



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

August 13, 2014

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

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2014605

Dear Mr. Skaggs:

On June 30, 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 July 16, 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.

Based on the results of this inspection, the enclosed report documents one NRC-identified finding which was determined to involve a violation of NRC requirements. However, because the finding was a Severity Level IV violation and was entered into your corrective action program, the NRC is treating the violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the non-cited violation in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar Unit 2 Nuclear Plant.

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

M. Skaggs

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000391/2014605
w/Attachment

cc w/encl: (See next page)

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Letter to Michael D. Skaggs from Robert C. Haag dated August 13, 2014.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2014605

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2014605

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: May 18-June 30, 2014

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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, pre-operational testing, operation 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 NRC identified three examples of a severity level (SL) IV non-cited violation (NCV) of 10 Code of Federal regulations (CFR) 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to follow instructions provided in drawings associated with the separation of safety-related conduits of different divisions for trains A, B, and S, and the separation of safety-related wiring of different divisions and non-divisional wiring in panels. The inspectors determined that all three examples were more than minor in accordance with IMC 2517, because they represented an improper work practice that could impact the safety-related function of these components. The finding was determined to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy because it does not represent a breakdown in the QA process. The applicant issued PERs 890353 and 887940 to address the identified conditions. The inspectors reviewed this finding against cross-cutting area components as described in IMC 0310 "Components Within the Cross-Cutting Areas" and determined that no cross-cutting aspect applied. (Section OA.1.2)
- The inspectors concluded that issues pertaining to several open items, including two construction deficiency reports (CDRs), one violation, four temporary instructions (TIs), and two inspection procedures (IPs) 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; piping and supports; electrical systems and components; pre-operational testing activities; operations training and qualification, cable issues corrective action program (CAP), equipment seismic CAP, welding CAP, QA Records CAP, design basis verification program CAP; and various NRC inspection procedures.

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REPORT DETAILS

Summary of Plant Status

During the inspection period covered by this report, Tennessee Valley Authority (TVA) performed construction completion and pre-operational 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 PER 791626 and corresponding attachments. This PER documented a hardware nonconformance in which there had never been an inspection of the internal cleanliness of the pipe prior to performing weld 2-062-T317. The inspectors verified that corrective actions were taken to verify the internal cleanliness of the piping, and verified the cleanliness was documented in accordance with approved procedures.

The inspectors reviewed PER 753286 and corresponding attachments, related to purchased material documentation. The inspectors verified the documentation had been corrected to accurately reflect the material and the receipt inspection was performed by appropriate personnel. Additionally, the inspectors verified that the revision to the receipt inspection procedure adequately addressed the issue.

The inspectors reviewed PER 858639 and corresponding attachments, which evaluated the correctness of service request (SR) 219497, PER 241130, and action 241130-002, all of which evaluated the refurbishment of a snubber. The snubber number was recorded incorrectly in the initial SR and PER. The inspectors verified that the correct snubber that was evaluated for adequacy was recorded correctly and that there was no instance where the applicant could have installed a damaged snubber. In addition, the inspectors verified that the previous PER 241130 was updated via a records correction/deletion notice.

The inspectors reviewed PER 857655 and corresponding attachments, which documented missing components from the backdraft damper installed in lower compartment cooler (LCC) fan 2D-B. The inspectors verified that the actions from this PER included installing the missing components by reviewing the work order (WO) 115648288 created to close this PER.

The inspectors reviewed PER 841574 and corresponding attachments, which documented an engineering analysis of bolts on the duct connections for the LCC 2A-A

line. Several bolts were not accessible, and therefore, could not be verified to be snug tight. The inspectors reviewed the engineering analysis for acceptability and performed a walkdown to verify that the bolts, nuts, and washers were installed as described in WOs 09-951866-010 and 09-951866-011.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

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

Q.1.2 Safety Conscious Work Environment (Inspection Procedure 35007 and Temporary Instruction 2512/015)

a. Inspection Scope

The inspectors reviewed existing program requirements and recent concerns identified by the applicant's and contractor's employee concerns program. The inspectors reviewed the 2014 first quarter report and met with the employee concerns program coordinator to discuss the quarterly analysis of concerns and any trends.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors did not identify any issues or concerns regarding the ability of the applicant to provide a safety-conscience work environment.

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1 Construction Activities

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

a. Inspection Scope

During the second quarter of 2014, 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. Several inspection samples associated with Unit 1 and Unit 2 interface activities that occurred during the second quarter of 2014 were documented in Integrated Inspection Report (IIR) 05000391/2014604 (Agencywide Documents Access and Management System [ADAMS] Accession Number [No.] ML14177A214).

The work activity observed during the inspection period included work associated with:

- WO 115144722, Implement DCN 59675 Stage 11 – Unit 1 Mechanical fuel oil suction piping tie in to the 1A-A safety related 7 day fuel oil tank.

Specific work activities that the applicant had screened out as not affecting Unit 1 included, but were not limited to, testing, flushing, and ongoing refurbishment 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 Electrical Cable – Work Observation (Inspection Procedure 51063)

a. Inspection Scope

The inspectors observed termination installations for the solid state protection system in panel 2-PNL-99-R49-B associated with WO 11571238. The termination observed was associated with the nuclear instrumentation system, or neutron monitoring system. The inspectors observed the terminations of cables 2NM88D and 2NM90D on terminal block 106 and cables 2NM84D and 2NM80D on terminal block 102. The inspectors observed the cable terminations to verify that electricians were using the latest approved drawings, that the terminations were to the correct points, proper bend radius was maintained, cable identification was preserved, appropriate equipment was used, and that the work was being performed by qualified individuals and observed by Quality Control (QC).

b. Observations and Findings

No findings identified.

c. Conclusion

The inspectors concluded that the observed work was performed in accordance with drawings.

C.1.3 Instrument Components and Systems – Work Observation (Inspection Procedure 52053)

a. Inspection Scope

The inspectors observed in-process work associated with WO 110950616, which involved containment differential pressure transmitter 2-PDT-30-45-D. The inspectors also observed in-process work associated with WO 110950622 which involved containment differential pressure transmitter 2-PDT-30-43-F. The inspectors observed that the latest revisions of applicable drawings were available for the installers, that the components were as specified, that the mounting hardware was the material specified, that the components were installed in the proper location and orientation by qualified craft personnel using suitable equipment and tools, that component identification was properly maintained, that inspections were performed before the covering up of the work to be inspected, and that inspection activities were timely and properly completed by qualified personnel.

The inspectors observed WO 112812478 which involved in-process calibration of a reactor coolant system (RCS) flow transmitter, 2-FT-68-29B, to verify that the latest revision of the procedures was available and used by qualified personnel performing the measuring & test equipment (M&TE) calibration. The inspectors also observed the in-process calibration to verify that the M&TE used was properly identified, traceable, and calibrated. The inspectors observed the in-process calibration to verify that the transmitter was able to be calibrated to the tolerance specified in the procedure.

The inspectors also observed portions of Eagle 21 testing for loops associated with RCS flow in WOs 112812441 and 112812463 to verify that M&TE was properly identified, traceable, and calibrated, that the latest revision of the procedure was available, and that personnel performing the testing and calibration were properly qualified.

The following samples were inspected:

- Inspection Procedure (IP) 52053 Section 02.02.c – 2 samples (Engineered Safety Features Actuation System)

b. Observations and Findings

No findings identified

c. Conclusion

The inspectors concluded that the observed work was performed in accordance with procedures and drawings.

C.1.4 Post-Fukushima Diverse and Flexible Construction Activities and Structural Welding associated with Auxiliary Feedwater Storage Tank (Inspection Procedures 49063 and 55100)

a. Inspection Scope

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

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 recommendations became the foundation of the NRC's post-Fukushima activities.

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

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 around critical design and structural attributes. Additionally, inspections were performed of as-built and completed modifications to verify that specifications, drawings, requirements, and standards were met.

More recently, IIR 05000391/2014604(ADAMS Accession No. ML14177A214), Section C.1.7, documented inspections associated with the FLEX building and the auxiliary feedwater storage tank (AFWST).

Inspection Activities: The inspectors reviewed and inspected the following for the structures and equipment noted below:

Intake Pumping Station

- Witnessed installation of essential raw cooling water (ERCW) mechanical connections to verify work was conducted in accordance with applicable procedures, design specifications, and standards.
- Reviewed post-issuance changes (PICs) to verify that all design changes were dispositioned in accordance with applicable procedures.
- Reviewed valve data sheets, weld data sheets, and magnetic particle examination test records to verify any discrepancies were resolved.
- Verified the as-built configuration of the installed ERCW mechanical connections were in accordance with applicable drawings.

AFWST

- The inspectors observed in-process welding of two vertical welds and the fit-up of the horizontal girth weld number 2 as part of the shell and plate assembly of the AFWST. The inspection was completed to verify that the welding process was in conformance with the welding procedure specification for flux-cored arch welding (FCAW) E308LT1-4, Rev. 1. The inspectors reviewed the FCAW procedure qualification record (PQR) for the above procedure to verify that the PQR essential variables for the specific welding process were covered and that the values or ranges of these variables were consistent with those permitted by the welding procedure specification.
- The inspectors walked down the filler metal storage room to determine whether welding material was clearly identified and stored in accordance with Chicago Bridge & Iron (CB&I) procedure CMS-830-15-WI-12003, "Storage and Care of Welding Consumables," dated September 14, 2009. In addition, the inspectors observed welding distribution activities to determine whether welding materials were distributed and documented in accordance with CB&I procedures.
- The inspectors reviewed performance qualification records for two welders using FCAW to determine if welding personnel were qualified and maintained their skills to perform welding activities in accordance with the requirements of American Society of Mechanical Engineers (ASME) Section III, Subsection IX, 2011 addenda.
- The inspectors observed a sample of visual inspections, to include tank plate out of roundness inspections, to verify the inspections met the acceptance criteria specified in procedure CMS-830-15-PR-45007, "Acceptance Criteria Visual Inspections Low Pressure AP-620 Storage Tank," dated September 22, 2010.
- The inspectors reviewed shell plate material to determine if the thicknesses were in accordance with the AFWST design specifications.
- The inspectors reviewed hydropneumatic test results to verify that the tank was tested in accordance with American Petroleum Institute standards and met the acceptance criteria (125% of design pressure).

Documents reviewed are listed in the Attachment.

b. Observations 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. Additional field inspections may be performed to review a sample of the remaining modifications to the plant and verify that work activities and the final as-builts comply with applicable specifications, standards, and requirements.

C.1.5 (Closed) Construction Refurbishment Process (Inspection Procedure 37002)

a. Inspection Scope

Background: In 1985, construction on Watts Bar Unit 1 and Watts Bar Unit 2 was stopped due to the identification of multiple construction QA issues. As described in IMC 2517, TVA addressed these WBN Unit 1 construction quality issues as part of the implementation of its Nuclear Performance Plan (NPP). In 1985, the NRC had completed its initial IMC 2512 inspection program for the construction of WBN Unit 1. However, the initial WBN inspection program was found to have some weaknesses, which were identified and corrected after the construction inspection program was completed for Unit 1, but before the facility was licensed. Because of the complexity of the rework activities under the NPP, the NRC implemented a "reconstitution" of the construction inspection program to verify that construction related inspections conducted after 1985 met the requirements of the IMC 2512 program. The results of this program were published in NUREG-1528, "Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1." TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to complete construction of Unit 2. As part of confirming that all issues and inspection requirements would be completed, the NRC performed a "reconstitution" of the IMC 2512 Construction Inspection Program for Unit 2. This "reconstitution" determined, through review of NRC inspection reports, the status of the IMC 2512 IPs in effect at the time construction was stopped. The NRC used the results of the reconstitution process to identify areas which required additional inspections. Integrated Inspection Report 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IMC 2512 IPs relating to construction.

