughout the performance of the HFT collection of procedures, a number of test deficiencies were identified and entered into the applicant's corrective action program. The resolution of these deficiencies will receive NRC review

through the implementation of IP 70324, "Preoperational Test Results Evaluation – Integrated Hot Functional Testing."

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. 6. This concludes the inspection efforts of IP 70314, "HFT Witnessing."

**P.1.6 Preoperational Test Witnessing (Inspection Procedures 70312 and 70337)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.5, and this test was performed in conjunction with or in support of 2-PTI-068-01, "HFT – Heatup and Cooldown."

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-001-01, "Main Steam Isolation Valves and Bypass Isolation Valves 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 tests were selected for inspection:

- Section 6.2, Main Steam Isolation Valve Bypass Valve 2-FCV-1-147
- Section 6.6, Main Steam Isolation 2-FCV-1-4 Functional Testing
- Section 6.9, Main Steam Isolation 2-FCV-1-29 Functional Testing

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. 6. This concludes the planned witnessing of 2-PTI-001-01; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.7 Preoperational Test Witnessing (Inspection Procedures 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.1.5.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-003B-04, "Auxiliary Feedwater Pumps and Valves 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 tests were selected for inspection of this item:

- Section 6.1, 2-FCV-3-116A, ERCW Header A AFW Pump 2A-A Suction, Logic and Stroke Time Test;
- Section 6.3, 2-FCV-3-126A, ERCW Header B AFW Pump 2B-B Suction, Logic and Stroke Time Test;
- Section 6.4, 2-FCV-3-126B, ERCW Header B AFW Pump 2B-B Suction, Logic and Stroke Time Test;
- Section 6.6, 2-FCV-3-136B, ERCW Header A TDAFW Pump Suction, Logic and Stroke Time Test;
- Section 6.7, 2-FCV-3-179A, ERCW Header B TDAFW Pump Suction, Logic and Stroke Time Test;
- Section 6.15, 2-LCV-3-173, TDAFW Pump SG2 Level Control, Logic, Stroke Time, and Fail Safe Position Test; and
- Section 6.16, 2-LCV-3-172, TDAFW Pump SG3 Level Control, Logic, Stroke Time, and Fail Safe Position Test.

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. 6. This concludes the planned witnessing of 2-PTI-003B-04; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.8 Preoperational Test Witnessing (Inspection Procedures 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.1.5 and this test was performed in conjunction with or in support of 2-PTI-068-01, "HFT – Heatup and Cooldown." Previous inspection efforts were documented in IIR 2015604 (ADAMS Accession No. ML15181A446)

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-003B-05, "Auxiliary Feedwater System Auxiliary 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 tests were selected for inspection:

- Section 6.6, 2-PMP-3-118, AFW Pump 2A-A and 2-PMP-3-128, AFW Pump 2B-B, Response Time Tests at 557F NOP-NOT Plateau;
- Section 6.8, 2-PMP-003-0002A-S, TDAFW Pump 2A-S, Hydraulic Performance at 557F NOP-NOT Plateau;

- Section 6.9, 2-PMP-003-0002A-S, TDAFW Pump 2A-S, 48 Hour Endurance Run at 557F NOP-NOT Plateau;
- Section 6.10, 2-PMP-003-0002A-S, TDAFW Pump 2A-S, Full Flow Test at 557F NOP-NOT Plateau;
- Section 6.11, 2-PMP-003-0002A-S, TDAFW Pump 2A-S, Response Time and Cold Quick Start Test at 557F NOP-NOT Plateau;
- Section 6.12, AFW System Water Hammer at 557F NOP-NOT Plateau;
- Section 6.13, 2-PMP-003-0002A-S, TDAFW Pump 2A-S, Minimum Steam Pressure Operation at 350F Heatup Plateau; and
- Section 6.14, 2-PMP-3-118, AFW Pump 2A-A and 2-PMP-3-128, AFW Pump 2B-B, Pump Runout Tests at 450F Heatup Plateau.

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. 6. This concludes the planned witnessing of 2-PTI-003B-05; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

### **P.1.9 Preoperational Test Witnessing (Inspection Procedures 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.1.5. Previous inspection efforts were documented in Section P.1.4 of IIR 05000391/2015604 (ADAMS Accession No. ML15181A446).

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. Specifically, the inspectors observed the emergency boration of the reactor coolant system to verify that the boric acid system could perform its safety-related function.

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. 6. This concludes the planned witnessing of 2-PTI-062-02;

however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

### **P.1.10 Preoperational Test Witnessing (Inspection Procedures 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.1.5, and this test was performed in conjunction with or in support of 2-PTI-068-01, "HFT – Heatup and Cooldown."

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-062-03, "HFT Charging and Letdown" 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 component tests were selected for inspection:

- Section 6.8, Seal Leakoff Alarm Tests;
- Section 6.11, Charging and Letdown Flow and Pressure Control Tests;
- Section 6.12, RCP Seal Flow and Filter Differential Pressure Tests; and
- Section 6.16, Boric Acid Emergency Boration, Manual Boration, and Filter Flow Tests.

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. 6. This concludes the planned witnessing of 2-PTI-062-03; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.11 Preoperational Test Witnessing (Inspection Procedure 70312)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.5., and this test was performed in conjunction with or in support of 2-PTI-068-01, "HFT – Heatup and Cooldown."

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-063-06, "Safety Injection System Check Valve 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 tests were selected for inspection:

- Section 6.1, Check Valve Flow Test at  $\geq 1380$  psig;
- Section 6.2, RCS Boundary Check Valve Flow Test at NOP-NOT; and
- Section 6.3, RCS Boundary Valve Leakage Testing.

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. 6. This concludes the planned witnessing of 2-PTI-063-06; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.12 Preoperational Test Witnessing (Inspection Procedure 70312)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.5. Previous inspection efforts were documented in IIRs 05000391/2015604 (ADAMS Accession No. ML15181A446) and 05000391/2015605 (ADAMS Accession No. ML15226A345).

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 component tests were selected for inspection of this item:

- Section 6.23, 1-FCV-67-10A, ERCW Strainer 1B-B Backwash Valve Unit 2 Thermal Overload Bypass Test;
- Section 6.24, 2-FCV-67-10A, ERCW Strainer 2B-B Backwash Valve Unit 2 Thermal Overload Bypass Test;
- Section 6.27, 1-FCV-67-10B, ERCW Strainer 1B-B Flush Valve Unit 2 Thermal Overload Bypass Test; and
- Section 6.28, 2-FCV-67-10A, ERCW Strainer 2B-B Flush Valve Unit 2 Thermal Overload Bypass Test.

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. 6. This concludes the planned witnessing of 2-PTI-067-03; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.13 Preoperational Test Witnessing (Inspection Procedures 70312 and 70436)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.5.

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-074-01, "Residual Heat Removal System Pump/Valve Logic," 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 test was selected for inspection:

- Section 6.8, Valve 2-FCV-74-24.

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. 6. Additional NRC inspection of the performance of this test is planned and will be documented in future reports.

**P.1.14 Preoperational Test Witnessing (Inspection Procedures 70312 and 70436)**

a. Inspection Scope

Background: The background for this preoperational test witnessing is the same as that in the background section of P.1.5., and this test was performed in conjunction with or in support of 2-PTI-068-01, "HFT – Heatup and Cooldown." Previous inspection efforts were documented in IIR 05000391/2015605 (ADAMS Accession No. ML15226A345).

Inspection Activities: The inspectors witnessed activities associated with the performance of preoperational test instruction 2-PTI-074-02B, "RHR HFT Heatup/Cooldown," 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 tests were selected for inspection:

- Section 6.3, A Train Cooldown Following Hot Functional Testing; and
- Section 6.4, B Train Cooldown Following Hot Functional Testing.

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. 6. This concludes the planned witnessing of 2-PTI-074-02B; however, additional inspection may be performed, at the discretion of the NRC, should additional testing occur.

**P.1.15 (Closed) Preoperational Test Procedure Verification (Inspection Procedure 70311)**

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 inspection program that supports the issuance of an Operating License. IMC 2513 requires the procedural review of the preoperational test procedures to ensure they are consistent with regulatory requirements and applicant commitments. The following inspections were performed in relation to satisfying the required procedural reviews.

Inspection Activities: The inspectors reviewed the applicant's test library to verify that approved test procedures existed for the areas/systems of IP 70311 that were applicable to Watts Bar Unit 2. Additionally, for the applicable primal systems listed in IMC 2513 Appendix A that were not chosen for in-depth procedure review, the inspectors also reviewed the applicant's document library to verify that test procedures were available, approved, and controlled.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedures were present and appropriately managed in the document control library. This completes the procedure review of preoperational test procedure IP 70311.

**P.1.16 Testing Piping Support and Restraint Systems, and Bulletin 88-11: Pressurizer Surge Line Thermal Stratification (Inspection Procedure 70370)**

a. Inspection Scope

Background: Appendix A to IMC 2513 identifies that, IP 70370 – Testing Piping Support and Restraint Systems, shall be performed prior to fuel load. The purpose of IP 70370 is to ensure that pipe supports, component supports, and restraint systems were installed in accordance with regulatory requirements, programs, and procedures for the following plant conditions:

- normal operating temperature and pressure
- after steam transient testing

Inspection Activities: Section P.1.5 of this report outlines the inspection activities associated with the applicant's implementation of hot functional testing. One component of hot functional testing is the applicant's implementation of 2-PTI-999-02, "Thermal Expansion" to verify that safety-related systems exhibit expansion consistent with design. As part of the inspection activities associated with the thermal expansion, the inspectors reviewed the applicant's programs and procedures to determine if the applicant established adequate programs and procedures pertaining to the examination and testing of piping support and restraint systems. Specifically, the inspectors verified that the programs and procedures:

- examined piping support systems at various temperatures from ambient to normal operating temperature to detect interference caused by thermal expansion;
- set and/or calibrated snubbers, restraints, and vibration arrestors and that these were checked at predetermined temperatures;
- examined piping supports and restraint systems during transient testing to ascertain that pipe motion and vibration were within design limits and that water hammer did not exist;
- conducted vibration tests, including resolution of high vibration; and
- ensured that displacement measurements were made at ambient and operating temperatures.

In addition to reviewing the applicant's programs and procedures, inspectors also performed direct observation of applicant activities related to field measurements and performance of visual examination of dynamic, fixed, and component supports. Specifically, the inspectors ensured that:

- hydraulic fluid in snubbers, shock suppressors, and restraints were at the proper level;
- fluid leaks through seals or elsewhere were not evident;
- deterioration, corrosion, physical damage, or deformation was not noticeable;
- lubricants were applied as required;
- all required bolts, locking devices, nuts, and washers were installed;
- support plates, extension rods, and connecting joints were not bent, deformed, loose, or otherwise out of specification;
- connecting joints, moving parts, piston shafts, seals, etc. were free from arc strikes, weld spatter, paint, scoring, roughness, general corrosion, or other materials that may obstruct proper operation;
- snubber positions were at or near their predicted position and not near their limits in either extension or compression;
- fixed pipe supports were not deteriorated and corrosion was not evident;
- springs in hangers were not obstructed by foreign material;
- spring hangers provided with indicators were consistent with the plant condition;
- threaded connections were secured by locknuts, fasteners, cotter pins, or similar locking devices and conform to the as-built drawings;
- sliding or rolling supports were provided with material and/or lubricants suitable for the environment and compatible with sliding contact surfaces;
- thermal expansion of the piping system was not restricted by the supports; and
- component supports showed no signs of deformation and that no other discontinuities or detrimental indications appeared on welded surfaces.

Additionally, the inspectors performed a review of the records for pipe support testing to verify that the applicant had evaluated all piping support testing, results were within the established acceptance criteria, and deficiencies identified in pipe support testing records were corrected.

The following samples were inspected:

- Normal Operating Temperature and Pressure (557 degrees Fahrenheit (°F)):
  - 02.02.a Dynamic Support Samples: 67
  - 02.02.b Fixed Support Samples: 33
  - 02.02.c Component Support Samples: 30

Specifically, the inspectors observed the applicant's inspection teams in the areas of the lower containment from azimuth 95° to 150°, the raceway, the pressurizer enclosure, and the auxiliary building. These areas contained supports from the CVCS, safety injection system (SIS), main feedwater system (MFW), residual heat removal system (RHR), RCS, auxiliary feedwater (AFW) and main steam (MS) systems.

- After Steam Transient Testing (Ambient):
  - 02.02.a Dynamic Support Samples: 90
  - 02.02.b Fixed Support Samples: 49
  - 02.02.c Component Support Samples: 30
  - 02.03 – three samples

Specifically, the inspectors observed the applicant's inspection teams and performed inspections in the areas of the steam generator enclosures, the raceway, the auxiliary building and the lower containment from azimuth 95° to 150°. These areas covered supports from the SI, CVCS, RCS, AFW, MS and MFW systems. The inspectors also observed inspections of the S/G upper ring girders, inner and outer bumper plates, upper ring girder rear bumpers, and the Paul Monroe snubbers on the S/Gs.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors determined that the applicant adequately inspected the condition of and measured the movement of supports on safety-related systems. This inspection procedure will remain open until a review the applicant's approved test results can be performed.

**P.1.17 Preoperational Test Results Evaluation (Inspection Procedure 70400)**

a. Inspection Scope

Background: IMC 2513,"Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase," issue date January 1, 1984, purpose 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 QA programs, necessary for operation of the facility have been documented and implemented.

IMC 2513 defines the inspection program that supports the issuance of an Operating License. IMC 2513 requires the pre-operational test results review of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspection was performed to in relation to satisfying the required pre-operational test results review.

