



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

September 30, 2014

Mr. Michael D. Skaggs  
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SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2014607

Dear Mr. Skaggs:

On August 16, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on September 4, 2014, with Mr. Hruby and other members of your staff.

This inspection examined activities conducted under your Unit 2 construction permit as they relate to safety and compliance with the Commission's rules and regulations, the conditions of your construction permit, and fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings were identified during this inspection.

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

M. Skaggs

2

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

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000391/2014607  
w/Attachment

cc w/encl: (See next page)

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

Sincerely,

/RA/

Robert Haag, Chief  
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Division of Construction Projects

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

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w/Attachment

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Letter to Michael D. Skaggs from Robert C. Haag dated September 30, 2014.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2014607

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2014607

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: July 1-August 16, 2014

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Approved by:

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



## **EXECUTIVE SUMMARY**

### **Watts Bar Nuclear Plant, Unit 2**

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a seven-week period of inspections in the areas of quality assurance (QA), identification and resolution of construction problems, engineering and construction activities, preoperational testing, operational readiness activities, 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**

- The inspectors concluded that issues pertaining to several open items, including three construction deficiency reports (CDRs), one violation (VIO), one temporary instruction (TI), one generic letter (GL), six inspection procedures (IPs), and two Appendix HH items 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; mechanical systems and components; electrical systems and components; preoperational testing activities; operational preparedness; and various NRC inspection procedures.

## **Table of Contents**

<b>I. QUALITY ASSURANCE PROGRAM .....</b>	<b>6</b>
Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure 35007) .....	6
<b>II. MANAGEMENT OVERSIGHT AND CONTROLS .....</b>	<b>7</b>
<b>C.1 Construction Activities .....</b>	<b>7</b>
C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls .....	7
C.1.2 Safety-Related Mechanical Components Work Observation (Inspection Procedure 50073) .....	7
C.1.3 Post-Fukushima Diverse and Flexible Construction Activities .....	8
C.1.4 Reactor Vessel and Internals – QA Review and Work Observation (Inspection Procedures 50051 and 50053) .....	9
C.1.5 (Closed) Instrument Components and Systems – Procedure Review (Inspection Procedure 52051) .....	10
<b>P.1 Preoperational Activities .....</b>	<b>15</b>
P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 71302) .....	15
P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70362) .....	16
P.1.3 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, 70433B, 70436B, and 70443) .....	18
P.1.4 Preoperational Test Witnessing (Inspection Procedure 70312) .....	20
<b>III. OPERATIONAL READINESS ACTIVITIES .....</b>	<b>21</b>
<b>O.1 Operations .....</b>	<b>21</b>
O.1.1 (Closed) Quality Assurance Program - QA/QC Administration (Inspection Procedure 35740B) .....	21
O.1.2 (Closed) Quality Assurance Program - Audits (Inspection Procedure 35741B) ..	22
O.1.3 Quality Assurance Program - Procurement Control (Inspection Procedure 35746B) .....	23
O.1.4 Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material (Inspection Procedure 35747B) .....	24
O.1.5 Quality Assurance Program - Records (Inspection Procedure 35748B) .....	27
O.1.6 (Closed) Quality Assurance Program - Safety Review Committee (Inspection Procedure 40301) .....	29
<b>F. 1 Fire Protection .....</b>	<b>30</b>
F.1.1 Postfire Safe Shutdown, Emergency Lighting and Oil Collection Capability at Operating and Near-Term Operating Reactor Facilities (Inspection Procedure 64100) .....	30
F.1.2 Fire Protection Program (Inspection Procedure 64704) .....	30

<b>ST.1 Surveillance Testing .....</b>	<b>31</b>
ST.1.1 Quality Assurance Program-Tests and Experiments (Inspection Procedure 35749B).....	31
ST.1.2 (Closed) Quality Assurance Program-Measurement and Test Equipment (Inspection Procedure 35750) .....	32
<b>R.1 Radiation Safety .....</b>	<b>33</b>
R.1.1 Liquids and Liquid Wastes (Preoperational and Supplemental) (Inspection Procedure 84523).....	33
R.1.2 Gaseous Waste System (Preoperational and Supplemental) (Inspection Procedure 84524).....	34
R.1.3 (Closed) Radiological Environmental Monitoring (Preoperational and Supplemental) (Inspection Procedure 80521).....	36
<b>IV. OTHER ACTIVITES .....</b>	<b>36</b>
OA.1.1 (Discussed) Violation 391/87-19-02, Failure to Preserve Equipment Installed in the North and South Valve Rooms (Inspection Procedure 50090).....	36
OA.1.2 (Discussed) Construction Deficiency Report 391/83-48: Relocating Sensing Lines on Upper Containment Cooler (Inspection Procedure 92701).....	38
OA.1.3 (Discussed) Construction Deficiency Report 391/87-15: Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification (Inspection Procedure 35007).....	38
OA.1.4 (Discussed) Construction Deficiency Report 391/89-08: Kapton Insulated Pigtail Insulation Damage (Inspection Procedure 51053) .....	40
OA.1.5 (Discussed) Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance (Inspection Procedure 70312 and Temporary Instruction 2515/109) .....	42
OA.1.6 (Discussed) Generic Letter 2006-03: Potentially Nonconforming HEMYC and MT Fire Barrier Configurations; Bulletin No. 1992-01: Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free from Fire Damage; Bulletin No. 1992-01 (Supplement 1): Failure of Thermo-Lag 330 Fire Barrier System to Perform Its Specified Fire Endurance Function; Generic Letter 1992-08: Thermo-Lag 330-1 Fire Barriers (Inspection Procedure 35007).....	43
OA.1.7 (Closed) Safety Evaluation Report 23 Appendix HH Open Items 63 and 93, Eagle 21 Two-Way Communication Test (Inspection Procedure 52053).....	44
OA.1.8 (Closed) Inspection of Watts Bar Nuclear Plant Cable Tray and Supports Corrective Action Program Plan (Temporary Instruction 2512/017 and Inspection Procedures 51053 and 37051).....	45
OA.1.9 (Closed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 391/85-35: Support of Conductors Inside Vertical Conduit Runs (Temporary Instruction 2512/016 and Inspection Procedure 35007) .....	49
OA.1.10 (Closed) Construction Deficiency Report 391/84-25: Failure to Provide Fire Detectors in Rooms Containing Redundant Safe Shutdown Circuits (Inspection Procedure 35007).....	50
OA.1.11 (Closed) Construction Deficiency Report 391/89-06: Inadequate Qualifications for Cable Tray Supports and Fittings (Inspection Procedure 51053).....	52
OA.1.12 (Closed) Violation 391/87-19-01, Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 50090)53	

<b>V. MANAGEMENT MEETINGS.....</b>	<b>57</b>
<b>X1 Exit Meeting Summary.....</b>	<b>57</b>

## 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 (WBN) Plant, 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 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 PERs, test reports, and the corrective actions completed through the inspection period associated with event notification (EN) 50166. EN 50166 identified three lots of fuses made by Littelfuse that were potentially susceptible to nuisance opening. The fuses were procured commercially, and subjected to the commercial grade dedication (CGD) process by TVA. The potentially defective fuses were purchased for Watts Bar Unit 2 and were installed at Watts Bar Unit 2 only. Specifically, the inspectors reviewed PER 779200, which was the PER that first identified that fuses in the warehouse were blown. The inspectors also reviewed PER 878252, which was issued by TVA upon receiving a report from the vendor. The vendor X-rayed fuses and determined that a large portion of the three lots had potential defects and would be more susceptible to nuisance opening. The vendor also tested a sampling of the fuses at 80 percent current according to Underwriters Laboratories, Inc. (UL) Standard (STD) 248, and all but one of the fuses passed the test. Because the fuses are a CGD item, the inspectors reviewed the critical characteristics, which included testing, of the fuses to verify their adequacy. The inspectors also verified that criteria for X-raying fuses had been added to the procurement data sheets for future fuses and the fuses in the lots sent back for additional testing.

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

No findings were identified.

##### **c. Conclusions**

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

## II. MANAGEMENT OVERSIGHT AND CONTROLS

### C.1 Construction Activities

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

##### a. Inspection Scope

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

Specific work activities observed included work associated with:

- Work Order (WO) 114900863, Perform Differential Pressure Testing of WBN-2-FCV-067-0124-B
- PER 909736, Unit 2 RWST overfilled from HPFP header into auxiliary building.

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

##### b. Observations and Findings

No findings were identified.

##### c. Conclusions

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

#### C.1.2 Safety-Related Mechanical Components Work Observation (Inspection Procedure 50073)

##### a. Inspection Scope

The inspectors observed portions of the installation of the reactor coolant pump 2-1 seal assembly to verify the work was performed in accordance approved work instructions and procedures. In addition, the inspectors verified that foreign material exclusion covers were used to protect equipment and precautions were in place to prevent

damage during placement and mounting. The inspectors also verified that, during installation, hold points for measurements were completed in accordance with the approved procedure.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The installation of the reactor coolant pump 2-1 seal was in accordance with the approved procedures.

### **C.1.3 Post-Fukushima Diverse and Flexible Construction Activities**

a. Inspection Scope

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

The Order was issued in response to the Fukushima accident. The NRC created a task force of senior NRC staff that reviewed the circumstances of the event to determine what lessons could be learned. In July 2011, the task force provided recommendations to enhance U.S. reactor safety; these became the foundation of the NRC's post-Fukushima activities.

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

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

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

Inspections have also been performed for those modifications specific to Unit 1, and future inspections will be documented under the Unit 1 docket number, 05000390.

Inspection Activities:

Connections between the 225kVA emergency diesel generators and the seven-day fuel storage tank located in the Emergency Diesel Generator Building:

The following activities were included in this inspection:

- witnessed installation of FLEX mechanical connections to the emergency diesel generator (EDG) safety-related seven-day fuel tank to verify work was conducted in accordance with applicable procedures, design specifications, and standards;
- interviewed cognizant personnel to verify knowledge of work activity requirements and procedures and to identify any adverse trends; and
- verified the as-built configuration of the installed piping was in accordance with applicable drawings.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusions

The inspectors observed various work activities associated with FLEX. This work included installation of piping and other related modifications.

**C.1.4 Reactor Vessel and Internals – QA Review and Work Observation (Inspection Procedures 50051 and 50053)**

a. Inspection Scope

The inspectors reviewed procedures and observed work activities associated with the reactor vessel assembly in preparation for the applicant to perform reactor coolant system cold hydrostatic testing. Specifically,

- The inspectors observed and verified portions of full-flow filter installation consistent with procedure PI-907161-3157, Rx Assembly for Cold Water Hydrostatic Testing – Section III Components, Revision (Rev.) 2. Specifically, the inspectors verified that installation and torqueing of the full-flow filter into the internals was controlled and consistent with procedures.
- The inspectors observed and verified portions of the implementation of procedure MRS-SSP-2430; WBT Preliminary, Intermediate, and Final Cleaning of Reactor Vessel Internals; Rev. 0; for cleaning the reactor vessel lower internals.
- The inspectors observed portions of the implementation of procedure MRS-SSP-2738, Final Work and Westinghouse Inspections Required for Reactor Vessel Internals for the Tennessee Valley Authority Watts Bar Nuclear Power Plant Unit 2, Rev. 1, for verification of the as-built condition.
- Inspectors reviewed the applicant's procedure PI-907161-3158, Reactor Pressure Vessel (RPV) Assembly of Non-Pressure Components and Main O-rings for Cold Water Hydrostatic Testing, Rev. 1; and witnessed work activities



associated with rigging, testing, lifting, and placement of the RPV lower internals, upper internals, and RPV. The inspectors verified that adequate procedures were established prior to lower and upper internals lift and placement activities.

- The inspectors verified work procedure PI-907161-3157, Rx Assembly for Cold Water Hydrostatic Testing – Section III Components, Rev. 2, for RPV internals installation was established and covered specific criteria related to levelness checks and placement. Additionally, the inspectors witnessed the RPV internals installation and verified that installation activities were being performed adequately and documented.
- The inspectors verified that RPV and internals procedures for protection and cleanliness were established and adhered to. Inspectors witnessed work activities involving RPV cleaning, lower internals cleaning and inspection, and upper internals cleaning and inspection. The inspectors verified that adequate foreign material exclusion area zoning, consistent with housekeeping procedures, was established and adhered to for work being performed near or on the RPV or internals.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

Below is a summary of each section of IP 50051 and 50053:

- IP 50051 Section 02.04b – 1 sample
- IP 50051 Section 02.04c – 1 sample
- IP 50051 Section 02.04d – 1 sample
- IP 50051 Section 02.04e – 1 sample
- IP 50053 Section 02.01c – 1 sample
- IP 50053 Section 02.02b – 1 sample
- IP 50053 Section 02.03b – 1 sample
- IP 50053 Section 02.03c – 1 sample
- IP 50053 Section 02.03d – 1 sample

c. Conclusions

Adequate controls were in place to protect the RPV and lower internals; lifting and setting activities were performed consistent with procedures.

**C.1.5 (Closed) Instrument Components and Systems – Procedure Review (Inspection Procedure 52051)**

a. Inspection Activities

The purpose of this IP was to determine whether technical requirements contained in the facility safety analysis report (SAR) for safety-related instrumentation have been adequately translated into applicable construction specifications, drawings, work procedures, and instructions, and whether these documents were of sufficient detail and clarity for adequate work performance and control. Additionally the IP was to determine whether applicable quality assurance plans, instructions, and procedures for the control and installation of safety-related instrumentation have been established in applicant and

contractor QA manuals and whether these conform to the QA program described in the facility SAR. The IP was also to determine whether any generic problems or other weaknesses exist within the operation of organizations responsible for quality assurance programs and work specifications/instructions for control and installation of instrumentation.

Portions of this IP have been previously addressed through inspection samples credited in the following inspection reports:

- 05000391/2008006 (ADAMS Accession No. ML081210735); Section E.1.2
- 05000391/2009602 (ADAMS Accession No. ML091210420); Section E.1.1
- 05000391/2010604 (ADAMS Accession No. ML103060240); Section T.1.1
- 05000391/2010605 (ADAMS Accession No. ML110410680); Section C.1.12
- 05000391/2012602 (ADAMS Accession No. ML12087A324); Section C.1.9
- 05000391/2012605 (ADAMS Accession No. ML12220A536); Section C.1.6

Section 02.01 of this IP required the completion of IP 35100, which was completed and documented in NRC Integrated Inspection Report (IIR) 05000391/2009602, Attachment 3.

Section 02.02 of this IP was used to determine whether procedures covering work and inspection activities as listed in the table below were appropriate for the activity and were technically adequate. In some cases the procedures reviewed were only mentioned by name in the reference section in the referenced inspection reports. Additionally the reference sections may have also included additional procedures which would not be associated with this IP. In order to provide clarity for which procedure reviews were credited, the associated procedure name was also included in the table below.

Section	Attribute	Associated Procedures	Inspection Reports
02.02a	Receiving Inspections	SPP-4.2, Material Receipt Inspection, Rev. 19 NPG-SPP-04.2, Material Receipt and Inspection, Rev. 0000 25402-000-GPP-0000-N6104, Bechtel Material Receiving, Rev.0005	05000391/2008006 (ADAMS Accession No. ML081210735); Section E.1.2 05000391/2010605 (ADAMS Accession No. ML110410680); Section C.1.12
02.02b	Storage	SPP-4.3, Material Storage and Handling, Rev. 5 NPG-SPP-04.3, Material Storage and Handling, Rev. 0000	05000391/2008006 (ADAMS Accession No. ML081210735); Section E.1.2 05000391/2010605 (ADAMS Accession No. ML110410680); Section C.1.12

02.02.c	Work	MMQ006.026, Installation and Maintenance of Compression Tube Fittings N3E-934, Instrument and Instrument Line Installation and Inspection MAI-4.4A Instrument Line Installation, Rev. 14 MAI-4.4B Instrument and Instrument Panel Installation, Rev. 6 25402-000-GPP-0000-N3401 Instrument and Instrument	05000391/2010604 (ADAMS Accession No. ML103060240); Section T.1.1 05000391/2012602 (ADAMS Accession No. ML12087A324); Section C.1.9 05000391/2012605 (ADAMS Accession No. ML12220A536); Section C.1.6
02.02d	Inspection	MAI-4.4A Instrument Line Installation, Rev. 14 MAI-4.4B Instrument and Instrument Panel Installation, Rev. 6 25402-000-GPP-0000-N3401 Instrument and Instrument Line Installation, Rev. 8	05000391/2012605 (ADAMS Accession No. ML12220A536); Section C.1.6

02.02e	Construction Testing and Calibration Procedures	<p>2-SI-1-1 - 18 Month Channel Calibration - .SG 1 Main Steam Header Pressure Channel I Loop 2-LPP-1-2A (P-514) Draft Version.</p> <p>2-SI-3-6 – 18 Month Channel Calibration of Steam Generator 2 Narrow Range Level Channel IV, Loop 2-LPL-3-55 (L-527) Draft Version.</p> <p>2-SI-3-68 – 18 Month Channel Calibration Steam Generator 1 Wide Range Level Channel III Loop 2-LPL-3-43 (L-501) Draft Version.</p> <p>2-SI-30-44 – 18 Month Channel Calibration Containment Press Channel II Loop 2-LPP-30-44 (P-936) Draft Version.</p> <p>2-SI-68-2 – 18 Month Channel Calibration RCS Loop 2 Delta T/TAVG CH II Loop 2-LPT-68-25 (T-421/422) Rev. 0000 Dated: 03/04/2014.</p> <p>2-SI-68-15 - 18 Month Channel Calibration Reactor Coolant Flow Loop 2 CH-I, Loop 2-LPF-68-29A (F-424) Draft Version.</p>	This section of this inspection report.
02.02f	Change Control	<p>SPP-9.3, Plant Modifications and Engineering Change Control, Rev. 17</p> <p>NPG-SPP-09.3, Plant Modification &amp; Engineering Change Control, Rev. 0001</p>	<p>05000391/2009602 (ADAMS Accession No. ML091210420); Section E.1.1</p> <p>05000391/2010605 (ADAMS Accession No. ML110410680); Section C.1.12</p>

Section 02.03 of this procedure was used to review the work and QA/QC procedures, pertaining to installation and inspection, for changes when I&C work was about 50% installed. This was inspected in this inspection period and is documented in this section.

Section 02.04 of this procedure allowed for additional inspections based on the results of the old Systematic Assessment of Licensee Performance (SALP) program. The SALP program is no longer in use. There is now a different process used for determining the need for additional inspections. This section was determined to be closed as no need

for additional inspections has been identified for this area. If additional inspections are determined to be needed, then this section and procedure will be reopened.

During the inspection period, the inspectors reviewed several Watts Bar Nuclear Plant Unit 2 surveillance instructions, and reference materials listed in these instructions, to verify that the calibration and testing processes were included and described in proper detail required to conduct and monitor the work performed. This review was performed in order to satisfy inspection requirement 02.02e of IP 52051.

The inspectors reviewed a number of vendor manuals, setpoint and scaling documents, technical specifications, and the FSAR, Section 7, for the purpose of establishing sources of data for calibration requirements present in the surveillance instructions. The inspectors reviewed the calibration data sheets to confirm that the calibration involved the checking of multiple points over the full range of the instrument and that the methodology used for checking the points would detect potential repeatability or hysteresis errors. Data sheets also included setting procedures that covered zero point settings and metering span settings in accordance with manufacturer instructions. The inspectors compared provided calibration ranges with associated setpoint and scaling documents to verify a match between both documents. The inspectors compared these Unit 2 calibration procedures with respective Unit 1 calibration procedures to identify any changes or deviations present with this set of procedures. The inspectors reviewed historical PERs to assess problems encountered with calibration in previous cycles using similar calibration procedures.

In order to satisfy inspection requirement 02.03 of IP 52051, the inspectors reviewed the five procedures in Section 02.02.c, "Work" listed in the table above associated with installation and inspection to determine whether any changes were made and the impact of those changes. Two of the procedures, N3E-934, Instrument and Instrument Line Installation and Inspection, and MAI-4.4A, Instrument Line Installation, had no changes made. The other procedures were reviewed for their changes.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

The inspectors observed the precautions and limitations provided within these calibration procedures as part of the calibration techniques for proper calibration outcomes. The inspectors observed that in each of these instructions the applicant had included controls for removal and handling of the components scheduled for calibration including adequate coordination with senior plant operators. The calibration procedures identified the manufacturer name and model numbers for tools used in the calibration process. Most of these procedures had been through the independent quality review by the technical staff.