Most of the equipment at Watts Bar Unit 2 was installed during the original construction period. Because layup activities were terminated for a period of time after 2001, it was necessary to ensure the equipment was still capable of meeting its required specifications. In order to address this concern, the applicant established a refurbishment program to identify the scope of equipment in the program, and perform appropriate activities to assure design standards were met. The applicant's general program procedure for refurbishment, 25402-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, was submitted to NRC on July 8, 2009 and reviewed by the Office of Nuclear Reactor Regulation. This resulted in issuance of the NRC Safety Evaluation Report (SER) dated July 2, 2010 (TAC No. ME1708). Though the program did not identify specific components, structures, or commodities to be refurbished, SER review found the program to be generally acceptable. This inspection selected actual implementation activities to confirm components, structures, and commodities were adequately covered.

Inspection Activities:

The purpose of IP 37002 was to:

- Determine whether the applicant's process for construction refurbishment includes the appropriate scope of structures, systems, and components (SSCs) including associated passive commodities to be refurbished, replaced, or evaluated to assure design requirements are met.

- Determine whether the applicant's process for construction refurbishment includes appropriate refurbishment activities, inspections, and tests; commensurate with the applicable pre-service degradation mechanism; to assure SSCs are confirmed to meet design requirements.
- Evaluate the applicant's implementation of the construction refurbishment process by independently evaluating samples of refurbishment activities.

During this inspection period, the inspectors reviewed the final component refurbishment report for active and passive commodities of System 074, Residual Heat Removal (RHR) and System 063, Safety Injection System (SIS). The inspectors selected a sample of components and reviewed documentation to verify that planned refurbishment work had been completed. The inspectors reviewed WOs associated with the following components to verify that required refurbishment activities were performed:

- PI-074-0013, RHR Pump A-A Discharge Pressure Indicator
- PI-074-0026, RHR Pump B-B Discharge Pressure Indicator
- MTR-074-0001-A, RHR System Isolation Valve Motor
- MTR-074-0002-B, RHR System Isolation Valve Motor
- TE-074-0014-G, RHR Pump A-A Discharge Temperature
- TE-074-0025-F, RHR Pump B-B Outlet Temperature
- TE-074-0029, RHR System Outlet Heat Exchanger A Temperature
- TE-074-0039, RHR System Outlet Heat Exchanger B Temperature
- TANK-063-0046, Refueling Water Storage Tank
- EI-063-0012A, SI Pump A-A Motor Current Indicator
- EI-063-0016A, SI Pump B-B Motor Current Indicator
- BKR-063-0001A-A, RWST to RHR Suction (2-FCV-63-1)
- BKR-063-0011-B, RHR HX B to SIS Pump (2-FCV-63-11)
- BKR-063-0022-B-B, SIS Pump Cold Leg Injection
- BKR-063-0025-B, SIS Boron Injection Tank Shutoff Valve (2-FCV-63-25)

The inspectors reviewed evaluations of inspection results for each sample to confirm appropriateness of "accept as is" or repair/replacement actions.

In addition, the inspectors reviewed Assessment Report NC-WB-14-008, "Refurbishment Program," dated June 4, 2014. The report was reviewed to evaluate the QA organization's assessment of the effectiveness of the refurbishment program and the adequacy of corrective actions for any deficiencies that were identified.

The following samples were completed:

- Section 02.01.c – one sample
- Section 02.02.b – two samples
- Section 02.02.c – 12 samples
- Section 02.02.d – one sample

The following table lists the inspections that were performed and credited as samples under IP 37002.

IP Section	Inspection Report
02.01.a. Scoping Document Review	05000391/2010606 Section E.1.1 (ML102280522)
02.01.b. System Reviews	05000391/2010606 Section E.1.1
02.01.c. Self-Assessment and Audit Review	05000391/2010606 Section Q.1.1 05000391/2014605 Section C.1.5
02.02.a.1. Refurbished Components	05000391/2010602 Section C.1.6 (ML101230144) 05000391/2010604 Section C.1.13 (ML103060240) 05000391/2010604 Section C.1.9 05000391/2010605 Section C.1.2 (ML110410680) 05000391/2010606 Section E.1.2 05000391/2012604 Section C.1.2 (ML12167A212)
02.02.a.2. Replaced Components	05000391/2010604 Section C.1.3 05000391/2010604 Section C.1.15 05000391/2010604 Section C.1.16 05000391/2011603 Section C.1.7 (ML111370702)
02.02.b. Active Mechanical System Components	05000391/2010602 Section C.1.6 05000391/2010604 Section C.1.10 05000391/2010605 Section C.1.11 05000391/2010606 Section E.1.3 05000391/2011603 Section C.1.11 05000391/2011608 Section C.1.10 (ML11311A082) 05000391/2012603 Section C.1.2 (ML12123A156) 05000391/2013603 Section C.1.3 (ML13134A239) 05000391/2013607 Section C.1.13 (ML13273A512) 05000391/2014605 Section C.1.5
02.02.c. Active Electrical and Instrumentation Components	05000391/2010604 Section C.1.3 05000391/2010604 Section C.1.13 05000391/2010604 Section C.1.16 05000391/2011602 Section C.1.9 (ML110800483) 05000391/2011602 Section C.1.9 05000391/2011603 Section C.1.7 05000391/2011608 Section C.1.10 05000391/2014605 Section C.1.5

02.02.d. Passive Commodities	05000391/2010604 Section C.1.2 05000391/2010604 Section C.1.7 05000391/2010604 Section C.1.8 05000391/2010604 Section C.1.9 05000391/2010605 Section C.1.8 05000391/2010605 Section C.1.9 05000391/2011603 Section C.1.6 05000391/2011603 Section C.1.8 05000391/2011604 Section C.1.2 (ML111810890) 05000391/2011607 Section C.1.11 (ML112730197) 05000391/2011608 Section C.1.10 05000391/2011609 Section C.1.7 (ML11350A229) 05000391/2013603 Section C.1.3 05000391/2013607 Section C.1.13 05000391/2014605 Section C.1.5
02.02.e. Record Review	05000391/2011603 Section C.1.6 05000391/2011607 Section C.1.11 05000391/2011608 Section C.1.10 05000391/2013603 Section C.1.3
02.02.f. Problem Identification and Resolution Report Review	05000391/2010602 Section C.1.6 05000391/2010606 Section Q.1.1 05000391/2011603 Section C.1.6 05000391/2011607 Section C.1.11 05000391/2011608 Section C.1.10

The samples listed in the inspection reports above meet the minimum sample requirements of IP 37002. The list above captures only those inspections which specifically credited IP 37002. It should be noted that a considerable amount of additional refurbishment inspection activities have not been directly documented as inspection samples for IP 37002. The inspection attributes covered under IP 37002 were also inspected as part of Construction Phase Inspection Procedures (i.e. IP 49063, 49053, 50053, etc.) discussed in IMC 2517 and listed in IMC 2512. The inspection guidance in IP 37002, Sections 02.02.a, 02.02.b, 02.02.c, and 02.02.d, provides for the use of appropriate IMC 2512 inspection procedures to be used for conducting inspections of refurbished components. Additionally, in IIR 05000391/2010006, the inspectors documented that for piping supports, electrical cable, conduit, and cable tray systems; the applicant credited refurbishment activities to the established specific Corrective Action Programs (CAPs) for these areas. This was considered acceptable and these activities have been covered via the NRC inspections of the CAPs. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

Below is a summary of each section of IP 37002:

Section 02.01 –Complete
 Section 02.02 - Complete

c. Conclusion

The inspectors determined that the implementation of the refurbishment program met the applicable requirements. The required sample size has been met for each section of IP 37002. In summary, IP 37002 is considered closed; however, if additional significant refurbishment activities are performed, inspections may be performed at the NRC's discretion.

C.1.6 (Closed) Piping – Work Observation (Inspection Procedure 49063)

a. Inspection Scope

Background: In 2007, the NRC performed a reconstitution of the IMC 2512 Construction Inspection Program for WBN Unit 2. The history of this process was described above in the background of Section C.1.5 of this inspection report. The reconstitution results for IP 49063 determined that the requirements of the IP were met for Unit 2. The inspection scope for new work included a sample of piping activities related to several safety-related piping systems.

Additionally, as-built inspections were performed and documented as part of IP 37051, "Verification As-Built," for several safety-related systems including component cooling water, emergency raw cooling water, safety injection, residual heat removal, containment spray, and chemical and volume control system. The as-built inspections covered attributes of IP 49063 and are documented in IIRs 05000391/2014602 (ADAMS Accession No. ML14086A063) and 05000391/2014603 (ADAMS Accession No. ML14129A381).

Inspection Activities: The purpose of this IP was to verify, by direct observation and independent evaluation of work performance, work in progress, and completed work, that activities related to safety-related piping (other than the reactor pressure vessel and reactor coolant piping) were accomplished in accordance with NRC requirements, commitments, and the applicant's procedures. No new inspection activities were performed under IP 49063 for this inspection period. The following table lists the inspections that were performed under this IP.

IP Section	Inspection Report
02.01 In 4 different piping systems observe 5 piping activities such as handling; cleanliness; installation; cutting; grinding; bending; supporting; cleaning and flushing; hydrostatic testing	05000391/2009602 Section C.1.4 (ML091210420)
	05000391/2009604 Section C.1.6 (ML093030479)
	05000391/2009605 Section C.1.3 (ML100290703)
	05000391/2011607 Section C.1.11 (ML112730197)
	05000391/2012607 Section C.1.2 (ML12276A028)

	05000391/2012609 Section C.1.4 (ML12356A073) 05000391/2013604 Section C.1.5 (ML13179A079) 05000391/2013605 Section C.1.2 (ML13220A640) 05000391/2013607 Section C.1.2 (ML13273A512) 05000391/2013609 Section C.1.3 (ML13353A599) 05000391/2013610 Section C.1.3 (ML14049A158)
02.02 For piping activities selected in 02.01 determine the following: a. Conformance with specifications b. Personnel are adequately qualified c. conformance with inspection procedures d. conformance with record requirements e. identification and control of material f. control of nonconforming items	05000391/2009602 Section C.1.4 05000391/2009604 Section C.1.6 05000391/2009605 Section C.1.3 05000391/2010602 Section C.1.7 (ML101230144) 05000391/2010604 Section C.1.8 (ML103060240) 05000391/2010605 Section C.1.9 (ML110410680) 05000391/2011602 Section C.1.2 (ML110800483) 05000391/2011607 Section OA.1.3 05000391/2012609 05000391/2012602 Section C.1.2 (ML12087A324) 05000391/2012603 Section C.1.3 (ML12123A156) 05000391/2012607 Section C.1.2 05000391/2012609 Section C.1.4 05000391/2013604 Section C.1.5 05000391/2013605 Section C.1.2 05000391/2013607 Section C.1.2 05000391/2013609 Section C.1.3 05000391/2013610 Section C.1.3
02.03 For one location determine if piping runs are installed as required by applicable specifications, field drawings, and procedures.	05000391/2009602 Section C.1.4 05000391/2009605 Section C.1.3 05000391/2011607 Section OA.1.3 05000391/2013604 Section C.1.5 05000391/2013605 Section C.1.2 05000391/2013607 Section C.1.2 05000391/2014602 Section E.1.1 (ML14086A063) 05000391/2014603 Section E.1.1 (ML14129A381)
02.04 For one piping system determine if field changes have been implemented in accordance with the approved design control procedures to include revisions to pipe stress analysis.	05000391/2009605 Section C.1.3 05000391/2011607 Section OA.1.3 05000391/2014602 Section E.1.1 05000391/2014603 Section E.1.1

Section 02.05 required an expansion of the sample size as appropriate, based upon the applicant's Systematic Assessment of Licensee Performance (SALP) Category. SALP is no longer in use. At this time the additional sampling sections are not required as determined by regional management. No additional samples are required.

b. Observations and Findings

No findings were identified.