Inspection Activities: The inspectors performed a detailed review of the results for preoperational test procedure 2-PTI-067-01, "ERCW Valve Functional Test," Rev. 1, to verify that the applicant's evaluation of the procedure performance and results was conducted in accordance with approved procedures. This review was performed to provide assurance that the test data was within the established acceptance criteria and the applicant's methods for identifying and correcting deficiencies were adequate. The inspectors performed the following activities associated with this test results review:

- reviewed all changes made to the test procedure to verify they were properly annotated, did not affect the objective of the test, and were performed in accordance with administrative procedures;

- reviewed all documented test deficiencies to verify they had been properly resolved, reviewed, and accepted;
- reviewed the test summary and evaluation to verify that the system was evaluated to meet design requirements and acceptance criteria;
- reviewed the original “as-run” copy of the test to verify completion of data sheets, calculations, and signatures/initials;
- QA inspection records were reviewed to verify they were completed as required by the test procedure; and
- the approval of the test results were reviewed for completeness to ensure that personnel charged with the responsibility for review and acceptance had documented their evaluation and corrected any identified discrepancies.

The inspectors reviewed the test results to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the test evaluation was performed in accordance with established procedures.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant’s test results were processed in a manner consistent with the guidance of procedure SMP-10.0, “Watts Bar Nuclear Plant Unit 2 Packaging and Processing Test Results,” Rev. 2. This completes the test results evaluation of preoperational test procedure 2-PTI-067-01.

**P.1.18 Preoperational Test Results Evaluation (Inspection Procedure 70400)**

a. Inspection Scope

Background The background for this preoperational test results evaluation is the same as that in the background section of P.1.17.

Inspection Activities: The inspectors performed a detailed review of the results for preoperational test procedure 2-PTI-072-01, “Containment Spray Pump and Valve Logic Test,” Rev. 1, to verify that the applicant’s evaluation of the procedure performance and results was conducted in accordance with approved procedures. This review was performed to provide assurance that the test data was within the established acceptance criteria and the applicant’s methods for identifying and correcting deficiencies were adequate. The inspectors performed the following activities associated with this test results review:

- reviewed all changes made to the test procedure to verify they were properly annotated, did not affect the objective of the test, and were performed in accordance with administrative procedures;
- reviewed all documented test deficiencies to verify they had been properly resolved, reviewed, and accepted;
- reviewed the test summary and evaluation to verify that the system was evaluated to meet design requirements and acceptance criteria;

- reviewed the original “as-run” copy of the test to verify completion of data sheets, calculations, and signatures/initials;
- QA inspection records were reviewed to verify they were completed as required by the test procedure; and
- the approval of the test results were reviewed for completeness to ensure that personnel charged with the responsibility for review and acceptance had documented their evaluation and corrected any identified discrepancies.

The inspectors reviewed the test results to verify that the overall test acceptance was met. The inspectors conducted a review with the responsible test engineer to assure that the test evaluation was performed in accordance with established procedures.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant’s test results were processed in a manner consistent with the guidance of procedure SMP-10.0, “Watts Bar Nuclear Plant Unit 2 Packaging and Processing Test Results,” Rev. 2. This completes the test results evaluation of preoperational test procedure 2-PTI-072-01.

## **SU.1 Startup Testing Activities**

### **SU.1.1 Quality Assurance for the Startup Test Program (Inspection Procedure 35501)**

a. Inspection Scope

The inspectors reviewed key documents and interviewed QA personnel to ascertain whether the licensee’s QA program, that covers operational activities, had been implemented for the startup and power ascension test program.

The inspectors reviewed the qualifications of QA personnel involved with the Watts Bar 2 startup program and the currently planned startup activities that QA will be monitoring. Programmatic procedures were reviewed for adequacy in the areas of conduct of testing, tracking of test deficiencies, testing documentation, and the control of measuring and test equipment.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Review of QA personnel qualifications indicated an adequately experienced staff. The inspectors were shown the methodology of tracking and resolution of QA observations. Startup activities to be covered by QA presence appeared comprehensive. Procedures associated with the conduct of testing, tracking of test deficiencies, testing

documentation and the control of M&TE were adequate. A QA program which covers operational activities has been implemented and is ready for the startup and power ascension test program.

### III. OPERATIONAL READINESS ACTIVITIES

#### O.1 Operations

##### O.1.1 Technical Specifications Review (Inspection Procedure 71301)

###### a. Inspection Scope

Background: During the previous inspection period of May 18 – June 30, 2015, the inspectors compared Unit 1 and Unit 2 TSs to identify differences and ensure that differences were appropriately identified. The results of the previous inspection were documented in IIR 05000391/2015605 (ADAMS Accession No. ML15226A345). The system walk down portion of the TS review inspection could not be performed during the May 18 – June 30, 2015 inspection report interval because some of the applicant's surveillance procedures were not completed.

The remaining scope of the TS review inspection was to complete the system walk downs to verify TS surveillance capability existed for selected installed plant systems. The systems selected for walk downs were based on plant systems that were new or different from previous Unit 1 systems, and systems that were shared between Unit 1 and Unit 2. The purpose of the walk downs was to verify the installed systems matched the surveillance procedures, in order to verify TS surveillance capability existed.

Inspection Activities: During this inspection period, the inspectors walked down the following surveillance procedures in the plant to verify TS surveillance capability existed for the installed plant systems.

- Steam Generator Level Instrumentation
  - 2-SI-3-10, 18 Month Channel Calibration of Steam Generator 4 Narrow Range Level Channel II Loop 2-LPL-3-106 (L-549)
  - 2-SI-3-1, 18 Month Channel Calibration of Steam Generator 1 Narrow Range Level Channel II Loop 2-LPL-3-38 (L-519)
- Auxiliary Building Gas Treatment System
  - 0-SI-30-7-A, Auxiliary Building Gas Treatment System Pressure Test Train A
- Reactor Vessel Level Indicating System, Inadequate Core Cooling Monitor, Core Exit Thermocouples, Sub cooling Margin Monitor
  - 2-SI-68-80-A, Channel Calibration of Train A Common Q Post Accident Monitoring System
  - 2-SI-0-4, Monthly Surveillances, Appendix D, Remote Shutdown and PAM Channel Check Data
- Emergency Gas Treatment System
  - 0-SI-65-6-B, Emergency Gas Treatment System Train B 10-Hour Operation

- Essential Raw Cooling Water
  - 2-SI-99-300-A, Engineered Safety Feature Actuation System Slave Relay GO Test
- Component Cooling System
  - 2-SI-99-300-B, Engineered Safety Features Actuation System Slave Relay GO Test Train B

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No Findings were identified. The inspectors observed the following items:

- Steam Generator Level Instrumentation: The inspectors verified that the steam generator #4 level instrumentation, as installed in the plant, matched the surveillance procedures and fulfilled the intent of TS surveillance requirements SR 3.3.1.10, SR 3.3.2.9, and SR 3.4.7.2.
- Auxiliary Building Gas Treatment System: The inspectors verified that the common Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary configuration, as of July 1, 2015, was reflected in 0-SI-30-7-A, Auxiliary Building Gas Treatment System Pressure Test Train A, Rev. 30, and this surveillance procedure fulfilled the intent of TS surveillance 3.7.12.4. However, the ABSCE boundary configuration on July 1, 2015 was not the ABSCE boundary configuration that will exist for dual unit operation. As Unit 2 construction activities progress, the ABSCE boundary configuration changes will require future revisions to the Train A/B surveillance procedures. ABSCE boundary configuration changes are controlled in accordance with the applicant's design change notification (DCN) process; therefore, no further pre-operational readiness inspection activity is required for this system.
- Reactor Vessel Level Indicating System (RVLIS), Inadequate Core Cooling Monitor, Core Exit Thermocouples, Subcooling Margin Monitor (Common Q): The inspectors could not verify surveillance capability existed for the Subcooling Margin Monitor and RVLIS because the computer display screens at control room panels 2-M-4 and 2-M-6 were de-energized during the inspection period.
- Emergency Gas Treatment System (EGTS): The inspectors noted that 0-SI-65-6-B, Emergency Gas Treatment System Train B 10-Hour Operation, Rev. 000U2, was unable to demonstrate that an EGTS Train was tested when aligned to the Unit 2 containment annulus area. The applicant initiated CR 1046622 to benchmark Sequoyah on how to alternate the EGTS units' suction/discharge paths between the Unit 1 and Unit 2 containment annulus areas with some periodicity. Further follow-up inspection is needed to ensure the final revision of the surveillance procedure meets the intent of the TS surveillance requirements for this system.



- ERCW System and CCS: The inspectors determined that the surveillance procedures, which were targeted to fulfill the intent of TS slave relay surveillance requirements 3.7.8.2, 3.7.8.3, and 3.7.7.4, were:
  - 0-SI-82-5, 18 Month Loss Of Offsite Power With Safety Injection Test - DG 2A-A, Rev 34
  - 0-SI-82-6, 18 Month Loss Of Offsite Power With Safety Injection Test - DG 2B-B, Rev 000U2

The 0-SI-82-5, Rev. 34 had not yet been revised to include dual unit surveillance requirements.

c. Conclusions

Further follow-up inspection is planned to ensure that:

- 2-SI-0-4, Monthly Surveillances, Appendix D, Remote Shutdown and PAM Channel Check Data, Items 11 and 12, match the screen displays on control room panels 2-M-4 and 2-M-6, to fulfill the intent of the TS surveillance requirements SR 3.3.3.1.
- 0-SI-65-6-B, Emergency Gas Treatment System Train B 10-Hour Operation, includes guidance to alternate the EGTS units' suction/discharge paths between the Unit 1 and Unit 2 containment annulus areas with some periodicity, and that the surveillance procedure fulfills the intent of TS surveillance requirement SR 3.6.9.1.
- 0-SI-82-5, 18 Month Loss Of Offsite Power With Safety Injection Test - DG 2A-A; and 0-SI-82-6, 18 Month Loss Of Offsite Power With Safety Injection Test - DG 2B-B; include verifications of all ERCW and CCS pump/valve automatic alignments which occur during a safety injection signal and during a loss of offsite power, and that the surveillance procedure fulfills the intent of TS surveillance requirement SR 3.7.8.2, 3.7.8.3, and 3.7.7.4.

#### IV. OTHER ACTIVITES

##### **OA 1.1 (Discussed) 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**

a. Inspection Scope

Background: Generic Letter (GL) 89-04 informed licensees of NUREG-1482, "Guidelines for In-service Testing Programs at Nuclear Power Plants." NUREG-1482 contained recommendations for developing and implementing in-service testing programs. NUREG-1482 referenced paragraph 50.55.a(b) of title 10 of the Code of Federal Regulations (10 CFR), which stated the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code for nuclear power plants was incorporated by reference into the NRC regulations. Paragraph 50.55a(f)4 of 10 CFR requires that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves which are classified as ASME

Code Class 1,2, and 3 must meet the in-service test requirements of ASME OM Code as incorporated by reference in 10 CFR 50.55a(b). As referenced in supplemental safety evaluation report (SSER) 22 Section 3.9.6, TVA committed to submitting an in-service testing (IST) program and submitting relief requests to NRR for WBN Unit 2 nine months before the projected date of operating license (OL) issuance. TVA submitted a letter, dated December 12, 2013, which provided the NRC staff with TVA's Technical Instruction, 0-TI-100-006, "Inservice Testing Program" for the Watts Bar Nuclear Plant WBN Units 1 and 2, Rev. 0. For Unit 1, WBN submitted Enclosure 1, which was an update to the IST program for the Unit 1 third 10-year interval. Enclosure 2 of the submittal requested to allow (1) alignment of the 120 month interval dates for the Unit 1 IST program to be concurrent with Unit 2 IST program, and (2) Unit 1 and Unit 2 to utilize the latest edition and addenda of the ASME OM Code currently reference by 10 CFR 50.55a(b), which is ASME OM Code 2004 Edition through 2006 Addenda.

The Unit 2 IST program was reviewed and documented in IIRs 05000391/2014614 (ADAMS Accession No. ML14363A315) and 05000391/2015604 (ADAMS Accession No. ML15181A446).

Inspection Activities: The inspectors reviewed the pre-service test procedure for the auxiliary feedwater turbine-driven pump test. In addition, the inspectors observed the pre-service test and reviewed the test records to verify that the test was completed in accordance with the approved test procedure and that acceptance criteria was established and met. In addition, the inspection was completed to verify the requirements of ASME OM Code 2004 Edition through 2006 Addenda were met.

The following samples from TI 2515/114 were completed:

- 03.02 b, d, g, and h – one per subsection
- 03.03 a and b – one per subsection
- 03.06, a, b, c, d, and e - one per subsection

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The pre-service test for the auxiliary feedwater turbine-driven pump was completed in accordance with the approved procedures and met the requirements of ASME OM Code 2004 Edition through 2006 Addenda.

**OA.1.2 (Discussed) Final Corrective Action Program/ Special Program Inspection (Temporary Instructions 2512/016, 2512/019, 2512/020, 2512/024, 2512/028, 2512/029, 2512/030, 2512/031, 2512/037, 2512/039, and 2512/043)**

a. Inspection Scope

Background: The Corrective Action Programs (CAPs) and Special Programs (SPs) were developed in 1986 by TVA to identify, document, investigate, and correct quality problems at Watts Bar Nuclear Plant. There were a total of 18 CAPs and 11 SPs. These CAPs and SPs were all part of the inspection program for Watts Bar Unit 2. All of the CAPs and SPs that were reviewed as part of this final inspection had been previously inspected and it was determined by the NRC that the program implementation was adequate to resolve the issue. These previous inspections satisfied Section 03.01 of the CAP or SP Temporary Instruction (TI). This final inspection did not go back and reassess the technical aspects of the program. The final inspection satisfied Section 03.02 of each of the TIs for the selected CAPs and SPs, which required a final inspection be performed after TVA certified that the CAP or SP was completed.

The following SPs were reviewed and closed by NRC during the Unit 1 review. These programs applied to the Watts Bar Nuclear Plant site, and a subsequent letter (ADAMS Accession No. ML090210107) was issued closing these programs with no inspection needed for Watts Bar Unit 2.