Below is a summary of each section of IP 52051:

- Section 02.01 – Complete
- Section 02.02 – Complete
- Section 02.03 – Complete
- Section 02.04 – Complete

a. Conclusion

The inspectors concluded that the applicant developed adequate Unit 2 calibration procedures. The inspectors concluded that the changes made to installation and inspection procedures were adequate. The inspectors determined that procedures associated with instrumentation and controls were adequate and established within quality assurance requirements. Based on previous NRC inspections and the current inspection effort, a sufficient number of samples have been reviewed; IP 52051 is 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 direct observation of activities, tours of the facility, interviews and discussions with the applicant's personnel, and reviewing facility records. Preoperational testing activities were limited during the inspection period and included the following system or portions thereof:

- System 063-safety injection system.

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

- general plant/equipment conditions;
- activities in progress (e.g., maintenance, preoperational testing, etc.) were being conducted in accordance with applicant's procedures;
- listened for the public address system announcements to determine that blind spots did not exist; (i.e., cannot be heard clearly enough to be understood); and
- construction work force authorized to perform activities on systems or equipment.

In addition, the inspectors observed the preoperational test setup of motor-operated valve 2-FCV-063-0175-B, safety injection (SI) pump 2B minimum recirculation isolation valve. The inspections were completed to verify that the testing was conducted in accordance with approved procedures (see Section O.A 1.5, Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance, for further inspection details.)

02.02 (Monthly Inspection Activities): During this inspection period, the inspectors reviewed the turnover package for the Unit 2 portion of the safety injection system (System 63) as part of startup manual procedure (SMP) 4.0, System Completion and Turnover, Rev.11, to verify jurisdiction controls were appropriate and applicant procedures were followed. Additionally, the inspectors reviewed the turnover package to

ensure required preventative maintenance was incorporated into a schedule for accomplishment.

The inspectors reviewed maintenance plans on safety-related equipment, to determine if the maintenance was scheduled in accordance with developed procedures and that these procedures were adequate for the maintenance being performed. The maintenance had not been performed but the methodology was discussed with the Refurbishment and Preventative Maintenance Manager to determine how systems with completed preoperational testing would be protected.

b. Observations and Findings

No findings were identified.

c. Conclusion

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

**P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70362)**

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 requires the procedural 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 satisfy the required procedural review for the mandatory testing associated with the reactor coolant system hydrostatic test.

Inspection Activities:

The inspectors reviewed preoperational test procedure 2-PTI-068-14, "Reactor Coolant Primary Hydrostatic Test, U2," to verify that the procedure was technically adequate, consistent with regulatory requirements and licensee commitments, and contained the following administrative good practice attributes:

- the title described the purpose of the procedure;
- the cover page had appropriate information and approval signatures;
- each page had appropriate identification information;
- the last page was clearly identifiable by markings;
- a clear statement of procedure purpose/objectives;

- planning information such as prerequisites, precautions, required tools, reference documents, and coordination requirements;
- clearly identified and appropriate QC hold points;
- signoff requirements including concurrent and independent verification steps established where appropriate;
- equipment alignment instructions are clear and concise;
- equipment identifiers are accurate (10 percent sample);
- actions to be taken within the steps are specifically identified (20 percent sample);
- instrumentation units consistent for data collection (10 percent sample);
- graphs, charts, tables, data sheets, and work sheets are clearly usable;
- calculation sheets technically accurate;
- clear instructions for system restoration;
- overall, clear concise steps for testing with action critical (acceptance criteria) steps identified (20 percent sample);
- clear quantitative acceptance criteria with acceptability and contingencies; and
- overall sequence of the procedure consistent with the obtaining the intended result.

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

The review was conducted to verify the procedure included the following:

- The system boundary includes all pressure vessels, piping, pumps, and valves which are part of the reactor coolant system, or connected to the reactor coolant system, up to and including:
  1. The outermost containment isolation valve in system piping that penetrates primary containment.
  2. The second of two valves normally closed during normal reactor operation in system piping that does not penetrate primary containment.
  3. The reactor coolant system safety and relief valves.
- The system is vented during the filling operation.
- Water quality is specified as required by the latest vendor or other specifications for the temperatures to be present during the test.
- Reactor coolant temperature requirements are stated to ensure that primary components are maintained above the nil ductility transition temperature.
- The minimum hydrostatic test pressure is 1.25 times the lowest design pressure of any component within the test boundaries protected by the overpressure devices which satisfy the requirements of NB-7000.
- The maximum hydrostatic test pressure is less than the limits specified by ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB-3226.
- The hydrostatic test pressure is maintained for a minimum of 10 minutes before initiation of the examination for leakage.



- The examination for leakage includes all joints, connections, and regions of high stress, such as regions around openings and thickness transition sections. This examination is at a pressure equal to the design pressure or three-fourths of the test pressure, whichever is greater.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that preoperational test procedure 2-PTI-068-14, "Reactor Coolant Primary Hydrostatic Test, U2," was technically adequate, consistent with regulatory requirements and licensee commitments, and contained administrative good practice attributes. The review of 2-PTI-068-14 is complete.

**P.1.3 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, 70433B, 70436B, and 70443)**

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 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 the performance of preoperational test instructions 2-PTI-063-01, Safety Injection System (SIS) Integrated Test, Rev. 0000 and 2-PTI-063-03, Safety Injection System Charging, SI, and RHR Flow Balance Test, Rev. 0002 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 inspectors assessed the following attributes associated with these test observations:

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

- test interruptions and continuations were handled in accordance with approved procedures;
- testing events and discrepancies were properly documented;
- 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 selected and reviewed five drawings and one vendor manual to ensure that they were approved and current. 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.

The inspectors performed a review of one design change package associated with System 63, since the system was turned over to the applicant's startup group, to verify that reviews, processing, and implementation were performed in accordance with established procedures.

The inspectors conducted interviews and reviewed training records for two personnel involved in the above tests to verify they had received appropriate training for performing the tests.

In addition to generic test witnessing activities, specific inspection efforts were directed to ensure the following important system functions were adequately tested:

- The chemical and volume control system (System 62) demonstrated operation of system components and instrumentation, including failure mode and electrical independence.
- The containment spray system (System 72) demonstrated the ability to transfer to the recirculation phase and proper operation of system instrumentation and components.
- The residual heat removal system (System 74) demonstrated proper operation of system isolation valve control, proper operation of system logic, protection, instrumentation and alarm functions, and proper operation of system components in each system configuration.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, Watts Bar Nuclear Plant Unit 2 Conduct of Test, Rev. 4.

**P.1.4 Preoperational Test Witnessing (Inspection Procedure 70312)**

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 and
- management controls and procedures, including quality assurance programs, necessary for operation of the facility have been documented and implemented.

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.

During the original preoperational test execution of 2-PTI-063-03; SIS Safety Injection System, Charging, SI, and Residual Heat Removal System (RHR) Flow Balance test; it was discovered by the applicant that a spiral wound metal gasket had deformed severely in flow element 2-FE-063-0124; the discrepancy was documented in PER 913460. As part of the corrective actions the applicant decided to repeat portions of 2-PTI-063-03.

Inspection Activities: The inspectors witnessed the performance of preoperational re-test for test instruction 2-PTI-063-03 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 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;
- testing events and discrepancies were properly documented;
- 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 test to verify that the overall test acceptance criteria were 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 test, 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 SMP-9, Watts Bar Nuclear Plant Unit 2 Conduct of Test, Rev. 2.

### III. **OPERATIONAL READINESS ACTIVITIES**

#### O.1 **Operations**

##### O.1.1 **(Closed) Quality Assurance Program - QA/QC Administration (Inspection Procedure 35740B)**

a. Inspection Scope

Background: This IP provided guidance to the inspectors in reviewing QA program documentation to verify that the applicant had (1) Defined the scope and applicability of the QA Program, (2) Established appropriate controls for preparation, review, and approval of QA/QC group procedures, and (3) Established a mechanism for reviewing and evaluating the QA program. These controls have been well-established and implemented in support of Unit 1 operations.

Inspection Activities: The inspectors verified that Unit 1 QA/QC administrative controls will be applied to Unit 2 after construction is completed. The inspectors reviewed the applicant's Quality Assurance Department Transitions And Change Management Plan For Two-Unit Operations which was developed to ensure that personnel in the Nuclear Power Group (NPG) QA department have a clear understanding of responsibilities and activities associated with the transition of Watts Bar from a single-unit operating plant to a two-unit operating plant. The inspectors reviewed NC PP-14, Watts Bar Nuclear Plant Unit 2 Audits and Assessment, Attachment 1, Quality Assurance Program Transition Strategy for Watts Bar Unit 2; which defines the transfer of accountability for implementation of the QA program from Bechtel to TVA. The inspectors conducted interviews with TVA personnel to ensure that the transition plan and PP-14 were well understood and were being implemented effectively. The inspectors also reviewed the applicant's transition milestone action plan (tracked in the corrective action program) to verify that the scope was adequate to ensure a safe and effective transfer of QA/QC administrative controls to two-unit operation.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The transfer of accountability for implementation of the QA program from Bechtel to TVA will occur prior to fuel load.

c. Conclusions

The inspectors concluded that TVA has adequately planned to transition from a single-unit to a two-unit QA program. The current QA program for Unit 1 will transition to a QA program that will cover both units. No further inspection is required for adequate implementation of IP 35740B. IP 35740B is closed.

**O.1.2 (Closed) Quality Assurance Program - Audits (Inspection Procedure 35741B)**

a. Inspection Scope

The inspection was performed to satisfy the requirements of NRC IP 35741B, Sections II.2.a and II.2.b, based on the letter sent to TVA on November 8, 2013, describing the scope of inspections for the IPs listed in Appendix B of IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase, for Watts Bar Nuclear (WBN) Unit 2. The inspectors reviewed the following to verify that audits were performed in accordance with written procedures and checklists:

- TVA Nuclear Quality Assurance Plan (NQAP) (TVA-NQA-PLN89-A-Rev 29), Section 12.0, “Audit,”
- WBN Unit 2 Audit and Assessments Procedure (NC PP-14),
- The NPG department’s internal audits procedure (QADP-2), and
- Bechtel WBNP Unit 2 Construction Completion Project, Project Quality Assurance Audits and Audit Personnel Qualifications (25402-QAS-0003).

Additionally, audit schedules were reviewed to ensure long-range audit schedules or plans in effect, and areas to be audited, are consistent with technical specifications and Final Safety Analysis Report (FSAR) commitments. Interviews with responsible WBN NPG, Nuclear Construction (NC), and Bechtel QA personnel indicated that the transition to dual-unit operation has proceeded in accordance with a detailed transition action plan and is tracked in the corrective action program. Reviews of the various audit reports including NPG, NC, and Bechtel (SSA1404, SSA1405, NC 1202, NC1306, 25402-WBN-AR-14-001, 25402-WBN-AR-13-002) indicated audits covered areas designated in the audit schedule. Auditors were independent of any direct responsibility for the activities which they audited. Deficiencies identified during audits were resolved or tracked by the corrective action program.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that TVA has adequately planned to transition from a single-unit to a two-unit QA program. The current QA audit program for Unit 1 will transition to a QA program that will cover both units, and will meet the Technical Specification requirements and FSAR commitments. No further inspection is required for adequate implementation of IP 35741B. IP 35741B is closed.

**O.1.3 Quality Assurance Program - Procurement Control (Inspection Procedure 35746B)**

a. Inspection Scope

Background: Until commercial operations begin for WBN Unit 2, the construction purchasing activities including purchasing and receiving, vendor lists, and supplier audits are performed and supervised by TVA's construction contractor using their own, TVA approved, quality assurance manual.

Inspection Activities: The inspectors reviewed the WBN NQAP (TVA-NQA-PLN89-A-Rev. 29), Section 8.0, "Procurement and Material Control," and the "TVA Supply Chain Transition Plan for Two Unit Operation," Rev. 0, dated August 12, 2013. Samples were selected to satisfy the requirements of IP 35746B, Section II.2 "Implementation," in relation to WBN dual-unit procurement controls. The inspectors applied IP 35746B Section II.2.b for samples of recently purchased and received safety-related items, Section II.2.c for an approved vendor list, and Section II.2.d for supplier audits. The inspectors interviewed responsible procurement personnel and reviewed the WBN procurement procedures, procurement vendor lists, and supplier audits.

The inspectors reviewed procurement control procedures to verify that no revisions were required for dual-unit operation. The inspectors reviewed the following procedures:

- SC-SPP-04.02.01, "TVA Inventory Management Policy," Rev. 13, dated 12/16/2011;
- NPG-SPP-04.1, "Procurement of Material, Labor, and Services," Rev. 2, dated 07/01/2013;
- NPG-SPP-04.2, "Material Receipt and Inspection," Rev. 3, dated 02/03/2014; and
- NPG-SPP-04.3, "Material Storage and Handling," Rev. 1, dated 07/19/2011.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors determined from interviews and review of the procurement transition plan, that within 90 days of commercial operations, the WBN Unit 2 purchased inventory, as well as any new procurement requirements, will be transferred to TVA dual-unit WBN procurement control. Samples of safety-related items purchased under dual-unit procurement activities cannot be selected until that time. The construction contractor's "Evaluated Suppliers List" and the TVA "Acceptable Supplier List" (ACL) differed in that many of the vendors used for WBN Unit 2 construction were not on TVA's ACL. The transition plan indicated that these lists will be reconciled during

the transition, however this has not occurred yet. The construction contractor performed direct audits of the different vendors in order to qualify them for the WBN Unit 2 project. Supplier audits performed by TVA are currently performed by Nuclear Procurement Issues Committee (NUPIC) members or the TVA QA organization. Audits of the different vendors will be reconciled during the transition to WBN dual-unit procurement control.

The inspectors reviewed the procurement control procedures and could not identify any issues that would inhibit the transition to dual-unit operations. The inspectors noted that the "Watts Bar Nuclear Plant Operational Spares Strategy Document," dated December 10, 2013, identified major critical spares for both WBN units and both Sequoyah Nuclear Plant (SQN) units for stock, because WBN Unit 2 would no longer be available as a critical spares source. In addition, the plan identified the differences between WBN Unit 1 and WBN Unit 2 to facilitate purchase of those spares necessary for WBN Unit 2 startup and operation. A dual-unit inventory review evaluated the operational need and equipment criticality and a procurement strategy necessary to reach a targeted inventory level for startup.

c. Conclusions

The inspectors concluded that further inspection will be required to verify the adequacy of the completed transition to WBN dual-unit procurement controls in order to close IP 35746B. Specifically, the inspectors require samples of safety-related items that have been procured by the organization. IP 35746B will remain open.

**O.1.4 Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material (Inspection Procedure 35747B)**

a. Inspection Scope

Background: Until commercial operations begin for WBN Unit 2, the construction receipt, storage, and handling of equipment and material program activities are being performed and supervised by TVA's construction contractor using their own, TVA approved, quality assurance manual and procedures.

Inspection Activities: The inspectors reviewed the WBN NQAP (TVA-NQA-PLN89-A-Rev. 29), Section 8.2, "Control of Purchased Material, Equipment, and Services," Section 8.3 "Identification and Control of Materials, Parts, and Components," Section 9.6 "Handling, Storage, and Shipping," and the "TVA Supply Chain Transition Plan for Two Unit Operation," Rev. 0. Samples were selected to satisfy the requirements of IP 35747B Section II.2 "Implementation," in relation to the dual-unit controls for receipt, storage, and handling of equipment and material. Based on the letter sent to TVA on November 8, 2013, describing the scope of inspections for the IPs listed in Appendix B of IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase, for Watts Bar Nuclear (WBN) Unit 2, the inspectors applied IP Section II.2.b for samples of safety-related items stored in the warehouse, Section II.2.c for safety-related items stored in the offsite warehouse, and Section II.2.d for warehouse tours to ensure appropriate cleanliness and environmental controls were maintained. The inspectors reviewed the WBN and Bechtel procedures, and interviewed responsible material storage and handling personnel.

The inspectors toured the following warehouses and laydown yards:

- Warehouses 4, 5, 6, and 7
- Spring City Warehouse
- Laydown Yard B

The inspectors verified the following six components were properly tagged and stored:

- ASME ¾" pipe seamless 0.219" carbon steel, QA-1 Class II, Storage Level D  
Cat ID: CRP174M  
MRR: 43807  
PO: 702943-1  
UTC: 620803  
Heat: 00A101460  
Location: Laydown Yard B
- Globe Valve ½" carbon steel Anderson Greenwood Crosby, QA-1 Class III, ANSI B16.5, Class 1700, PST 700, Storage Level C  
UNID: WBN-2-DRV-3-0919  
MRR: 47W427-A2746  
PO: 3871  
UTC: 203530  
Part: 5617B  
SN: 387102  
Location: Warehouse 5
- Electrical Box, DCS Electronics Inc., 12"X12" QA-1, Storage Level C  
UNID: 2-JB-290-6707-G  
CAT ID: BWG047Q  
PO: 62608-1  
UTC: 147283  
SN: S1030-SN-02  
Location: Warehouse 7
- Pressure Transmitter, Rosemount, Storage Level S  
CAT ID: CPH027H  
PO: 512290  
MRR: 000500120  
Part: 1154DH4RC  
UTC: 395164  
Trace: 391476-1  
SN: 0546897  
Location: Warehouse 7
- Solenoid Valve, 4" Class II, ASME SA182, Storage Level C  
CAT ID: CPK270J  
PO: 78776  
Part: 82AB-001-4BB  
UTC: 182466  
Heat: KXL



SN: 25

Location: Spring City Warehouse

- Cable Assembly, NAMCO Connector, QA-1, 20ft (240"), Storage Level B  
 CAT ID: CPK290C  
 PO: 26088-12  
 MRR: 000008434  
 UTC: 24099  
 Lot: 414108  
 Date code: 5009  
 EC: 290-29020  
 Location: Spring City Warehouse

Documents reviewed are listed in the Attachment.

b. Observations and Findings

The inspectors noted that the transition plan determined that the procedures controlling storage and handling required no revisions for dual-unit operation. The inspectors identified these procedures as NPG-SPP-04.2, "Material Receipt and Inspection," Rev. 3, dated February 3, 2014, and NPG-SPP-04.3, "Material Storage and Handling," Rev. 1, dated July 19, 2011. The inspectors reviewed these procedures and could not identify any inadequacies that would inhibit the transition to dual-unit operations. The inspectors also reviewed contractor procedure 25402-PRO-0007, "Field Material Storage Control," Rev. 5.

Introduction: The inspectors identified an Unresolved Item (URI) associated with storage of safety-related Level S components.

Description: A walkdown of WBN Unit 2 contractor Warehouses 4, 5, 6, and 7, and the Spring City Warehouse revealed that safety-related equipment that was tagged "Level S Storage" may have been stored in warehouses with inadequate temperature controls to ensure the components life cycle was not reduced due to environmental conditions. The inspectors performed an independent walkdown of WBN Unit 2 warehouses and identified a Rosemount pressure transmitter in WBN Unit 2 warehouse 7. Warehouse 7 is a Level B storage facility with a temperature band of 40-140°F. The Rosemount transmitter has an allowable temperature band of 40-120°F which is more restrictive than the Level B temperature band. The applicant identified additional Level S components and is currently verifying if they have been properly stored and controlled. The inspectors also identified that the applicant's material storage and handling procedures do not define Level S storage. In response to the observations within this URI, the applicant issued PER 920312 to perform an additional review of all of the Level S components and determine potential effects of improperly stored Level S safety-related components that have been installed in WBN Unit 2.

Further review is needed to determine if a performance deficiency exists. The following items should be reviewed to address the URI:

1. Review the actions associated with PER 920312;
2. Perform an independent review of the extent of condition data;
3. Evaluate the corrective actions associated with those items applicable to WBN Unit 2.

This unresolved item is identified as URI 05000391/2014607-01, Potential Inadequate Storage of Safety-Related Equipment.

c. Conclusions

The inspectors identified URI 05000391/2014607-01, Potential Inadequate Storage of Safety-Related Equipment. The inspectors concluded that further inspections are required to verify the adequacy of IP 35747B. IP 35747B will remain open.