Below is a summary of each section of IP 49063:

- Section 02.01 –Complete
- Section 02.02 - Complete
- Section 02.03- Complete
- Section 02.04- Complete
- Section 02.05- Not Applicable

c. Conclusion

The inspectors determined that the work activities associated with the safety-related piping met the applicable requirements. IP 49063 is considered closed; however, if additional safety-related piping activities are performed, inspections may be performed at the NRC's discretion.

P.1 Pre-Operational Activities

P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 70312)

a. Inspection Scope

In order to verify that the applicant's management control system was effectively discharging its responsibilities over the preoperational testing program, inspectors performed direct observation of activities, tours of the facility, interviews and discussions with the applicant's personnel, and reviews of facility records. Preoperational testing activities associated with System 063, safety injection system, continued during the inspection period.

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. Inspectors also verified the following, as available and on a sampling basis, during the tours:

- general plant/equipment conditions;
- plant areas for fire hazards - examined fire alarms, extinguishing equipment, actuating controls, firefighting equipment, and emergency equipment for operability; and also verified that ignition sources and flammable material were being controlled in accordance with the applicant's procedures

- activities in progress (e.g., maintenance, preoperational testing, etc.) were being conducted in accordance with the applicant's procedures;
- 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 was authorized to perform activities on systems or equipment.

In addition, the inspectors observed the preoperational test setup of motor operated valve (MOV) WBN-2-MVOP-063-0004 and work associated with corrected actions for PER 891471, "MOV actuator closed control torque switch failed to open and design input discrepancies with spring packing adjustment." The inspections were completed to verify that the testing was conducted in accordance with approved procedures.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

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

III. **OPERATIONAL READINESS ACTIVITIES**

O.1 **Operations**

O.1.1 **Pre-Licensing Review of Training and Qualification Programs (Inspection Procedure 41301)**

a. Inspection Scope

During the period of June 2 – June 30, 2014, the inspectors evaluated the applicant's licensed operator requalification (LOR) training program to confirm that:

- unit differences were incorporated into the training program and
- training materials, training delivery, and test items were consistent with the Watts Bar Unit Differences and Training Plan Report, September 2013 (ADAMS Accession No. ML13319B206)

Each inspection activity was performed to support the finding required by 10 CFR 55.47 (a)(3) that each applicant "has learned the operating procedures for and is qualified to operate competently and safely."

Inspectors reviewed the LOR training program schedules and the following classroom training materials:

- 3-OT-MCS146AA, Expanded LOR Unit Differences
- 3-OT-MSC146CC, Westinghouse In-Core Information, Surveillance, and Engineering (WINCISE) System

- 3-OT-MSC146DF, Unit 2 Impact on Common Systems
- 3-OT-MSC146EE, Turbine & Secondary Plant Changes
- 3-OT-MSC146GR, Electrical & Fire Protection System Differences
- 3-OT-MSC146HH, Common Q Inadequate Core Cooling Monitor (ICCM)
- 3-OT-MSD146JJ, Unit 2 Procedure Differences (EOIs)
- 3-OT-MSC146LL, Unit 2 and Unit 1 Steam Generator & Feedwater Differences
- 3-OT-MSC146KK, Unit 2 Cycle 1 Core Design

On June 18, 2014, the inspectors observed simulator training utilizing exercise guide 3-OT-SRT-U2-EOI-1 which consisted of two scenarios. These scenarios were modified to include Unit 2 specific set points.

- The first scenario began with a steam leak on #3 Steam Generator inside containment. The operating crew responded using 2-AOI-38, "Main Steam or Feedwater Line Leak," which resulted in a manual reactor trip and safety injection.
- The second scenario began with high leak off flow from the #2 reactor coolant pump (RCP). The operating crew responded using 2-AOI-24, "RCP Malfunctions during Pump Operation." Subsequently, two control rods dropped requiring a manual reactor trip. Due to failures in the Auxiliary Feedwater system (AFW), all AFW was lost. When steam generator levels reached 6% narrow range, the operators entered 2-FR-H.1, "Loss of Secondary Heat Sink."

The inspectors reviewed the three versions of the applicant's comprehensive differences examinations to identify flaws and enhancements, and provided comments to the applicant. The inspection has not been completed until the applicant has completed administration of the comprehensive differences examination.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant's LOR and Non-Licensed Operator Requalification training programs are accredited by the Institute of Nuclear Power Operations. Aspects of the LOR training program are routinely inspected as part of the Reactor Oversight Process. The existing accredited Unit 1 training program processes are acceptable to support the licensed and non-licensed operator training programs, in part, because Unit 2 systems and equipment are very similar to Unit 1. The applicant's differences training; including the comprehensive differences written examination, Job Performance Measure operating test, and simulator modifications; support the finding that each applicant has learned the operating procedures for and is qualified to operate Watts Bar Unit 2 competently and safely. This IP will remain open until the applicant has completed administration of the comprehensive differences examination.

O.1.2 Operating Procedures (Inspection Procedure 42450B)

a. Inspection Scope

During the period of May 5–June 23, 2014, the inspectors reviewed a sample of the applicant's General Operating Instructions (GOs), Operating Test Instructions (OTIs), System Operating Instructions (SOIs), Surveillance Instructions (SIs), Technical Instructions (TIs), and Technical Requirements Instructions (TRIs) and compared them with the existing Unit 1 procedures, using criteria in:

- American National Standards Institute (ANSI) N18.7-1972, "Administrative Controls for Nuclear Power Plants"
- ANSI N18.7-1976/ANS 3.2, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"
- NRC Regulatory Guide (RG) 1.33-1978, Rev. 2, "Quality Assurance Program Requirements (Operation)"
- RG 1.33-2013, Rev. 3, "Quality Assurance Program Requirements (Operation)"
- TVA-NQA-PLN89-A, "Quality Assurance Program Description"
- Inspection Procedure 42450B, "Operating Procedures."

Each inspection activity was performed to verify that plant operating procedures were prepared to adequately control safety-related operations within the applicable regulatory requirements, to verify that differences between the units were incorporated into Unit 2 procedures, and to verify that the procedures met the criteria in RG 1.33.

Inspectors obtained copies of the indices for the plant's GOs, SOIs, OTIs, TIs, and TRIs and reviewed them for completeness.

The inspectors reviewed and compared a sampling of Unit 1 and Unit 2 GOs, SOIs, TRIs, OTIs, and TIs to verify whether or not unit differences were incorporated, and to verify whether or not the procedures met the criteria specified in RG 1.33.

The list of Unit 1 and 2 GOIs, OTIs, SOIs, TIs and TRIs that the inspectors reviewed is contained in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the Watts Bar active and in-process Unit 2 GOs, OTIs, SOIs, TRIs, and TIs were prepared to adequately control safety related operations in accordance with specific regulatory requirements. The inspectors will review plant SIs when a representative sample of Unit 2 SIs becomes available.

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Unresolved Item 87-19-06, Review of Cable Separation of Nonsafety-Related Cables in Close Proximity to Safety-Related Cables in Electrical Panels (Inspection Procedure 51063)

a. Inspection Scope

Background: This unresolved item (URI) was initiated in 1987, when NRC inspectors observed both non-safety and safety-related Division B cables in physical contact with each other in junction box 2-JB-292-1973-B. Separately the applicant identified in condition adverse to quality report (CAQR) WBP871231, that there were cables that violated the train separation criteria at the bottom of panel M15/2. PER 143957 was issued by the applicant to document and track resolution of these two individual examples of failure to meet train separation criteria. Engineering document construction release (EDCR)-2 55127A was issued to address cable separation within panels and junction boxes. This document identified 18 individual panels/junction boxes with safety-related cables and non-safety-related cables or other safety-related cables from different trains in close proximity to each other requiring separation resolution.

Previous inspection activities that addressed aspects of this item can be found in IIR 05000391/2010605 Section OA.1.15 (ADAMS Accession No. ML110410680).

Inspection Activities: To follow-up on this URI the inspectors reviewed an engineering complete closure document, PP-19-2, for PER 143957. The closure document stated that EDCR 55127A was issued to bring all circuits into compliance with TVA design criteria WB-DC-30-4 for electrical cable separation. The inspectors reviewed EDCR 55127A and noted that it contained a list of 18 enclosures (control panels, cabinets, etc.) containing wiring that failed to meet the separation requirements criteria of WB-DC-30-4. The inspectors interviewed responsible engineering staff to determine the status of work associated with the resolution to URI 391/87-19-06.

The inspectors asked the applicant for a list of work orders (WOs) that were prepared to implement EDCR-2 55127A and were given a list of 12 WOs, 9 of which were marked closed. The inspectors reviewed the closed WOs and found that WOs 115432869, for junction box 2-JB-292-1973-B, and 111832696, for panel M15/2, had not yet been completed and thus will need to be inspected at a future time when work is complete.

The inspectors conducted a walkdown of panels included in the scope of EDCR 55127A and inspected panels with WOs indicated as closed, to evaluate final compliance with separation requirements. Panels 2-PNL-278-M6, 2-PNL-278-M9, 2-PNL-278-L10, and 2-PNL-278-M10 were inspected. The inspectors conducted a walkdown of samples of conduit separation between different safety-related divisions to assess compliance with raceway separation criteria identified in drawing 45W3000-1. One of the conduits inspected was 2VC6034A; it was inspected for its separation from junction box 2-JB-292-2235-S train S and other safety-related conduits such as 2SG685S. Train S designates cable that can be powered from either electrical train A or B.

Documents reviewed are listed in the Attachment.

b. Observations and findings

The inspectors identified three examples of a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to follow instructions provided in drawings stating the requirements for separation of safety-related wiring of different divisional trains A, B, and non-divisional cables. This violation is documented in report Section OA.1.2.

The inspectors determined that of the 9 closed WOs reviewed, only 6 of the 18 enclosures listed in EDCR-2 55127A were addressed. The inspectors determined through further inspections, that there existed more WOs associated with this EDCR than the original 12 presented. The inspectors observed that the applicant does not have a totally reliable and repeatable way to find a list of work orders that accomplish the work directed by a given EDCR.

c. Conclusion

The inspectors concluded that further inspections of additional samples of completed work are needed to demonstrate that physical separation and electrical isolation requirements have been met. Therefore, URI 87-19-06 will remain open.