- TI 2512/033: Concrete Quality SP
- TI 2512/042: Soil Liquefaction SP

The following CAP was withdrawn with the resubmittal of Chapter 14 of the FSAR to conform to the requirements of RG 1.68 as documented in a letter to TVA (ADAMS Accession No. ML090210107). The entire program is described in Chapter 14 of Amendment 91 to the FSAR. Therefore, these activities were not inspected under a CAP, rather they were assessed as part of the FSAR review and inspected as part of the IMC 2513, Preoperational Testing and Operational Preparedness Phase.

- Prestart Testing Program CAP

Inspection Activities: The inspectors reviewed a portion of the 18 CAPs and 11 SPs that TVA described as being completed. The inspectors reviewed documents that were required to be completed as part of the CAP or SP to verify the programs were completed. The documents reviewed included the final completion packages, and a sample of other documents that were required to be closed or completed in order to close the item, such as: commitment packages, calculations, WOs, and procedures. The inspectors reviewed these documents to verify that they were completed and signed.

The list of CAPs and SPs that were reviewed for completion to satisfy Section 03.02 of the TIs were:

- TI 2512/016: Cable Issue CAP, Sub-issue - Computerized Cable Routing System
- TI 2512/016: Cable Issue CAP, Sub-issue - Silicone Rubber Insulated Cables
- TI 2512/016: Cable Issue CAP, Sub-issue - Cable Jamming
- TI 2512/016: Cable Issue CAP, Sub-issue - Sidewall Bearing Pressure
- TI 2512/016: Cable Issue CAP, Sub-issue - Pulling Through 90 degree Condulets and Mid-Route
- TI 2512/016: Cable Issue CAP, Sub-issue - Verify No Power Assisted Cable Pulls Occurred
- TI 2512/019: Design Baseline and Verification Program CAP

- TI 2512/020: Electrical Issues CAP, Sub-issue - Contact and Coil Rating
- TI 2512/024: Heat Code Traceability CAP
- TI 2512/028: QA Records CAP
- TI 2512/029: Q-List CAP
- TI 2512/027: Piece Parts/Procurement CAP
- TI 2512/030: Seismic Analysis CAP
- TI 2512/031: Vendor Information CAP
- TI 2512/037: Master Fuse List SP
- TI 2512/039: Microbe Induced Corrosion SP
- TI 2512/043: Use-As-Is Condition Adverse to Quality Reports SP

b. Observations and Findings

No findings were identified.

c. Conclusions

Sufficient inspection samples (CAPs and SPs certified by TVA to be complete) were not available to complete this inspection. Additional inspection activities will be performed.

**OA.1.3 (Discussed) Construction Deficiency Report 50-391/86-11: Thermal Expansion of Liquid Sample Piping (Inspection Procedures 52053 and 52055)**

a. Inspection Scope

Background: CDR 391/86-11 was created to address deficiencies in design provisions to accommodate thermal expansion in liquid sample piping in System 43 (sampling and water quality system) and System 90 (radiation monitoring system). The inspection scope was to confirm that the required support modifications were implemented. During a previous inspection, IIR 05000391/2010605 (ADAMS Accession No. ML110410680), the inspectors determined that EDCRs had been issued to install the sample piping. The inspectors also determined that the piping would be field routed and installed. The as-installed configurations would then be sketched in detail and submitted to design engineering for stress analysis. After completing the analysis and accomplishing any rework, engineering would incorporate the sketches into a final as-built isometric drawing(s).

Inspection Activities: The inspectors interviewed members of the design engineering staff and the field construction staff to verify that the previously identified process of system installation and design analysis was performed as stated. The inspectors reviewed a sample of four isometric drawings of piping sections from System 43 during this inspection. The inspectors reviewed the Field Change Requests (FCRs) generated by the design engineering group from the initial sketches after the analysis of the piping sections had been completed. The inspectors also performed walkdowns of the piping sections of the four samples to verify that the as-built condition matched the conditions identified in the final isometric drawings.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of the applicant's piping design and analysis activities, the inspectors determined that the applicant has taken steps to adequately correct the discrepancies of System 43 as noted in CDR 391/86-11. This item will remain open pending the completion of the System 90 system installation and analysis.

**OA.1.4 (Discussed) Followup - Watts Bar Nuclear Plant Unit 2 Response to Bulletin 2012-01: Design Vulnerability in Electrical Power System (Inspection Procedure 92701)**

a. Inspection Scope

Background: On January 30, 2012, Unit 2 at the Byron Station automatically tripped from full power because of an undervoltage condition on the electrical buses that powered the reactor coolant pumps (RCPs). The undervoltage condition was caused by a failure of a porcelain insulator stack and the "C" phase of an electrical power feeder from the 345 kV switchyard to the plant. The resulting open circuit created an unbalanced voltage condition that was propagated through the station auxiliary transformer and resulted in degraded voltage in two of three electrical phases supplying various station buses. The affected buses included two safety-related buses serving engineered safety features (ESF) equipment. The buses remained tied to the failed circuit; however, undervoltage protection for the RCP buses successfully detected the degraded voltage and properly acted to trip those pumps. In addition, several other large motors tripped from phase overcurrents created by the unbalanced voltage.

The event was significant because the two safety-related buses were not automatically disconnected from the failed electrical circuit. Undervoltage and overcurrent protective functions associated with the safety-related buses were not designed to detect the condition and resultant current flows were not sufficient to cause the station auxiliary transformer overcurrent relays or differential relays to isolate the affected transformer. As a result, the emergency diesel generators did not automatically connect to the safety-related buses. Fortunately, manual actions taken by plant operators were sufficient to terminate the event in time to prevent damage to the RCP seals from loss of seal cooling water. The only equipment damaged in this event was a main feedwater pump due to loss of bearing lube oil.

Based on the Byron Station event, the NRC staff issued Bulletin 2012-01, "Design Vulnerability in Electric Power System." In January 2015, the NRC review of the TVA responses to the bulletin concluded the design vulnerability existed at Watts Bar Unit 2 and no design features had been provided to enable functioning of the electric power system with an open phase condition with offsite power circuits. As a result, TVA committed to implement necessary administrative and equipment changes.

Inspection Activities: During this inspection, inspectors reviewed documents, conducted interviews, and performed direct observations to verify the adequacy of actions taken to date at Watts Bar Unit 2 to address the electrical system design vulnerability identified in

Bulletin 2012-01. The inspectors also evaluated whether the applicant's actions will provide reasonable assurance of proper functioning of the electric power system with an open phase condition (OPC) in the offsite power circuits.

The inspection scope included an evaluation of the interim actions reported in TVA's response to the February 2014 NRC Request for Additional Information; including:

- A walkdown of the Watts Bar switchyards to identify vulnerabilities to an open phase condition.
- A review of procedures for daily inspections of the transformer yard to ensure thoroughness relative to identification of off-normal conditions by Operations personnel. The applicant response also credited the performance of a review of the procedure for periodic thermography of switchyard components.
- A review of procedures for transferring supply feeders to emergency shutdown buses to verify voltages are checked on all three phases prior to making a transfer.
- A review of training to plant operators on the lessons learned from Bulletin 2012-01.

The inspection scope also included an evaluation of the long term actions to achieve final resolution as described in the TVA responses to the February 2014 and September 2014 NRC Request for Additional Information (RAI), and in Supplement 27 to the NRC Safety Evaluation Report. The inspectors compared TVA's preliminary design criteria for modifications to the electrical distribution system to criteria published in NUREG 0800, Branch Technical Position 8-9, "Open Phase Conditions in Electric Power System."

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

The inspectors observed that the following actions had been accomplished in response to Bulletin 2012-01:

- A walkdown of the switchyard by the applicant was documented in PER 574360. The walkdown determined that a potential existed for an ungrounded open phase to develop at stingers used to connect (a) the overhead power lines to the rigid buswork at the common station service transformers, and (b) the buswork to the transformer high side bushings.
- The applicant reviewed procedures for daily switchyard inspections and periodic thermography as documented in PER 574360. The applicant determined the procedures did not require any changes.
- The applicant review of procedures for conducting bus transfers was documented in PER 609570. The applicant determined that the existing procedures had not addressed the performance of three phase voltage checks when transferring Engineered Safety Features buses to offsite power sources. Corrective actions were implemented to revise procedure SOI-200.01 and procedure series SOI-201 and SOI-211.

- A briefing on Bulletin 2012-01 was administered using Operator Training Lesson Plan 3-OT-MISC142. The training was directed to plant operators in session 2 of the 2013 licensed operator requalification training program.
- Equipment changes to accomplish a final resolution of vulnerabilities to an open phase condition were being developed under design change notice (DCN) 64063. The development of the design was still in progress at the time of this inspection; however, an interview with design engineers identified that the design solution would employ established relaying technology to provide monitoring of negative sequence voltage. TVA engineers stated that negative sequence voltage is a key parameter to address this issue. Also, TVA indicated they were no longer considering use of a PSC 2000 Solutions design that was discussed in the response to the February 2014 NRC RAI.
- The preliminary design criteria described as applicable to the in-process design were generally comparable to the criteria outlined in NRC BTP 8-9.

c. Conclusion

Based upon the inspection sample, the inspectors determined that the applicant had implemented their interim actions to mitigate the potential impact of an open phase condition. Actions to accomplish final resolution of the condition had been initiated and preliminary design criteria for equipment changes were generally comparable to criteria outlined in Branch Technical Position 8-9. Further inspection related to this Bulletin will be performed at a later date.

**OA.1.5 (Closed) Construction Deficiency Report 391/82-04: Foam Seals in Mechanical Pipe Sleeves (Inspection Procedure 92701)**

a. Inspection Scope

Background: The deficiency was initially reported to the NRC on December 4, 1981, as NCR WBN CEB 8118 in accordance with 10 CFR 50.55(e). The issue was documented as CDR WBRD 50-391/81-04. The CDR concerned the use of silicon sealants in pipe sleeves at certain locations that could be subjected to pipe movement. The maximum pipe movement at the sleeves could cause a failure of the sealant to perform its intended design function; serving as a pressure, water, and/or fire protection seal. TVA performed an analysis that indicated that pipe movement could result in a failure of the silicone seals. TVA generally concluded that the deficiency resulted from the fact that the piping analyst had not considered the potential for increased pipe stresses and support loads caused by the silicone foam sealant. The cause for this lack of consideration was concluded as being twofold: 1) the drawings indicating the sleeve arrangements had not been checked by the piping analysts and; 2) there was no design criterion or other documentation to address the consideration of the foam sleeve seals, including inadequate procedures to control the analyst's activities. NRC IIR 05000391/20130615 (ADAMS Accession No. ML13310A820) describes additional background information, Unit 1 and Unit 2 corrective actions, and initial NRC inspection of Unit 2 activities to address the historical issues.

Inspection Activities: The inspectors reviewed EDCRs 54431 and 54423, including associated FCR's and drawing revision authorizations (DRAs), and the applicable fire test to verify that the intended work scope for the replacement of the silicone foam seals included properly designed boot seals. The inspectors reviewed TVA drawing series

47W470 and 47W471 to verify penetration sleeve locations. The inspectors walked down seals WBN-2-SLV-304-R2F603 and WBN0SLV 304-A0444BMA to verify that the seals were installed in accordance with the tested configurations and the applicable DRAs. The inspectors reviewed completed WOs, used to install the seals, to verify that appropriate materials were used during installation. The inspectors also reviewed an engineering evaluation justifying the use of a larger size pipe than the approved size in the DRA.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant's engineering complete package and completed work orders, the inspectors concluded that the applicant implemented adequate corrective actions with regard to Construction Deficiency Report 391/82-04. Therefore, this item is considered closed.

**OA.1.6 (Closed) Construction Deficiency Report 391/85-18: Fire Rated Penetration Assemblies Deficiencies (Inspection Procedure 92701)**

a. Inspection Scope

Background: The deficiency was initially reported to the NRC on June 25, 1985, as NCR W-235-P in accordance with 10 CFR 50.55(e). The issue was documented as CDR WBRD 50-390/85-19 for Unit 1 and WBRD 50-391/85-18 for Unit 2. The CDR concerned the breaching of various penetrations in fire rated barriers without proper or adequate ties to the necessary controls and guidance regarding their breaching. TVA concluded that the deficiency resulted from a lack of proper construction procedures that stated the methods for breaching penetrations and replacing fire stop assemblies and the documentation of such activities was also inadequate. This deficiency had the potential to result in a situation where a fire could be allowed to propagate from one compartment to another or facilitate the spread of the products of combustion. This could negatively impact the ability to achieve and maintain the safe shutdown of the plant in the event of a fire. NRC IIR 05000391/20130615 (ADAMS Accession No. ML13310A820) describes additional background information, Unit 1 and Unit 2 corrective actions, and initial NRC inspection of Unit 2 activities to address the historical issues.

For Unit 2, TVA initiated PER 172776 to address the necessary corrective actions. TVA issued ECN 5761 and ECN 5762 to implement the necessary work requirements for the corrective actions. The ECNs are supported by a series of EDCRs that address not only the necessary corrective actions for this specific PER, but a variety of other identified penetration assembly issues. The corrective actions associated with mechanical seal requirements are addressed by EDCR 54423 and EDCR 54431, along with the results of LSWD-1088 and LSWD-1093. TVA issued EDCR-2 59512, using the results of LSWD-482, for the electrical penetration sealing requirements.



Inspection Activities: To address Unit 2 actions, the inspectors performed the following inspection activities. The inspectors walked down the Unit 2 Auxiliary Building to evaluate the adequacy of the fire resistance of penetration seals to ensure that at least one train of safe shutdown equipment would be maintained free of fire damage. Construction detail drawings were reviewed as necessary to verify the penetration seals met the requirements and applicant commitments. The inspectors selected the following risk significant sample of electrical and mechanical penetration seals and observed the installed barrier assemblies and compared the as-built configurations to the approved construction details; supporting fire endurance test data; licensing basis commitments; and standard industry practices.