**O.1.5 Quality Assurance Program - Records (Inspection Procedure 35748B)**

a. Inspection Scope

Background: This IP provided guidance to the inspectors in reviewing QA records program documentation to verify that the applicant had developed a QA program relating to the control of records that is in conformance with regulatory requirements, and industry guides and standards. The record storage program has been well-established under the Unit 1 organization.

Inspection Activities: Based on the letter sent to TVA on November 8, 2013, describing the scope of inspections for the IPs listed in Appendix B of IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase, for Watts Bar Nuclear (WBN) Unit 2, the inspectors performed section II.2.b of IP 35748B to verify that Unit 2 will be incorporated into the established record storage program at Watts Bar when dual-unit operation begins.

The inspectors reviewed the applicant's WBN Support Services, Security and Licensing Transition Plan for Two Unit Operations. The inspectors reviewed the applicant's records management procedures (NPG-SPP-31.2 and NC PP-22) to verify that procedures were being followed and that NPG-SPP-31.2 would be adequate for dual-unit operation. The inspectors conducted interviews with TVA personnel to ensure that the transition plan was well understood and was being implemented effectively. The inspectors walked down the record vault and records processing facilities to ensure that they were in accordance with the NQAP requirements. The inspectors performed IP 35748B step II.2.b to verify that QA records were being handled and stored appropriately. These records included:

- FCR 57675-A, 2-FT-070-165C Setpoint Change, dated March 25, 2011
- FCR 62775-A, Drawing Revision, dated December 11, 2013
- Personnel Training Record, WB2-190, dated August 4, 2010
- Personnel Training Record, WB2-364, dated February 12, 2014
- WO 111452136, HVAC Functional Test, dated May 15, 2013
- WO 111033786, Air Operated Valve/Damper Test, dated May 9, 2013
- WO 110743623, Minor Maintenance WBN-2-FCV-027-0140, dated March 18, 2010
- WO 110940183, Minor Maintenance WBN-2-FCV-063-0158, dated December 12, 2013
- 25402-011-MRA-EWE2-00310, Receipt Inspection, Rev. 0
- 254022-000-FMR-E000-00127A, Receipt Inspection, Rev. 0

Documents reviewed are listed in the Attachment.

b. Observations and Findings

Introduction: The inspectors identified a URI associated with storage of QA records.

Description: On January 18, 1990, the NRC approved TVA's NQAP as acceptable to meet 10 CFR Part 50, Appendix B. The applicant's NQAP states, in part that, TVA will provide two-hour minimum fire-rated protection for QA records and utilize one of the following alternatives as single storage facilities:

1. A fire-resistive vault or file room that meets the applicable requirements of ANSI 45.2.9-1974 with the following exceptions:
  - a. Records will be afforded the protection of a two-hour rated facility.
  - b. Records will be stored in fully enclosed cabinets.
  - c. Structure, doors, frames, and hardware shall be designed to fully comply with a minimum two-hour rating.
  - d. Pipes or penetrations will be allowed for fire protection, lighting, temperature, humidity control, or communications.
  - e. Work not directly associated with records storage or retrieval will be prohibited in the facility.
  - f. Smoking and eating/drinking will be prohibited throughout the records facility.
2. One-hour fire-rated cabinets if the following conditions are met:
  - a. The records are re-creatable, OR
  - b. Are contained within a facility of fire-resistive construction with adequate smoke detection or fire-suppression systems: OR
  - c. Are within a facility with a fuel loading less than 25 pounds/square foot as defined by National Fire Protection Act (NFPA) 232-1980.

During the review of the above part of TVA's NQAP, the inspectors questioned whether TVA met both parts of the statement, "TVA will provide two-hour minimum fire-rated protection for QA records and utilize one of the following alternatives as single storage facilities." TVA utilized Trailer 71 and room EQB1D as facilities to process QA records. Trailer 71 and room EQB1D met the second part of the statement by following alternatives 2.c. and 2.b., respectively, of the NQAP as a single storage facility. However, TVA had not demonstrated that the configuration of Trailer 71 met the first part of the statement, that the single storage facility was equivalent to two-hour fire-rated protection. In response to the observations within this URI, the applicant issued PER 927528 to review the URI and make corrective actions if necessary.

Further review is needed to address the issue of concern as defined by IMC 0612, "An issue of concern about which more information is required to determine (a) if a performance deficiency exists, (b) if the performance deficiency is More-than-Minor, or (c) if the issue of concern constitutes a violation. Such a matter may require additional information from the licensee or cannot be resolved without additional guidance, or clarification/interpretation of the existing guidance." The NRC will review and evaluate the data that was received during the inspection to address the URI. This unresolved

item is identified as URI 05000391/2014607-02, Potential Inadequate Storage of QA Records.

c. Conclusions

The inspectors identified URI 05000391/2014607-02, Potential Inadequate Storage of QA Records. The inspectors concluded further inspection will be required to verify the adequacy of IP 35748B. IP 35748B will remain open.

**O.1.6 (Closed) Quality Assurance Program - Safety Review Committee (Inspection Procedure 40301)**

a. Inspection Scope

Background: This IP provided guidance to the inspectors in reviewing QA safety review committee program documentation to verify that the on-site and off-site review committees or their equivalents were established and functioning in conformance with technical specifications requirements and FSAR. These requirements have been well established under the Unit 1 organization.

Inspection Activities: Based on the letter sent to TVA on November 8, 2013, describing the scope of inspections for the IPs listed in Appendix B of IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase, for Watts Bar Nuclear (WBN) Unit 2, the inspectors verified that Unit 2 will be incorporated into the established safety review committee program at Watts Bar when dual-unit operation begins.

The inspectors reviewed the applicant's 2014 Nuclear Construction Review Board (NCRB)/Nuclear Safety Review Board (NSRB) Quality Assurance Transition Strategy which was developed to ensure that personnel in the NPG QA department have a clear understanding of responsibilities and activities associated with the transition of Watts Bar from a single-unit operating plant to a safe dual-unit operating plant. The inspectors reviewed procedure NPG-SPP-03.2, Nuclear Safety Oversight, to ensure that it was adequate to support dual-unit operation. The inspectors conducted interviews with TVA personnel to ensure that the transition plan was well understood and is being implemented effectively.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded no further inspection will be required to verify the adequacy of IP 40301. IP 40301 is closed.

## **F. 1 Fire Protection**

### **F.1.1 Postfire Safe Shutdown, Emergency Lighting and Oil Collection Capability at Operating and Near-Term Operating Reactor Facilities (Inspection Procedure 64100)**

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

The inspectors observed a Dual-Unit Appendix R Fire Demonstration for a fire in room 757-A22 to verify that operators could reasonably perform the procedures within applicable shutdown time requirements. The Dual-Unit Appendix R Fire Demonstration included:

- a fire scenario where both units were required to shutdown
- short duration actions in the main control room (MCR)
- operator manual actions (OMAs) outside the MCR.

The inspectors reviewed procedures 0-AOI-30.1, Plant Fires, Rev. 0 and 0-AOI-30.2 C.30, Fire Safe Shutdown Room 757-A22, Rev. 0, which were used in the demonstration; and applicable portions of the draft As-built Fire Protection Report to verify that required OMAs were adequately translated.

Documents reviewed are listed in the Attachment.

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

No findings were identified.

#### **c. Conclusions**

The inspectors concluded that the observed demonstration provided reasonable assurance that operator manual actions could be performed within the allowable shutdown time requirements.

### **F.1.2 Fire Protection Program (Inspection Procedure 64704)**

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

The inspectors reviewed and walked down WO 110798108, "Replace Disconnect Switches 2-SW-068-0394-A and 2-SW-068-0395-B," dated March 28, 2014, to verify that the change did not decrease the effectiveness of the fire protection program, and had no adverse effect on the ability to achieve safe shutdown. The purpose of the change was to ensure that the head vent throttle valves, 2-FSV-68-396-B-P and 2-FSV-68-397-A-P, stayed closed during certain fire scenarios. The applicant added switches/contacts to isolate wires from the control building portion of the circuit to prevent spurious opening of the valves.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based upon the review of a facility change affecting fire protection, the inspectors concluded that the reviewed activities conformed to the applicable regulatory requirements.

## **ST.1 Surveillance Testing**

### **ST.1.1 Quality Assurance Program-Tests and Experiments (Inspection Procedure 35749B)**

a. Inspection Scope

Background: Until commercial operations begin for WBN Unit 2, the WBN 10 CFR 50.59 program activities and procedures do not include WBN Unit 2.

Inspection Activities: The inspectors reviewed the WBN 10 CFR 50.59 program procedures. Additionally, the inspectors reviewed all of the design change procedures and training documents associated with the 10 CFR 50.59 process. The inspectors also interviewed operations and engineering personnel who had received the WBN 1 & 2 difference training, and reviewed the difference training lesson plans, as well as the operations and engineering continuous training schedule.

The inspectors reviewed the WBN procedures NPG-SPP-09.4, "10 CFR 50.59 Evaluations of Changes Tests, and Experiments," Rev. 8, NPG-SPP-09.5, "Temporary Modifications," Rev. 8, and NEDP-8.4, "Equivalency Evaluation for Procurement and Use of Replacement Materials and Items," Rev. 0. The inspectors determined the procedures were generic and did not require any changes to incorporate WBN Unit 2. The inspectors noted some procedures associated with the modification and design change process would require removal of WBN Unit 2 exceptions. The inspectors reviewed the engineering qualification procedures for the 10 CFR 50.59 modifications and evaluations process.

The inspectors verified that all of the engineers will be receiving the WBN Units 1 & 2 difference training during continuous training segments. The inspectors reviewed the lesson plans and noted that they include the system differences and common system vulnerabilities. The inspectors also verified that the training requirements would be updated to incorporate WBN Unit 2 specific training for engineers performing evaluations on WBN Unit 2. Additionally, the inspectors verified that operators have been receiving WBN 1 & 2 difference training during their licensed operator requalification training segments. The inspectors verified the 2015 and beyond initial license training classes, are scheduled to receive the difference training and receive dual-unit licenses. The inspectors also reviewed the training schedule to determine when maintenance, and other technical branches that may have input into the 10 CFR 50.59 process, would be receiving the difference training. The inspectors verified that all of the difference training is scheduled to be completed by the end of 2014.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors had one observation regarding the master equipment list (MEL)/Maximo database which is used when performing modification changes and 10 CFR 50.59 evaluations. The applicant did not provide a transition plan or any information regarding the final updates required to ensure the MEL/Maximo database is compliant with the existing plant configuration after the contractor has completed their initial upload into Maximo for WBN Unit 2. The inspectors did not receive a transition plan for the 10 CFR 50.59 program or the MEL/Maximo database upload, that would identify what departments will be completing the final WBN Unit 2 transitional phase in the Maximo database. The inspectors were unable to verify if the information that will not be uploaded by the WBN Unit 2 contractor, but is needed for safety-related equipment programs (i.e. locked valve program, fuse program, environmental qualification (EQ) program, and emergency preparedness (EP) program equipment), will be uploaded by the time WBN Unit 2 is on line.

c. Conclusions

The inspectors concluded that further inspection will be required to verify the adequacy of the completed transition to WBN dual-unit test and experiment controls.

**ST.1.2 (Closed) Quality Assurance Program-Measurement and Test Equipment (Inspection Procedure 35750)**

a. Inspection Scope

Based on the letter sent to TVA on November 8, 2013, describing the scope of inspections for the IPs listed in Appendix B of IMC 2513, Light Water Reactor Inspection Program – Preoperational Testing and Operational Preparedness Phase, for Watts Bar Nuclear (WBN) Unit 2, the inspectors verified that Unit 2 will be incorporated into the established M&TE program at Watts Bar when dual-unit operation begins.

The inspectors reviewed the WBN Unit 2 preoperational testing activities to determine whether they used the established WBN site measurement and test equipment (M&TE) program. In addition, the inspectors reviewed the maintenance transition plan for dual-unit operations to determine whether the WBN Unit 1 M&TE program would continue to be the basis for dual-unit operations. The inspection reviewed the WBN NQAP M&TE procedures, startup group (SUT) completed work orders, M&TE usage reports, the maintenance transition plan, and interviewed responsible preoperational and startup group personnel.

Interviews with responsible WBN SUT personnel determined that TVA was directly responsible for these activities and that WBN Unit 2 construction funded the existing WBN Unit 1 M&TE program to support the WBN Unit 2 activities. The review of completed work orders (1112640106, 112226423, and 112226620) determined that TVA personnel, not the construction contractor, were performing preoperational and startup activities and that they were utilizing the WBN Unit 1 M&TE program. The M&TE usage reports documented that SUT work activities used adequately controlled M&TE. The "Maintenance Department Transition and Change Plan for Two Unit Operation," Rev. 4,

documented the plan to transition to common maintenance processes and procedures, facilities, and special equipment for WBN Unit 2 commercial operations.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that no further inspection will be required to verify the adequacy of IP 35750. IP 35750 closed.

## **R.1 Radiation Safety**

### **R.1.1 Liquids and Liquid Wastes (Preoperational and Supplemental) (Inspection Procedure 84523)**

a. Inspection Scope

During the week of August 4-8, 2014, the inspectors walked-down accessible sections of the Unit 2 liquid radioactive waste processing system (System 77) and Unit 2 liquid effluent monitoring system (System 90) and assessed the components for material condition and conformance with system design documents including the FSAR. The walkdowns included observations of the following System 77 and System 90 components that are unique to Unit 2 (along with associated pumps, valves, and piping):

- steam generator blowdown effluent monitor (2-RE-90-120/121)
- reactor coolant drain tank (RCDT)
- reactor building floor and equipment drain sump
- reactor building floor and equipment drain pocket sump.

The inspectors discussed component function and liquid radwaste program implementation with applicant staff. The inspectors also reviewed primary calibration records for the 2-RE-90-120/121 detector type (RD-53 Offline Gamma Detector), as performed at a vendor facility.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified concerning Unit 2 liquid radwaste system preoperational activities. The inspectors determined that the bulk of the Unit 2 liquid radwaste processing system is shared with Unit 1 and has been successfully operating since Unit 1 startup (1996). The inspectors also noted that System 77 components were designed and built for dual-unit operational capacities. However, of those few System 77 components unique to Unit 2, only a small number have been turned over to the startup engineering group. These included valves WBN-2-FCV-077-0003 (RCDT drain valve, flow control) and WBN-2-LCV-077-0415 (RCDT drain valve, level control). The



inspectors reviewed operational testing records for these two valves. The inspectors also noted that several System 77 valves are relied upon during a containment isolation signal; however, they have not been turned over to startup engineering and were therefore not available for review.

System 90 liquid effluent monitors have not been turned over to startup engineering either, however, the inspectors observed parts of 2-RE-90-120/121 that are under construction. The inspectors noted that most of the sample lines have been installed according to design documents. However, a few isolation valves have not been installed and the cross-tie between 2-RE-90-120 and 2-RE-90-121 has not yet been completed. The inspectors also noted that the detector skids for the two redundant monitors are physically located at their appropriate locations in the turbine building, but are not yet powered and have not had preoperational testing performed.

c. Conclusions

This inspection procedure could not be completed because several System 77 and System 90 components have not yet had preoperational testing performed. Future inspections in this area should include an evaluation of preoperational testing records for the RCDT, containment sumps, and associated pumps and valves (including those relied upon to isolate containment); to the extent that Unit 2 System 77 can reasonably be verified as operable. This also includes a review of sampling procedures to verify Unit 1 protocols have been incorporated or new protocols are adequate. Additional inspection activities for System 90 liquid effluent monitoring components should include a review of 2-RE-90-120/121 functional testing (transfer calibrations, loop testing, automatic actuations, etc.).

**R.1.2 Gaseous Waste System (Preoperational and Supplemental) (Inspection Procedure 84524)**

a. Inspection Scope

During the week of August 4-8, 2014, the inspectors walked-down accessible sections of the Unit 2 gaseous waste disposal system (GWDS) (System 77), the Unit 2 gaseous effluent monitoring system (System 90), the auxiliary building gas treatment system (ABGTS) (System 30), reactor building purge ventilating system (RBPVS) (System 30), and the emergency gas treatment system (EGTS) (System 65). Equipment and components were assessed for material condition and conformance with system design documents including the FSAR. The walkdowns included observations of the following System 77 and System 90 components that are unique to Unit 2 (along with associated pumps, valves, and piping):

- containment purge air exhaust monitors (2-RE-90-130/131)
- pressurizer relief tank (PRT)
- RCDT
- volume control tank (VCT).

The inspectors discussed component function and gaseous radwaste program implementation with applicant staff. The inspectors also reviewed primary calibration

records for the 2-RE-90-130/131 detector type (RD-52 Offline Beta Detector), as performed at a vendor facility.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified concerning Unit 2 gaseous radwaste system preoperational activities. The inspectors determined that the bulk of the Unit 2 gaseous radwaste processing system is shared with Unit 1 and has been successfully operating since Unit 1 startup (1996). The inspectors also noted that System 77 components were designed and built for dual-unit operational capacities. However, of those few System 77 components unique to Unit 2, only a small number have been turned over to the startup engineering group. These included valves in the nitrogen supply piping of the gaseous radwaste system, WBN-2-FCV-063-0063 (SIS accumulator Tk 4 N2 makeup valve) and WBN-2-FCV-063-0064-A (SIS accumulator Tk N2 header inlet valve). The inspectors reviewed operational testing records for these two valves. The inspectors also noted that several System 77 valves are relied upon during a containment isolation signal; however they have not been turned over to startup engineering and were therefore not available for review.

System 90 gaseous effluent monitors have not been turned over to startup engineering either, however the inspectors observed portions of 2-RE-90-130/131 (containment purge exhaust) that are under construction and 2-RE-90-400 (shield building vent monitor) which is currently in service and required for Unit 1 operation. The inspectors noted that the RE-130/131 detector skids are bolted in place but that the sample lines, isolation valves, and electrical and signal wiring have not been installed and preoperational testing has not been performed. In addition, several additional flow sensor (isokinetic) channels have to be installed in the 2-RE-400 flow monitoring system before preoperational testing can be completed.

The ABGTS ventilation is shared with Unit 1 and required for Unit 1 operation. The RBPVS and EGTS are Unit 2 specific, but have not yet been turned over to startup engineering. Preoperational testing and the system flow balance will be performed using simulated filtration. Charcoal and high-efficiency particulate air (HEPA) filters will be installed and tested just prior to fuel load.

c. Conclusions

This inspection procedure could not be completed because several GWDS components have not yet had preoperational testing performed. Future inspections in this area should include a review of preoperational testing records related to Systems 30, 65, and 77. This includes the ability of the GWDS to collect waste gas from the VCT, PRT, and RCDT; operability of associated pumps and valves (including those relied upon to isolate containment), and an evaluation of charcoal/HEPA air cleaning systems. This also includes a review of sampling procedures to verify Unit 1 protocols have been incorporated or new protocols are adequate. Additional inspection activities for System 90 components should include a review of 2-RE-90-130/131 functional testing (transfer calibrations, loop testing, automatic actuations, etc.).

### **R.1.3 (Closed) Radiological Environmental Monitoring (Preoperational and Supplemental) (Inspection Procedure 80521)**

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

During the week of August 4-8, 2014, the inspectors reviewed and discussed with licensee staff the most recent draft of the dual-unit Offsite Dose Calculation Manual (ODCM), which contains the requirements for the radiological environmental monitoring program (REMP). The inspectors also performed a baseline inspection of the Unit 1 REMP under the Reactor Oversight Process (ROP) using IP 71124.07. The Unit 1 inspection included all of the inspection requirements of IP 80521 and will be documented in Watts Bar Unit 1 Quarterly Inspection Report 05000390/2014004.

Documents reviewed are listed in the Attachment.

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

No findings of significance were identified concerning the Unit 2 REMP. The inspectors determined that the REMP, meteorological monitoring program, and associated quality assurance program requirements are shared with Unit 1 and have been successfully operating since Unit 1 startup (1996). No additional air or water sampling stations or offsite thermo luminescent dosimeter locations will be added by the applicant for Unit 2 operation. The inspectors determined that the existing Unit 1 REMP will be adequate for Unit 2 operation once the dual-unit ODCM becomes effective.

#### **c. Conclusions**

No further inspection is required, this IP is closed.