OA.1.2 (Discussed) Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation (Temporary Instruction 2512/016)

a. Inspection Scope

Background: The sub-issue was established as a result of various employee concerns, reports of conditions adverse to quality, and NRC findings related to electrical installations, materials, and equipment. In this instance, the applicant determined that examples of redundant divisions of enclosed raceways existed with less than the minimum required 1-inch separation. This sub-issue was further divided into three categories:

- separation between redundant divisions of Class 1E raceways;
- internal panel separation between redundant enclosed divisions of Class 1E cables; and
- coil-to-contact and contact-to-contact isolation between Class 1E and non-Class 1E circuit

In a prior NRC inspection, IIR 05000391/2011608, Section OA.1.8 (ADAMS Accession No. ML11311A082), inspectors determined that the applicant had adequately implemented a process to address the physical cable separation and electrical isolation sub-issue, but additional samples needed to be inspected. Additionally, in IIR 05000391/2011602, Section OA.1.5 (ADAMS Accession No. ML110800483) and IIR 05000391/2013604, Section OA.1.29 (ADAMS Accession No. ML13179A079), NRC inspectors completed a limited sample demonstrating adequate separation internal to control panels and between raceways containing redundant divisions of Class 1E circuits.

Inspection Activities: The inspectors evaluated the applicant's actions to resolve the Cable Issues CAP, sub-issue of Physical Cable Separation and Electrical Isolation. The

inspectors reviewed program activities to confirm that the applicant's program complies with all commitments and NRC requirements. The inspectors reviewed drawings WB-DC-30-4, Rev. 23 and 45W3000-1, Rev. 1 to ensure separation requirements were properly identified and documented. The inspectors also reviewed WOs 115182635 and 114446977 to verify that documented work activities ensured compliance with separation requirements. The inspectors conducted walkdowns of conduits 2VC9727A and 2VC937A to verify that reworked conduits were properly installed in relation to redundant divisions of Class 1E raceways.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

Introduction: The inspectors identified the following three examples of a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to follow instructions provided in drawings associated with the separation of safety-related conduits of different divisions for trains A, B, and S, and the separation of safety-related wiring of different divisions and non-divisional wiring in panels.

Description:

Example 1: The inspectors conducted a walkdown of completed safety-related train-A flexible conduit 2VC6034A installed under closed WO 113325528. The inspectors observed that the completed installation for this conduit failed to maintain the required 1-inch minimum separation between the different divisional conduits and was actually in contact with junction box 2-JB-292-2235-S and in close proximity to conduits 2SG685S and 2SG687S. The installed conduits did not comply with the separation requirements indicated on drawing 45W3000-1, note 4, which states that: "Conduits carrying cable of different safety-related divisions (or suffixes) may cross or run parallel to each other provided a minimum separation of 1-inch exists between the conduits and any portion of the boxes, fittings, etc., included in the involved conduit runs." The components involved with this issue are associated with systems 003B (Auxiliary Feedwater System) and 046B (Auxiliary Feedwater Control System). The inspectors brought this observation to the attention of the applicant. A service request (888539), later converted to PER 890353, was generated by the applicant to address the separation deficiency.

Example 2: The inspectors conducted a walkdown of completed safety-related cable installation inside main control room panel 2-PNL-278-M006 identified by the applicant as ready for inspection by the NRC. The inspectors observed multiple instances where redundant Class 1E wiring was touching non-Class 1E wiring. The installed cables did not comply with the separation requirements indicated on drawing 2-45W2640, Section 1, "Control Board Critical Wiring," paragraph 1.0.2: "Braided sheath material installed on Class 1E Teflon board wiring is an acceptable barrier for reducing the redundant Class 1E to Non-Class 1E separation to less than six inches (for Teflon board wiring only). Braid covered wiring for Class 1E circuits shall be restrained such that redundant Class 1E to Non-Class 1E wiring does not touch nor shall they be able to migrate with time to touch." The inspectors brought this observation to the attention of the applicant. PER 887940 was generated by the applicant to address the separation deficiency.

Example 3: The inspectors conducted a walkdown of completed safety-related cable installation inside main control room panel 2-PNL-278-M010 identified by the applicant

as ready for inspection by the NRC and installed under closed WO 112808093. The inspectors observed multiple instances where redundant Class 1E wiring was touching non-Class 1E wiring. The installed cables did not comply with the separation requirements indicated on drawing 2-45W2640, Section 1, "Control Board Critical Wiring," paragraph 1.0.2. The inspectors brought this observation to the attention of the applicant. PER 887940 was generated by the applicant to address the separation deficiency.

The inspectors determined that all three examples were more than minor in accordance with IMC 2517, because they represented an improper work practice that could impact the safety-related function of these components. The finding was determined to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy because it does not represent a breakdown in the QA process. The applicant issued PERs 890353 and 887940 to address the identified conditions. The inspectors reviewed this finding against cross-cutting area components as described in IMC 0310 "Components Within the Cross-Cutting Areas" and determined that no cross-cutting aspect applied.

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Drawing 45W3000-1, note 4 states that: "Conduits carrying cable of different safety-related divisions (or suffixes) may cross or run parallel to each other provided a minimum separation of 1-inch exists between the conduits and any portion of the boxes, fittings, etc., included in the involved conduit runs." Also, drawing 2-45W2640, Section 1, "Control Board Critical Wiring," paragraph 1.0.2 states: "Braided sheath material installed on Class 1E Teflon board wiring is an acceptable barrier for reducing the redundant Class 1E to Non-Class 1E separation to less than six inches (for Teflon board wiring only). Braid covered wiring for Class 1E circuits shall be restrained such that redundant Class 1E to Non-Class 1E wiring does not touch nor shall they be able to migrate with time to touch."

Contrary to the above, on May 22, 2014 for example 1, the installed conduits did not comply with the separation requirements indicated by notes on drawing 45W3000-1. In this particular case, there was a train A division conduit (2VC6034A) touching a corner of a division S box 2-JB-292-2235-S and in close proximity to division S conduits 2SG685S and 2SG687S with a separation of less than 1-inch.

For examples 2 and 3, the installed cables did not comply with the separation requirements indicated on drawing 2-45W2640. In these particular cases, there were train A, train B, and non-divisional cables in contact with each other.

These three cases of a SL IV violation were entered into the applicant's corrective action program as SR 888539, "Conduit separation between Train A conduit and Train S components" and subsequently converted to PER 890353 and PER 887940, "NRC walk down for separation criteria to be addressed." This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This NCV is identified as 05000391/2014605-01, Failure to accomplish installation in accordance with instructions, procedures, or drawings.

c. Conclusion

The inspectors identified three examples of an NCV associated with the installation of safety-related conduits and wiring not conforming to the separation requirements indicated on drawings 45W3000-1 and 2-45W2640. The applicant also generated a Service Request 888584, subsequently converted to PER 890366, to address the lack of a documented process to perform a final walkdown of panels for train separation. Additional inspection activities are needed to close the Cable Issues CAP sub-issue for Physical Cable Separation and Electrical Isolation.

OA.1.3 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Inspection Procedure 35007)

a. Inspection Scope

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

The concern that long vertical cable tray runs may not be adequately supported was initially reported to the NRC on May 26, 1989, in accordance with 10 CFR 50.55(e) as CAQR WBP880575. The follow-up final report associated with the notification (ADAMS Accession No. ML073551053) was transmitted by letter dated September 7, 1990, and identified apparent cause, safety implications, and planned or completed corrective actions.

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

IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) concluded in Section OA.1.2 that the programmatic aspects of the applicant's implementation plan for this CAP were adequate. This is generally the same conclusion reached in Section OA.1.13 as reported in IIR 05000391/2010605 (ADAMS Accession No. ML110410680).

Inspector Activities: The inspectors observed the environmental qualification inspection of the Kellems grip installation in vertical raceway 3A196/3A197, associated with WO 114319481, to verify that no damage had occurred in the installation of the Kellems mesh basket grips. The WO installed 16 Kellems grips in two groups of eight at two different elevations. The inspectors also walked down the raceway to verify that the installation was done in accordance with drawings and procedure MIA 3.2, "Cable Pulling for Insulated Cables Rated Up to 15,000 Volts," Rev. 27.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that the sample of vertical supports were installed in accordance with the drawings and procedure. These items are remaining open for additional samples of field observations.

OA.1.4 (Discussed) Inspection of Watts Bar Nuclear Plant Equipment Seismic Qualification Corrective Action Program (Temporary Instruction 2512/021 and Inspection Procedures 37051, 50073, 51053, 51055, 52053, and 52055)

a. Inspection Scope

Background: The Equipment Seismic Qualification Corrective Action Program (ESQ CAP) was developed by TVA to provide reasonable assurance that Category I and I(L) equipment were adequately qualified for design basis seismic events and were in compliance with the regulatory and licensing requirements. The issues identified in the ESQ CAP originated from employee concerns, lessons learned, and other applicant source documents such as condition adverse to quality reports (CAQRs), corrective action tracking documents (CATDs), vertical slice reviews, discrepancy reports (DRs), PERs, and NRC open items.

The issues identified, and root causes, were grouped into the following categories:

- the completeness and retrievability of seismic qualification documentation;
- interface control, including interface control among engineering disciplines and between engineering and other organizations;
- design documents and as-installed conditions;
- as-installed conditions and inspection documentation;
- equipment mounting conditions;
- issues identified on the 1982 NRC Seismic Qualification Review Team audit remaining open items list (Westinghouse Equipment), and the evaluation of the effects of the updated building response spectra versus the original spectra.

Inspection Activities: Previous inspection efforts, associated with the ESQ CAP, were documented in NRC IIR 05000391/2013610 (ADAMS Accession No. ML14049A158) along with several other inspection reports. The NRC had inspected, reviewed, and documented several aspects of the ESQ CAP through inspections of the CAP, inspection of associated NRC open items, and inspection performed under the guidance of several NRC inspection procedures used for the assessment of plant equipment. IIR 05000391/2013610 documented some background details along with a review performed on the ESQ CAP to determine if the implementation of the Unit 2 CAP met requirements by using the same approaches employed for the Unit 1 ESQ CAP.

The purpose of this inspection was to gather sufficient information to determine if the applicant's ESQ CAP plan was satisfactorily implemented to ensure that the issues

addressed in the CAP were adequately resolved. The inspection focused on a review of the adverse conditions involving the ESQ CAP which were characterized by the applicant as programmatic. The inspectors performed the following inspection activities of different areas associated with the ESQ CAP:

ASCO Solenoid Valves

It was identified that ASCO solenoid valves did not always meet the installation and the vendor requirements. Issues identified with the installation and seismic qualification of ASCO solenoid valves were addressed under Construction Deficiency Reports (CDRs) 391/87-11 and 391/86-59. CDR 391/87-11 was closed in IIR 05000391/2012-609 (ADAMS Accession No. ML12356A073). The closure of CDR 391/86-59 is described in section OA.1.12 of this report.

Foxboro Transmitters and Mounting Brackets

Issues identified with the installation and seismic qualification of Foxboro transmitters were addressed under CDR 391/86-59 and Violation (VIO) 391/86-21-02. The issues identified included unqualified modifications to mounting brackets, mounting of local panels, and installation of conduit attachments. The closure of CDR 391/86-59 and VIO 391/86-21-02 are respectively described in sections OA.1.12 and OA.1.13 of this report.

Seismic Qualification of Quick Exhaust Valves

In 1986, the applicant identified a deficiency at Watts Bar Unit 2 where no documentation could be found to show seismic qualification of Parker-Hannifin quick exhaust valves within the population of auxiliary feedwater control valves. An evaluation of the extent of the problem also identified that 20% of a sample of engineering change notices (1980 through 1985) contained errors related to specification of quality assurance and seismic requirements. The applicant issued PER 172738 and EDCR 53401-A to provide qualified installations of quick exhaust valves at 2-LCV-003-0148, -0156, -0164, and -0171.

In this inspection, the inspectors interviewed responsible engineering personnel, reviewed documentation contained in the corrective action plan document for PER 172738, reviewed vendor qualification records, and reviewed EDCR 53401-A. The inspectors observed that the applicant planned to "field-route" the quick exhaust valve piping and components and submit an isometric diagram of the as-installed configuration to design engineering for analysis and qualification for the seismic application.