<u>Component No.</u>	<u>Description</u>	<u>Seal Detail</u>
A1292AMA/B	Mechanical Penetration Seal	XLVII (47)
A0088AMA/B	Mechanical Penetration Seal	XLV (45)
A0091AMA/B	Mechanical Penetration Seal	I (1)
A0404AMA/B	Mechanical Penetration Seal	XLVII (47)
A0406AMA/B	Mechanical Penetration Seal	XXXVII (37)
A0440AMA/B	Mechanical Penetration Seal	XLV (45)
A0463AMA/B	Mechanical Penetration Seal	XXXVIII (38)
A0471CMA/B	Mechanical Penetration Seal	LX (40)
A0671AMA/B	Mechanical Penetration Seal	BOX ANCH
A0617FMA/B	Mechanical Penetration Seal	III (3)
A0781CMA/B	Mechanical Penetration Seal	LXXXIII (83)
A0472BMA/B	Mechanical Penetration Seal	G.L. 86-10
A0432AMA/B	Mechanical Penetration Seal	L (50)
A0094AMA/B	Mechanical Penetration Seal	G.L. 86-10
16680A/B	Electrical Penetration Seal	H-1
16780A/B	Electrical Penetration Seal	H-1
A15520LR	Electrical Penetration Seal	H-1
A16067A	Electrical Penetration Seal	H-1
A2084B	Electrical Penetration Seal	H-1
A2085A	Electrical Penetration Seal	H-1
AC1209A	Electrical Penetration Seal	L-1 (Floor)
AC 1209GA	Electrical Penetration Seal	L-1 (Floor)
A1314KAB	Electrical Penetration Seal	L-2
A1314LAB	Electrical Penetration Seal	L-2
A1458B	Electrical Penetration Seal	P-4
A4351	Electrical Penetration Seal	P-4
A4359J	Electrical Penetration Seal	P-4
A4359K	Electrical Penetration Seal	P-4

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that the reviewed penetration seal activities conformed to the applicable regulatory requirements. No fire protection deficiencies were found within the

selected sampling of electrical and mechanical penetration seals. Construction Deficiency Report 391/85-18 is closed.

**OA.1.7 (Closed) Construction Deficiency Report 391/87-14: Mechanical Sleeve Sealing Deficiencies (Inspection Procedure 92701)**

a. Inspection Scope

Background: Various historical deficiencies were identified involving the sleeve-sealing program for seismic Category I structures at WBN. The deficiencies included the following: a lack of adequate documentation of seal materials; incorrect translation of test models into the design details; and design drawing errors. As a result of these historical deficiencies, TVA could not demonstrate the ability of the sleeve seals in Category I structures to perform their intended safety function.

For Unit 1, TVA issued design criteria WB-DC-40-66, "Penetration Assemblies and Seals for Category I Structures," and walked down piping sleeves in Category I structures to evaluate the condition of the seals. In addition, TVA conducted tests to determine the capabilities and limits of the sleeve-seal materials of the seal configurations installed. TVA updated the engineering drawings to reflect the as-built conditions. The NRC closed the construction deficiency for Unit 1 in IR 50-390/95-39 and 50-391/95-39 (ADAMS Accession No. ML072680875.)

For Unit 2, TVA initiated PER 143783 to address the necessary corrective actions. TVA issued EDCR 54423 and EDCR 54431, along with the results of limited scope walk downs 1093 and 1088 to identify the condition of existing seals and provide the work scope for the mechanical seal configuration.

Inspection Activities: To address Unit 2 actions the inspectors performed the following inspection activities. The inspectors walked down the Unit 2 Auxiliary Building to evaluate the adequacy of the penetration seals and to ensure the construction detail drawings met the requirements and applicant's commitments. The inspectors selected a risk significant sample of penetration seals and observed the installed barrier assemblies and compared the as-built configurations to the approved construction details; supporting fire endurance test data, as applicable; licensing basis commitments; and standard industry practices.

Documents reviewed are in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The mechanical seal corrective actions were in progress during the inspection and not all of the as-built configurations for the mechanical seals were complete. However, the inspectors concluded that the reviewed penetration seal activities conformed to the applicable regulatory requirements and design controls, and that the corrective actions were in place to complete the remaining construction activities. Construction Deficiency Report 391/87-14 is closed.

**OA.1.8 (Closed) Construction Deficiency Report 391/87-15: Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification (Inspection Procedure 35007)**

a. Inspection Scope

Background: The deficiency was initially reported to the NRC on June 22, 1987, in accordance with 10 CFR 50.55(e) as Significant Condition Reports (SCRs) WBP 8777 and WBPP 8790. The issue was documented as CDR 390/87-14 for Unit 1 and CDR 391/87-15 for Unit 2. The CDR concerned the heating, ventilating, and air conditioning (HVAC) ducts associated with the containment purge air system. The bellows expansion joints that were initially installed adjacent to the duct penetrations in the 3-hour fire-rated shield building wall had no fire resistive rating, and there were no fire dampers installed at the duct penetrations. NRC IIR 05000391/20140607 (ADAMS Accession No. ML14274A076) describes additional background information, Unit 1 and Unit 2 corrective actions, and initial NRC inspection of Unit 2 activities to address the historical issues.

Inspection Activities: The inspectors performed walkdowns, and reviewed design specifications, fire test data and/or fire rating certifications to verify that selected fire dampers were installed in the auxiliary building HVAC duct floor penetrations per DCN 35361 and EDCR 52849 Rev. A (Work Scope No. 3.) The inspectors also verified that fire compartmentation drawings, 2-47W240 series, were updated to show regulatory required fire barriers.

The inspectors reviewed EDCR 54923 Rev A. (Work Scope No. 38) to verify the installation of fire wrap on three HVAC exhaust duct bellow expansion joints. The inspectors performed a walkdown on a sample fire wrap on a section of HVAC ductwork located in room 713.9-A19 to verify that the wrap was installed in accordance with DCA 64512-12. The inspectors also reviewed Calculation EPM-RA-032795, "Appendix R-Evaluation of Duct Opening Protection in Fire Rated Walls," Rev. 4 to verify that fire wrap used to protect the bellow expansion joints were rated for three hour fire resistance.

The inspectors reviewed associated WOs, DRAs, and on a sampling basis performed field verification of installed Unit 2 flexible connectors to verify that flexible connectors met the required environmental qualifications. The reviewed activities were performed per EDCR 52861 (Work Scope No. 1) and EDCR 52953 (Work Scope No. 2.) Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. However, the applicant stated that DCN 64512 removed the installed fire wrap because the installed joints needed to be replaced with joints that could withstand the external pressure due to a flood elevation of approximately 15-feet over the top of the bellows. At the time of the inspection, the final work related with replacing the joints and installing the new fire wrap had not been completed; however, the applicant's actions to address the previous fire wrap design issues were adequately addressed.

c. Conclusions

Based on a review of the applicant's engineering complete and partial closure packages, the inspectors concluded that the applicant has proposed or implemented adequate corrective actions with regard to this fire protection issue. Therefore, CDR 391/87-15 is considered closed.

**OA.1.9 (Closed) NRC Bulletin 79-24: Frozen Lines (Inspection Procedure 92717)**

a. Inspection Scope

Background: This issue resulted from an industry event involving freezing of a common High Pressure Coolant Injection recirculation line in early 1979. The applicant evaluated all lines for the need for freeze protection to address this NRC Bulletin (BL). The applicant's review for the BL identified a full flow test line from the containment spray pumps where it joins the refueling water storage tank. The applicant initiated EDCR 57933 for the susceptible instruments and initiated FCR 59253. This item was previously discussed in Section OA.1.1 of IIR 05000391/2012605 (ADAMS Accession No. ML 12220A536).

Inspection Activities: The inspectors performed field walkdowns of heat tracing associated with RWST level transmitters 2-LT-63-50 and 2-LT-63-51 and containment spray recirculation piping installed under at WO 116943583 and FCR 57933 to verify that the subject piping and instruments had been heat traced in a manner that would resolve the original concern. Additionally, the inspectors reviewed the drawings to ensure that the heat tracing was installed as prescribed.

Documents reviewed are in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors determined that the applicant has taken steps to adequately address the concerns identified by BL 79-24. This item is closed.

**OA.1.10 (Closed) Generic Letter 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Temporary Instruction 2515/111; Electrical Distribution System Follow-up Inspection)**

a. Inspection Scope

Background: The purpose for NRC Generic Letter (GL) 2006-02, was to determine if compliance is being maintained with NRC regulatory requirements governing electric power sources and associated personnel training for nuclear power plants. The NRC issued this GL to obtain information from its licensees in four areas:

- (1) Use of protocols between the nuclear power plant (NPP) and the transmission system operator (TSO), independent system operator (ISO), or reliability coordinator/authority (RC/RA) and the use of transmission load flow analysis tools by TSOs to assist NPPs in monitoring grid conditions to determine the operability of offsite power systems under plant TSs. (The TSO, ISO, or RA/RC is responsible for preserving the reliability of the local transmission system. In this GL the term TSO is used to denote these entities);
- (2) use of NPP/TSO protocols and analysis tools by TSOs to assist NPPs in monitoring grid conditions for consideration in maintenance risk assessments;
- (3) offsite power restoration procedures in accordance with Section 2 of NRC RG 1.155, "Station Blackout;" and
- (4) losses of offsite power caused by grid failures at a frequency equal to or greater than once in 20 site years in accordance with RG 1.155

The NRC completed a safety evaluation (ADAMS Accession No. ML100080768) of TVA's response to GL 2006-02 for unit 2. The safety evaluation report (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.

The inspectors reviewed several calculations and documentation associated with electrical distribution system voltages for dual unit operations, with followup conference calls with responsible staff from the electrical design group to address required clarifications. Included in the reviews were the applicant's documentation to verify system design, SAR commitments, and closure package PP19-2 information. Previous inspection reports addressing this GL are IIR 05000391/2015604, Section OA.1.6 (ADAMS Accession No. ML15181A446) and IIR 05000391/2014608, Section OA.1.5 (ADAMS Accession No. ML14322A182).

Inspection Activities: The inspectors reviewed the closure package for GL 2006-02 (T02 150617 002) including a summary of commitments covered under the updated FSAR and discussed with responsible individuals the responses to requests for additional information. The documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified.

c. Conclusion

The inspectors concluded that the two-unit baseline electrical calculations and implementing procedures provided for maintaining grid reliability during two-unit operations were addressed adequately. This item associated with GL 2006-02 is closed.

**OA.1.11 (Discussed) Supplemental Safety Evaluation Report, Appendix HH – Open Item 1, Power Assisted Cable Pulls (Temporary Instruction 2512/016)**

a. Inspection Scope

The inspectors reviewed documentation to verify that the power assisted cable pulls associated with cables 2V3000B, 2V4231B, 2V2980A, 2V4230A, and the emergency diesel generators had proper controls to ensure they were not damaged during installation. The inspectors reviewed the WOs that installed the cables and the associated design specifications that provided the controls to prevent damage to the cables.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the results of this inspection and past inspections on this activity, adequate controls were in place during the reviewed cable pulling activities. Open Item 1 of Appendix HH will remain open until it is closed in a Supplemental Safety Evaluation Report.

**OA.1.12 (Closed) Electrical Issues Corrective Action Program - Sub-issue: Cable Separation and Electrical Isolation (Temporary Instruction 2512/020)**

a. Inspection Scope

Background: The bases for the raceway separation requirements for Watts Bar Nuclear Plant are contained in Watts Bar Design Criteria, WB-DC-30-4, "Separation /Isolation". The Electrical Issues CAP was initiated based on various employee concerns, conditions adverse to quality (CAQ) documents, and NRC findings related to electrical installation, materials, and equipment. As part of the Electrical Issues CAP, the applicant determined that examples of redundant divisions of enclosed raceways existed with less than the minimum required 1-inch separation.

Previous NRC inspection activities associated with this Electrical Issues CAP sub-issue are documented in IIR 05000391/2011602 – Section OA.1.5 (ADAMS Accession No. ML110800483), IIR 05000391/2011608 – Section OA.1.8 (ADAMS Accession No. ML11311A082), IIR 05000391/2013604 – Section OA.1.29 (ADAMS Accession No. ML13179A079), and IIR 05000391/2014605 – Section OA.1.2 (ADAMS Accession No. ML14226A049). During these inspections, NRC inspectors gathered a limited number of samples demonstrating adequate separation internal to control panels and between raceways containing redundant divisions of Class 1E circuits covered under EDCR 55125. The inspection reports listed above dealt primarily with the separation between redundant divisions of conduits and cable trays only. The separation between cables and wiring inside electrical panels and junction boxes is address under a different inspection scope included within EDCR 55127 and was pending completion.

Inspection Activities: The inspectors conducted walk-downs of the separation between pairs of conduit containing redundant divisions to verify that reworked conduits were properly installed in relation to separation between redundant divisions of Class 1E

raceways. The inspectors reviewed WOs to verify that documented work activities ensured compliance with separation requirements.

The inspectors observed the separation provided for the following raceway pairs:

- Conduit 2VC633B / Trays 4A2046/2047 and 3A2059/2060
- Conduit 2VC524A / Conduit 2VC0495B
- Conduit 2PLC1291A / Conduits 2VC537B and 2VC538B
- Conduit 2PM7276A / Conduits 2PM7277B and 2SG0676S
- Conduit 2SG701B / Conduit 2SG716S
- Conduit 2VC0536A / Conduit 2VC0538B
- Conduit 2PM7215E / Conduit 2PM6363F
- Conduit 2G1600A / Conduit 2PS688E
- Conduit 2SG0599A / Conduit 2G1602B
- Conduit 2VC2307B / Conduit 2RM293A
- Conduit 2PM6475D / Trays 5B2053 and 4B2054
- Conduit 2PM7215E / Conduits 2PM7214D and 2PM7260D
- Conduit 2PM6481A / Junction Box 0-JB-292-6162B
- Conduit 2B01049F / Conduit 2PLC3681A
- Conduit 2PP2769A / Conduit 2PV816F
- Conduit 2PV825E / Conduits 2PV830F, 2PM6220F, and 2PV833G

The inspectors reviewed WOs and Integrated Cable & Raceway Design System (ICRDS) reports for all the conduits listed above to assess implementation of isolation methods employed.

Documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified.

c. Conclusion

The inspectors concluded that the observations of completed work to date demonstrate that physical separation and electrical isolation between redundant raceway systems covered under EDCR 55125 were adequate. Based on this conclusion, and aforementioned inspection activities, the Electrical Issues CAP, Sub-issue: Cable Separation and Electrical isolation, is closed.

**OA.1.13 (Closed) Electrical Issues Corrective Action Program - Sub-issue: Cable Separation and Electrical Isolation (Temporary Instruction 2512/020)**

a. Inspection Scope

Background: The sub-issue was established as a result of various employee concerns, reports of conditions adverse to quality, and NRC findings related to electrical

installations, materials, and equipment. In this instance, the acceptance criteria established by the applicant in drawing 45W3000-1, "Cable/Wiring Separation Requirements Notes," Rev. 2 required wiring within control boards, panels, relay racks, switchgear, junction boxes, and other enclosures be provided six inches of free air space minimum between redundant divisions of Class 1E cable. The bases for cable separation requirements for Watts Bar Nuclear Plant are contained in drawing 2-45W2640, "Wiring Diagram Control Boards Critical Wiring Braid Installation," Rev. 6, , and DRA 45W3000-1, "EDCR 55127-A, page 134," Rev. 1,.

Previous NRC IIR 05000391/2014605, Section OA.1.2 (ADAMS Accession No. ML14226A049), included a limited number of samples demonstrating separation internal to control panels and between raceways containing redundant divisions of Class 1E circuits covered under EDCR 55127.

Inspection Activities: The inspectors performed equipment walkdowns to inspect cable separation integrity inside selected panels in the main control room and in the auxiliary control room. The inspectors reviewed design criteria documents to verify that observed conditions complied with separation requirements. The inspectors reviewed Work Order 117023447, "CRDR EDCR 54631 SYS 043 030 030L 278 2-PNL-278-M010 Temp Monitoring," dated July 29, 2015, for cutting cables inside M-Panel and relabeling with abandon number 2ABN5051B, 2ABN5045B, and 2ABN5046B.

The inspectors observed the separation provided for the following panels:

- Panel 2-PNL-278-M6
- Panel 2-PNL-278-M3
- Panel 2-PNL-278-L10
- Panel 2-PNL-278-M10
- Panel 2-PNL-278-M15
- Panel 2-PNL-278-M4
- Panel 2-PNL-278-M5
- Panel 2-PNL-278-M9
- Panel 2-PNL-90-M31.

b. Observations and findings:

No findings were identified.

c. Conclusion:

The inspectors concluded that the observations of completed work to date demonstrated that physical separation and electrical isolation between wiring systems covered under EDCR 55127 were adequately addressed. Based on this, and the aforementioned inspection activities, the Electrical Issues CAP, Sub-issue: Cable Separation and Electrical Isolation, is closed.

**OA.1.14 (Closed) Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22 (Temporary Instruction 2515/120)**



a. Inspection Scope

Background: TI 2515/120 was previously inspected and discussed in IIR 05000391/2013609 (ADAMS Accession No. ML13353A599), IIR 05000391/2010603 (ADAMS Accession No. ML102170465), and IIR 05000391/2014614 (ADAMS Accession No. ML14363A315). Background details are discussed in those reports.

Inspection Activities: Previous inspection results documented the verification through inspection of the adequacy of applicant programs, procedures, training, equipment and systems, and supporting documentation for implementing the station blackout (SBO) rule.

During this inspection period, the inspectors reviewed documentation and test results for the modification to supply backup nitrogen to the AFW level control valves and steam generator PORVs required to meet the SBO coping duration. As noted in section P.1.7 of this inspection report, the inspectors witnessed testing of 2-PTI-003B-04, Sections 6.15 and 6.16, which covered AFW level control valves 2-LCV-3-173 and 2-LCV-3-172. The inspectors also performed a cursory review of test data results for 2-LCV-3-174 and 2-LCV-3-175 to verify that the AFW level control valves had been appropriately tested and controlled from backup nitrogen stations.

Additionally, the inspectors reviewed the SBO abnormal operating procedure, AOI-40, to verify that updates to the SBO coping evaluation had been incorporated into plant procedures.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The applicant's actions taken to meet the requirements of the SBO rule are acceptable. TI 2515/120 is closed.

**OA.1.15 (Closed) Inspection of the Proposed Interim Actions Associated with Near-Term Task Force Recommendation 2.1: Flooding Hazard Evaluations (Temporary Instruction 2515/190)**

a. Inspection Scope

The inspectors independently verified that the licensee's proposed interim actions would perform their intended function for flooding mitigation. The inspectors conducted an independent verification to confirm the following:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant.
- External visual inspection for indications of degradation that would prevent its credited function from being performed.
- Reasonable simulation, if applicable to the site

- Flood protection feature functionality was determined using both visual observation and review of other documents.
- The procedures or activities can be executed as specified/written, and within available time, if time-dependent.
- Water levels and associated effects, and severe weather conditions would not impair support functions and would not impede performing necessary interim actions.
- Equipment availability or staffing issues would not prevent implementation of the interim actions.

The inspectors verified that issues identified were entered into the licensee's corrective action program.

b. Observations and Findings

No findings were identified.

c. Conclusions

These activities constituted the completion of TI 2515/190, Inspection of the Proposed Interim Actions Associated with Near-Term Task Force Recommendation 2.1 Flooding Hazard Evaluations. This inspection effort is also documented in Section 4OA5 of IIR 05000390/2015003 for Unit 1.

**OA.1.16 (Closed) Review of Actions for EA-14-179 Associated with Failure to Follow Site Procedure for Installation of Anchor Bolts (Inspection Procedure 92702)**

a. Inspection Scope

The inspectors reviewed the applicant's response to Severity Level (SL) III Violation (VIO) 05000391/2015614-01 (EA-14-179) described in NRC IIR 05000391/2015614 and Investigation Report 2-2013-011 (ADAMS Accession No. ML 15097A307). The SL III Violation was associated with contract employees willfully violating 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings;" for failing to remove and replace, or obtain site engineering approval, for newly installed wedge bolt anchors that exceeded 5 degrees of perpendicular as required by TVA Procedure MAI-5.1B.

The inspectors reviewed the applicant's apparent cause evaluation (ACE) and associated PER, verified that all corrective actions to prevent recurrence (CAPR) were completed, and reviewed associated effectiveness reviews. Corrective actions that were verified included: the revision of site and fleet procedures to either clarify or enhance the requirement of 10 CFR 50.9, and training for staff regarding 10 CFR 50.9 and anchor bolt installation. The applicant's ACE noted that reinforcing steel (rebar) had been cut or nicked at various locations during the installation of the anchor bolts without notifying engineering or obtaining an evaluation. Corrective actions were generated that included training on anchor bolt installation and revising procedures to require concrete to be scanned for rebar prior to drilling for anchor bolt installation. The inspectors reviewed the training and procedure revisions to verify that they were accomplished and adequate. The inspectors also reviewed the engineering evaluations performed to verify the structural adequacy of the structure with the cut or nicked rebar. In addition, the

inspectors sampled new WOs to verify that the requirement for scanning concrete structures for rebar prior to drilling for anchor bolt installation was incorporated.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant's causal analysis and corrective actions for EA-14-179 were adequate, fully implemented, and compliance with the associated regulatory requirements has been restored. Violation 05000391/2015614-01 is closed.

**OA.1.17 NRC Office of Investigation Report 2-2013-017**

a. Inspection Scope

The inspectors reviewed the NRC Office of Investigations (OI) Report 2-2013-017, which was related to removal of a quality control (QC) rejection sheet from a quality-related work order.

b. Observations and Findings

Introduction: On May 25, 2015, the OI completed an investigation to determine whether on or about August 30, 2011, Bechtel employees, while working at WBN Unit 2, failed to maintain complete and accurate information by deliberately removing a QC data sheet from a quality-related work order. The OI investigation concluded that one former Bechtel field engineer, at WBN Unit 2, deliberately violated 10 CFR 50.9(a), "Completeness and accuracy of information," by removing a QC data sheet, containing a QC rejection, from a quality-related work order.

Description: On December 18, 2012, the TVA Office of the Inspector General (OIG) advised the NRC that potential NRC violations existed involving missing QC data. Specifically, a Bechtel field engineer had removed a QC data sheet containing a QC reject associated with anchor bolts in a quality-related work order.

On August 26, 2011, a Bechtel QC inspector identified a bent anchor bolt on a base plate for reactor coolant drain tank pump 6. Reactor coolant drain tank pump 6 is a quality-related (Seismic Category I(L)) component. On August 29, 2011, the QC inspector noticed the anchor bolt had been straightened and there was no documentation to support the repair/straightening. The QC inspector entered a QC rejection on a data sheet within the quality-related pump grouting work package, for the anchor bolt being straightened without documentation. On August 31, 2011, the QC inspector was notified that pump 6 had been grouted by the night shift. Upon inspection of the work package, it was noted that the QC rejection sheet had been removed from the work package. Because the night shift QC inspector had no knowledge of the improperly repaired anchor bolt which was documented in the missing QC data sheet, he approved commencement of the pump 6 grouting activities.

The QC inspector who originally created the QC rejection documentation initiated PER 428905 to document the removal of the QC rejection sheet; this was classified as an A Level PER. Additionally PER 432288 was subsequently created to disposition the nonconforming anchor bolt. The final anchor bolt disposition was "Use-As-Is." TVA's OIG opened an investigation relative to the actions of the Bechtel employee/s on September 11, 2011. On December 18, 2012, the TVA OIG advised NRC OI that TVA officials had indicated that there were potential NRC violations associated with the missing data sheet. On January 31, 2013, NRC OI opened an investigation as to whether a former Bechtel field engineer and former Bechtel superintendent willfully provided incomplete and inaccurate information by virtue of removing a data sheet, which indicated a QC rejection, from a quality-related work package at WBN Unit 2.

On May 26, 2015, NRC OI completed their investigation. The OI substantiated that a former field engineer employed by Bechtel, deliberately provided incomplete and inaccurate information by virtue of removing a data sheet with a QC rejection from a work package at WBN Unit 2. The OI did not substantiate that a former superintendent employed by Bechtel willfully provided incomplete and inaccurate information by virtue of removing a data sheet with a QC rejection from a work package at the WBN Unit 2.

The inspectors determined that the failure to maintain complete and accurate information for quality-related work following 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 involved willfulness. 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, section 50.9(a), Completeness and accuracy of information states, "Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects."

The Watts Bar Nuclear FSAR, Revision 113, Table 3.2-3, classifies the reactor coolant drain tank pumps as Seismic Category I(L) components.

TVA's Nuclear Quality Assurance Plan, Revision 31, Appendix C, section 4.0, paragraph B, states, in part, that those components or systems designated as Seismic Category I(L) in nuclear plant FSARs shall be classified as quality-related. Section 6.3.2.A requires that, "Sufficient records and documentation shall be prepared and maintained to provide evidence of the quality of items affecting quality. QA records shall be legible, complete, and identifiable to the item involved."

Contrary to the above, on or about August 30, 2011, the licensee failed to maintain complete and accurate quality-related work order documents covered by the TVA and Bechtel QA programs in all material respects. Specifically, a contract employee deliberately removed a QC data sheet, which contained a valid QC rejection for a damaged anchor bolt, from WO 10-951093-000, which provided steps for grouting of the reactor coolant drain tank (RCDT) pump WBN-2-PMP-077-0006 base plate, essential for the seismic qualification of the RCDT pump. A new, blank QC data sheet was substituted for the data sheet that contained the QC rejection to allow grouting work to

be completed without site engineering approval of the damaged anchor bolt. This caused the quality-related WO documentation to be incomplete and inaccurate in that the actual physical condition and properties of the anchor bolt, which is required information for Seismic Category I(L) calculations, were no longer represented in the WO. This documentation is material to the NRC in that it provides the basis for compliance with seismic and construction-related QA procedures and regulatory requirements.

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 field engineer were willful. In reaching this conclusion, the NRC noted that during transcribed interviews with NRC's OI representatives, the individual involved was trained in the requirements of quality-related documentation and did not lack an understanding or knowledge of the requirements. The involved individual acted deliberately when violating the requirements of 10 CFR 50.9(a).

In consideration of the fact that the individual was a field engineer 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 there was at least one other example of deliberate misconduct associated with anchor bolts in the late 2011 timeframe, this violation was not considered to be the result of an isolated action of one employee; therefore the non-cited violation criteria of paragraph 2.3.2.a.4.(c) was not satisfied, such that this violation will be cited.

This is identified as violation (VIO) 05000391/2015607-02, Failure to Maintain Complete and Accurate Information for Anchor Bolt Installation.

c. Conclusions

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

**OA.1.18 (Closed) Generic Letter 89-19, Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants**

a. Inspection Scope

Background: In 1989, the NRC issued GL 89-19 (ADAMS Accession No. ML 8909070029) requesting action to resolve Safety Issue A-47, Safety Implications of Control Systems in Light Water Reactor (LWR) Nuclear Power Plants pursuant to 10 CFR 50.54(f). The NRC concluded that protection should be provided for certain control system failures and that selected emergency procedures should be modified to assure that plant transients, resulting from control system failures, do not compromise public safety.