## **IV. OTHER ACTIVITIES**

### **OA.1.1 (Discussed) Violation 391/87-19-02, Failure to Preserve Equipment Installed in the North and South Valve Rooms (Inspection Procedure 50090)**

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

Background: During an NRC inspection of the north and south valve rooms conducted in October, 1987, several examples of failure to control the preservation of equipment and general housekeeping deficiencies were found. This was identified as a violation (VIO) of 10 CFR Part 50, Appendix B, Criterion XIII, which requires, in part, "that measures shall be established to control the handling, storage, shipping, cleaning, and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration." VIO 50-391/87-19-02 was issued to document these deficiencies. The applicant initiated six PERs to address the 13 examples of this violation associated with the maintenance and preservation issues found in the north and south valve rooms. The 13 examples are described in NRC IIR 05000391/2013605 (ADAMS Accession No. ML13220A640), Section OA.1.7.

Inspection Activities: The inspectors reviewed the applicant's engineering closure packages, PERs, engineering document construction releases (EDCRs), drawing revision authorizations (DRAs), and WOs to determine if the corrective actions

associated with the hardware deficiencies satisfied the concerns identified in the VIO mentioned above.

The inspectors performed field verifications on the following examples:

Example 8: Junction Box 2JB-292-1515A had a broken flexible conduit and corrosion on some of the terminal and controller leads. The flexible conduit was replaced. The corrosion observed inside the junction box was placed in the applicant's corrective action program. No further inspection is required.

Example 10: A wooden ladder was found bearing against the motor terminal box cover of valve 2-FCV-1-15. The inspectors performed a walkdown to verify the condition of the terminal box cover. No damage was found on the terminal box or its immediate components. No further inspection is required.

Example 12: Valves 2-FCV-3-033-A and 2-FCV-3-047B had excessive corrosion and condensation. The applicant initiated WOs 112362331 and 112362166 to document the refurbishment of both valves. The inspectors performed a walkdown to verify that the damage caused by the corrosion and condensation was properly addressed by corrective actions. No further inspection is required.

Example 13: A bent rod was observed on spring can support 47A427-3-9. The spring can support was replaced with a rigid support, eliminating any previously identified issues. No further inspection is required.

NRC Inspectors also reviewed three additional examples associated with VIO 391/87-19-02:

- Numerous instances of uncapped conduits were found in the valve rooms
- Hanger pins and other loose electrical parts were found lying in the valve rooms
- Water pockets were observed in several locations throughout the north valve room.

The inspectors reviewed procedures associated with housekeeping and turnover of the valve rooms and interviewed responsible applicant personnel to determine if the three aforementioned issues were adequately addressed and effectively tracked by the corrective action program. No further inspection is required for these examples.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusions

The corrective actions for seven of the 13 examples associated with VIO 391/87-19-02 were determined to be adequate by NRC inspectors. This VIO remains open pending inspection of the remaining six examples.

### **OA.1.2(Discussed) Construction Deficiency Report 391/83-48: Relocating Sensing Lines on Upper Containment Cooler (Inspection Procedure 92701)**

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

Background: The deficiency was initially reported to the NRC on August 10, 1983, as Nonconformance Report (NCR) WBN NEB 8321 in accordance with 10 CFR 50.55(e). The issue was documented as CDR 390/83-50 for Unit 1 and CDR 391/83-48 for Unit 2. The CDRs were primarily related to the ventilation system (System 30) sensing line flow switches, which were not installed in accordance with mounting drawings. For Unit 1, CDR 390/83-50 was closed in NRC IR 50-390/84-53 and 50-391/84-42 (ADAMS Accession No. ML072570621). NRC IIR 05000391/2013604, Section OA 1.4 (ADAMS Accession No. ML13179A079) documented additional background details and inspection results for CDR 391/83-48.

Inspection Activities: During this inspection, the inspectors interviewed applicant staff and reviewed the applicant's engineering complete closure documentation, including referenced documents, and actions associated with PER 172601 to determine if the corrective actions associated with the sensing line deficiencies were properly resolved and documented. The inspectors observed in-process installation of sensing lines for two flow switches associated with PER 172601. The inspectors reviewed several work order packages, drawings, and EDCRs. These installations were compared against design and installation drawings to determine if they matched the as-built condition and to verify if the sensing lines were located on the correct discharge side of the fans.

The following in-process installations of flow switches were observed:

- 2-FS-30-78 A/B & B/A
- 2-FS-30-78 C/D & D/C.

Documents reviewed are listed in the Attachment.

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

No findings of significance were identified.

#### **c. Conclusions**

Corrective actions were found to be adequate, and the as-built condition matched final drawings and records. Additional field observations are required to verify that installation work was adequately performed to physically resolve the deficiencies associated with sensing lines and flow switches identified in CDR 391/83-48.

### **OA.1.3(Discussed) 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 WBP 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. Fire hazard analysis calculation FSG-CAM-022787 concluded that the 3-hour fire barrier shield building wall would be breached if the expansion joints were exposed to fire. The fire would be supported by combustible materials, such as oil, grease, charcoal, rubber, plastic, and electrical cables. Based on the amount of combustible material, propagation of a fire through the shield building wall was considered likely. Also, the bellows expansion joints did not have a documented environmental qualification for radiation. The synthetic material used in these bellows (Neoprene) begins to experience change in physical properties when subjected to radiation doses in the range of 10 rad. The integrated accident dose these bellows would experience is in the range of 12 to 20 rads. If this dose were combined with the accumulated 40-year normal integrated dose, the bellows could fail to perform their design function.

The NRC closed CDR 390/87-14 in NRC IR 50-390/95-77 and 50-391/95-77 (ADAMS Accession No. ML072610797), dated December 6, 1995. The closure actions for Unit 1 included:

- Unit 1 compiled a listing of all safety-related bellows/expansion joints in the plant HVAC systems. This action also included updating of fire compartmentation drawings to show fire cells.
- An analysis of the fire cells was performed considering the material which was used to fabricate the bellows/expansion joints. This analysis resulted in corrective action for several cells.
- The bellows at the containment penetrations in the containment purge air system were wrapped with 3-hour fire rated fabric (DCN36185).
- It was determined that the materials used to fabricate the HVAC joints had been purchased on two contracts. Review of these contracts and the vendor supplied documentation determined that the joints fabricated were acceptable for both EQ and Appendix R applications. However, some of the materials were not certifiable and were replaced (DCN M-08936-A).
- Unit 1 installed fire dampers at locations where ducts penetrated auxiliary building floors (DCN W-35361-A).
- In order to prevent recurrence, engineering procedures were revised to provide for an interdisciplinary review and to clearly require design changes to consider fire protection and EQ requirements.

For Unit 2, historical PER WBP890151SCA addressed Unit 2 CDR 391/87-15 and the remaining actions are currently found in PER144090. The Unit 2 deficiencies are addressed in a similar manner as Unit 1 as follows:

- The remaining Unit 2 flexible connector modifications are addressed by EDCRs 52861 (work scope 1), 52882 (work scope 3), and 52953 (work scope 2). The action also includes updating the fire compartmentation drawings.
- Calculation EPM-RA-032795, "Appendix R-Evaluation of Duct Opening Protection in Fire Rated Walls" is applicable to both Units.

- The bellows at the containment penetrations in the containment purge air system were wrapped with 3-hour fire rated fabric. The 3M fire wrap material specified in EDCR 54923 (work scope 38) is no longer available. As an alternative, the 3-hour "Fire Resistive System" is manufactured by Thermal Ceramics Inc. (Fire Master Fast Wrap XL). DRAs 54923-359 and 54923-360 are revised to show the Thermal Ceramics Inc. product application.
- Unit 2 flexible connector's material meets the requirements of NFPA 90A as demonstrated by purchase order (PO) number 33782-156. The flexible connectors were rated for the allowable dose given in drawing 3-47E235-56, Table 2, Environmental Data, Environment –Harsh, EL 713.0, for Unit 2 room A19.
- DCN 35361 addressed the addition of fire dampers in the Auxiliary Building HVAC duct floor penetrations for Unit 1 and 2.
- Engineering procedures were revised to provide for an interdisciplinary review and to clearly require consideration of fire protection and EQ requirements during design changes.

Inspection Activities: The inspectors reviewed WOs 112411930 and 112461853, and performed field verification of installed Unit 2 flexible connectors in System 30A HVAC ducts as required by EDCRs 52882.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on field verification and review of the applicant's engineering complete and partial closure packages, the inspectors concluded that the applicant has proposed and implemented adequate corrective actions. However, additional inspections are required to review the implementation of additional corrective actions.

**OA.1.4 (Discussed) Construction Deficiency Report 391/89-08: Kapton Insulated Pigtail Insulation Damage (Inspection Procedure 51053)**

a. Inspection Scope

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

wires for damage, to state that appropriately trained modifications personnel utilizing a two-party inspection process would be used instead.

During additional inspections of electrical penetrations in 1994, the NRC identified numerous examples of Kapton pigtail damage on work that had been completed and inspected by the applicant (IR 50-390/94-61 and 50-391/94-61, ADAMS Accession No. ML072980623). At the time of these inspections, walkdowns to inspect for damage were complete. The corrective actions developed for the CDR, as well as the management overview of implementation, were found inadequate and VIO 50-390/94-61-02 was issued. As a result, of the inspector's findings, the applicant conducted inspections of five additional penetrations and found damaged wires on four of the five penetrations; the applicant issued significant corrective action report (SCAR) WBP SCA640055. By letter dated November 14, 1994 (ADAMS Accession No. ML072980636), the applicant cited additional actions to correct the underlying deficiencies with the identification and correction of potentially damaged primary containment electrical penetrations containing Kapton insulated pigtails.

On the basis that TVA will implement methods consistent with those used at WBN Unit 1 and using the requirements in General Construction Specification G-38, "Installation, Modification and Maintenance of Insulated Cables Rated Up To 15,000 Volts," Rev. 20. TVA's original commitments in this regard were to: 1) issue design output detailing QC inspection and repair/rework requirements; and 2) complete all corrective actions for this deficiency before Unit 2 fuel loading. Additional actions, which came from the applicant response to VIO 50-390/94-61-02, were to: 1) inspect all class 1E and accessible non-1E electrical penetrations, 2) modify G-38 to provide alternate repair methods on Kapton insulators and to install permanent protective barriers, and 3) provide training to craft, quality control inspectors, and field engineers in the proper repair methods for Kapton insulators.

By letter dated December 17, 2013 (ADAMS Accession No. ML13360A210) the applicant revised their commitment to state that an inspection of the WBN Unit 2 electrical penetration Kapton insulated pigtails for damage utilizing a TVA Nuclear Engineering (NE) cable specialist or NE designee will be conducted. In addition, the applicant stated that they would conduct a final inspection of each bundle's outside cables to validate that there is no new damage to the Kapton pigtail, following construction activities at each penetration, but prior to installation of the protective polyolefin heat shrink on each bundle of cable. In addition, if damage was found, the NE cable specialist/NE designee shall inspect the next layer of cables for damage and will continue this process until a layer of cables with no damage is found. A repair sheet would be completed for any damages found, and construction would complete the required repairs with QC present.

Additionally, previous inspections of Kapton pigtails were documented in IIR 05000931/2010603 (ADAMS Accession No. ML102170465) Section T.1.1 and IIR 05000931/2014603 (ADAMS Accession No. ML14129A381) where the NRC observed the Kapton insulated conductor familiarization course training.

Inspection Activities: The inspectors observed field engineers and NEs performing quality inspections of the individual strands comprising the Kapton insulation system for 2-PENT-293-6-A. The inspectors observed repairs resulting from the inspections to verify that proper procedures were followed.



Inspectors also reviewed General Engineering Specification G-38, Section 14, and MAI 3.3, Rev. 31, Appendix F to verify that Kapton insulated pigtail protection and inspection requirements had been appropriately incorporated.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of were identified.

c. Conclusions

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

**OA.1.5(Discussed) Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance (Inspection Procedure 70312 and Temporary Instruction 2515/109)**

a. Inspection Scope

The inspectors observed dynamic motor-operated valve (MOV) diagnostic testing for the following GL 89-10 MOV:

- 2-FCV-063-0175-B, safety injection pump 2B minimum recirculation isolation valve

The inspectors reviewed test activities to determine if they were properly controlled and handled. To make those determinations, the inspectors reviewed work instructions, applicable design specifications, calculations, system descriptions, work packages, and approved procedures. The inspectors reviewed training records for personnel associated with MOV testing to determine if the personnel supervising and conducting the tests were qualified in accordance with the applicant's procedures.

During the observance of the testing, the inspectors determined if:

- measuring and test equipment used during the test was properly identified, traceable, and within the current calibration interval;
- measuring and test equipment was suitable for the application, was used within the calibrated range, and was recorded in the applicable work orders;
- testing results were recorded during the activity; and
- test discrepancies were properly identified for resolution.

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

- design inputs for design basis operating conditions (such as temperature, flow, and pressure, including differential pressure) were consistent with the applicable system description and the Final Safety Analysis Report;

- calculations complied with design standard DS-M18.2.22, TVA Mechanical Design Standard for MOV Design Basis and Joint Owner's Group (JOG) Review Methodologies, Rev. 5; and
- calculations complied with design standard DS-M18.2.21, Mechanical Design Standard for Motor Operated Valve Thrust and Torque Calculations, Rev. 20.

The following samples were inspected:

- Temporary Instruction (TI) 2515/109, Section 04.07 – one sample
- TI 2515/109, Section 04.15 – one sample

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the activities reviewed, MOV testing was conducted by qualified individuals using qualified procedures, design calculations were performed in accordance with applicable specifications, and the applicant was adequately implementing GL 89-10 requirements. Additional inspection activities are required to complete this TI. These activities include additional MOV samples for Part 2 and all Part 3 requirements of this TI. Part 3 inspections will be performed after the applicant completes all GL 89-10 related actions. Based on this limited review and the remaining actions by the applicant, no additional conclusion is warranted for this inspection.

**OA.1.6 (Discussed) Generic Letter 2006-03: Potentially Nonconforming HEMYC and MT Fire Barrier Configurations; Bulletin No. 1992-01: Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free from Fire Damage; Bulletin No. 1992-01 (Supplement 1): Failure of Thermo-Lag 330 Fire Barrier System to Perform Its Specified Fire Endurance Function; Generic Letter 1992-08: Thermo-Lag 330-1 Fire Barriers (Inspection Procedure 35007)**

a. Inspection Scope

Background: GL 2006-03 informed licensees of required actions to address issues related to electrical raceway fire barrier system (ERFBS) material that was installed and relied upon for separation and/or safe shutdown purposes to satisfy applicable regulatory requirements. GL 92-08 informed licensees of failures in fire barrier system endurance and ampacity de-rating tests, installation procedures, and as-built configuration discrepancies associated with the Thermal Science, Incorporated (TSI), St. Louis, Missouri, Thermo-Lag 330-1 ERFBS that was installed to protect safe shutdown capability. The NRC initiated a series of small scale fire tests for a sample of ERFBS and issued the results of the TU Electric and NRC fire tests in Bulletins (BLs) 92-01, "Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free from Fire Damage," June 24, 1992, and 92-01 Supplement 1, "Failure of Thermo-Lag 330-1 Fire Barrier system to Perform its Specified Fire Endurance Function," August 28, 1992. NRC IIR 05000391/2013615 (ADAMS

Accession No. ML13310A820) describes additional background information, Unit 1 and Unit 2 corrective actions, and initial NRC inspection activities of the Unit 2 engineering design methodology, to address the ERFBS historical issues.

Inspection Activities: The inspectors reviewed work procedures, EDCRs, field change requests (FCRs), and WOs related to ERFBS Thermo-Lag 330-1 installations throughout the Auxiliary Building to verify that the installation activities were completed in accordance with G-98, "Installation, Modification, and Maintenance of Electrical Raceway Fire Barrier Systems," Rev. 11, and the approved construction drawings. The inspectors reviewed ampacity de-rating, combustible loading, and seismic loading calculations to verify that the addition of the Thermo-Lag material to the conduits were included in the revised design analysis, were adequate, and completed in accordance with the approved procedures. The inspectors also reviewed QC program monitoring of the installation of the ERFBS at required hold points, the storage requirements for Thermo-Lag 330-1 materials, and the current training qualifications of craft installers.

The inspectors verified that Hemyc and MT fire barrier materials were not installed or planned to be installed at WBN Unit 2. The inspectors reviewed the Draft As-Constructed Fire Protection Report and Procedure G-98, "Installation, Modification, and Maintenance of Electrical Raceway Fire Barrier Systems," Rev. 11 and determined that Hemyc and MT fire barrier materials are not approved for use in ERFBS. In addition, the engineering methodology and description of the controls to be used to ensure the adequacy of other fire barrier types appear to be consistent with the assessment requested in GL 06-03 and GL 92-08.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on these actions, the inspectors determined GL 2006-03 is closed. However, BL 1992-01, BL 1992-01 (Supplement 1), and GL 1992-08 remain open because additional inspections are needed for Thermo-Lag fire barrier material installations.

**OA.1.7 (Closed) Safety Evaluation Report 23 Appendix HH Open Items 63 and 93, Eagle 21 Two-Way Communication Test (Inspection Procedure 52053)**

a. Inspection Scope

Background: Safety Evaluation Report (SER) 23 (ADAMS Accession No. ML11206A499) listed two items which were related to precluding two-way communications for the Eagle 21 system between non-safety and safety-related components. Open Item 63 specifically states that TVA will confirm that testing has demonstrated that two-way communication (between non-safety and safety) is impossible with the Eagle 21 communications interface. Open Item 93 states that TVA should confirm to the staff that testing has sufficiently demonstrated that two-way communication is precluded with the configurations described in drawings 5D93433 and 3D20355. These drawings deal with jumper configuration and cable wiring.

Inspection Activities: The inspectors reviewed the test procedure, Eagle 21 vendor manual, and associated drawings to verify that the described test configuration and acceptance criteria was valid for the Open Items in question. The test procedure involved injecting data packets through the cable normally attached to the fiber optic converter and reading any return data packets. Additionally, oscilloscope traces were placed on the serial to Ethernet controller's (i.e., the communications interface) transmit and receive lines and also on the loop controller processor's (the safety-related processor board) receive lines.

The inspectors reviewed the drawings to verify that they were in the same configuration as described in Open Item 93. The inspectors observed the testing and reviewed the testing results to verify the test setup and to determine whether the acceptance criteria were met.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that testing demonstrates that two-way communication is precluded between the safety and non-safety-related portions of the Eagle 21 system for the Watts Bar Unit 2 configuration. Based on this inspection, Open Items 63 and 93 are closed.

**OA.1.8 (Closed) Inspection of Watts Bar Nuclear Plant Cable Tray and Supports  
Corrective Action Program Plan (Temporary Instruction 2512/017 and Inspection  
Procedures 51053 and 37051)**

a. Inspection Scope

Background: The Cable Tray and Supports Corrective Action Program Plan (Cable Tray CAP) was established to resolve historical issues related to the structural adequacy of cable trays and their supports, and to implement a comprehensive completion plan to adequately resolve these issues. The issues identified in the Cable Tray CAP originated from employee concerns, lessons learned, and other applicant source documents such as CAQRs, corrective action tracking documents (CATDs), vertical slice reviews (VSRs), discrepancy reports (DRs), PERs, and NRC open items. The main objectives of this CAP were to assure that cable trays and their supports were structurally adequate, complied with design criteria, and the design criteria complied with licensing requirements. The Cable Tray CAP was developed after the applicant determined that adverse conditions involving cable trays and supports were programmatically characterized as having:

- a lack of documented design qualification for certain cable tray hardware;
- installed configuration not complying with design output documents; and
- a lack of documentation to verify previous re-inspection.

TVA letter dated November 18, 1988, "Watts Bar Nuclear Plant (WBN) - Corrective Action Program (CAP) Plan for Category I Cable Trays and Cable Tray Supports, Rev. 0 (ADAMS Accession No. ML073540947), proposed the applicant's approach for resolving this CAP. In NUREG-1232, Volume 4, "Safety Evaluation Report on the (TVA) Watts Bar Nuclear Performance Plan (ADAMS Accession No. ML073450544)," the NRC staff concluded that TVA's CAP plan, for Unit 1, was an acceptable methodology to ensure that the cable trays and supports were adequately supported for all plant design conditions.