The interviews and reviews of engineering documents were performed to evaluate whether the corrective actions would address the adverse condition identified in PER 172738. The review of the equipment qualification report was performed to determine whether qualification testing implemented engineering specifications and guidance of IEEE 344-1975, modeled the actual equipment to be installed in the plant, showed that the test response spectra bounded the required response spectra, and recorded appropriate dispositions for test anomalies.

Nozzle Load

PER 172685 was documented to address nonconformance report (NCR) WBNCEB8225 which stated that nozzle load qualification was in an undeterminable status because engineering change notices were closed before nozzle load approval was received from the applicant's ESQ group. The inspectors reviewed PER 172685,

as well as its associated documentation, to determine if the corrective actions were adequate. The corrective actions intended to qualify the affected nozzles and included reanalysis of piping and associated pipe supports, revisions to support designs, load tables, and isometrics as required. The NRC also reviewed a sample of three load calculation reports that were performed as part of the corrective actions.

Locally Mounted Instruments in Category I Structures Were Installed Without Tests Being Performed

Issues identified during the applicant's inspections of anchor bolt installations and welded connections for locally mounted Unit 2 instruments were mainly addressed under CDR 391/86-53. The corrective actions for these issues included the performance of walk-downs for critical attributes, and the issuance of new and revised instructions and calculations. CDR 391/86-53 was closed in IIR 05000391/2013-604 (ADAMS Accession No. ML13179A079). Inspection of CDR 391/86-59 and VIO 391/86-21-02 included supplementary reviews of several aspects associated with CDR 391/86-53. CDR 391/86-59 and VIO 391/86-21-02 were closed in sections OA.1.12 and OA.1.13 of this report.

Walkdowns

The applicant identified the appropriate inspection attributes for the issues requiring field walkdown. These attributes were found to be applicable to the items within the scope of the ESQ CAP, for both Units 1 and 2, whenever the type of equipment was procured, designed, and installed in the same manner for both units. During this inspection, the inspectors reviewed a sample of seismic walk-down packages to determine if they were performed in accordance with the applicable procedures. The inspectors performed field observations of the equipment identified in these packages. These field observations included observable walkdown attributes such as equipment anchorage, orientation, mounting configuration, and hardware attachments. The inspectors reviewed walkdown packages to verify that discrepancies, such as damaged brackets, loose connections, or missing hardware were properly identified.

ESQ Database Development

The applicant's document control system, MAXIMO, contains the Master Equipment List (MEL). The MEL serves as the ESQ database for the Unit 2 seismic Category I and I(L) equipment. During this inspection, the inspectors reviewed a sample of MEL entries to determine if they were performed in accordance with the applicable procedures. The inspectors reviewed MEL records and performed field observations of equipment to independently verify that accurate data was entered into the MEL. Specifically, the inspectors reviewed the MEL to verify that it accurately reflected the equipment construction status, included appropriate labeling, and contained or otherwise referred to correct equipment safety and quality categories, unique identification numbers, location information, seismic qualification report, calculations, approval memorandums, equipment type, and vendor documentation.

Design Basis Review/Revision

Because of the similarities between Units 1 and 2, most of the design commitments for both units were addressed in the Unit 1 final closure report of the ESQ CAP. Design basis documents associated with the ESQ CAP were common for both units; however

the inspectors reviewed the following design basis documents to verify that recent revisions would not affect CAP commitments:

- WB-DC-20-32, Integrated Interaction Program Screening and Acceptance Criteria, Rev. 5
- WB-DC-40-31.2, Seismic/Structural Qualification of Seismic Category I Electrical, and Mechanical Equipment, Rev. 14
- WB-DC-40-31.13, Seismic/Structural Qualification of Category I(L) Electrical and Mechanical Equipment, Rev. 8

Identification and Resolution of Historic ESQ CAP Problems

The inspectors reviewed several PERs issued to track and resolve historic issues of the ESQ CAP for Watts Bar Unit 2. This was done to determine if these issues were properly identified, addressed, and resolved by the applicant as part of the implementation of the ESQ CAP. The inspectors performed a focused sample of the following PERs during the ESQ CAP team inspection:

- PER 143778 was documented to address a condition in which a sample of isolation valves for radiation monitors were supplied with non-essential control air as opposed to essential control air, making radiation monitors, RE-90-106 and -112, non-seismically qualified. This condition existed on Unit 1, and flow control valves 1-FCV-90-107 thru -111 and 1-FCV-90-113 thru -117 were modified to be supplied with essential control air. The applicable flow diagrams, system descriptions, and the safety analysis report were updated to reflect these modifications. The same actions were taken for Unit 2. At the time of the inspection, the supply of non-essential control air was removed from valves 2-FCV-90-107, -111, -113, and -117, however installation of essential control air to these valves had not yet started. Flow control valves 2-FCV-90-108, -109, -110, -114, -115, and -116 were not installed for Unit 2 during the time of the inspection. The inspectors reviewed the applicable portions EDCR 52341-A related to the modifications to RE-90-106 and -112. The inspectors reviewed the applicable drawings, drawing revision authorizations (DRAs), and changes made to the system descriptions and the safety analysis report. The inspectors performed field observations of in-process installations of flow control valves 2-FCV-90-107, -111, -113, and -117.
- PER 143713 was issued to address concerns from a 1986 report to NRC under 10 CFR 50.55(e) which stated that installations of flexible conduit did not compensate for thermal or seismic movement. The applicant established two commitments, (1) implement an engineering change to provide requirements for flexible conduit routed to pipe mounted devices; and (2) install the modifications and verify the as-built configurations. Affected devices included solenoid operated valves, motor operated valves, and temperature switches. For Unit 2, calculation EDQ00299920090001 was issued to document 290 breakages (i.e. non-conformances) found in walkdowns of Class 1E conduits. EDCR 55120 was issued to guide the correction of the breakages. The previous inspection of installations of flexible conduit was documented in IIR 05000391/2011607 (ADAMS Accession No. ML112730197). The inspectors determined that the design requirements had been properly defined and the walkdowns to identify breakages had been adequately implemented. Remaining actions by the

applicant were to develop and implement WOs to correct the breakages. In this inspection, the inspectors conducted interviews with design engineers and construction field engineers, reviewed records of installations of flexible conduit, and conducted direct field observations of a sample of flexible conduit that had been reworked or replaced to correct breakages. A sample of ten construction WOs were reviewed to determine whether requirements in EDCR 55120 and associated DRAs and field change requests (FCRs) had been accurately translated into the work instructions. The review of WOs included a determination whether the documentation of completed work demonstrated that installations of flexible conduit conformed to requirements for conduit length, fit-up of connectors, bend radius, and no visible evidence of physical damage. The inspection sample included direct observations of the following installations of flexible conduit:

- 2VC1800 at valve 2-FCV-63-98
 - 2VC1801 at valve 2-FCV-63-98
 - 2VC1851B at valve 2-THV-67-567-B
 - 2VC2013 at valve 2-FCV-68-333-A
 - 2VC2014 at valve 2-FCV-68-333-A
 - 2VC2155B at valve 2-FCV-067-0138-B
 - 2VC2334 at valve 2-FCV-70-3
 - 2VC2335 at valve 2-FCV-70-3
- PER 172742 tracked and documented corrective actions to address seismic qualification issues concerning VIO 391/86-18-01. However, the NRC determined that the deficiencies concerning VIO 391/86-18-01 were also documented and addressed by CDR 391/86-59 and CDR 391/87-11. Therefore, the corrective actions associated with VIO 391/86-18-01 were addressed by CDR 391/86-59 and CDR 391/87-11. CDR 391/87-11 was closed in NRC IIR 05000391/2012609 (ADAMS Accession No. ML12356A073). The closure of CDR 391/86-59 is described in section OA.1.12 of this report.

Other areas reviewed

The following additional items related to the ESQ CAP were reviewed:

- Focused Self-Assessment: The applicant performed a focused self-assessment of the in-process work for the Unit 2 ESQ CAP. This was done to determine whether the intended objectives of the ESQ CAP were met and to identify strengths and areas for improvement (AFIs) in the program. The closure report for the Unit 2 ESQ CAP listed the AFIs in Attachment 8. The NRC inspectors reviewed the corrective actions for AFIs number two and three to determine if these AFIs were adequately resolved and documented.
- ESQ CAP-related items VIO 86-21-02, Instrument valves, Foxboro transmitters, and instrument panels not seismically qualified; and CDR 86-59, Qualification of ASCO solenoid valve conduit connector configuration; were closed in Sections OA.1.12 and OA.1.13 of this report.
- Additionally, the following ESQ CAP-related open items have been closed and documented in previously issued inspection reports:

- VIO 86-02-01, Failure to follow procedures resulted in improperly installed solenoid valves/seismic qual. of switchgear, closed in IIR 05000391/2012603 (ADAMS Accession No. ML12123A156).
- CDR 85-57, Category I and I(L) instrument bolting requirements, closed in IIR 05000391/2013604 (ADAMS Accession No. ML13179A079).
- CDR 86-14, Failure to follow procedures & inadequate procedures resulted in improperly installed solenoid valves and undocumented review of seismic qualification of switchgear, closed in IIR 05000391/2014602 (ADAMS Accession No. ML14086A063).
- CDR 86-53, Inspection of Category I and I(L) locally mounted instrument bolting, closed in IIR 05000391/2013604 (ADAMS Accession No. ML13179A079).
- CDR 87-01, Inadequate support shown on typical valve support drawings, closed in IIR 05000391/2012607 (ADAMS Accession No. ML12276A028).
- CDR 87-08, Improper fabrication, inspection & documentation of wall-mounted instrument panel, closed in IIR 05000391/2011603 (ADAMS Accession No. ML111370702).
- CDR 87-11, Failure to coordinate solenoid valve replacement documents, closed in IIR 05000391/2012609 (ADAMS Accession No. ML12356A073).
- CDR 87-21, Limitorque motor actuator component interchangeability, closed in IIR 05000391/2011-607 (ADAMS Accession No. ML112730134).
- CDR 87-23, Failed motor pinion keys & motor shaft in Limitorque operator, closed in IIR 05000391/2012609 (ADAMS Accession No. ML12356A073).
- CDR 87-27, Potential failure of operator-to-valve engagement on Xomox supplied valves, closed in IIR 05000391/2013605 (ADAMS Accession No. ML13220A640).
- CDR 89-01, Limitorque worm shaft clutch gear failure, closed in IIR 05000391/2012607 (ADAMS Accession No. ML12276A028).
- CDR 91-31, Use of non-dedicated commercial grade electrical devices in safety-related devices, closed in IIR 05000391/2014602 (ADAMS Accession No. ML14086A063).
- TI 2512/030, Seismic Analysis CAP closed in IIR 05000391/2010602 (ADAMS Accession No. ML12087A324).

Documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that the reviewed corrective actions associated with the ESQ CAP were adequately performed, documented, and completed.

The ESQ CAP (TI 2512/021) will remain open pending inspection of the following associated items:

- Additional field verification of final as-builts for several equipment categories.
- Additional review of several programmatic aspects of the ESQ CAP, including the review of interface and recurrence control, and seismic evaluations.