Watts Bar is considered a Group 1 plant, as defined in GL 89-19, because one of the three level transmitters is an isolated output to the steam generator level control system located in a cabinet separate from the protection circuit. The NRC has concluded that the overfill protection system for Group 1 plants is satisfied by providing adequate protection which includes demonstrating the evaluation of common mode failures due to

fire. TVA issued a framework letter dated January 29, 2008 (ADAMS Accession No. ML080320443), indicating when they performed the evaluation of common mode failures due to fire.

Previous NRC inspection activities that addressed aspects of this item can be found in IIR 05000391/2013607 (ADAMS Accession No. ML13273A512), IIR 05000391/2013608 (ADAMS Accession No. ML 13316A776), and IIR 05000391/2014605 (Adams Accession No. ML14226A049).

Inspection Activities: The team verified that the licensee adequately assessed the capability of Watts Bar Units 1 and 2 to mitigate, or to cope, with a postulated steam generator overfill condition during an Appendix R fire event. The team interviewed licensee personnel; reviewed fire safe shutdown (FSSD) calculations that determined the minimum required operator action times to mitigate fire damage that causes a potential SG overfill condition; reviewed a sample of FSSD procedures to verify the adequacy of procedural guidance that implemented the operator manual actions (OMAs); and performed walk-throughs of applicable FSSD procedural steps to verify the feasibility and reliability of operators to complete the required actions in a timely manner.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The team determined that the licensee adequately assessed steam generator overfill vulnerabilities during postulated Appendix R fire events; and that the licensee adequately implemented FSSD procedural steps to mitigate the potential for the main feedwater and auxiliary feedwater systems to overfill SGs during Appendix R fire events.

## **V. MANAGEMENT MEETINGS**

### **X1 Exit Meeting Summary**

An exit meeting was conducted on September 3, 2015, to present inspection results to Paul Simmons and other members of the staff. The inspectors identified that no proprietary information had been received during the inspection and none would be used in the inspection report. The staff acknowledged the observations and provided no dissenting comments.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Applicant personnel

A. Bangalore, Bechtel - Electrical Engineer  
D Beckley, Bechtel - Engineering  
C. Boudreaux, TVA - Startup Testing Engineer  
J. Boykin, TVA - QC  
B. Briddy, TVA  
C. Brush, Appendix R Consultant  
J. Bushnell, TVA - Licensing  
J. Calle, TVA – Dual Unit Transition Manager  
M. Casner, TVA - Engineer  
D. Charlton, TVA – Regulatory Compliance  
T. Cheek, TVA – CAP Manager  
E. Cobey, TVA - Licensing  
M. Cooper, Unit 2 Project Director  
R. Cox, TVA - Electrical and I&C Design Manager  
B. Crouch, TVA - Engineering  
R. Enis, TVA - Engineering  
S. Gill, Bechtel - Plant Design  
E. Haston, TVA – Fire Protection Design Engineer  
S. Hilmes, TVA - Electrical Engineering  
M. Marinac, TVA - Operations  
K. McCormack, TVA - Startup Testing Engineer  
R. Mcnutt, Bechtel – Task Manager  
A. Melda, TVA – Unit 2 Executive Director  
T. Morgan, TVA - Licensing  
D. Myers, TVA - Senior QA Manager  
J. O'Dell, TVA - Regulatory Compliance  
B. Patel, Bechtel - Plant Design  
G. Peterson, Bechtel - Electrical Engineer  
L. Peterson, TVA - WBN2 Site Support Manager  
R. Profitt, TVA - Licensing Specialist  
T. Raley, Project Engineering Manager  
J. Ricks, TVA – Electrical Design  
M. Ring, TVA - Licensing  
J. Riste, TVA – Licensing  
J. Robertson, Bechtel - Project Director  
G. Scott, TVA – Licensing  
D. Shutt, TVA - Licensing  
P. Simmons, TVA – Vice President  
M. Skaggs, TVA – Senior Vice President  
B. Sprinkle, TVA - Operations Supervisor  
J. Sterchi, TVA - Fire Marshall  
J. Stewart, Bechtel – Civil Superintendent  
D. Wade, TVA – Engineering  
T. Wallace, WBN2 Senior Manager Operations Unit 2 Construction  
K. Walsh, TVA - Site Vice President  
T. Washburn, TVA - Engineering  
N. Welch, TVA – Startup Testing Manager

R. Wiggall, Engineering Supervisor  
T. Womack, TVA - Corporate Engineering  
N. Young, Bechtel - Plant Design



### INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction and Pre-Construction Activities
IP 35501	QA for the Startup Test Program
IP 37301	Comparison of As-Built Plant to FSAR Description
IP 46053	Structural Concrete Work Observation
IP 50053	Reactor Vessel and Internals Work Observation
IP 52053	Instrument Components and Systems – Work Observation
IP 52055	Instrument Components and Systems – Record Review
IP 64704	Fire Protection Program
IP 70304	Engineered Safety Features Test Preoperational Test Procedure Review
IP 70306B	Loss of Offsite Power Test Preoperational Test Procedure Review
IP 70311	Preoperational Testing Procedure Verification
IP 70312	Preoperational Test Witnessing
IP 70314	HFT Witnessing
IP 70337	Main Stream Isolation Valve Test - Preoperational Test Procedure Review
IP 70370	Testing Piping Support and Restraint Systems
IP 70433	Chemical Control System Test - Preoperational Test Witnessing
IP 70436	Residual / Decay Heat Removal System Test - Preoperational Test Witnessing
IP 70438	Auxiliary Feedwater System Test – Preoperational Test Witnessing
IP 71111.07	Heat Sink Performance
IP 71301	Startup Test Results Evaluation
IP 71302	Preoperational Test Program Implementation Verification
IP 72400	Overall Startup Test Program
IP 92701	Followup
IP 92702	Followup on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders
IP 92717	IE Bulletins for Information and IE Information Notice Followup
TI 2512/016	Inspection of Watts Bar Nuclear Plant – Electrical Issues Corrective Action Program Plan
TI 2512/020	Inspection of Watts Bar Nuclear Plant – Electrical Issues Corrective Action Program Plan
TI 2515/111	Inspection of Watts Bar Nuclear Plant – Electrical Distribution System Followup Inspection
TI 2515/114	Inspection Requirements for Generic Letter 89-04, Acceptable Inservice Testing Programs
TI 2515/190	Inspection of Licensee's Proposed Interim Actions as a Result of the Near-Term Task Force Recommendation 2.1 Flooding Evaluation

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000391/2015607-02	VIO	Failure to Maintain Complete and Accurate Information for Anchor Bolt Instillation (Section OA.1.17)
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### Opened and Closed

05000391/2015607-01	CIF	Failure to Comply with Conduct of Maintenance – Expectations and Standards (Section C.1.1)
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### Closed

52055	IP	Instrument Components and Systems – Records Review (Section C.1.4)
71111.07	IP	Heat Sink Performance (Section C.1.5)
70304 70306	IP IP	Engineered Safety Features and Loss of Offsite Power Test - Preoperational Test Procedure Review (Section P.1.4)
70314	IP	HFT Witnessing (Section P.1.5)
70311	IP	Preoperational Test Procedure Verification (Section P.1.15)
391/82-04	CDR	Foam Seals in Mechanical Pipe Sleeves (Section OA.1.5)
391/85-18	CDR	Fire Rated Penetration Assemblies Deficiencies (Section OA.1.6)
391/87-14	CDR	Deficient Mechanical Sleeve Sealing Deficiencies (Section OA.1.7)
391/87-15	CDR	Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification (Section OA.1.8)
79-24	BL	Frozen Lines (Section OA.1.9)
2006-02	GL	Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Section OA.1.10)
2512/020	TI	Electrical Issues CAP Sub-Issue: Cable Separation and Electrical Isolation (Section OA.1.12)
2512/020	TI	Electrical Issues CAP Sub-Issue: Cable Separation and Electrical Isolation (Section OA.1.13)

2515/120	TI	Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22 (Section OA.1.14)
2515/190	TI	Inspection of the Proposed Interim Actions Associated with Near-Term Task Force Recommendation 2.1 Flooding Hazard Evaluations (Section OA.1.15)
05000391/2015614-01	VIO	Failure to Follow Site Procedure for Installation of Anchor Bolts (Section OA.1.16)
89-19	GL	Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants (Section OA.1.18)
<u>Discussed</u>		
89-04	GL	Guidance on Developing Acceptable In-Service Testing Programs (Section OA.1.1)
2512/XX	TI	Final Corrective Action Program/ Special Program Inspection (Section OA.1.2)
391/86-11	CDR	Thermal Expansion of Liquid Sample Piping (Section OA.1.3)
2012-01	BL	Design Vulnerability in Electrical Power System (Section OA.1.4)
Item 1	SSER Appendix HH	Power Assisted Cable Pulls (Section OA.1.11)

## LIST OF DOCUMENTS REVIEWED

### II. MANAGEMENT OVERSIGHT AND CONTROLS

#### C.1 Construction Activities

##### C.1.4 Instrument Components and Systems – Records Review

###### EDCRs

EDCR 52356, Component wiring mods to Aux Control Room Panel 2-L-11A  
 EDCR 52709, Replace Foxboro equipment with Eagle 21 Rack 1-13 & 28  
 EDCR 53597, Install/inspect instrument lines and instruments for 2-L-136  
 EDCR 53919, Modify, inspect, and/or install sample lines to process/root valves of containment sump and Rx Coolant Hot Legs 1&3  
 EDCR 54070, Replace RTDs for 2-TE-72-6 and 2-TE-72-31 and add annunciator inputs for 2-FCV-72-44-A and 2-FCV-72-45-B.

###### Audits

WBN QA Observation 73041, Calibration for pressure transmitter Steam Generator 2 pressure Loop WBN-2-LPP-003-0050, 4/21/2015  
 WBN QA Oversight Report for January – March 2015 – NC-WB-15-007, 4/30/2015  
 WBN Unit 2 Construction Completion Project Quality Surveillance Report 25402-WBN-SR-10-1091 Installed Instrument transmitters, 6/19/2010  
 WBN QA Assessment Report – EDCR 52419, Installation of Containment sump Level transmitters - NGDC-WB-10-001, 2/17/2010

##### C.1.5 Heat Sink Performance

###### Procedures

2-TI-79.701, Component Cooling System Heat Exchanger B Performance Test, Rev. 0

###### Calculations

CN-SEE-III-19, Westinghouse Calculation Watts Bar Unit 1 Revised Net Input Factor for Increased Letdown Flow Rate, dated Oct. 2007  
 EPM-JN-010890, Performance of CCS Heat Exchangers, Rev. 12, dated 12/2009  
 PCWG-14-14, Watts Bar Unit 2 Replacement Steam Generator Nuclear Steam Supply System Performance Capability Parameters, Rev. 0, dated 5/18/15

###### Work Orders

114389285, Flowmeter for ERCW Flow to CCS Heat Exchanger A, 3/2014

## Problem Evaluation Reports

786866, Flush Plans for Unit 2 CCS May Not Meet Regulatory Requirements

### **P.1 Preoperational Activities**

#### **P.1.3 Comparison of As-Built Plant to FSAR Description**

##### Licensing Documents:

Watts Bar Unit 2 Technical Specifications (Developmental)  
 Watts Bar Unit 2 Technical Specifications Bases Document (Developmental)  
 Final Safety Analysis Report (FSAR)

##### Drawings:

2-45W760-3-6, Wiring Diagram, Main & Aux Feedwater System, Schematic Diagrams, Rev. 8  
 2-45W760-3-7, Wiring Diagram, Main & Aux Feedwater System, Schematic Diagrams, Rev. 8  
 2-47W610-2-3, Electrical Control Diagram, Condensate System, Rev. 13  
 2-47W610-3-3, Electrical Control Diagram, Aux Feedwater System, Rev. 12  
 2-47W611-2-1, Electrical Logic Diagram, Condensate System, Rev. 9  
 2-47W611-3-1, Electrical Logic Diagram, Feedwater Pump Turbine Auxiliaries, Rev. 9  
 2-47W611-3-2, Electrical Logic Diagrams, Feedwater System, Rev. 13  
 2-47W611-3-3, Electrical Logic Diagram, Auxiliary Feedwater System, Rev. 8  
 2-47W611-3-6, Electrical Logic Diagram, Feedwater System, Rev. 7  
 2-47W611-99-4, Electrical Logic Diagram, Reactor Protection System, Rev. 3  
 2-47W611-99-6, Electrical Logic Diagram, Reactor Protection System, Rev. 7  
 2-47W803-1, Flow Diagram, Feedwater, Rev. 31  
 2-47W804-1, Flow Diagram, Condensate, Rev. 22

#### **P.1.4 Watts Bar Nuclear Plant Unit 2 Integrated Safeguards Test Preoperational Test Procedure Review**

##### Miscellaneous

1-15E500-2, Rev. 52, "Key Diagram Station Auxiliary Power System"  
 2-54114-1-7246D11-56, Rev. 0, "Electrical Solid State Protection System Interconnection Diagram"  
 2-PTI-001-01, Rev. 1, "Main Steam Isolation Valves and Bypass Isolation Valves"  
 2-PTI-099-04, Rev. 1, "Safeguards System"  
 2-PTI-072-01, Rev.1, "Containment Spray Pump Valve Logic Test," dated 4/18/2015  
 2-PTI-262-01, Rev. 0, "Train 2A Unit 2 Integrated Safeguards Test," dated 6/24/2015  
 2-TSD-063-1, Rev. 3, "Integrated ESFAS System Test," dated 5/22/2015  
 2-TSD-262-1, Rev. 1, "Test Scoping Document, Integrated Safeguards Test Train A," dated 5/15/2015

### **SU.1 Startup Testing Activities**

#### **SU.1.1 Quality Assurance for the Startup Test Program (Inspection Procedure 35501)**

Miscellaneous

TVA-NQA-PLN89-A, TVA Nuclear Quality Assurance Plan, Rev. 31  
 NPG-SPP-06.9.1, Conduct of Testing, Rev. 9  
 NPG-SPP-31.2, Records Management, Rev. 4  
 NPG-SPP-22.300, Corrective Action Program, Rev. 3  
 NPG-SPP-06.4, Measuring and Test Equipment, Rev. 3