For Unit 1, the applicant resolved these issues through the following actions:

- reviewing and revising the design criteria and licensing requirements for cable trays, supports, and hardware;
- updating design output requirements to comply with the revised design criteria, and to adequately translate design requirements;
- revising construction, maintenance, and QA procedures to incorporate design output requirements;
- performing walkdowns of field configurations to identify deviations from design output;
- using walkdown data for critical case evaluations, and issuance of modifications as required for existing installations;
- developing generic validation calculations for typical hardware configurations, and evaluation of critical cases; and
- modifying field conditions, where necessary, to ensure consistency with design output documents.

In a letter from R. R. Baron to the NRC dated November 1, 1995 (ADAMS Accession No. ML 072890437), TVA notified the NRC of completion of the Cable Tray CAP for Unit 1. The Watts Bar Unit 1 Cable Tray CAP inspection was completed and documented in a final report issued on November 24, 1995 (NRC Inspection Report 50-390/95-69 and 50-391/95-69) (ADAMS Accession No. ML072610762). The majority of the design commitments for both Units 1 and 2 were addressed in the Unit 1 final closure report due to the similarities between the two units.

TVA's regulatory framework letter to NRC dated January 29, 2008 (ADAMS Accession No. ML080320443), outlined TVA's plans for the implementation of the Unit 2 Cable Tray CAP which stated that the Unit 1 approach would be used. The NRC letter from Patrick D. Milano to Mr. Ashok Bhatnagar (ADAMS Accession No. ML090210107) dated February 11, 2009, "Watts Bar Nuclear Plant, Unit 2 – Status of Regulatory Framework for the Completion of Corrective Action and Special Programs and Unresolved Safety Issues," provided the staff's assessment of TVA's approaches for resolving CAPs and special programs. The staff concluded there was reasonable assurance that, when implemented as described, the Cable Tray CAP would be appropriately resolved for Unit 2.

The applicant committed to using the same approach used to resolve the Unit 1 CAP although the scope of the Unit 2 CAP only included those cable trays and cable tray supports that were not addressed by the Unit 1 CAP. For those cable trays and their corresponding supports that were determined to be within the scope of the Unit 2 CAP, TVA performed a 100 percent walkdown to determine their as-built configuration. Cable

trays and supports with similar characteristics were grouped and a worst case or “bounding” example was selected and analyzed for each group. Unique cable trays or supports or those that could not be bounded were analyzed separately. Cable trays and supports that did not meet seismic requirements or other design criteria were to be modified accordingly.

Previous inspection results for the Unit 2 Cable Tray CAP, documented in IIR 05000391/2012602 (ADAMS Accession No. ML12087A324), concluded that reasonable assurance exists that the programmatic aspects of the CAP, related to cable tray supports, have been adequately implemented by the applicant. Inspection results documented in this inspection report credited the Cable Tray CAP with field inspection of a number of cable tray supports and cable tray segments. The report stated that field work on the cable tray supports was essentially complete and the inspectors observed that work in this area complied with regulatory requirements and applicant commitments. Therefore, aspects related to cable tray supports for this CAP were considered adequate, however the inspectors determined that field work to repair the deficiencies associated with cable trays had not yet been performed. The inspectors concluded that the applicant had appropriately identified and planned the work needed to complete the required cable tray modifications, but that only a small portion of that work had been completed. Although the inspectors were able to verify that the applicant had appropriately bounded and grouped cable trays and identified deficiencies, field work needed to resolve those deficiencies was not complete at the time of this inspection. At the conclusion of that inspection, it was identified that additional inspection was needed to verify that work was adequately performed to physically resolve the cable tray deficiencies identified by the Cable Tray CAP.

Inspection Activities: During this inspection, the applicant had completed more than 50 percent of all the required cable tray modifications within the scope of the Cable Tray CAP. Inspection activities focused on verifying adequate implementation of field work related to cable tray modifications associated with the Cable Tray CAP. The inspectors performed as-built verifications of 15 cable tray modifications associated with 11 modified cable tray sections. These inspected modifications were determined to be a representative sample for all the required cable tray modifications. The following DRAs depicted the required cable tray modifications:

- DRA 55231-002
- DRA 55231-007
- DRA 55231-008
- DRA 55231-009
- DRA 55231-010
- DRA 55231-012
- DRA 55231-020
- DRA 55231-022
- DRA 55231-023
- DRA 55231-025
- DRA 55231-027
- DRA 55231-028
- DRA 55231-039
- DRA 55231-045
- DRA 55231-046

As part of these inspection activities, the inspectors performed field inspections of four completed WOs to verify that the information documented in the WOs matched field conditions. These four WOs contained implementing instructions, and as-built drawings for the 15 aforementioned modifications. The inspectors performed as-built walk-downs of the cable trays to verify that location, orientation, protection, routing, supports, separation isolation, and identification were consistent with associated drawings and specifications. The selected WOs for cable tray modifications included:

- WO 110886017
- WO 110886060
- WO 110885856
- WO 110885857.

Specifically, the inspectors performed as-built walk-downs to verify actual cable tray installation against drawings, field change requests, and the work orders mentioned above. In addition, the inspectors interviewed personnel in charge of cable tray modifications to determine whether the applicant was able to properly document the modification of existing cable trays.

The following samples were inspected:

- IP 37051 Section 02.01.b.2, 4 Samples
- IP 51053 Section 02.02.f, 4 Samples

Documents reviewed are listed in the Attachment.

Other areas reviewed:

The following additional items related to the Cable Tray CAP were reviewed:

- CDR 391/89-06, Inadequate Qualifications for Cable Tray Supports and Fittings, was closed in Section OA.1.11 of this IIR.
- Additionally, the following Cable Tray CAP-related open items have been closed, and documented in previously issued inspection reports:
  - CDR 86-21, Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit Loading, closed in IIR 05000391/2013608 (ADAMS Accession No. ML13316A776)
  - CDR 86-37, Deficiencies in Embedded Plate Design & Control of Field Changes, closed in IIR 05000391/2012604 (ADAMS Accession No. ML12167A212).

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on review of the engineering complete closure package and the aforementioned inspection activities, the overall program implementation of the Cable Tray CAP was determined to be adequate, and TI 2512/017 is considered closed. However, it should be noted that although specific review of the Cable Tray CAP is not warranted, inspection of items related to the Cable Tray CAP may still be performed under Inspection Procedure 51053, "Electrical Components and Systems - Work Observation," due to the current status of this inspection procedure.

**OA.1.9 (Closed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 391/85-35: Support of Conductors Inside Vertical Conduit Runs (Temporary Instruction 2512/016 and Inspection Procedure 35007)**

a. Inspection Scope

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

The concern that long vertical conduit runs may not be adequately supported and that random failures due to cutting of the insulation and conductor creep may occur during normal service condition, especially silicone rubber insulated cables, was initially reported to the NRC on September 6, 1985, in accordance with 10 CFR 50.55(e), as NCR W-262-P, and was superseded by CAQR WBP 890295 for Unit 1 and CAQR WBP 890269 for Unit 2. The follow-up final report associated with the notification (ADAMS Accession No. ML082401652) was transmitted by letter dated October 3, 1985, and identified apparent cause, safety implications, and planned or completed corrective actions.

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

IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) concluded, in Section OA.1, that the programmatic aspects of the applicant's implementation plan for this CAP were adequate to address the concerns in the CDR. This is generally the same conclusion reached in Section OA.1.12 of IIR 05000391/2010605 (ADAMS Accession No. ML110410680). A sample of observed installation was documented in IIR 05000391/2014605 (ADAMS Accession No. ML14226A049).

Inspection Activities: The inspectors observed the installation of Kellems mesh (basket) grips for cables installed in vertical conduits 2G1525A and 2G1524B to verify the basket grip was installed in accordance with design drawings and procedures and that the cable support spacing was adequate.

Documents reviewed are listed in the Attachment.



b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of TVA's engineering complete package, the inspectors concluded that the vertical support which was sampled was adequately installed. Based on the field observations in this report, the prior field observations, and the reviews in IIR 05000391/2010605, 05000391/2013605, and 05000391/2014605, this Cable Issues CAP Sub-issue and CDR are closed.

**OA.1.10 (Closed) Construction Deficiency Report 391/84-25: Failure to Provide Fire Detectors in Rooms Containing Redundant Safe Shutdown Circuits (Inspection Procedure 35007)**

a. Inspection Scope

Background: The deficiency was initially reported to the NRC on May 11, 1984, as NCR WBN MEB 8415 in accordance with 10 CFR 50.55(e). The issue was documented as CDR 390/84-27 for Unit 1 and CDR 391/84-25 for Unit 2. The CDR concerned the 10 CFR 50, Appendix R, Section III.G.2 requirement for fire suppression and detection systems in the post-accident sampling rooms, due to the presence of redundant safe shutdown circuits. The circuits, which are associated with three of the four steam generator main steam header pressure transmitter channels, are routed in conduits through the rooms and are separated by one-hour rated fire barriers installed around the conduits. Pre-action sprinkler systems have been provided in the post-accident sampling rooms (previously the fuel transfer valve rooms) on the auxiliary building elevation 729.0 ft. The smoke detectors that actuated the sprinkler systems were incorrectly located in the ventilation and purge air rooms on the auxiliary building elevation 737.0 ft.

The concern was that, if the nonconforming condition was not corrected, a fire in the post-accident sampling rooms would not be detected, nor would the sprinkler system be manually actuated in a timely manner. This could result in fire damage to redundant safe shutdown equipment that could adversely affect plant safety.

The applicant implemented Engineering Change Notice (ECN) 4872 to add cross-zoned smoke detectors in both post-accident sampling rooms on the auxiliary building elevation 729.0 ft. to activate the existing pre-action sprinkler systems. The smoke detectors installed in the ventilation and purge air rooms on the auxiliary building elevation 737.0 ft. were connected to the same detection zone as the other smoke detectors in that area, as described in the final CDR report submitted to the NRC on June 8, 1984 (ADAMS Accession No. ML082261044).

The NRC closed CDR 390/84-27 for Unit 1 in IR 50-390/85-09 (ADAMS Accession No. ML082190704), noting that cross-zoned smoke detectors had been added in the post-accident sampling room to activate the existing pre-action sprinkler system. The inspectors also noted, for Unit 1, that the smoke detectors installed in the ventilation and purge air rooms on the auxiliary building elevation 737.0 ft. were connected to the same detection zone as the other smoke detectors in that area.

For Unit 2, the following ionization-type smoke detectors (Pyrotronics Model DI-3) were installed in the Unit 2 post-accident sampling room: 0-XS-13-0301A, 0-XS-13-0301B, 0-XS-13-0301D, 0-XS-13-0301E, 0-XS-13-0301F, and 0-XS-13-0301G. TVA monitored the detectors for Unit 2 in accordance with the code of record for the Watts Bar fire detection system in NFPA 72E, Automatic Fire Detectors – 1974. The requirement for periodic tests is contained in NFPA 72E, Section 7-3.1.5, which states: “Smoke detectors shall be tested semiannually in accordance with the manufacturer’s instructions.” Unit 2 electrically disabled the smoke detectors and initiated fire protection impairment permit Number C10-0205 on March 26, 2010, in the Unit 2 post-accident sampling room (zones 126 and 127) in support of Unit 2 construction activities in the area. WO 10-815605-000 implemented the impairment wiring modifications to disable the detectors on March 27, 2010.

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

- Reviewed engineering closure documentation for CDR 391/84-25, dated February 10, 2012, to verify the adequacy of the corrective actions.
- Reviewed ECN 4872 to add cross-zoned smoke detectors in both post-accident sampling rooms on the auxiliary building elevation 729.0 ft. to verify the adequacy of the design.
- Performed a field walkdown of the Unit 2 post-accident sampling room to visually verify the location of the new smoke detectors, and verified that the detectors were routed to fire alarm panel 0-L-625 as described in SOI-13.01, Fire Detection System, Rev. 25.
- Reviewed WO 09-818154-000 to implement procedure 0-FOR-13-625, 6 Month Fire Detection Test – Panel L625, completed on January 2, 2010, to verify when the smoke detectors in the Unit 2 post-accident sampling room were last tested.
- Reviewed outstanding fire protection impairment permit number C10-0205, March 26, 2010 to verify the detectors were removed from service to support construction activities in accordance with NPG-SPP-18.4.6, Control of Fire Protection Impairments, Rev. 2.
- Reviewed Part II of the As-Constructed Fire Protection Report (FFP) to verify that the new smoke detectors were incorporated in the FFP.
- Reviewed MI-13.104, Isolating ZA-30 Module Fire Detection Zones, Rev. 4, to ensure that the procedure included requirements for post-maintenance testing.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors noted that the detectors were under a Fire Protection Impairment Permit (C-10-02-5) due to construction activities. As a compensatory measure, the applicant implemented roving fire watches. The current condition and the fire protection impairment met the requirements of the fire protection program. The detectors will be restored in accordance with MI-13.104 once the construction activities are completed.

c. Conclusions

Based on a review of the applicant's final closure package and the inspection activities above, CDR 391/84-25 is closed.

### **OA.1.11 (Closed) Construction Deficiency Report 391/89-06: Inadequate Qualifications for Cable Tray Supports and Fittings (Inspection Procedure 51053)**

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

Background: The deficiency was initially reported to the NRC on June 22, 1989, as WBP 880040 and 880041 in accordance with 10 CFR 50.55(e). The issue was documented as CDR 390/89-06 for Unit 1 and CDR 391/89-06 for Unit 2.

The CDR concerned cable trays and supports that were not properly qualified for the as-built plant and the as-installed configuration of cable trays did not match the design drawings.

The CDR involved problems associated with three programmatic deficiencies as noted in the corrective action plan for the cable tray and cable tray supports. The deficiencies included a lack of documented design qualification for cable tray hardware; installed configurations not complying with design output documents; and a lack of documentation to verify previous inspections.

The applicant implemented the Cable Tray CAP to correct the deficiencies for both Unit 1 and Unit 2. The actions to resolve the issues for Unit 1 are discussed in Section OA.1.8 of this report.

After a review of the adequacy and effectiveness of the corrective actions, a review of the cable trays and cable tray supports CAP for Unit 1, and inspections of the QA records associated with cable supports and cable tray supports, the inspectors determined that CDR 390/89-06 was adequately resolved for Unit 1 as documented in NRC IRs 50-390/94-64 (ADAMS Accession No. ML072980741), 50-390/95-69 (ADAMS Accession No. ML072610762), and 50-390/93-78 (ADAMS Accession No. ML072851292).

For Unit 2, the inspectors reviewed the applicant's engineering complete documentation and closure report for the Cable Tray CAP, including referenced documents, and actions associated with PER 143986 which was issued to track required Unit 2 actions for CDR 391/89-06. This was performed to determine if the corrective actions associated with CDR 391/89-06 were properly resolved and documented, as stated in NRC IIR 05000391/2013612, Section OA 1.3 (ADAMS Accession No. ML13088A066). IIR 05000391/2013612 also credited CDR 391/89-06 with inspection efforts documented in Section OA 1.1 of IIR 05000391/2012602 (ADAMS Accession No. ML12087A324), for the Cable Tray CAP. The inspectors concluded, in IIR 05000391/2012602, that there was reasonable assurance that the programmatic aspects of the CAP related to cable tray supports had been adequately implemented and the inspectors were able to verify that appropriate actions had bounded and grouped cable trays and had properly identified deficiencies. However, the inspectors determined in IIR 05000391/2012602 that further inspection would be needed to verify that work has been adequately performed to physically resolve the cable tray deficiencies identified by the CAP.

It was concluded in IIR 05000391/2013612, that the corrective actions developed for CDR 391/89-06 were adequate; however inspectors noted that additional inspection activities were required to review the work order implementation of remaining actions documented in EDCRs 52934, 55045, and 55231.

Inspection Activities: During this inspection, the inspectors reviewed EDCRs 52934, 55045, and 55231 to identify remaining corrective actions for cable trays only, because IIR 05000391/2012602 previously found that actions related to cable tray supports were adequately implemented for the Cable Tray CAP. The inspectors did not identify significant corrective actions for cable trays in EDCRs 55045 and 52934. However, EDCR 55231 contained most of the corrective actions related to cable trays. The inspectors identified and inspected 15 completed corrective actions within the scope of EDCR 55231. The inspectors reviewed WOs for EDCR 55231 and determined that several of the corrective actions in EDCR 55231 had not yet been implemented. However, the inspectors determined that the 15 inspected cable tray modifications were a representative sample of all the required corrective actions. Section OA 1.8 of this report closes the Unit 2 Cable Tray CAP, and documented additional details about the as-built verifications for these 15 cable tray modifications, and their associated WOs.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on the review of the engineering complete closure packages and other activities completed during this and previous inspections, the inspectors determined that the applicant implemented appropriate actions to resolve the original construction deficiency. Based on these proposed actions, this item is closed.

**OA.1.12 (Closed) Violation 391/87-19-01, Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 50090)**

a. Inspection Scope

Background: In October 1987, to assess the construction quality at Watts Bar Nuclear Plant, the NRC selected the Unit 2 North and South Valve rooms with the objective of performing a detailed inspection of completed work prior to the piping and equipment becoming inaccessible due to painting and insulation. Selected inspection areas included electrical, mechanical, instrumentation, housekeeping, preservation of equipment, and review of nondestructive examination results.

Several issues were identified involving failure to control installation activities in accordance with prescribed procedures and drawings. As a result, the NRC issued a violation (VIO) for TVA's failure to follow procedures and instructions when installing equipment as required by 10 CFR Part 50, Appendix B, Criterion V. The discrepancies documented in Inspection Report No. 50-391/87-19 were associated with pipe supports, electrical conduit supports, undersized welds, and conduit separation requirements. The following 13 samples were cited:

1. Spring can 2-01B-172 identification tag was not properly installed; only one of the two travel stops was removed; and the hanger was cold set at 717 pounds, exceeding the installation requirement of 682 pounds.

2. Support 0-CSP-292-18684X was found to have incomplete welds, under-filled welds, weld spatter, weld overlap, as-built dimension in error, a weld symbol incorrectly positioned on the drawing, and a saw cut on the square tube steel which could cause a possible stress riser.
3. Snubber 47A496-6-75 hanger clamp was tack welded to its A-307 bolt. There was sufficient space to install a lock washer or jam nut according to installation requirements.
4. Restraint 2-01B-164 was not welded in accordance with drawing 2-01B-164, Rev. 901. The welds from the shim plate to the structural steel were undersized.
5. The as-built configuration of structural platform 48W1707-6, Rev. 7, was not in accordance with drawing detail G24-G24. Also the welds on beam-to-embed and beam-to-beam exhibited slag, unacceptable overlap, and undersized welds according to drawing requirements.
6. Platform attachment PD07-26 was identified as having unacceptable undercut and insufficient root reinforcement.
7. Platform attachment PD07-26 was identified as having unacceptable weld overlap.
8. Platform attachment PD07-28 was identified as having undersize welds, unacceptable overlap, lack of fusion, and slag.
9. B-001 valve support for valves 2-RTV-01A-290 and 2-RTV-01A-291A, were identified as having their pressure boundary attachment welds to process piping painted with Amerlock 4400, contrary to TVA requirements specified in construction engineering procedures.
10. Snubber and valve supports 2-01A-354 and 2-01A-355 support clamps were misaligned.
11. Beam 1708-05 attachment to embed was identified as having welds with lack of penetration, contrary to the requirements specified on drawing 48W1708-05, detail C-6 for structural platforms.
12. Conduit supports 0-CSP-292-1178 and 0-CSP-292-1179 attachment welds were not in conformance with the welding detail on drawing 47A056-04, Rev. 4. Also, the support strap bolts for these supports did not have markings to identify the material type of the bolts.
13. Safety-related conduits 2VC-2954A (Division A) and 2PM-7418B (Division B) are located with less than one inch of spatial separation as required by Section 8.3.1.4.3 of the FSAR and quality control procedures.

This VIO identified a wide spectrum of discrepancies, and for that reason, several factors were identified as contributing to this violation. The applicant determined that quality control program weaknesses, inadequate training, inattention to detail, and failure to effectively make the necessary changes to engineering documents, were significant

factors in failing to comply with installation requirements. Also, it was identified that applicant personnel failed to adhere to design drawing details or failed to obtain the required design approvals for necessary changes. TVA responded to the VIO in an August 4, 1988 letter to the NRC (ADAMS Accession No. ML072530388), committing to correct deficiencies, address generic implications, and prevent recurrence of similar deficiencies.