OA.1.5 (Discussed) Generic Letter 1979-36, Adequacy of Station Electric Distribution System Voltages (Inspection Procedure 92701)

a. Inspection Scope:

Background: In 1979, the NRC published Generic Letter (GL) 79-36 requesting licensees to examine undervoltage protection of safety-related electric equipment for potential damage as a result of sustained degraded voltage from the offsite electric grid system. This generic letter was issued in response to events at a number of operating nuclear plants that brought into question the conformance of the station electric distribution system to 10 CFR 50, Appendix A – General Design Criteria (GDC)– 17, Electric Power Systems. The NRC also published Information Notice No. 79-04, “Degradation of Engineered Safety Features,” dated February 16, 1979, that was issued to address an event that occurred at the Arkansas Nuclear One Station on September 16, 1978, which brought into question the conformance of the station electric distribution system design to GDC-17 with regard to the capacity and the capability of the onsite systems.

Generic Letter 79-36 required all licensees to review the electric power systems at each of their nuclear power plants to determine analytically if, assuming all onsite sources of Alternating Current (AC) power are not available, the offsite power system and the onsite distribution system is of sufficient capacity and capability to automatically start as well as operate all required safety loads. Protection of safety loads from undervoltage conditions must be designed to provide the required protection without causing voltages in excess of maximum voltage ratings of safety loads and without causing spurious separations of safety buses from offsite power. In addition, the adequacy of the onsite distribution of power from the offsite circuits was to be verified by performing tests to assure that the analysis results are valid.

Inspection Activities: The inspectors reviewed the commitment completion closure package 10177824 for the response to the GL 79-36 to determine if the applicant’s analysis and tests documented the adequacy of station electric distribution system voltages. The inspectors reviewed calculations to determine that the analysis covered the adequacy and functionality of the Auxiliary Power System to support two unit operation; including evaluation of steady-state and transient voltages, short circuit currents, and bus loadings. Calculations examined Common Station Service Transformers (CSSTs) C and D, 6.9kV Shutdown Boards, the downstream 6900-480 volt transformers, and the 480V distribution boards and loads. Inspectors reviewed design input data that established minimum and maximum voltage levels for 6.9kV switchgear and 480V switchgear/MCCs at steady-state levels and minimum voltage operation levels.

The inspectors reviewed calculations that evaluated Unit 2 Class 1E control circuits for control power transformer loading and maximum control loop length for AC starters to maintain adequate operating voltage. The analysis for the control circuits also covered minimum allowable steady-state voltage under degraded voltage conditions compared to vendor data on minimum pickup voltages for different size starters. The inspectors

reviewed calculations developed to resolve deficiencies in the sizing of 6.9kV cables for such equipment as Centrifugal Charging Pump 2A-A and Auxiliary Feedwater Pump 2A-A.

The inspectors reviewed test scoping documents to assess the methods outlined by the test procedure to include each portion of the distribution system and tests to be performed, instrumentation used, calibration requirements, test sequencing, and data recording requirements. The inspectors reviewed a test summary report to assess voltage measurement test results compared with analyzed voltage values. Values measured included operating data under no-load, steady-state, and transient conditions for comparison to engineering voltage calculations. Measurements were taken at 6.9kV Shutdown Board 1B-B, 480V Shutdown Boards 1B1-B & 1B2-B, and Vital Instrument Power Boards 1-II & 2-II (Subsection 6.3.13 for A, B, and C). The inspectors also reviewed methods used to demonstrate isolation between the four channels of 120V AC Vital Power from each other.

Documents reviewed are listed in the attachment.

b. Observations and findings

No findings were identified.

The inspectors noted that the closure package 10177824 states as corrective action for this issue prior to operation of either of the Watts Bar Units, modifications were made to the 480V Class 1E auxiliary power distribution system to reduce voltage regulation in the system. This was accomplished by removing current limiting reactors from the 480V shutdown board busses. The closure package did not state that the current limiting reactors were later replaced on the 1600 amps section of safety-related shutdown Motor Control Centers. SR 903548 was generated to include this information in closure package 10177824. The inspectors reviewed design change notices (DCN) associated with the installation of Common Station Service Transformers CSST-C and CSST-D equipped with auto load tap-changers that re-established the requirement for current limiting reactors in both Unit 1 and Unit 2.

c. Conclusion

The inspectors concluded that TVA has conducted adequate testing to perform a comparison between analyzed voltage levels and measured voltage readings. However, this item will remain open pending further inspections for a more detailed review of the calculations determining the minimum calculated degraded voltage levels acceptable to support safety injection equipment operations while connected to offsite power during motor starting conditions.

OA.1.6 (Discussed) Generic Letter 89-19, Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants (Inspection Procedure 92701)

a. Inspection Scope:

Background: In 1989, the NRC issued GL 89-19 (ADAMS Accession No. ML 8909070029) requesting action to resolve Safety Issue A-47, Safety Implications of

Control Systems in Light Water Reactor (LWR) Nuclear Power Plants pursuant to 10 CFR 50.54(f). The NRC concluded that protection should be provided for certain control system failures and that selected emergency procedures should be modified to assure that plant transients, resulting from control system failures, do not compromise public safety.

Watts Bar is considered a Group 1 plant, as defined in GL 89-19, because one of the three level transmitters is an isolated output to the steam generator level control system located in a cabinet separate from the protection circuit. The NRC has concluded that the overfill protection system for Group 1 plants is satisfied by providing adequate protection which includes demonstrating the evaluation of common mode failures due to fire. TVA issued a framework letter dated January 29, 2008 (ADAMS Accession No. ML080320443), indicating when they performed the evaluation of common mode failures due to fire.

Previous NRC inspection activities that addressed aspects of this item can be found in IIR 05000391/2013607 Section OA.1.3 (Adams Accession No. ML13273A512) and IIR 05000391/2013608 Section OA.1.3 (ADAMS Accession No. ML 13316A776).

Inspection Activities: The inspectors reviewed a draft of the Fire Protection Program document to verify compliance with 10 CFR Part 50, Appendix R. The inspectors reviewed Integrated Cable and Raceway Design System (ICRDS) reports for conduits 2PM1416E and 2PM1223F. These conduits served the steam generator hi-hi level protection and the level control system. The reports provided information on the routing to maintain separation requirements. The inspectors reviewed calculations that defined cable reroute requirements for 2PM1416E. The inspectors interviewed staff members responsible for the design of the level control systems.

Documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified.

c. Conclusion

The inspectors concluded that for the electrical portion, TVA has adequate rerouting plans for redundant steam generator level control system conduit separation. However, this item will remain open pending further inspections of the emergency manual operator actions to be utilized in the event of steam generator overfill protection system failure.

OA.1.7 (Closed) Welding Corrective Action Program (Temporary Instruction 2512/032)

a. Inspection Scope

Background: The Welding CAP was initiated in the mid-1980s to address 26 welding related issues which are referred to as sub-issues in this report. The sub-issues were addressed and inspected as separate items and are documented in various NRC inspection reports. The corrective actions and inspection activities for each are summarized below.

Sub-Issue 1, Structural Platform Welds – Elevation 741.0

Description: Connections in structural platforms in the control and auxiliary buildings were found to be inadequate due to missing welds or welds that did not meet design weld size requirements.

Unit 1 Corrective Actions: The applicant performed walkdowns and inspections leading to replacements, repairs, and redesigns. More than 1000 connections were evaluated.

Unit 2 Corrective Actions: No corrective actions were performed on Unit 2 because the structures are shared and were corrected within the Unit 1 Welding CAP.

NRC Inspection Activities: The inspectors reviewed NRC inspection report 50-391/89-04 (ADAMS Accession No. ML072530694) to verify that the structures were in fact shared and deficiencies were completed within the Unit 1 Welding CAP.

Sub-Issue 2, Radiographs for ASME Piping Welds

Description: Two radiographs containing rejectable indications were found to have been accepted by the same radiographic film interpreter.

Unit 1 Corrective Actions: The Unit 1 corrective actions were an expanded radiographic film review representing over 2700 welds. 350 welds were subsequently rejected and repaired.

Unit 2 Corrective Actions: The applicant performed a complete review of all Unit 2 ASME Class 1, 2, and 3 weld radiograph films which resulted in re-radiography of 282 welds for reasons such as unacceptable film quality. Defective welds were repaired or evaluated for use-as-is.

NRC Inspection Activities: The inspectors reviewed procedures, observed radiography, reviewed radiographic film, and reviewed the applicant's plans and activities to verify the adequacy of the applicant's corrective actions as documented in NRC IIRs 05000391/2010604 (ADAMS Accession No. ML103060240) Section OA.1.2 and 05000391/2010605 (ADAMS Accession No. ML110410680) Section OA.1.9.

Sub-Issue 3, Piping Shear Lugs

Description: Welds joining shear lugs to piping did not achieve full penetration as required by the design drawings.

Unit 1 Corrective Actions: The applicant performed inspection and evaluation of 120 existing lugs. 115 were found acceptable as-is, while five needed ultrasonic examination to confirm adequate penetration. Code case N-318 was used.

Unit 2 Corrective Actions: The applicant moved this item to the Hanger and Analysis Update Program (HAAUP) CAP and consequently performed no actions for this issue within the Welding CAP.

NRC Inspection Activities: NRC inspection actions for this issue have and will continue to be documented with the HAAUP CAP. Specifically, IIR 05000391/2012-608 (ADAMS

Accession No. ML12319A368) Sections OA.1.14 and OA.1.2 document NRC inspection activities to date.

Sub-Issue 4, Wall-Mounted Instrument Panels

Description: Site fabricated wall-mounted instrument panels lacked the required full penetration welds.

Unit 1 Corrective Actions: Destructive testing was performed on the worst 2 panels to confirm acceptance as-is for the remaining panels.

Unit 2 Corrective Actions: The applicant inspected the existing Unit 2 wall panels and found them to be acceptable as-is based on the Unit 1 evaluation.

NRC Inspection Activities: The inspectors reviewed the applicant's evaluation and inspected a sample of the instrument panels as documented in IIR 05000391/2011603 (ADAMS Accession No. ML111370702) Section OA.1.6 to verify they were bounded by the Unit 1 test and evaluation.

Sub-Issue 5, Heating, Ventilation, and Air Conditioning (HVAC) Ductwork Welding

Description: Safety-related ductwork (including the hydrogen collection system) was fabricated and installed without a quality assurance program and without specific welding requirements from engineering.

Unit 1 Corrective Actions: The applicant performed a leak test as well as weld surveys, seismic analysis, and weld repairs as required.

Unit 2 Corrective Actions: The applicant determined that the actions performed under the Unit 1 Welding CAP adequately demonstrated the structural integrity and functionality of the subject ductwork welds for both Unit 1 and Unit 2.

NRC Inspection Activities: The inspectors held discussions with the applicant's engineers, reviewed evaluations, and performed a walkdown as documented in NRC IIR 05000391/2011603 Section OA.1.7 to verify that the Unit 2 ductwork was bounded by the corrective actions performed under the Unit 1 Welding CAP.

Sub-Issue 6, Structural Steel Partition Wall – Elevation 755.0

Description: A visual inspection revealed deficient welding, missing beams, and improper connections on the structural steel partition wall that separates the mechanical equipment room, the locker room, and the kitchen on the west end of the 755' elevation of the control building.

Unit 1 Corrective Actions: The applicant performed reanalysis, revision of calculations and drawings, and repairs as necessary.

Unit 2 Corrective Actions: No actions were performed by the applicant for this sub-issue.

NRC Inspection Activities: The inspectors performed no activities for this sub-issue since it was a shared system and was adequately closed with Unit 1 as documented in NRC inspection report 50-390 & 391/89-04 Section 4.3.1.2.7 (2).