**III. OPERATIONAL READINESS ACTIVITIES****O.1 Operations****O.1.1 Technical Specifications Review**Procedures

2-SI-3-10, 18 Month Channel Calibration of Steam Generator 4 Narrow Range Level Channel II Loop 2-LPL-3-106 (L-549)  
 2-SI-3-1, 18 Month Channel Calibration of Steam Generator 1 Narrow Range Level Channel II Loop 2-LPL-3-38 (L-519)  
 2-SI-68-80-A, Channel Calibration of Train A Common Q Post Accident Monitoring System  
 2-SI-0-4, Monthly Surveillances, Appendix D, Remote Shutdown and PAM Channel Check Data  
 0-SI-65-6-B, Emergency Gas Treatment System Train B 10-Hour Operation  
 0-SI-30-7-A, Auxiliary Building Gas Treatment System Pressure Test Train A  
 0-82-5, 18 Month Loss Of Offsite Power With Safety Injection Test - DG 2A-A  
 0-82-6, 18 Month Loss Of Offsite Power With Safety Injection

**IV. OTHER ACTIVITIES**

**OA 1.1 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**

Procedures

2-SI-3-925-S, Auxiliary Feedwater Pump 2A-S Preservice Pump Test, Rev. 3

Calculations

WBN-SDD-N3-3B-4002, Auxiliary Feedwater System Description, (Pump Curves), Rev. 20  
 EPPOED070391, Equations for AFW Pump Performance Curve, Rev. 14

**OA.1.3 Construction Deficiency Report 50-391/86-11: Thermal Expansion of Liquid Sample Piping (Inspection Procedures 52053 and 52055)**

Calculations

WBN MEBEPMJSR012286, "Sampling and Radiation Monitoring Line Operating Temperatures," revision 014 dated 06/24/2013  
 WBN CEB43212, "Summary of Piping/Tubing Analysis Problem No. 43212," revision 001 dated 04/07/2015

WBN CEB43234, "Summary of Piping/Tubing Analysis Problem No. 43234," revision 001 dated 06/17/2015

WBN CEB43213, "Summary of Piping/Tubing Analysis Problem No. 43213," revision 001 dated 06/12/2015

WBN CEB43230, "Summary of Piping/Tubing Analysis Problem No. 43230," revision 001 dated 05/28/2015

### Drawings

2-47W625-1 Revision 9

2-47W625-3 Revision 5

2-47W625-705 Revision 0

2-47W625-705A Revision 0

2-47W625-706 Revision 0

2-47W625-706A Revision 0

2-47W625-706B Revision 0

2-47W625-725 Revision 0

2-47W625A-725 Revision 0

2-47W625B-725 Revision 0

2-47W625-732 Revision 0

2-47W625A-732 Revision 0

2-47W625B-732 Revision 0

### FCRs

62120 dated 05/08/2015

62215-A dated 10/03/2013

63936-A dated 05/09/2015

65287-A dated 06/19/2015

65288-A dated 06/18/2015

65324-A dated 05/29/2015

## **OA.1.4 Followup - Watts Bar Nuclear Plant Unit 2 Response to Bulletin 2012-01, Design Vulnerability in Electrical Power System**

### Miscellaneous

TVA response to NRC Request for Additional Information Related to Granting an Operating License, dated 2/3/2014 (ML14038A075)

TVA response to NRC Request for Additional Information Related to Granting an Operating License, dated 6/19/2014 (ML14163A606)

NEI Letter to NRC Office of Nuclear Reactor Regulation, "Project Number 689, Industry Initiative on Open Phase Condition, Revision 1," dated 3/16/2015 (ML15075A455 and ML15075A456)

Procedure 1-PI-OPS-1-CR/IC, Rev. 11, Control Building / Ice Condenser AUO Work Station Responsibilities

Procedure 1-PI-OPS-1-OS, Rev. 24, Outside AUO Work Station Responsibilities

Procedure 1-PI-OPS-1-SY, Rev. 4, Switchyard Inspections

Procedure 1-SOI-201.01, Rev. 1, 6.9 KV Unit Board 1A

Procedure 2-SOI-201.05, Rev. 0, 6.9KV Unit Board 2A 2-BD-201-A

Procedure 0-TI-31.07, Rev. 0, Infrared Thermography Inspections

CR 519091, Review and Evaluate INPO Event Report for Scram from 4.14 kV Design Problem, dated 3/9/2012

CR 574360, Potential Engineering Gaps Were Identified, dated 7/2/2012

PER 609570, NRC Bulletin 2012-01 Requirements, dated 9/14/2012  
 Operator Training Lesson Plan 3-OT-MISC142, Rev. 38, Licensed Operator Requal,  
 dated 2/27/2013  
 TVA Presentation to Open Phase Workshop, "Hybrid Solution: Class 1E Protection (ABB 60Q)  
 & Standby Transformer Detection (EPRI)," by Tamatha Womack.  
 Design Change Request (DCN) 64063, Rev. A, "Install Open Phase Protection Relays,"  
 dated 8/18/2014  
 Preventive Maintenance Job Plan 600114519, Rev. 2C, "Switchyard Systems 200, 201 and 244  
 Thermography Tests"

### **OA.1.5 Construction Deficiency Report 391/82-04: Foam Seals in Mechanical PipeSleeves**

#### Change Packages

EDCR 54423  
 EDCR 54431  
 FCR 57657  
 FCR 65518-A

#### Drawings

2-47W240-14, Fire Protection Compartmentations – Fire Cells Plan EL. 716.0, Rev. 3  
 47W470-8, Mechanical Sleeves Interior Walls & Floors, Rev. F  
 DRA 54423-060, -061  
 DRA 54431-035, -036

#### Work Orders

WO 111373516  
 WO 111714562

#### Other Documents

Engineering Report 0006-00922-02, Appendix C, Rev.1  
 Fire Test ICC0186015, Fire and Hose-Stream Tests for Penetration Seal Systems, Dated 1986  
 MAI-2.2, Mechanical Penetration Seals, Rev. 07

### **OA.1.6 Construction Deficiency Report 391/85-18: Fire Rated Penetration Assemblies Deficiencies**

#### Engineering Change Packages

EDCR 54431, Mechanical Seal Details for the Auxiliary Building to Support U2 Operation,  
 06/17/2010

#### Drawings

2-47W240-1, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 692, Rev. 3  
 2-47W240-2, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 708, Rev. 3  
 2-47W240-3, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 729, Rev. 4  
 2-47W240-3, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 737, Rev. 4  
 2-47W240-5, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 772, Rev. 3



Work Orders

WO 93-14258-00, Mechanical Seal Install in Auxiliary Building, 07/29/1993  
 WO 114102317, CCC EDCR2 54431 SYS 304 0-SLV-304-A0088AMA/B & 0-SLV-304-A0091AMA/B, 05/20/2015  
 WO 111807177, CCC EDCR2 54431 SYS 304 0-SLV-304-A0457AMA/B & 0-SLV-304-A0472BMA/B, 05/20/2015  
 WO 116644178, CCC EDCR 54431 SYS 304 WBN-0-SLV-304-A0432AM, Rev. 0  
 WO 116654749, CCC EDCR 54431 SYS 304 WBN-0-SLV-304-A0094AM, Rev. 0

PERs Generated During Inspection

PER 1069885, Damaged Sleeve Seal A0091AM, 08/12/2015

Calculations

Fire Test ICC01091035  
 0006-00922-02, Engineering Report for Penetration Seal Program Assessment, Rev. 1  
 0006-00922-02, Penetration Seal Program Assessment, Appendix F, Engineering Evaluations  
 G.L. 86-10, Rev. 1

Other Documents

Penetration Seal Installation Data Sheet for Penetration No. A0088AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0091AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0404AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0406AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0440AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A1292AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0463AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0471CMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0671AMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0472BMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0617FMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0781CMA/B, Rev. 1  
 Penetration Seal Installation Data Sheet for Penetration No. A0671AMA/B, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A2085A, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A2084B, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. AC1209A, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. AC1209GA, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A16780A, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A106067A, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A1458B, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A4351, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A1314KAB, Rev. 1  
 Cable Tray and Sleeve Seal Installation Data Sheet for Penetration No. A1314LAB, Rev. 1  
 DCA 38264, Electrical Penetration Seal Details, Rev. 0  
 ICO1091035, Penetration Seal Fire Resistance Tests 3-Hour Qualification, 01/28/1992  
 SER Related to the Operation of WBN Plant, Units 1 & 2, Section 3.1.4, Fire Barrier Penetration  
 Seals, November 1995

## **OA.1.7 Construction Deficiency Report 391/87-14: Deficient Mechanical Sleeve Sealing Deficiencies**

### Engineering Change Packages

EDCR 54431, Mechanical Seal Details for the Auxiliary Building to Support U2 Operation, 06/17/2010

EDCR 54423, Mechanical Seal Details for the Reactor Building, 6/16/2010

### Drawings

2-47W240-1, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 692, Rev. 3

2-47W240-2, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 708, Rev. 3

2-47W240-3, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 729, Rev. 4

2-47W240-3, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 737, Rev. 4

2-47W240-5, Aux. Building Fire Protection Compartmentation – Fire Cells Plan EL. 772, Rev. 3

### Work Orders

WO 93-14258-00, Mechanical Seal Install in Auxiliary Building, 07/29/1993

WO 114102317, CCC EDCR2 54431 SYS 304 0-SLV-304-A0088AMA/B & 0-SLV-304-A0091AMA/B, 05/20/2015

WO 111807177, CCC EDCR2 54431 SYS 304 0-SLV-304-A0457AMA/B & 0-SLV-304-A0472BMA/B, 05/20/2015

WO 116644178, CCC EDCR 54431 SYS 304 WBN-0-SLV-304-A0432AM, Rev. 0

WO 116654749, CCC EDCR 54431 SYS 304 WBN-0-SLV-304-A0094AM, Rev. 0

WO 114811476, seal conduit at location C15882B

WO 114306265, install conduit seal for 2PV2641

WO 116540944, seal conduits, 2VC6070B, 2SG934B

WO 116619605, seal conduits, 0LTB1430, 2SG934B, 2VC9589A

WO 114306062, seal conduits, 2NM3368J, 2NM3367J

### Calculations

Fire Test ICC01091035

0006-00922-02, Engineering Report for Penetration Seal Program Assessment, Rev. 1

0006-00922-02, Penetration Seal Program Assessment, Appendix F, Engineering Evaluations G.L. 86-10, Rev. 1

### Other Documents

Penetration Seal Installation Data Sheet for Penetration No. A0088AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0091AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0404AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0406AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0440AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A1292AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0463AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0471CMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0671AMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0472BMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0617FMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0781CMA/B, Rev. 1

Penetration Seal Installation Data Sheet for Penetration No. A0671AMA/B, Rev. 1  
 ICO1091035, Penetration Seal Fire Resistance Tests 3-Hour Qualification, 01/28/1992  
 SER Related to the Operation of WBN Plant, Units 1 & 2, Section 3.1.4, Fire Barrier Penetration  
 Seals, November 1995

### **OA.1.8 Construction Deficiency Report 391/87-15: Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification**

#### Design Change Packages

DCN 35361-A,  
 DCN 64512  
 EDCR 52849, Work Scope No. 3, Rev A  
 EDCR 52861, Work Scope No. 1, Rev. A  
 EDCR 52953, Work Scope No. 2  
 EDCR 54923, Work Scope No. 38, Rev. A

#### Drawing

2-47W240-4, Fire Protection Compartmentation – Fire Cell Plan EI. 755.0 & 757.0, Rev. 2  
 2-47W240-4, Fire Protection Compartmentation- Fire Cell Plan Elevation 755.0 & 757.0, Rev. 2  
 2-47W240-4, Fire Protection Compartmentation-Fire Cell Plan EI 755.0 & 757.0, Rev. 2  
 2-47W240-9, Fire Protection Compartmentation-Fire Cells Plan EI 726.0 & 728.0, Rev. 3  
 2-47W866-8, Flow Diagram Heating, Cooling & Ventilating Air Flow, Rev. 12  
 47W920-2, Mechanical Heating, Ventilating, and Air Conditioning, Rev. 50  
 47W920-4, Mechanical Heating, Ventilating, and Air Conditioning, Rev. 46

#### Work Order

090-952004-002, EDCR 52953 -Remove the existing flex connectors on the supply and return duct work to the coolers (Pipe Chase Cooler 2A-A, & 2B-B)  
 111026396, CCM EDCR 52849 SYS 031 2-ISD-031-3927  
 114498050, CM Sys 030H EDCR 52861 SR 692582 WBN-2-DUCT-030-RB/SR  
 115668118, SUT SYS 030 030A 031 EDCR-52849 WBN-2-ISD-031-3927 CTN 2-031-01165-M03-00

#### Other Documents

Material Requisition, 25402-011-MRA-MKH-00003, Rev. 002  
 Calculation EPM-RA-032795, "Appendix R-Evaluation of Duct Opening Protection in Fire Rated Walls," Rev. 4  
 NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0005

### **OA.1.9 NRC Bulletin 79-24, Frozen Lines**

#### Miscellaneous

DRA 57933-011, Rev. 1  
 DRA 57933-012, Rev. 1  
 Thermon Drawing TH12362-ET-003-1-1, Rev. 0  
 EDCR 57933, Rev. A  
 FCR 65627 AA-01  
 FCR 65627 AA-02

### **OA.1.10 Generic Letter 2006-02, Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power**

#### Miscellaneous

Open Items / Commitment Completion Form NGDC PP-19-2 Tracking Number NCO080008048  
Final Closure Package dated: 6/17/2015.