Inspection Activities: The inspectors performed field verifications on each of the 13 discrepancies associated with VIO 391/87-19-01 to determine their condition. In addition, the inspectors interviewed responsible personnel and reviewed recent and historical records associated with the VIO to verify that appropriate corrective actions had been taken.

The inspectors performed the following inspection activities for the 13 discrepancies:

1. Spring Can 2-018-172: The inspectors reviewed corrective action quality report (CAQR) WBN 871086 and performed a walkdown of the pipe support to determine if the identification tag was properly placed and the travel stops were removed. In addition, the inspectors reviewed calculation 201B172 to determine if the support met the loading requirements above 682 pounds. TVA concluded that the support met the current criteria requirements and was acceptable as is.
2. Conduit Support 0-CSP-292-18684X: The inspectors reviewed CAQR WBN 871101, interviewed TVA's personnel, and performed a walkdown of the conduit support, to determine if the discrepancies documented on the CAQR were properly addressed. In addition, the inspectors reviewed calculation WCG-2-752 to determine if the current condition of the welds and the saw cut on the base of the support were properly evaluated and that current conditions do not affect the structural integrity of the conduit support. The applicant determined the welds to be acceptable as is and no further actions are required.
3. Snubber 47A496-6-75: The Inspectors reviewed DCN 53864-346 and WO 115896066 and determined that the snubber will be removed eliminating any previously documented discrepancy.
4. Restraint 201B-164: The inspectors reviewed CAQR WBN 871087, DRA 52465-012, and performed a walkdown of the support to determine if the undersized welds were repaired. The welds were reworked, inspected, and accepted by the applicant's quality control inspectors.
5. The applicant updated drawings 48W1707-06 and 48W1707-24 to reflect current as-built configurations of the beam-to-embed-connection for platform 47W1707-06. The inspectors reviewed additional documentation including DRAs, walkdown packages, and calculation WCG-1-615, Rev. 2, to determine if the applicant properly evaluated the revised plate configuration against the stresses produced by thermal loads during plant operations. In addition, the inspectors performed a walkdown of the platform to establish if the DRA contained an accurate detail of the beam-to-embed connection, including its weld sizes. No field work is required, and all actions to resolve this issue have been completed.

- 6, 7, and 8. The inspectors reviewed the corrective actions documented in PER 143939, which addressed the welding discrepancies associated with platform attachments PD07-26, PD07-40, and PD07-28, located in the south valve room. In addition, the inspectors performed a walkdown of the attachment welds, reviewed CAQR WBP871136, and reviewed the applicant's evaluation of the existing platform attachment welds in question. Specifically, the inspectors reviewed the sections of calculation WCG-1-615 associated with the platform attachment welds to determine if the welding discrepancies would reduce the structural stability of the attachments. The calculation determined that the welds were acceptable as is and no further action is required.
9. The inspectors performed a walkdown of B-001, valve support for valves 2-RTV-01A-290 and 2-RTV-01A-291, to determine if the Amerlock 400 coating was removed in accordance with CAQR WBN871088. The inspectors determined that the coating was completely removed from the pressure boundary attachments for both valves.
10. The inspectors evaluated the field condition of snubber/strut valve supports 2-01A-354 and 2-01A-355 to verify that the clamps on these supports were aligned according to the requirements of CAQR WBN871087. The inspectors determined that the corrective actions were properly implemented and the clamps for both valve supports were aligned.
11. The inspectors evaluated the condition of safety-related welds associated with a structural beam located on platform 48W1708-05, detail C-6. Specifically, the inspectors reviewed the corrective actions documented on CAQR WBN 871137 and performed a walkdown of the beam attachment to the embed plate to determine if the repairs on the safety-related welds properly addressed the lack of penetration. The welds were reworked and brought into compliance as documented on Work Plan CAI01FZ.
12. The inspectors evaluated the field configuration for the following conduit supports:
- 0-CSP-292-1178
  - 0-CSP-292-1179
  - 0-CSP-292-1180.

The inspectors reviewed walkdown package LSWD-492 and calculation WCG-2-752 to determine if the applicant properly evaluated the configuration of the welds and if the welds provided the necessary support required by engineering design specification WB-DC-40.30.10. In addition, the inspectors also reviewed WBN Unit 1, corrective action document package WBP890248SCA, to determine if the condition of the conduit support strap bolts was properly evaluated, and that the bolts' material grade properties are similar or superior to ASTM A-307. The weld configuration on the supports was determined to be acceptable as is and the unmarked bolts' material type was found to have similar or better properties than the ASTM A-307 bolts.

13. The last item of this VIO to be inspected was the condition of spatial conduit separation associated with safety-related conduits:

- 2VC-2954A
- 2PM-7418B.

The inspectors reviewed CAQR 871130, EDCR 53217, and ICRDS 2PM7418B to determine if the condition was properly evaluated and addressed. The applicant's evaluation, determined that conduit No. 2PM-7418B should be deleted to resolve an additional issue regarding a nearby hot pipe. The inspectors reviewed FCR 61810 and WO 113536596 to verify the removal of the conduit was properly documented. The removal of conduit support 2PM-7418B eliminates the spatial separation issue.

In addition to the historical records, the inspectors also reviewed current DRAs, PERs, and walkdown packages to verify that conditions were brought into compliance and the appropriate measures were taken to prevent recurrence.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusion

The inspectors determined that the issues associated with VIO 391/87-19-01 were properly addressed and tracked in the applicant's corrective action program and appropriate measures were taken to prevent recurrence. Based on a review of the applicant's final closure package and the results of this inspection, VIO 391/87-19-01, Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms, is closed.

## **V. MANAGEMENT MEETINGS**

### **X1 Exit Meeting Summary**

An exit meeting was conducted on September 4, 2014, to present inspection results to Mr. Hruby and other members of his staff. The inspectors identified that no proprietary information had been received during the inspection and none would be used in the inspection report. The applicant acknowledged the observations, and provided no dissenting comments.



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Applicant personnel**

J. Adair, TVA Unit 2 QA Oversight  
B. Ansel, Bechtel Field Engineer  
H. Baldner, TVA Regulatory Compliance  
L. Belvin - Site Nuclear Assurance Manager  
J. Boykin, TVA Quality Programs  
J. Calle, Manager, WBN Interface & Transition  
D. Charlton, TVA Regulatory Compliance  
J. Davenport, TVA Supply Chain  
B. Enis, TVA Oversight  
W. Hooks, Radiation Protection Manager  
R. Hruby, TVA - General Manager Technical Services  
B. Hunt, WBN Operations Dual Unit Transition Manager  
K. Lovell, TVA-Senior Manager, Refurbishment Engineering & Construction  
J. Mitchell, Supply Chain Specialist  
J. May, Bechtel Quality Control Inspector  
T. Morgan, TVA Licensing  
D. Myers, TVA- Assistant Senior Manager, WBN Unit 2 QA  
K. Nesmith, TVA-Nuclear Plant Technical Task Manager  
J. O'Dell, TVA Regulatory Compliance  
D. Oliver, WBN2 Supply Chain Program Manager  
R. Onis, TVA Unit 2 Engineering  
L. Peterson - Manager, WBN Unit 2 Site Support - Document Control  
P. Russell, TVA  
G. Scott, TVA – Regulatory Compliance  
D. Shutt, Licensing  
M. Skaggs, TVA – Senior Vice President  
S. Smith, TVA - SUT Assistant Manager  
N. Welch, TVA - Preoperational Startup Manager  
T. Wilburn, WBN Unit 2 RP & Chemistry Transition Manager  
O. J. Zeringue, TVA - General Manager Engineering and Construction

### INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction and Pre-Construction Activities
IP 35740B	QA Programs (QA/QC Administration)
IP 35741B	QA Programs (Audits)
IP 35746B	QA Programs (Procurement Control)
IP 35747B	QA Programs (Receipt, Storage and Handling of Equipment and Materials)
IP 35748B	QA Programs (Records)
IP 35749B	QA Program (Test and Experiments)
IP 35750	QA Program Measuring and Test Equipment
IP 37051	Verification of As-Built
IP 40301	Safety Committee Activity
IP 50051	Reactor Vessels and Internals-QA Review
IP 50053	Reactor Vessels and Internals-Work Observation
IP 50073	Mechanical Components - Work Observation
IP 50090	Pipe Support and Restraint Systems
IP 51053	Electrical Components and Systems – Work Observation
IP 52051	Instrument Components and Systems – Procedure Review
IP 52053	Instrument Components and Systems - Work Observation
IP 64100	Postfire Safe Shutdown, Emergency Lighting and Oil Collection Capability at Operating and Near-Term Operating Reactor Facilities
IP 64704	Fire Protection Program
IP 70300	Preoperational Test Procedure Review
IP 70302	Preoperational Test Program Implementation
IP 70312	Preoperational Test Witnessing
IP 70362	Reactor Coolant System Hydrostatic Test Procedure Review
IP 70433B	Chemical Control System Test Preoperational Test Witnessing
IP 70436B	Residual/Decay Heat Removal System Test Preoperational Test Witnessing
IP 70443	Containment Spray System Test Preoperational Test Witnessing
IP 71302	Preoperational Test Program Implementation Verification
IP 80521	Radiological Environmental Monitoring (Preoperational and Supplemental)
IP 84523	Liquids and Liquid Wastes (Preoperational and Supplemental)
IP 84524	Gaseous Waste System (Preoperational and Supplemental)
IP 92701	Follow-up
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/017	Inspection of Watts Bar Nuclear Plant Cable Tray and Supports Corrective Action Program Plan
TI 2515/109	Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000391/2014607-01	URI	Potential Inadequate Storage of Safety-Related Equipment (Section O.1.4)
05000391/2014607-02	URI	Potential Inadequate Storage of QA Records (Section O.1.5)

### Opened and Closed

None

### Closed

35740B	IP	Quality Assurance Program - QA/QC Administration (Section O.1.1)
35741B	IP	Quality Assurance Program - Audits (Section O.1.2)
35750	IP	Quality Assurance Program-Measurement and Test Equipment (Section ST.1.2)
40301	IP	Quality Assurance Program - Safety Review Committee (Section O.1.6)
52051	IP	Instrument Components and Systems – Procedure Review (Section C.1.5)
80521	IP	Radiological Environmental Monitoring (Preoperational and Supplemental) (Section R.1.3)
2006-03	GL	Potentially Nonconforming HEMYC and MT Fire Barrier Configurations (Section OA.1.6)
Open Item 63	SSER Appendix HH	Eagle 21 Two-Way Communication Test (Section OA.1.7)
Open Item 93	SSER Appendix HH	Eagle 21 Two-Way Communication Test (Section OA.1.7)
2512/017	TI	Inspection of Watts Bar Nuclear Plant Cable Tray and Supports Corrective Action Program Plan (Section OA.1.8)
391/85-35	CDR	Support of Conductors Inside Vertical Conduit Runs (Section OA.1.9)
391/84-25	CDR	Failure to Provide Fire Detectors in Rooms Containing Redundant Safe Shutdown Circuits (Section OA.1.10)
391/89-06	CDR	Inadequate Qualifications for Cable Tray Supports and Fittings (Section OA.1.11)

391/87-19-01	VIO	Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Section OA.1.12)
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Discussed

87-19-02	VIO	Failure to Preserve Equipment Installed in the North and South Valve Rooms (Section OA.1.1)
391/83-48	CDR	Relocating Sensing Lines on Upper Containment Cooler (Section OA.1.2)
391/87-15	CDR	Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification (Section OA.1.3)
391/89-08	CDR	Kapton Insulated Pigtail Insulation Damage (Section OA.1.4)
89-10	GL	Safety-Related Motor-Operated Valve Testing and Surveillance (Section OA.1.5)
1992-08	GL	Thermo-Lag 330-1 Fire Barriers (Section OA.1.6)
2512/016	TI	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan (Section OA.1.9)
2515/109	TI	Inspection Requirements for Generic Letter 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance (Section OA.1.5)
1992-01	BL	Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free from Fire Damage (Section OA.1.6)
1992-01 (Supplement 1)	BL	Failure of Thermo-Lag 330 Fire Barrier System to Perform Its Specified Fire Endurance Function (Section OA.1.6)

## LIST OF DOCUMENTS REVIEWED

### I. MANAGEMENT OVERSIGHT AND CONTROLS

#### C.1.2 Safety-Related Mechanical Components Work Observation (Inspection Procedure 50073)

WO 111847475, "SUTR EDCR 53056 SYS 068 Install #1 Runner Assembly, Seals, Cplg and align"

PI-903781-RCP-01, "Reactor Coolant Pump Cartridge Conversion seal Installation at Watts Bar Unit 2," Rev. 0

### **C.1.3 Post-Fukushima Diverse and Flexible Construction Activities**

WO 115144722, Implement DCN 59675 Stage 11 – Unit 1, Mechanical fuel oil suction tie in to the safety related 1A-A 7 day fuel tank  
 WO 115204842, Implement DCN 59675 Stage 14, Mechanical fuel oil suction piping to the generators on aux building roof  
 WO 115307371, DCN 60853 Stage 5 Install piping/pump skid DGA-A side inside Diesel Gen Bldg. for Fuel Oil  
 WO 115307402, DCN 60853 Stage 5 Install piping/pump skid DG B-B side inside Diesel Gen Bldg. for Fuel Oil  
 WO 115204810, Implement DCN 59675 Stage 12 – Unit 2 Mechanical fuel oil suction piping tie in to the safety related 7 day fuel tank  
 WO 115283168, Implement DCN 59675 Stage 14 – Implement the installation of fuel oil suction piping

### **C.1.4 Reactor Vessel and Internals – QA Review and Work Observation (Inspection Procedures 50051 and 50053)**

#### WOs

115753972, WHS SYS 068 2-RPV-068-U2 RPV CH Assembly (non-code)  
 115505496, CCM SYS 068 2-RPV-068-U2 Westinghouse Perform RV/I Inspections per MRS-SSP-2738

### **C.1.5 Instrument Components and Systems – Procedure Review (Inspection Procedure 52051)**

#### PERs

PER 915149 – NRC Identified Incorrect Tolerances in 2-SI-3-68, dated 07/29/2014  
 Historical PER 353920 – Error Discovered in Power Distribution Monitoring System Calibration (1-TRI-0-20), dated 2/28/2011  
 Historical PER 354318 – TB 11-6, Revision 1, Reactor Vessel Instrumentation System Calibration, dated 4/14/2011  
 Historical PER 459705 – RCP Relay Calibration Sis 1-SI-68-36, 37, 38, 39 needs section 1.2.2 SR table reference corrected, dated 11/29/2011.

#### Drawings

2-47W600-31, Rev. 3 Unit 2 – Electrical Instruments and Controls, dated 11/18/2012  
 2-47W610-1-1, Rev. 15 Unit 2 – Electrical Control Diagram Main Steam System, dated 7/7/2014  
 2-47W611-1-1, Rev. 8 Unit 2 – Electrical Logic Diagram Main and Reheat Steam, dated 6/2/2014  
 2-45N2635-10, Rev. 0 Unit 2 – Wiring Diagrams Local Instrument Panels Connection Diagrams-SH 10, dated 3/28/2012  
 2-47W610-3-1, Rev. 10 Unit 2 – Electrical Control Diagram Main Aux Feedwater System, dated 5/8/2014  
 2-47W610-3-1C, Rev. 6 Unit 2 – Electrical Control Diagram Main Aux Feedwater System, dated 5/12/2014  
 2-69247-08F802403-FD-2102-1, Rev 1 Unit 2 – Electrical Steam Generator 1 to 4 SG Wide Range Level, dated 4/8/2014  
 45N2635-11, Rev. 16 Unit 2 – Wiring Diagrams Local Instrument Panels Connection Diagrams-Sheet 11, dated 4/3/1992  
 2-47W600-89, Rev. 0 Unit 2 – Electrical Instruments and Controls, dated 10/6/2008  
 2-47W610-30-1B, Rev. 6 Unit 2 – Electrical Control Diagram Ventilation System, dated 3/10/2014

2-47W611-88-1, Rev. 4 Unit 2 – Electrical Logic Diagram Containment Isolation, dated 7/30/2013  
 2-69247-08F802403-FD-2201-1, Rev 4 Unit 2 – Electrical Rod Control System T. AVG Input Validation Highest Selection, dated 5/15/2014  
 2-47W610-68-2, Rev. 13 Unit 2 – Electrical Control Diagram Reactor Coolant System, dated 6/13/2014

#### Manuals

Vendor Manual - WBN-VTM-W090-0010, Vendor Technical Manual for Weschler (formerly Westinghouse) Equipment, Rev. 10, dated 4/16/1996  
 Vendor Manual - WBN-VTM-R369-0010, Rosemount Transmitters, Rev. 37, dated: (not provided)  
 Vendor Manual - WBN-VTM-W120-2991, Westinghouse Energy Systems Eagle 21 TM Process Upgrade System, Rev. 5, dated 5/29/1998.  
 Technical Bulletin – WBN-VTD-R369-0410, Rosemount Inc. Technical Bulletins 1 thru 4 for Models 1153 and 1154 Series Pressure Transmitters (Loss of Fill Fluid), Rev. 0, dated 6/8/1990  
 Product Manual – WBN-VTD-R369-0460, Rosemount Model 1154 Alphaline Pressure Transmitters for Nuclear Service, Rev. 0, dated 6/16/1994  
 Supplemental Instruction Manual – WBN-VTD-R369-0480, Rosemount Model 1154 Alphaline Nuclear Pressure Transmitters with Model 1159 Remote Diaphragm Seals, Rev. 0, dated 12/30/1994  
 Technical Bulletin – WBN-VTD-W090-0050, Weschler Renewal Parts Data for Switchboard Instruments (Formerly Westinghouse) Type H-252 and V-252, dated 11/27/1991  
 Technical Bulletin – WBN-VTD-W090-0150, Installation, Operation and Maintenance Instructions for Weschler (Formerly Westinghouse) 252 Line Switchboard Edgewise Instruments Five Inch Classification for PAM/1E Requirements, dated: 5/31/1991  
 Descriptive Bulletin – WBN-VTD-W090-0160, Descriptive Bulletin for Weschler (Formerly Westinghouse) 252 Edgewise Switchboard Instruments, dated 9/14/1990

#### Miscellaneous

Setpoint and Scaling Document (SSD) Steam Line Pressure 2-P-1-2A, Rev 0, dated 3/29/2011  
 Setpoint and Scaling Document (SSD) Steam Generator NR Level 2-L-3-42, Rev 1, dated 4/29/2014  
 Setpoint and Scaling Document (SSD) Steam Generator Trip Time 2-L-3-42T, Rev 0, dated 2/3/2011  
 Setpoint and Scaling Document (SSD) Steam Generator NR Level 2-L-3-55, Rev 1, dated 4/29/2014  
 Setpoint and Scaling Document (SSD) Wide Range Steam Generator Water Level 2-L-3-43, Rev 1, dated 2/24/2014  
  
 Setpoint and Scaling Document (SSD) Containment Pressure 2-P-30-44, Rev 1, dated 4/17/2014  
 Setpoint and Scaling Document (SSD) Delta T/T AVG 2-T-68-25, Rev 3, dated 4/15/2014  
 Setpoint and Scaling Document (SSD) Reactor Coolant Flow PS-1 2-F-68-29A, Rev 1, dated 1/17/2011  
 Unit 2 Technical Specification Sections 3.3.1, 3.3.2 and 3.3.3, Revision G & H  
 Development and Issue of Operating and Technical Instructions – NC-PP-32, Rev. 005 Watts Bar Unit 2 Procedure Review and Approval, dated 6/18/2014  
 Watts Bar Nuclear Plant Unit 0, 1, & 2 Technical Instruction TI-56.0 Plant Scaling and Setpoint Document, Rev. 0005, dated 3/5/2010  
 Watts Bar Unit 2 Narrow Range Steam Generator Water Level Setpoint and Scaling Document (SSD) Supporting Calculation Note – CN-CPS-10-8, Rev. 000, dated 11/4/2010