Sub-Issue 7, Temporary Attachments – Piping

Description: Documentation could not be located for the required nondestructive examination (NDE) of areas from which thermocouples had been removed after post weld heat treatment.

Unit 1 Corrective Actions: Inspections were performed for all instances where records could not be located. No defects were found.

Unit 2 Corrective Actions: The applicant performed surface examinations (Penetrant Testing (PT) or Magnetic Particle Testing (MT) as applicable) of the affected areas. Because the exact locations of removal could not be located, the exams covered 360 degrees around the pipe and 4 inches back from the weld on both sides.

NRC Inspection Activities: The inspectors reviewed procedures, inspection records, and observed applicant inspections to verify the adequacy of the Unit 2 corrective actions as documented in the following NRC IIRs:

- 05000391/2011603 Section OA.1.8
- 05000391/2011605 (ADAMS Accession No. ML112201418) Section OA.1.6

Sub-Issue 8, Classification of Containment Liner Welds

Description: Drawings were discovered which improperly classified attachment welds to the steel containment vessel.

Unit 1 Corrective Actions: The applicant performed design reviews and changes and determined that the welds were acceptable as-is because they had been made to equivalent requirements, specifically TVA Class B.

Unit 2 Corrective Actions: No actions were performed for Unit 2.

NRC Inspection Activities: No NRC inspection activities were performed on Unit 2 because the as-built welds on Unit 2 were made to TVA class B, as were the Unit 1 welds, and are thus equivalent to the appropriate code class.

Sub-Issue 9, Missing Angle Brace on Monorail

Description: A structural brace was found to be missing from a monorail support assembly.

Unit 1 Corrective Actions: The applicant installed the missing brace.

Unit 2 Corrective Actions: None.

NRC Inspection Activities: No NRC inspection activities were performed on Unit 2 since this was an isolated issue related to Unit 1 and closed in NRC inspection report 390,391/89-04 Section 4.3.1.2.7(3).

Sub-Issue 10, Independent Weld Deviation Reports (IDRs)

Description: During the course of field work by TVA Welding Project (WP) personnel, perceived hardware discrepancies outside the scope of the Unit 1 evaluation were discovered and documented on IDRs.

Unit 1 Corrective Actions: Of 474 IDRs, approximately 50 CAQRs were issued addressing approximately 250 of the issues raised in the IDRs.

Unit 2 Corrective Actions: The applicant reviewed all IDRs for the possibility of applicability to Unit 2. They found that none were applicable and documented the results.

NRC Inspection Activities: The inspectors reviewed a sample of the IDRs to verify that they were not applicable to Unit 2 as documented in IIR 05000391/2012603 (ADAMS Accession No. ML12123A156) Section OA.1.1.

Sub-Issue 11, Main Steam Impingement Sleeve

Description: An employee concern led to several welding discrepancies being identified on one of the main steam impingement sleeves located outside of the Unit 1 Auxiliary Building.

Unit 1 Corrective Actions: Ultrasonic Testing (UT) examinations were performed and a slugged weld was identified and corrected.

Unit 2 Corrective Actions: The Unit 2 main steam impingement sleeves welds were examined and found to be deficient. The applicant generated work orders to weld steel plates across the welds to bridge them and carry the load.

NRC Inspection Activities: The inspectors reviewed drawings and calculations, walked down the sleeves, and held discussions with the applicant's responsible engineering staff to verify the adequacy of Unit 2 corrective actions, as documented in NRC IIR 05000391/2011607 (ADAMS Accession No. ML112730197) Section OA.1.10 and 05000391/2012603 Section OA.1.2.

Sub-Issue 12, North / South Valve Rooms

Description: Employee concerns had been raised about welding over cracks in structural welds in the Unit 1 north and south valve rooms.

Unit 1 Corrective Actions: The welds were subjected to visual and ultrasonic examinations. 46 out of the 236 examined welds required engineering evaluations before being deemed acceptable. Based on a recommendation by WP, accessible welds on 4 fabricated beams in the room were examined by MT, revealing lamellar tearing in one of them which was subsequently repaired.

Unit 2 Corrective Actions: To address the concern about lamellar tearing, the applicant performed MT examinations of the identical connections on Unit 2 as were done on Unit 1. One instance of lamellar tearing was identified and repaired. The remaining portion of this sub-issue was covered by the applicant under CDR 83-55, Welds on Structural Steel in Main Steam Valve Rooms.

NRC Inspection Activities: The inspectors reviewed procedures and records, and observed activities associated with this sub-issue to verify that the structural steel in the north and south valve rooms was in accordance with the applicable codes and would meet its safety function. These activities are described in more detail under CDR 83-55 (closed in IIR 05000391/2012-603) and in the following NRC IIRs:

- 05000391/2011603 Section OA.1.9
- 05000391/2011607 Section OA.1.9
- 05000391/2012603 Section OA.1.3

Sub-Issue 13, Audit Program Review

Description: At the request of the NRC, a review of WBN's audit program of welding from 1974 to 1986 was performed. It was found to have been adequate.

Unit 1 Corrective Actions: No corrective actions were taken for Unit 1.

Unit 2 Corrective Actions: No corrective actions were taken for Unit 2.

NRC Inspection Activities: No inspection activities were required for this sub-issue.

Sub-Issue 14, Evaluation of Generic NCRs

Description: A number of generic (containing large populations of welds) NCRs were initiated throughout the applicant's welding program beginning in 1980. The nonconforming conditions related principally to the geometric attributes of fillet and socket welds. At WBN, NCRs were issued against large groups of similar items, e.g., structural steel welds, electrical support welds, pipe support welds, etc. Because many of the weld deviations reported through the Department of Energy's Weld Evaluation Project (DOE/WEP) re-inspections also related to weld geometry (size, length, and location), WP elected to review the NCRs to determine if a significant number of the currently reported deviations might also have been addressed earlier by the applicant's quality assurance program.

Unit 1 Corrective Actions: The applicant conducted a number of sample re-inspections to evaluate hardware addressed by the NCRs. Based on the sample selected, the entire population of components was considered to be acceptable. WP compared the conclusions of these NCRs with DOE/WEP Unit 1 conclusions and documented the results of the comparison in Section 4.2.4 of the WP Final Report.

The results of the comparison are that the applicant and contractor EG&G Idaho, Inc. both concluded that the welds in question, which were resolved by inspection/examination, document review, and engineering analysis, now meet the WBN Final Safety Analysis Report (FSAR) requirements. Since there were no generic problems associated with the remaining un-sampled components within the weld

populations by EG&G, the applicant and EG&G both concluded with a specific degree of confidence that the un-sampled components within these populations also meet the WBN FSAR requirements.

Unit 2 Corrective Actions: The applicant determined that the actions taken for Unit 1 were adequate to justify that no actions were necessary for Unit 2.

NRC Inspection Activities: The inspectors performed no activities with this sub-issue since the condition was found to be adequate during the Unit 1 Welding CAP.

Sub-Issue 15, Code Applicability for Work Performed After Completion of N-5 Data Reports

Description: After completion of the N-5 Data Reports for ASME Section III piping systems, welding activities have been performed at WBN in accordance with ASME Section XI, In-service Inspection. In June 1987, a meeting was held between the applicant and the NRC to discuss code applicability for these activities. The NRC advised them that they consider WBN to be a plant still under construction, and the NRC position, provided in a July 1987 letter stated that ASME welding activities at WBN should be performed to the construction Code of Record, ASME Section III, 1971 Edition through Summer 1973 Addenda. In addition, the NRC required the applicant to review any such activities to identify where work was performed in accordance with ASME Section XI or by a non-stamp holder. The applicant was required to identify these as exceptions to the Code of Record and to request approval from the NRC for the proposed alternatives as prescribed by 10 CFR 50.55a(a)(3).

Unit 1 Corrective Actions: the applicant revised the WBN welding program to require that welding activities affecting ASME code systems be performed in accordance with the construction Code of Record.

The applicant reviewed repair, replacement, and modification activities performed on ASME code systems since the completion of the system N-5 data report forms. This review identified several work plans and maintenance requests that represent exceptions to the construction Code of Record. The applicant evaluated these exceptions and determined that welding was performed in accordance with the technical requirements of ASME Section III. However, required pressure tests were performed in accordance with ASME Section XI rather than ASME Section III. In addition, some of the work plans and maintenance requests did not have the required ANI review for material acceptance. The applicant subsequently provided these documents to the ANI for approval. The pressure tests were redone in accordance with ASME Section III.

Unit 2 Corrective Actions: The applicant performed no corrective actions for Unit 2 because the welding program was revised in accordance with the Unit 1 corrective actions and no Section XI work was done on Unit 2.

NRC Inspection Activities: The inspectors discussed the issue with the applicant's responsible engineer and reviewed procedures to verify that this sub-issue was no longer applicable and that all work was being performed to ASME Section III as documented in NRC IIR 05000391/2011605 Section OA.1.11.

Sub-Issue 16, Code of Record

Description: Section NA-1140 of ASME Section III addresses the use of later editions and addenda of the Code that are less restrictive than the Code of Record (1971 Edition through Summer 1973 Addenda for WBN). The applicant's original interpretation of this requirement was inappropriate, in that, necessary governing documents were not revised and concurrence was not obtained for cases where less restrictive editions/addenda were utilized.

Unit 1 Corrective Actions: The applicant reviewed 21 welding and welding-related specifications to determine where less restrictive editions/addenda were utilized. Twenty-one areas were identified that were less restrictive than the Code of Record. Each area was evaluated and justification provided. The results of the evaluations and the justifications were forwarded to the NRC in August 1987. In June 1988, Watts Bar Engineering Project Procedure WBEP-3.18, "Use of Later Editions and Addenda in Code Cases to the ASME Code," was issued to control and document the use of later code provisions. Additionally, other design output sources, e.g., design criteria, weld and NDE assignment drawings, and use-as-is nonconformance dispositions were reviewed to capture other possible uses of later code provisions prior to the implementation of WBEP-3.18 (now EAI-8.01). Past usage of later code provisions has been identified and documented. EAI-8.01 will control the future use of later code provisions.

Unit 2 Corrective Actions: The applicant performed no activities concerning Unit 2 for this sub-issue since the same welding specifications are used on both Unit 1 and Unit 2; the review that was performed is applicable to both Units.

NRC Inspection Activities: The inspectors performed no activities concerning this sub-issue since it was closed for Unit 2 in NRC Inspection report 50-391/89-04 Section 4.4.1.

Sub-Issue 17, Welds on Vendor Supplied Equipment

Description: At the request of the NRC, vendor welds were added to the scope of the applicant's weld evaluation. This evaluation was assigned to WBN Nuclear Quality Assurance to complete. A list of vendors was selected by using quality indicators compiled by the WP. Deviant conditions were evaluated by Nuclear Engineering.

Unit 1 Corrective Actions: Welds were evaluated by equipment specific methods, i.e. re-examination, analysis, review of previous analysis, etc. Deficiencies identified were tracked to closure on NCRs and CAQRs.

Unit 2 Corrective Actions: The applicant reviewed the equipment in the scope and determined that the refueling water storage tank (RWST) and polar crane still had deficiencies that were not corrected during the original Welding CAP. On the RWST, the applicant performed a review of radiographs and performed re-radiography and weld repair as necessary. For the polar crane, the records and radiographic film were reviewed and the welds found acceptable as is.

NRC Inspection Activities: The inspectors reviewed the applicant's corrective actions and reviewed radiographic film to verify the adequacy of the applicant's corrective actions. The inspectors identified one non-cited violation. The finding and inspection activities are detailed in NRC IIR 05000391/2012603 Section OA.1.4.