WBN-VTD-S106-0020, Siemens-Allis Certified Report of Test 800 HP, Essential Raw Cooling Water Pump motor, dated 6/20-24/1978.

TVA Standard Programs and Processes TVA-SPP-10.010, Rev. 0005, NERC Standard Compliance Processes Shared by TVA's Nuclear Power Group and Transmission and Power Supply, dated: 5/22/2015.

On-Line Work Management – NPG-SPP-07.01, Rev 0015, dated: 02/25/2015, Work Control Prioritization - In Line – NPG-SPP-07.1.4, dated: 01/21/2015

NPG-SPP-07.1.6, Rev 0004 On Line Work Control Power System Alerts / Offsite Power, dated: 01/21/2015

NPG-SPP-07.1.7, Rev 0004 Station Seasonal Readiness, dated: 03/03/2015

NPG-SPP-07.2 Rev 0005, Outage Management dated: 06/30/2014

Technical Instruction 0-TI-12.125 Offsite Power Requirements Rev. 0000, dated: 06/02/2015

Containment Spray Pumps & Drivers – Westinghouse Contract Number: 71-54114-1, Induction Motor Data Sheet, dated: 7/15/1976.

WBN-VTD-W120-2626, Miscellaneous Engineering Data Sheets for Westinghouse Supplied Centrifugal Charging Pumps, dated: 10/2/1968 (2 HP) & 11/14/1972 (600 HP). Dated: 08/06/1975.

WBN-VTD-P076-0030, Operating and Maintenance Instructions for Parson-Peebles Induction Motors (PUB.#GCM/254924), Auxiliary Feed Water Pump Motor, 600 HP, dated: 08/06/1975.

Westinghouse Motor S.O. 74F12120, Induction Motor Data Sheet - Safety Injection Pumps – 400HP, dated: 12/5/1975.

#### Calculations

Calculation EDQ00099920080014, Rev 029 – Diesel Generator Loading Analysis, dated: 05/15/2015 (Extracts)

Calculation EDQ00099920070002, Rev 046 AC Auxiliary Power System Analysis dated: 6/11/2015 is the Calculation of Record (COR) for Dual Unit Operation

Calculation PSO-WBN-PLN-EDX-000-999-2004-0002, Rev 3, Watts Bar Nuclear Plant (WBN) – Transmission System Study (TSS) – Grid Voltage Study of WBN's Off-Site Power System, dated 4/1/2011

### **OA.1.11 Supplemental Safety Evaluation Report, Appendix HH – Open Item 1, Power Assisted Cable Pulls**

#### Design Specifications

G-38, Installation, modification, and maintenance of insulated cables rated up to 15,000V, Rev. 24

G-40, Installation, modification and maintenance of electrical conduit, cable trays, boxes, electrical penetrations, electric conductor seal assemblies, lighting and miscellaneous systems, Rev. 19

MAI-3.2 "Cable Pulling for Insulated Cables Rated up to 15,000 Volts," Rev. 21

Work Orders

WO 115100545  
 WO 115100231  
 WO 112717843  
 WO 112717908  
 WO 112717900  
 WO 114793501

**OA.1.12 Electrical Issues CAP - Sub-issue: Cable Separation and Electrical Isolation**Miscellaneous

WB-DC-30-4 Revision R23 WATTS BAR NUCLEAR PLANT UNIT 1/UNIT 2  
 "SEPARATION/ISOLATION" , dated: 2/9/2012  
 Drawing Revision Authorization (DRA) 55125-88, Drawing Number 45N824-8 Rev. 40, dated:  
 2/13/2013  
 Drawing Revision Authorization (DRA) 55125-84, Drawing Number 45N822-13 Rev. 23, dated:  
 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-86, Drawing Number 45N822-9 Rev. 39, dated:  
 5/10/2013  
 Drawing Revision Authorization (DRA) 55125-50, Drawing Number 45N822-7 Rev. 42, dated:  
 10/3/2013  
 Drawing Revision Authorization (DRA) 55125-77, Drawing Number 45N822-16 Rev. 17, dated:  
 5/10/2013  
 Drawing Revision Authorization (DRA) 55125-85, Drawing Number 45N822-13 Rev. 23, dated:  
 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-43, Drawing Number 45N824-8 Rev. 40, dated:  
 10/10/2013  
 Drawing Revision Authorization (DRA) 55125-139, Drawing Number 45W828-9 Rev. 31, dated:  
 11/30/2012  
 Drawing Revision Authorization (DRA) 55125-6, Drawing Number 45W804-12 Rev. 30, dated:  
 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-8, Drawing Number 45W804-12 Rev. 30, dated:  
 5/26/2010  
 Drawing Revision Authorization (DRA) 55125-73, Drawing Number 45W826-37 Rev. 31, dated:  
 5/10/2013  
 Drawing Revision Authorization (DRA) 55125-26, Drawing Number 45N824-8 Rev. 40, dated:  
 10/9/2014  
 Drawing Revision Authorization (DRA) 55125-44, Drawing Number 45N824-8 Rev. 40, dated:  
 4/1/2014  
 Drawing Revision Authorization (DRA) 55125-28, Drawing Number 45W828-30 Rev. 4, dated:  
 5/10/2013  
 Drawing Revision Authorization (DRA) 55125-142, Drawing Number 45W828-7 Rev. 40, dated:  
 2/13/2013  
 Drawing Revision Authorization (DRA) 55125-57, Drawing Number 45W812-6 Rev. 27, dated:  
 5/10/2013  
 Drawing Revision Authorization (DRA) 55125-159, Drawing Number 45W812-6 Rev. 27, dated:  
 2/13/2013  
 Drawing Revision Authorization (DRA) 55125-161, Drawing Number 45W812-6 Rev. 27, dated:  
 2/13/2013

Work Orders

WO# 115121606 - CCE BC CONDUIT EDCR2 55125 SYS 003B 292 WBN-2-MISC-292  
2VC633B, dated: 7/1/2014

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# 111117673 - CCE EDCR2 55125 SYS 290 2-MISC-290, dated: 5/28/2014

**OA.1.14 Temporary Instruction 2515/120, Inspection of Implementation of Station  
Blackout Rule Multi-Plant Action Item A-22**

Calculations

EPMSMC110292, Backup Nitrogen Supply for Auxiliary Feedwater LCVs and Main Steam  
PORVs, Rev. 10

EPMMA041592, Station Blackout Coping Evaluation, Rev. 22

Other

EDCR-2 60749, Rev. A

Procedures

1-AOI-40, Station Blackout, Rev. 5

System Descriptions

NPG-WBN2-3B-4002, Auxiliary Feedwater System Description, Rev. 2

DCN

DCN 60976-A, Replace Existing Lighting with LEDs and load shed for 125V DC FLEX analysis

Drawings

2-47W803-2, Flow Diagram Auxiliary Feedwater, Rev. 32

2-47W803-3, Flow Diagram Auxiliary Feedwater, Rev. 25

**OA.1.16 Review of Actions for EA-14-179 Associated with Failure to Follow Site  
Procedure for Installation of Anchor Bolts**

Corrective Actions

CR# 1049583, NRC Identified – Administrative Oversight Issue with PP-3, dated: 7/9/2015  
PER# 635002, Problem Evaluation Report – Corrective Action Plan for Possible Improper  
Anchor Bolt Installation, 11/1/2012

Miscellaneous

Records Correction/Deletion Notice, 635002, Possible Improper Anchor Bolt Installation on (2)  
HVAC Supports, dated: 7/9/2015

CNL-14-079, Watts Bar Nuclear Plant, Unit 2 – Reply to Notice of Violation (EA-14-179), dated: 5/1/2015  
 Commitment Completion Form, T02 150518 002, 10 CFR 50.9 Refresher Training, dated: 5/14/2015

### Procedures

NC-PP-3, Watts Bar Unit 2 Corrective Action Program, Rev. 14  
 BPP-01.1, Administration of Site Procedures, Rev. 13  
 25402-000-GPP-0000-N1206, Work Order Processing, Rev. 20  
 NPG-SPP-03.1.6, Root Cause Analysis, Rev. 5  
 NPG-SPP-03.1.5, Apparent Cause Evaluations, Rev. 5

### Work Orders

WO# 116723658 – CCI SYS 043 EDCR 53919 FCR 65288 AA 01 Stress Problem, dated: 5/27/2015  
 WO# 116771932 – CCI SYS 043 EDCR2 53917 FCR 65287 AA-04 WBN-2-HGR-043-AB Stress, dated: 6/18/2015  
 WO# 116771095 – CCM EDCR NONE SYS 077 WBN-2-HGR-077-RB, dated: 6/26/2015  
 WO# 116734756 – CCM EDCR2 54655 FCR 64995 AA-05 SYS 026 026.1 WBN-2-HGR-026-RB, dated: 5/15/2015  
 WO# 110800508, CCM EDCR 54289 SR 739542 PER 779183 SYS 030 WBN-2-HGR-030-RB, dated: 2/24/2014  
 WO# 114040732, CCM EDCR 54289 SYS 030 WBN-2-DUCT-030-RB, dated: 5/2/2013  
 WO# 114041019, CCM EDCR 54298 SYS 030 WBN-2-DUCT-030-RB, dated: 7/1/2013  
 WO# 114041125, CCM EDCR 54298 PER 635002 SYS 030 WBN-2-DUCT-030-RB, dated: 8/22/2013  
 WO# 114189401, CCC EDCR 54298 PER 635002 SYS 661 2-STRU-661-5000 Civil Corrective Actions, dated: 5/20/2014

## **OA.1.18 Generic Letter 89-19, Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants**

### Drawings:

1-47W803-1, Flow Diagram Feedwater, Rev. 61  
 2-47W803-2, Flow Diagram Auxiliary Feedwater, Rev. 18  
 2-47W803-1-FAC-SNM, Flow Diagram Feedwater, Rev. 0

INSERT

### Procedures:

0-AOI-30.1, Plant Fires, Rev. 0  
 0-AOI-30.2, C.61, Fire Safe Shutdown Room IPS-A, IPS-C West, IPS-C Middle, and IPS Duct Bank A, Rev. 0  
 0-AOI-30.2, C.62, Fire Safe Shutdown Room IPS-B, IPS-C East, IPS-C Middle, and IPS Duct Bank B, Rev. 0  
 0-AOI-30.2, C.69, Fire Safe Shutdown Room, Control Room, Rev. 0

### Other Documents:

Technical Instruction, 0-TI-2018, Demonstration of Appendix r Actions, Rev. 1  
 White Paper, Fire Safe Shutdown Analysis of Steam Generator Overfill

NCO080008046, IP&S Number 199, GL 1989-19, "Request for Actions to Resolution of Unresolved Safety Issue A 47, 'Safety Implications of Control Systems in LWR Nuclear Power Plants'"

**Calculations:**

Calculation WBNAPS2065, Appendix R Post Fire Reactor Coolant System Cooldown and Depressurization, Rev. 8

Calculation EDQ00099920090016, Appendix R – Units 1 & 2 Manual Action Requirements, Rev. 4

Calculation MDQ00299920110381, Appendix R – Operator Manual Action Evaluations, Rev. 1



## LIST OF ACRONYMS

ABSCE	Auxiliary Building Secondary Containment Enclosure
ACE	Apparent Cause Evaluation
ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
ANSI	American National Standards Institute
BL	Bulletin (NRC)
CAP	Corrective Action Program
CAPR	Corrective Action to Prevent Recurrence
CAQ	Condition Adverse to Quality
CCS	Component cooling system
CDR	Construction Deficiency Report
CR	Condition Report
CSS	Containment spray system
CVCS	Chemical and volume control system
DCN	Design Change Notice
DRA	Drawing Revision Authorization
EA	Enforcement Action (NRC)
EDCR	Engineering Document Construction Releases
EGTS	Emergency Gas Treatment System
ERCW	Essential Raw Cooling Water
ESF	Engineered Safety Feature
FCR	Field Change Request
FSAR	Final Safety Analysis Report
FSSD	Fire Safe Shutdown
GL	Generic Letter
HFT	Hot Functional Testing
HVAC	Heating, Ventilating, and Air Conditioning
ICRDS	Integrated Cable & Raceway Design Software
IIR	Integrated Inspection Report
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IR	Inspection Report
IST	In-Service Test
ISO	Independent System Operator
LCO	Limiting Condition of Operation
LOOP	Loss of Offsite Power
LWR	Light Water Reactor
M&TE	Measuring and Test Equipment
NOV	Notice of Violation
No.	Number
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
OI	Office of Investigations
OIG	Office of the Inspector General
OL	Operating License
OM	Operation and Maintenance
OMA	Operator Manual Action
OPC	Open Phase Condition
PER	Problem Evaluation Report
PORV	Power Operated Relief Valve
PTI	Preoperational Test Instruction

QA	Quality Assurance
QC	Quality Control
RAI	Request for Additional Information
RCDT	Reactor Coolant Drain Tank
RC/RA	Reliability Coordinator / Authority
RCS	Reactor Coolant System
RCP	Reactor Coolant Pump
Rev.	Revision
RG	Regulatory Guide
RHR	Residual Heat Removal
RVLIS	Reactor Vessel Level Indicating System
SAR	Safety Analysis Report
SBO	Station Blackout
SCR	Significant Condition Report
SER	Safety Evaluation Report
SG	Steam generator
SIS	Safety Injection System
SL	Severity Level (NRC)
SOI	System Operating Instruction
SP	Special Program
SR	Surveillance Requirement
SSC	Structures, Systems, and Components
SSER	Supplemental Safety Evaluation Report
TI	Temporary Instruction (NRC)
TS	Technical Specifications
TSO	Transmission System Operator
TVA	Tennessee Valley Authority
VIO	Violation
WBN	Watts Bar Nuclear Plant
WB2	Watts Bar Nuclear Plant, Unit 2
WO	Work Order
10 CFR	Title 10 to the Code of Federal Regulations