WBN PSE Validate Route without AOR for 2-SI-1-1 (Workflow document) with Status date: July 10, 2014  
 WBN PSE Validate Route without AOR for 2-SI-3-6 (Workflow document) with Status date: July 14, 2014  
 WBN PSE Minor Editorial Changed for 2-SI-3-68 (Workflow document) with Status date: June 11, 2014  
 WBN PSE Validate Route without AOR for 2-SI-30-44 (Workflow document) with Status date: July 26, 2012  
 WBN PSE Validate Route without AOR for 2-SI-68-2 (Workflow document) with Status date: March 4, 2014

#### Procedures

MMQ006.026, Installation and Maintenance of Compression Tube Fittings, Rev. 1  
 N3E-934, Instrument and Instrument Line Installation and Inspection, Rev. 8  
 MAI-4.4A Instrument Line Installation, Rev. 14  
 MAI-4.4B Instrument and Instrument Panel Installation, Rev. 7  
 25402-000-GPP-0000-N3401 Instrument and Instrument Line Installation, Rev. 11

### **P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70362)**

2-PTI-068-14, Reactor Coolant Primary Hydrostatic Test, U2, Rev. 1, August 8, 2014  
 2-TOP-068-02, Reactor Coolant System, Rev. 1, August 8, 2014

### **P.1.3 Preoperational Test Witnessing (Inspection Procedures 70302, 70312, 70433B, 70436B, and 70443)**

#### Drawings

2-47W809-1 Rev. 31, Flow Diagram Chemical & Volume Control System  
 2-47W809-2 Rev. 14, Flow Diagram Chemical & Volume Control System and Boron Recovery System  
 2-47W810-1 Rev. 19, Flow Diagram Residual Heat Removal System  
 2-47W811-1 Rev. 35, Flow Diagram Safety Injection System  
 2-47W812-1 Rev. 25, Flow Diagram Containment Spray System

#### Miscellaneous

WBN-VTM W120-0720 Rev. 28, SIP Vendor Manual, Contract No. 71C62-54114-1  
 2-TSD-63-3 Rev. 4, Safety Injection System: Centrifugal Charging Pump, RHR Pump, Safety Injection Pump and Related SIS Performance Test, and Flow Balance Test  
 Design Change Notice 29470-A  
 Letter-SEE-IV-10-25 Rev. 2, Watts Bar Unit 2 ECCS Analysis Report, dated June 24, 2013  
 GOI-7 Rev. 052, Generic Equipment Operating Guidelines  
 0-MI-57.036 Rev. 0002, Electric Motor/Generator Replacement and Bearing Maintenance

## **II. OPERATIONAL READINESS ACTIVITIES**

### **O.1.1 Quality Assurance Program - QA/QC Administration (Inspection Procedure 35740B)**

#### Procedures

NC PP-14, Watts Bar Nuclear Unit 2 Audits and Assessments, Rev. 10  
 TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan, Rev. 29

#### Corrective Action Program Documents

PER 793552, QA Dual Unit Operation Readiness Transition Milestones

### Miscellaneous

Quality Assurance Department Transition and Change Management Plan for Two-Unit Operations, Rev. 10  
 QADM-3.1, Quality Assurance Oversight of Watts Bar Unit 2 Startup Operational Readiness, dated 02/06/2014  
 List of NPG Procedures That Contain WBN Unit 2 Exceptions, completed Early 2014  
 ANSI N18.7-1976, Administrative Controls and QA for the Operational Phase of Nuclear Power Plants, dated 02/19/1976

## **O.1.2 Quality Assurance Program - Audits (Inspection Procedure 35741B)**

### QA Audits and Surveillances

Audit Report, Bechtel Construction Operations Incorporated and Bechtel Power Corporation, Bechtel Quality Assurance Manuals (BQAMs), Audit No. 25402-WBN-AR -13-002, R0, dated June 3, 2013 through June 21, 2013  
 Audit Report, Watts Bar Nuclear Unit 2 Construction Completion Project, Project Nuclear, Quality Assurance Manual, Audit No. 25402-WBN-AR-14-001, R0, dated February 18, 2014 through March 04, 2014  
 Watts Bar Nuclear Plant Unit 2- Quality Assurance Audit No. NC1202 – Supplemental Limited Scope Audit of TVA Nuclear Construction Organization  
 Watts Bar Nuclear Plant Unit 2- Independent Audit of TVA Quality Assurance Department Activities – Audit No. NC1203  
 Watts Bar Nuclear Plant Unit 2- Independent Audit of TVA Quality Assurance Department Activities – Audit No. NC1304  
 Watts Bar Nuclear Plant Unit 2- Quality Assurance-TVA Nuclear Construction Organization – Audit No. NC1304  
 Watts Bar Nuclear Plant Unit 2- Quality Assurance-Preoperational Startup Activities – Audit No. NC1305  
 Watts Bar Nuclear Plant Unit 2 – Quality Assurance Updated Two-year Internal Audit Schedule (2013-2014) – R1, dated October 2, 2013  
 Watts Bar Nuclear Plant Unit 2 – Quality Assurance Updated Two-year Internal Audit Schedule (2014-2015), dated July 24, 2014  
 Watts Bar Nuclear Plant Audit Report, Audit SSA1406, Design Engineering, May 27 –June 6, 2014  
 TVA Quality Assurance Master Audit Schedule 2014-2015, Rev. 1  
 Chattanooga Office Complex Audit Report, Audit SSA1408, July 7 -16, 2014

### Miscellaneous Documents

Quality Assurance Department, Transition and Change Management Plan for Two-Unit Operation, Rev. 10  
 Nuclear Quality Assurance Plan (NQAP), TVA-NQA-PLN89-A Rev. 29  
 NPG Standard Department Procedure, Internal Audits, QADP-2 Rev. 8  
 Watts Bar Nuclear Plant Unit 2, Audit and Assessments, NC PP-14 Rev. 10  
 Bechtel Power Corporation Quality Assurance Procedure, Quality Program Audits, No. 2QP-Q01G-C0382 Rev. 3

### Corrective Action Documents

PER 920298, NC1404 Audit Documentation Deficiency  
 PER 920324, Failure to Follow Procedure



### **O.1.3 Quality Assurance Program - Procurement Control (Inspection Procedure 35746B)**

#### Procedures/Programs

NPG-SPP-04.1 Rev. 02, Procurement of Material, Labor and Services, TVA, dated 07/01/2013  
 NPG-SPP-04.2 Rev 3, Material Receipt and Inspection, dated 02/03/2014  
 SC-SPP-04.02.01 Rev 13, TVA Inventory Management Policy, dated 12/16/2011  
 NPG-SPP-04.3 Rev 1, Material Storage and Handling, dated 07/19/2011  
 NPG-SPP-09.0.9 Rev. 0000, Conduct of Procurement Engineering, TVA dated 06/23/2014

#### Miscellaneous Documents

TVA Supply Chain Transition Plan for Two Unit Operation Rev 0, dated 08/12/2013  
 Watts Bar Nuclear Plant Operational Spares Strategy Document, dated 12/10/2013

### **O.1.4 Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material (Inspection Procedure 35747B)**

#### Procedures

25402-PRO-0007, Field Material Storage Control, Rev. 5, dated 08/3/2012  
 NPG-SPP-04.2 Rev 3, Material Receipt and Inspection, dated 02/03/2014  
 NPG-SPP-04.3 Rev 1, Material Storage and Handling, dated 07/19/2011  
 NPG-SPP-04.1 Rev. 02, Procurement of Material, Labor and Services, TVA, dated 07/01/2013  
 NPG-SPP-04.4, Material Issue, Control and Return, Rev. 0003, dated 02/03/2014  
 NEDP-8.1, Technical Evaluation for Functional Classification of Materials, Items, and Services, Rev. 0000, 06/23/2014  
 NC-PP- 31, Watts Bar Nuclear Plant Unit 2 Procurement of Material, Labor and Services, Rev.0, dated 4/21/14

#### Miscellaneous Documents

TVA Supply Chain Transition Plan for Two Unit Operation Rev 0, dated 08/12/2013  
 86110-010-YAA-2013-00015, Bechtel Audit of Lettis Consultants International, dated 7/12/2013  
 86110-010-YAA-2013-00010, Bechtel Audit of An-Tech Laboratories Incorporated, dated 5/28-29/2013

#### Corrective Action Documents

PER 920312, NRC Inspection at Warehouse 7

### **O.1.5 Quality Assurance Records (Inspection Procedure 35748B)**

#### Procedures

NPG-SPP-31.2, Records Management, Rev. 4  
 TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan, Rev. 29  
 NPG-SPP-31.1, Document Control, Rev. 2  
 WB-DC-40-33, QA Records Storage Facility- (Unit 1/Unit 2), Rev. 8  
 NC PP-22, WBN2 ASME Section III Division 1 Document Control and Records Management, Rev. 4

#### Miscellaneous

SER, TVA Quality Assurance Plan, dated 01/18/1990  
 NFPA 232, Protection of Records, dated 1980  
 NPG-SPP-31.2 – Fuel Loading Analysis, Unit 2 QA Records Processing Area, Rev. 1  
 WBN Support Services, Security and Licensing Transition Plan for Two Unit Operations, Rev. 13

#### QA Records Samples

FCR 57675-A, 2-FT-070-165C Setpoint Change, dated 3/25/11  
 FCR 62775-A, Drawing Revision, dated 12/11/13

Personnel Training Record, WB2-190, dated 8/4/10  
 Personnel Training Record, WB2-364, dated 2/12/14  
 WO 111452136, HVAC Functional Test, dated 5/15/13  
 WO 111033786, Air Operated Valve/Damper Test, dated 5/9/13  
 WO 110743623, Minor Maintenance WBN-2-FCV-027-0140, dated 3/18/10  
 WO 110940183, Minor Maintenance WBN-2-FCV-063-0158, dated 12/12/13  
 25402-011-MRA-EWE2-00310, Receipt Inspection, Rev. 0  
 254022-000-FMR-E000-00127A, Receipt Inspection, Rev. 0

#### Corrective Action Documents

PER 919311, WBN Records Storage Vault Condition  
 PER 699659, Record Storage Vault Material Condition  
 PER 927528, Not Meeting Two-Hour Minimum Fire-Rated Protection for QA Records  
 PER 920126, PER 699659 Inappropriately Closed  
 PER 916105, QA Records Not Stored In Binders or Folders  
 PER 920121, Records Vault Door Modification  
 PER 921988, Records Not Stored Properly  
 PER 922386, Revise Evaluation to Add Critical Thinking

### **O.1.6 Quality Assurance Program - Safety Review Committee (Inspection Procedure 40301)**

#### Procedures

NPG-SPP-03.2, Nuclear Safety Oversight, Rev. 3  
 NC-SPP-03.02, Nuclear Construction Review Board, Rev. 0  
 TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan, Rev. 29

#### Miscellaneous

2014 NCRB/NSRB Quality Assurance Strategy

### **F.1.1 Postfire Safe Shutdown, Emergency Lighting and Oil Collection Capability at Operating and Near-Term Operating Reactor Facilities (Inspection Procedure 64100)**

0-AOI-30.1, Plant Fires, Rev. 0  
 0-AOI-30.2 C.30, Fire Safe Shutdown Room 757-A22, Rev. 0  
 3-OT-SRD-APP R Demo, Simulator Exercise Guide (SEG), Rev. 0  
 EDQ00099920090016, Appendix A1, Rev 3  
 Fire Protection Report, Part VII – Deviations and Evaluations

### **F.1.2 Fire Protection Program (Inspection Procedure 64704)**

Work Order 110798108, Replace Disconnect Switches 2-SW-068-0394-A and 2-SW-068-0395-B, dated 3/28/2014

## **ST.1.1 Quality Assurance Program-Tests and Experiments (Inspection Procedure 35749B)**

### Procedures

ESP070.109, Technical Evaluations, Rev. 28, dated 5/14/2013  
 0-PI-OPS-17.0, 18 Month Locked Valve Verification, Rev. 0056, dated 4/11/2014  
 ODM-43, Operator Key Parameter Reference Guide, Rev. 0000 dated 7/25/2014  
 NPG-SPP-09.18.2, Equipment Reliability Classification, Rev. 0001, dated 11/05/2010  
 NPG-SPP-09.0.5, Conduct of Design Engineering, Rev. 0000, dated 08-01-2013  
 NPG-SPP-07.7, NPG CTS Role and Oversight of Supplemental Personnel, Rev. 0002, dated 07/01/2014  
 NEDP-10, Design Output, Rev. 0018, dated 07-14-2014  
 NEDP-6, Design Standards and Guides Controls, Rev. 0005, dated 10/30/2008  
 NEDP-4, Q-List and UNID Control, Rev. 0022, dated 12/16/2013  
 NSDP-28, Security Plan Change, Rev. 0006, dated 11/19/2013  
 NPG-SPP-10.2, Clearance Procedure to Safely Control Energy, Rev. 0007, dated 02/21/2014  
 NPG-SPP-10.5, Plant Operations Review Committee, Rev. 0003, dated 02/14/2013  
 NPG-SPP-10.3, Verification Program, Rev. 0006, dated 02/12/2014  
 NPG-SPP-09.20, Vendor Manual Control, Rev. 0003, dated 01/13/2014  
 NPG-SPP-09.6, Master Equipment List (MEL), Rev. 0003, dated 04/01/2013  
 NPG-SPP-09.0.8, Risk Reviews for Engineering Tasks to Develop Engineering Documents, Rev. 0000, dated 11/08/2013  
 NPG-SPP-03.12, Technical Specifications/Licenses and Amendments, Rev. 0000, dated 05/30/2013  
 NPG-SPP-03.3, NRC Commitment Management, Rev. 0005, dated 04/30/2014  
 NEDP-11, Design Input Walkdown Controls, Rev. 5, dated 01/31/2005  
 NEDP-8.0, Evaluations for Procurement of Materials, Items, and Services, Rev. 0000, dated 06/23/2014  
 NEDP-3, Drawing Control, Rev. 0018, dated 09/16/2013  
 NEDP-2, Design Calculation Process Control, Rev. 0018, dated 08/04/2014  
 NEDP-1, Design Basis and Design Input Control, Rev. 0006, dated 09/29/2011  
 ESP070.281, Analysis – Calculations, Rev. 28, dated 05/14/2013  
 ESP070.103, Engineering Change Packages, Rev. 28, dated 05/14/2013  
 ESP070.100, Design Engineer Required Reading, Rev. 28, dated 05/14/2013  
 NPG-SPP-09.17, Temporary Equipment Control, Rev. 0005, dated 05/20/2014  
 NPG-SPP-09.9, 10 CFR 72.48 Evaluations of Changes, Tests, And Experiments for Independent Spent Fuel Storage Installation, Rev. 0002, dated 03/21/2014  
 ESP070.504, Temporary Modifications, Rev. 28, dated 05/14/2013  
 ESP070.102, Design Verification, Rev. 28, dated 05/14/2013  
 NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Rev. 0017, dated 06/02/2014  
 NPG-SPP-06.9.3, Post-Modification Testing, Rev. 0005, dated 03/25/2014  
 NPG-SPP-09.4, 10 CFR 50.59 Evaluations of Changes, Tests, and Experiments, Rev. 0008, dated 03/24/2014  
 NEDP-8.4, Equivalency Evaluation for Procurement and Use of Replacement Materials and Items, Rev. 0000, dated 06/23/2014

### Miscellaneous Documents

Watts Bar Nuclear Plant Units 1 and 2 Multi-Unit Operator Training and Certification Program and Request for Review, Letter dated September 19, 2013  
 EGT327.142B, WBN Unit Differences  
 GEN310.100E Rev 1.pptx, Unit 2 Differences and Changes for Electrical Maintenance  
 GEN310.200I-Rev 1.pptx, Unit 2 Differences and Changes for Instrument and Control Maintenance

GEN310.300M Rev 1.pptx, Unit 2 Differences and Changes for Mechanical Maintenance  
 Difference Training Schedule Excel Spreadsheet  
 Unit differences EDCR listing system differences For NRC.xlsx

### **ST.1.2 Quality Assurance Program Measurement and Test Equipment (Inspection Procedure 35750)**

#### Procedures/Programs

NPG-SPP-06.4, Measuring and Test Equipment, TVA  
 25402-000-GPP-0000-N7102, Control of Measuring and Test Equipment, Bechtel  
 SMP-6.0 Rev. 7, Watts Bar Nuclear Plant Unit 2 Administration, Conduct and Test Results  
 Processing of Generic Test Instructions

#### Work Control Documents

WO 111640106, Penetration Room Cooler 2B-B Temperature, SUT SYS 030A Perform GTI-01  
 for the following Temperature Switches on Aux Bldg EL 713, dated 06/05/2014  
 WO 112226423, RCP 3 Low Range Leakage, SUTI SYS 062 WBN-2-LPF-062-0036 CTN 2-  
 062-05611-I01-000 dated 05/29/2014  
 WO 112226620, RHR Letdown Flow Cont, SUT SYS 062 WBC-2-LPF-062-05618-I01-000,  
 dated 04/30/2014

#### Miscellaneous Documents

Maintenance Department Transition and Change Plan for Two Unit Operation, rev 4, dated  
 5/29/2014

### **R.1.1 Liquids and Liquid Wastes (Preoperational and Supplemental) (Inspection Procedure 84523)**

2-PTI-077-01, Liquid Waste Processing System, Rev. 0  
 2-PTI-077-03, Liquid Waste Collection, Rev. 1  
 WBN2-77C-4001, Liquid Radwaste Processing System, Rev. 2  
 WBN-DCD-40-24, Radiation Monitoring (Unit 1/Unit 2), Rev. 26  
 Work Order 111172026, RCDT Drain Preoperational Test  
 Work Order 111172120, RCDT Drain Preoperational Test  
 Work Order 112177435, RCDT Drain Preoperational Test  
 Work Order 112177615, RCDT Drain Preoperational Test  
 Drawing 2-47W610-90-2, S/G Blowdown Liquid Sample Monitor

### **R.1.2 Gaseous Waste System (Pre-Operational and Supplemental) (Inspection Procedure 84524)**

DCN 54207-A, 6/30/10  
 Drawings 46W501-1 thru 46W501-5, ABSCE Boundary  
 EDCR 52341, 6/3/10  
 WBN2-77A-4001, System Description for Gaseous Waste Disposal System, Rev. 2  
 WBN-DCD-40-24, Radiation Monitoring (Unit 1 / Unit 2), Rev. 26  
 Work Order 111007013, CTN 2-063-02324-I02-000, 3/14/14  
 Work Order 110939597, CTN 2-063-02326-I02-000, 4/15/14  
 2-PTI-077-02, Gaseous Waste Disposal System Preoperational Test Instruction, Rev. 0  
 PER 767550

### **R.1.3 Radiological Environmental Monitoring (Preoperational and Supplemental) (Inspection Procedure 80521)**

Watts Bar Nuclear Plant - Draft Two-Unit Offsite Dose Calculation Manual (ODCM), Rev. B

Watts Bar Nuclear Plant (WBN) Offsite Dose Calculation Manual (ODCM), Rev. 23

Watts Bar Nuclear Plant Final Safety Analysis Report (FSAR), Rev. 111

NUREG-0847, Supplement 26, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, June 2013

## **IV. OTHER ACTIVITIES**

### **OA.1.1 Violation 391/87-19-02, Failure to Preserve Equipment Installed in the North and South Valve Rooms (Inspection Procedure 50090)**

#### WOs

112362331

112362166

#### EDCRs

53217

#### Procedures

0-TI-437, System Turnover-Startup to Operations, Rev. 2

SMP-4.0, Watts Bar Nuclear Plant Unit 2 System Completion and Turnover, rev. 11

#### Design Specifications

WB-DC-30-4, Separation/Isolation, Rev. 22

#### PERs

524831

143794

143928

172756

172758

143938

172759

### **OA.1.2 Construction Deficiency Report 391/83-48: Relocating Sensing Lines on Upper Containment Cooler (Inspection Procedure 92701)**

#### EDCRs

EDCR 53599, Rev. A

#### Procedures

N3C-934

#### WOs

WO 115901755

#### FCRs

FCR 60794-A

Drawings

2-47A900-58D

2-47A900-58E

2-47W866-1, Flow Diagram Heating and Ventilation Air Flow, Rev. 19

2-47W915-3, Mechanical, Ventilation and Air Conditioning, Rev. 38

Closure Reports/Packages

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

**OA.1.3 Construction Deficiency Report 391/87-15: Containment Purge Air Bellows Have No Fire Rating or Environmental Qualification (Inspection Procedure 35007)**

DRA 52882-010, List of Locations for the Flex Connectors which will Be Replaced, Rev. 0  
Partial Completion of Open Items/Commitments, Tracking Number – 114114532, Dated 07/30/14

PER 144090

EDCR 52861, Rev. A

EPMRA032795, Appendix R Evaluation of Duct Opening Protection in Fire Rated Walls, Rev. 02

EDCR 54923, Rev. A

Purchase Order No. 33782-156, WBN2 Reactor/Auxiliary Building Ventilation System – Flex Connectors for EDCR 52882-A and EDCR 52953-A, Rev. 2

DCN 35361-A, Add HVAC Duct Fire Dampers, Dated 04/03/95

EDCR 52849, Rev A

Work Order 112411930, CCM EDCR 52882 SYS 030 Flexible Connections, Dated 03/27/12

Work Order 112461853, CCM EDCR 52882 PER 369701 SYS 030 Flexible Connections, Dated 03/26/12

**OA.1.4 Construction Deficiency Report 391/89-08: Kapton Insulated Pigtail Insulation Damage (Inspection Procedure 51053)**

WO 115540090 Inspect KAPTON Insulated conductors for damage

MAI-3.3, Cable Terminating, Splicing and Testing for Cables rated up to 15,000 volts, Rev. 0033

**OA.1.5 Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance (Inspection Procedure 70312 and Temporary Instruction 2515/109)**

Procedures/Programs

2-TI-85.008, Motor Operated Valve Dynamic Test, Rev. 3

Calculations

MDQ0020632008-0251, MOV Valve and Actuator Capability for 2-FCV-74-035, Rev. 1

WOs

114900833, Perform Differential Pressure Testing on 2-FCV-063-0175-B

Drawings

2-47W811-1, Flow Safety Injection System, Rev. 35

Training Records

Selected Personnel Training Records for SMP 5.0 Test Director Qualifications

Crane Nuclear Representative Diagnostic Test Engineer and Diagnostic Test Technician qualification record

Miscellaneous

WBN2-63-4001, Safety Injection System, Rev. 3

**OA.1.06 Generic Letter 2006-03: Potentially nonconforming HEMYC and MT fire barrier configurations; Bulletin No. 1992-01: Failure of Thermo-Lag 330 Fire Barrier System to Maintain Cabling in Wide Cable Trays and Small Conduits Free from Fire Damage; Bulletin No. 1992-01 (Supplement 1): Failure of Thermo-Lag 330 Fire Barrier System to Perform Its Specified Fire Endurance Function; Generic Letter 1992-08: Thermo-Lag 330-1 Fire Barriers (Inspection Procedure 35007)**

0-47W243-1, Thermo-Lag 330-1 Single Layer Design for Conduits 4" and Larger, Rev. 0  
 0-47W243-10, Thermo-Lag 330-1 Special Cable Tray Fitting, Rev. 0  
 0-47W243-11, Thermo-Lag 330-1 Multiple Stack Cable Trays – Single Enclosure, Rev. 0  
 0-47W243-12, Thermo-Lag 330-1 Multiple Parallel Cable Trays – Single Enclosure, Rev. 0  
 0-47W243-13, Thermo-Lag 330-1 Cable Tray with Raised Cover Single Enclosure, Rev. 0  
 0-47W243-15, Thermo-Lag 330-1 Multiple Conduits Three-Sided Enclosures, Rev. 0  
 0-47W243-16, Thermo-Lag 330-1 Multiple Conduits Four-Sided Enclosures, Rev. 0  
 0-47W243-17, Thermo-Lag 330-1 Gauge Conduits Four-Sided Enclosures, Rev. 0  
 0-47W243-18, Thermo-Lag 330-1 Miscellaneous Details, Rev. 0  
 0-47W243-19, Thermo-Lag 330-1 Miscellaneous Details, Rev. 0  
 0-47W243-2, Thermo-Lag 330-1 Single Layer Design for Conduits 3" and Smaller, Rev. 0  
 0-47W243-20, Thermo-Lag 330-1 Cable Tray & Conduit Support Details, Rev. 0  
 0-47W243-21, Thermo-Lag 330-1 Miscellaneous Support Details, Rev. 0  
 0-47W243-22, Thermo-Lag 330-1 Miscellaneous Details, Rev. 0  
 0-47W243-23, Thermo-Lag 330-1 Cable Tray Details, Rev. 0  
 0-47W243-24, Thermo-Lag 330-1 Miscellaneous Details, Rev. 0  
 0-47W243-3, Thermo-Lag 330-1 Junction Boxes, Rev. 0  
 0-47W243-4, Thermo-Lag 330-1 18" Cable Trays, Rev. 0  
 0-47W243-5, Thermo-Lag 330-1 Miscellaneous Details, Rev. 0  
 0-47W243-50, 3M-M20A Radiant Energy Shield, Inside Secondary Containment – Reactor Building, Rev. 0  
 0-47W243-51, 3M-M20A Radiant Energy Shield, Inside Secondary Containment – Reactor Building, Rev. 0  
 0-47W243-52, 3M-M20A Radiant Energy Shield, Inside Secondary Containment – Reactor Building, Rev. 0  
 0-47W243-6, 3M-M2OC Radiant Energy Shield, Inside Primary Containment-Reactor Building, Rev. 0  
 0-47W243-7, 3M-M2OC Radiant Energy Shield, Inside Primary Containment-Reactor Building, Rev. 0  
 0-47W243-75, Three Hour Rated Thermo-Lag 330-1 Baseline Conduit ERFBS, Rev. 0  
 0-47W243-76, Three Hour Rated Thermo-Lag 770-1 Conduit ERFBS Upgrade, Rev. 0  
 0-47W243-77, Three Hour Rated Thermo-Lag 330-14 Junction Box ERFBS Baseline, Rev. 0  
 0-47W243-8, 3M-M2OC Radiant Energy Shield, Inside Primary Containment-Reactor Building, Rev. 0  
 CDQ0002922013000158, Qualification Summary of Appendix R Conduit and Supports (DCN 53413), Rev. 0  
 CDQ0009992013000255, Qualification Summary of Appendix R Conduit and Supports (EDCR 55523), Rev. 0  
 DS-E12.6.3, Auxiliary and Control Power Cable Sizing Up to 15,000 Volts, Rev. 10  
 EDCR-2, 55523, Rev. A  
 EDCR-2, 55523B, Rev. B  
 EDQ00299920080002, Unit 2 Class 1E V4 Cable Ampacity, Rev. 26  
 EPMDOM012990, Combustible Loading Data (CLD), Rev.73

FP-50630-TL3-012, Thermo-Lag Fire Protection – Raceway 2PLC5137A, Room 737-A12, Sheet 7, Rev. 1  
 G-98, Installation, Modification, and Maintenance of Electrical Raceway Fire Barrier Systems, Rev. 05  
 G-98, Installation, Modification, and Maintenance of Electrical Raceway Fire Barrier Systems, Rev. 11  
 Open Items/Commitment Completion Form, Tracking Number – NCO080008020, Dated 12/05/11  
 Open Items/Commitment Completion Form, Tracking Number – NCO080008020, Dated 08/13/13  
 RWT000, General Employee Training, Rev. 15  
 Training Completion Records for FPT004.000, Electrical Raceway Fire Barrier Systems, Dated 01/17/14  
 WB-DC-40-31.10, Seismically Qualifying Conduit Supports, Rev. 11  
 WO No. 115435212, Implement Fire Wrap in Auxiliary Building

**OA.1.7 Safety Evaluation Report 23 Appendix HH Open Items 63 and 93, Eagle 21 Two-Way Communication Test (Inspection Procedure 52053)**

Documents

WO 115799048, Watts Bar Unit 2 Eagle 21 Unidirectional Communications Test  
 2-65717-5D93433-1, Electrical Eagle 21 – standard Serial to Ethernet controller Rev. 1  
 2-65717-5D93433-2, Electrical Eagle 21 – standard Serial to Ethernet controller Rev. 1  
 2-65717-5D93433-3, Electrical Eagle 21 – standard Serial to Ethernet controller Rev. 1  
 2-65717-3D20355-1, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-3, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-5, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-6, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-7, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-8, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-9, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 2-65717-3D20355-10, Electrical Eagle 21 – Standard Communication (LCP, TSP, MMI &SEC) Cable, Rev. 1  
 WBN-VTD-W120-5036, Westinghouse Eagle 21 Process Protection Upgrade System Volume 1, Rev. 1  
 WBN-VTD-W120-5037, Eagle 21 External Communication Interface System Technical Manual, Rev. 0  
 WBN-VTD-W120-5058, Westinghouse Eagle 21 Process Protection Upgrade System Volume 3, Book 1, Rev. 0  
 Test Results from WO 115799048



**OA.1.8 Inspection of Watts Bar Nuclear Plant Cable Tray and Supports Corrective Action Program Plan (Temporary Instruction 2512/017 and Inspection Procedures 51053 and 37051)**

EDCRs

EDCR 52934, Rev. A  
EDCR 55045, Rev. B  
EDCR 55231, Rev. A

DRAs

DRA 55231-112  
DRA 55231-113  
DRA 55231-114  
DRA 55231-115

WOs

WO 110885856, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
WO 110886017, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
WO 110886060, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
WO 110885857, CCE EDCR 55231 SYS 293 WBN-2-MISC-293

Calculations

WCG-2-531, WBN2 Seismic Category 1 Cable Trays – Resolution of Miscellaneous Outliers, Rev. 0  
WCG-2-557, WBN2 Seismic Category I Cable Trays – Bounding Evaluation of Outliers (Group 10), Rev. 0  
WCG-2-348, WBN2 Cable Tray Seismic Qualification Walkdown Guidelines, Rev. 1

Specifications

G-32, Bolt Anchors Set in Hardened Concrete, Rev 24  
G-40, Installation, Modification, and Maintenance of Electrical Conduit, Cable Trays, Boxes, Containment Electrical Penetrations, Rev. 18

Procedures

MAI-3.9, Installation of Cable Tray, Cable Tray Supports, and Cable Tray Cover, Rev. 11

FCRs

FCR 63223-A-AA07  
FCR 63317

Walkdown Packages

LSWD-3002, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB203, Rev. 0  
LSWD-3006, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB207, Rev. 1  
LSWD-3013, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB214, Rev. 1

Drawings

45W874-1  
45W874-3  
45W879-1  
45W879-2, Conduit & Grounding Elevation 703.0 to 811.0 Extended Development, Rev. 6  
45W889-3

45W889-4  
45W889-5

#### Closure Reports/Packages

Open Items/Commitment Completion Form for: NCO080008077 (Cable Tray CAP). Partial Closure (Engineering Complete) Dated: 2/18/2014

#### Miscellaneous Documents

Unit 2 Cable Tray and Support CAP Closure Report  
Unit 1 Cable Tray and Support CAP Closure Report  
Open Items/Commitment Completion Form for: PER 143986, Rev. 0. Partial Closure Documentation (Engineering Complete) Dated: 1/19/2012

#### **OA.1.9 Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 391/85-35: Support of Conductors Inside Vertical Conduit Runs (Temporary Instruction 2512/016 and Inspection Procedure 35007)**

WO 114310431, Install Cable Kellem Grips in accordance with EDCR 55116 and MAI-3.2 for conduit 2G1525A  
WO 114310246, Install Cable Kellem Grips in accordance with EDCR 55116 and MAI-3.2 for conduit 2G1524B  
FCR 62555-AA5  
FCR 62110-AA8  
DRA 55116-001, Rev. 1  
DRA 55116-013, Rev. 1  
DRA 55116-014, Rev. 1  
47A056-200, Mechanical Category I Support Conduit Typical, Rev. 4  
47A056-200A, Mechanical Category I Support Conduit Typical, Rev. 5  
MAI-3.2, Cable Pulling for Insulated Cables Rated Up to 15,000 Volts, Rev. 0027

#### **OA.1.10 Construction Deficiency Report 391/84-25: Failure to Provide Fire Detectors in Rooms Containing Redundant Safe Shutdown Circuits (Inspection Procedure 35007)**

0-FOR-13-625, 6 Month Fire Detection Test Panel L625, Rev. 9 01/13/14  
47W600-248, Unit 1 Electrical Instrument and Controls, Rev. 9 2/10/12  
ECN 4871, Data Sheet No.2, Dated 5/23/84  
ECN 4872, Dated 5/18/84  
MI-13.104, Isolating ZA-30 Module Fire Detection Zones, Rev. 4  
PER 172705, Install and Rewire Smoke Detectors in Unit 2 Post-Sampling Room, Dated  
SOI-13.01, Fire Detection System, Rev. 25  
Work Order 09-818154-00, 6 Month Fire Detection Test Panel L625, Dated 01/02/10  
Work Order 114846166, 0-FOR-13-625 6 Month Fire Detection Test Panel L625, Dated 01/03/14

#### **OA.1.11 Construction Deficiency Report 391/89-06: Inadequate Qualifications for Cable Tray Supports and Fittings (Inspection Procedure 51053)**

#### EDCRs

EDCR 52934, Rev. A  
EDCR 55045, Rev. B  
EDCR 55231, Rev. A

WOs

WO 110885856, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
 WO 110886017, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
 WO 110886060, CCE EDCR 55231 SYS 293 WBN-2-MISC-293  
 WO 110885857, CCE EDCR 55231 SYS 293 WBN-2-MISC-293

Calculations

WCG-2-531, WBN2 Seismic Category 1 Cable Trays – Resolution of Miscellaneous Outliers, Rev. 0  
 WCG-2-557, WBN2 Seismic Category I Cable Trays – Bounding Evaluation of Outliers (Group 10), Rev. 0  
 WCG-2-348, WBN2 Cable Tray Seismic Qualification Walkdown Guidelines, Rev. 1

Specifications

G-32, Bolt Anchors Set in Hardened Concrete, Rev. 24  
 G-40, Installation, Modification, and Maintenance of Electrical Conduit, Cable Trays, Boxes, Containment Electrical Penetrations, Rev. 18

Procedures

MAI-3.9, Installation of Cable Tray, Cable Tray Supports, and Cable Tray Cover, Rev. 11

FCRs

FCR 63223-A-AA07  
 FCR 63317

Walkdown Packages

LSWD-3002, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB203, Rev. 0  
 LSWD-3006, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB207, Rev. 1  
 LSWD-3013, WBN2 Cable Tray Seismic Qualification Walkdown Reactor BLDG. Area RB214, Rev. 1

Drawings

45W874-1  
 45W874-3  
 45W879-1  
 45W879-2, Conduit & Grounding Elevation 703.0 to 811.0 Extended Development, Rev. 6  
 45W889-3  
 45W889-4  
 45W889-5

Closure Reports/Packages

Open Items/Commitment Completion Form for: NCO080008077 (Cable Tray CAP). Partial Closure (Engineering Complete) Dated 2/18/2014

Miscellaneous Documents

Unit 2 Cable Tray and Support CAP Closure Report  
 Unit 1 Cable Tray and Support CAP Closure Report  
 Open Items/Commitment Completion Form for: PER 143986, Rev. 0. Partial Closure Documentation (Engineering Complete) Dated 1/19/2012

**OA.1.12 Violation 391/87-19-01, Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 50090)**

WOs

113536596  
115896066  
111234371

EDCRs

52465  
53580  
55125  
55127

FCRs

61810  
57231

Walkdown Packages

LSWD-492  
LSWD-517  
LSWD-526  
LSWD-427

Calculations

201B172, Calculations for Pipe Support, Rev. 2  
WCG-2-752, Evaluation of conduit Supports 0-CSP-292-1178, 0-CSP-292-1179, 0-CSP-292-1180, 0-CSP-292-1168/4, Rev.1  
WCG-1-615, Evaluation for SVRU Structures for Thermal Condition, Rev. 2

Procedures

25402-3DP-G04G-00046, Engineering Department Procedure Instruction engineering Drawings, Rev. 13  
25402-3DP-G04G-00090, Engineering Evaluation for Commodity Refurbishment, Rev. 009  
25402-3DP-G04G-00081, Engineering Document Construction Release, Rev. 17

Drawings

45W3000-1, Cable/Wiring Separation Requirements Notes, Rev. 1  
45W3000-2, Cable/Wiring Separation Requirements Details, Rev. 0  
1-45W3000-3, Cable/Wiring Separation Requirements Details, Rev. 1  
45W826-18, Rev. 36  
48W1707-24, Structural Steel Section and Details South Main Steam Valve Rooms, Rev. 7  
48W1707-06, Structural Steel Plan-Elev. 747'-3" South Main Steam Valve Rooms, Rev. 7  
48W1708-05, Structural Steel Plan-Elev. 754'-10" North Main Steam Valve Rooms, Rev. 6  
48W1708-06, Structural Steel Plan-Elev. 761'-2" North Main Steam Valve Rooms, Rev. 6

CAQRs

WBN 871086  
WBN 871087  
WBN 871088  
WBN 871136  
WBN 871130

PERs

143790  
 143791  
 143792  
 143939  
 143940  
 143796  
 143795

DRA's

52465-029  
 52465-012  
 52457-142  
 52457-098

Other Documents

Audit No. 25402-WBN-AR-14-0001, Rev. 0  
 WBP890248SCA, Corrective action Document Package  
 DCN 53864-346

**LIST OF ACRONYMS**

ABGTS	Auxiliary Building Gas Treatment System
ACL	Acceptable Suppliers List
ADAMS	Agencywide Documents Access and Management System
BL	NRC Bulletin
CAP	Corrective Action Program
CAQR	Condition Adverse to Quality Report
CATD	Corrective Action Tracking Document
CDR	Construction Deficiency Report
CFR	<i>Code of Federal Regulations</i>
CGD	Commercial Grade Dedication
DRs	Discrepancy Reports
DRA	Drawing Revision Authorization
ECN	Engineering Change Notice
EDCR	Engineering Document Construction Release
EDG	Emergency Diesel Generator
EGTS	Emergency Gas Treatment System
EN	Event Notification
EP	Emergency Preparedness
EQ	Environmental Qualification
ERFBS	Electrical Raceway Fire Barrier System
FCR	Field Change Request
FFP	Fire Protection Report
FLEX	Flexible Coping Strategies
FSAR	Final Safety Analysis Report
GL	Generic Letter
GWDS	Gaseous Waste Disposal System
HEPA	High-Efficiency Particulate Air
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IIR	Integrated Inspection Report
IR	Inspection Report

JOG	Joint Owners Group
M&TE	Measuring and Test Equipment
MCR	Main Control Room
MEL	Master Equipment List
MOV	Motor Operated Valve
NC	Nuclear Construction Group
NCR	Nonconformance Report
NCRB	Nuclear Construction Review Board
NE	Nuclear Engineering Group
NFPA	National Fire Protection Act
No.	Number
NPG	Nuclear Power Group
NPP	Nuclear Performance Plan
NQAP	Nuclear Quality Assurance Plan
NRC	Nuclear Regulatory Commission
NSRB	Nuclear Safety Review Board
NUPIC	Nuclear Procurement Issues Committee
ODCM	Offsite Dose Calculation Manual
OMA	Operator Manual Action
PER	Problem Evaluation Report
PO	Purchase Order
PRT	Pressurizer Relief Tank
QA	Quality Assurance
QC	Quality Control
REMP	Radiological Environmental Monitoring Program
RBPVS	Reactor Building Purge Ventilation System
RCDT	Reactor Coolant Drain Tank
Rev.	Revision
RHR	Residual Heat Removal System
ROP	Reactor Oversight Process
RPV	Reactor Pressure Vessel
SALP	Systematic Assessment of Licensee Performance
SAR	Safety Analysis Report
SCAR	Significant Corrective Action Report
SCR	Significant Condition Report
SER	Safety Evaluation Report
SI	Safety Injection
SIS	Safety Injection System
SMP	Startup Manual Procedure
SQN	Sequoyah Nuclear Plant
STD	Standard
SUT	Startup Group
TI	Temporary Instruction (NRC)
TSI	Thermal Science Incorporated
TVA	Tennessee Valley Authority
UL	Underwriters Laboratories, Inc.
URI	Unresolved Item
VCT	Volume Control Tank
VIO	Violation
VSR	Vertical Slice Review
WBN	Watts Bar Nuclear Plant
WO	Work Order