Sub-Issue 18, Radiographic Film Review

Description: During the NDE Level II and Level III examiner review (two separate reviews) of radiographs for ASME Section III piping welds, radiographs for 16 welds were determined to have 18 radiographic identification discrepancies. (Two welds were identified to have two different types of discrepancies.)

Unit 1 Corrective Actions: Welds requiring radiographic testing (approximately 2080 welds were radiographed) were interpreted as acceptable during construction, and independently reviewed and accepted. The remaining approximately 570 welds required repair or were re-radiographed, either during construction and/or as a result of the review program. This population of approximately 570 welds was selected as the basis for identifying radiographic identification discrepancies.

Of these 570 welds, approximately 400 welds required repair during initial construction. Of these 400 welds, approximately 300 welds did not require repair and/or additional radiography as a result of the second review. The remaining approximately 270 welds required repair and/or additional radiography as a result of the second review.

As part of the second review, the Level III examiner matched the repair radiographs (400 welds) to the original radiographs for repaired welds to ensure that the correct area was repaired and that the repair radiograph matched the original weld. No additional discrepancies were identified. During repair and/or re-radiography of the 270 weld population, the new radiographs, verified as corresponding to the correct welds, were compared against the existing radiographs. Two additional discrepancies were identified and corrected.

The applicant believed that the results of the two independent re-reviews of the ASME Section III piping welds (2650 population) and the additional evaluations of the 270 and 300 weld populations (about 22 percent of total population) demonstrated the ASME piping welds requiring radiography complied with the applicant's licensing commitments and that further evaluation for unidentified radiographs was not necessary.

Unit 2 Corrective Actions: The applicant performed no actions concerning this sub-issue since it was covered under sub-issue 2, Radiographs for ASME Piping Welds.

NRC Inspection Activities: The inspectors performed no activities for this sub-issue since it was covered under sub-issue 2, Radiographs for ASME Piping Welds.

Sub-Issue 19, Fillet Weld Adequacy

Description: The NRC identified an unresolved item (390/86-21-05) relating to verification of fillet weld adequacy. The concern specifically involved the fit-up requirements of the American Welding Society Structural Welding Code-Steel (AWS D1.1).

Unit 1 Corrective Actions: Both DOE/WEP and the WP evaluated this concern. The DOE/WEP evaluation concluded that "verification of fit-up for structural steel is not a safety-significant issue at WBNP-1." The WP concluded that even though the program changed somewhat throughout the period of structural welding, the minimum

requirements of AWS D1.1 were met. Enhancements to the program were made by revision of applicable procedures and training of personnel involved with fit-up.

Unit 2 Corrective Actions: The applicant determined that the conclusions of the Unit 1 evaluation are applicable to Unit 2 and therefore no actions were necessary for Unit 2.

NRC Inspection Activities: The inspectors performed no activities concerning this sub-issue since the conclusions of the Unit 1 evaluation are applicable to Unit 2 and it was closed in NRC inspection report 50-391/89-04 Section 4.1d, Weld Fit-up Gap.

Sub-Issue 20, Undersize Nozzle Welds in ASME Components

Description: An NRC team inspection conducted in October 1989 identified undersized nozzle-to-shell welds on 8 of 12 inspected tanks, filters, and heat exchangers in ASME Class 2 and 3 systems (NOV 390/89-200-41).

Unit 1 Corrective Actions: The corrective action to resolve this deficiency was based on an industry survey of other utilities and the applicant's inspections of components at WBN. The plan included inspecting accessible nozzle-to-shell fillet welds for those components that are most susceptible to failure or have the greatest safety significance resulting from weld failure, and inspecting accessible nozzle-to-shell fillet welds of one component from each vendor that does not meet the criteria for most susceptible to failure or greatest safety significance. The applicant evaluated those welds found to be undersized for adequacy to fulfill the intended function. The applicant inspected and evaluated the 79 components identified for evaluation. Six nozzles required repair.

The applicant identified in its materials Procurement Quality Supplier Information Center (SIC), suppliers of tanks, heat exchangers, and filters having undersized nozzle-to-shell fillet welds, and identified vendors listed in the SIC which could supply these ASME components. Existing procedures required that preparers of source surveillance plans and supplier audit programs review the SIC information in developing these plans.

Unit 2 Corrective Actions: The applicant reviewed the historical inspection records and inspected 158 nozzle to shell welds to verify acceptable size; 56 of those welds required additional evaluation for repair or use-as-is.

NRC Inspection Activities: The inspectors reviewed the applicant's corrective action documentation and met with the responsible engineer to verify the adequacy of their corrective actions as documented in NRC IIR 05000391/2012603 Section OA.1.5.

Sub-Issue 21, Lack of Penetration / Lack of Fusion in ASME Class 3 Welds

Description: During a July 1990 NRC inspection, by radiography, for internal corrosion of ASME Class 3 piping welds which had not been previously radiographed, several examples of lack of penetration (LOP) and lack of fusion (LOF) were identified.

Unit 1 Corrective Actions: The applicant developed a corrective action plan to demonstrate the adequacy of ASME Class 3 butt welds. This plan involved determining the postulated worst flaw of a statistical sample of welds by radiography, ultrasonic flaw sizing, and metallography; and identifying the highest stress locations using both ASME Section III and Section XI methods assuming the worst flaws are located at these welds.

This evaluation determined that only three weld locations were identified which required radiographic examination to verify weld quality. All three welds were radiographed and found to be well within an analytically acceptable flaw size.

Although the analysis indicated that the Class 3 welds were acceptable, the applicant elected to proceed with repairing any weld which contained LOP and/or LOF exceeding 10% in circumferential length. Engineering analysis indicated that a maximum of 18% would be acceptable. Repairs were performed under maintenance requests MR A-64607, A-646081, A-646082, A-646084, A-646085, A-646086, A-646099, A-656384, and A-644083.

To prevent recurrence the applicant developed a random radiography requirement to assure proper feedback into the welding system during the fabrication of Class 3 systems.

Unit 2 Corrective Actions: The applicant chose 20 welds at random to be radiographed to achieve the same 95/95 confidence level that was accepted during completion of Unit 1. The applicant de-committed from the 10% random radiography in 1996 and it is not being performed for new construction.

NRC Inspection Activities: The inspectors reviewed the applicant's corrective action documents, reports, and met the responsible engineers to verify that they achieved the same confidence as Unit 1 as documented in NRC IIR 05000391/2012603 Section OA.1.6.

Sub-Issue 22, Faulty Ultrasonic Testing Methods Used by EG&G

Description: A sample of ASME Class 3 welds found by radiographic examination to contain LOF/LOP defects (Item 21 above) had previously been examined and accepted by ultrasonic examination performed by EG&G. EG&G had performed ultrasonic examination on groups of both piping and structural welds to address various welding-related employee concerns. Failure of the EG&G ultrasonic examination to detect LOF/LOP in this case raised questions about the validity of results and conclusions based on their examination of other welds.

Unit 1 Corrective Actions: Investigation by the applicant and APTECH Engineering Services revealed that the problem resulted from insufficient sensitivity of the particular ultrasonic technique used by EG&G for flaw evaluation in piping welds, and could be isolated to two groups of pipe welds. The groups were No. 013 (ASME Class 3 ERCW piping) and No. 213 (B31.1 Code Fire Protection piping in the Additional Diesel Generating Building). The applicant's response to NRC Unresolved Item 50-390/90-20-03, with supporting information from APTECH report B26910114900, documents this evaluation. The NRC closed this item for Unit 1 in Inspection Report 390/91-05 (ADAMS Accession No. ML072610384).

Unit 2 Corrective Actions: The applicant performed no corrective actions for this sub-issue on Unit 2.

NRC Inspection Activities: The inspectors reviewed records and held discussions with the applicant's responsible engineer to verify that the issue was isolated and completely bounded by the Unit 1 corrective actions and thus not applicable to current Unit 2 work.

Sub-Issue 23, LOF/LOP in ANSI B31.1 Welds

Description: ANSI B31.1 Code welds in the additional diesel generator building fire protection system represented one of the two groups of welds for which an employee concern had been addressed by EG&G using potentially ineffective ultrasonic examination (see Item 22 above).

Unit 1 Corrective Actions: The applicant, utilizing methods similar to those described for Class 3 welds, reexamined these welds by both ultrasonic and radiography. The results of these examinations were analyzed and the welds found to be acceptable.

Unit 2 Corrective Actions: No actions were taken since the welds are common to both Units 1 and 2.

NRC Inspection Activities: The inspectors reviewed drawing 1-47W832-1, Rev. 40, to verify that the additional diesel generator building fire protection system was common to Units 1 and 2 and therefore completed within the Unit 1 Welding CAP.

Sub-Issue 24, NRC Review of Radiographs

Description: Sub-issue 24 originated from an issue identified at Seabrook nuclear facility that could apply to WBN. The concern was associated with the availability and control of welding records, specifically with radiographs and associated records. The concerns were apparently isolated incidents, but they raised potential questions with regard to the thoroughness of the applicant's 100 percent review effort and the ability of the NRC to exercise its oversight responsibilities.

Unit 1 Corrective Actions: In anticipation of possible similar issues being raised, the applicant and NRC completed the following actions:

- The applicant performed a walkdown of WBN Unit 1 to physically identify Class 1, and a sample of Class 2 field welds which required radiography to verify weld documentation.
- The applicant and NRC independently reviewed radiographic film records for Class 1 and Class 2 welds that required radiography to ensure the records contained the correct film.
- The NRC completed a 100 percent independent review of radiographs from Class 1 and Class 2 welds.

A total of 2516 welds were reviewed for ASME code acceptance. The inspection indicated that, overall, the weld quality and film quality were good. Only three welds were repaired as a result of this review. These three welds contained indications of an interpretative nature. The applicant took immediate corrective action for all discrepancies identified. The NRC indicated that follow-up inspections would occur throughout the completion of WBN Unit 1 to ensure all welds were reviewed.

Unit 2 Corrective Actions: The applicant performed no actions since this item is covered by sub-issue 2, Radiography for ASME Welds.

NRC Inspection Activities: No inspection activities were performed since the item is adequately covered under sub-issue 2, Radiography for ASME Welds.

Sub-Issue 25, Establish Boundaries of ASME Section III Jurisdiction

Description: During system completion review, the applicant identified examples of changes in TVA piping class that resulted in an incorrect determination of ASME code applicability.

Unit 1 Corrective Actions: The applicant reviewed flow diagrams for systems containing ASME Section III piping to identify any other instances of welds that had an incorrect determination of ASME applicability.

Unit 2 Corrective Actions: The applicant reviewed flow diagrams of the chemical & volume control system and component cooling system (CCS) to verify correct code classifications.

NRC Inspection Activities: The inspectors reviewed documents and held discussions with the responsible engineers to verify the adequacy of corrective actions as documented in NRC IIR 05000391/2011605 Section OA.1.10.

Sub-Issue 26, N-5 Code Data Report Program

Description: During the Unit 1 ASME N-5 review process, errors were noted in the original documentation.

Unit 1 Corrective Actions: To resolve these errors, the applicant established an N-5 work group. The work group charter was to review all completed N-5 data reports. The scope of this review applied to the ASME Code Section III, Division 1, fabricated and installed piping, including instrumentation. This review was completed in three phases. Phase I included the activities involved with closing Significant Corrective Action Report (SCAR) WBP900145SCA. Phase II was the initiation of any addenda to the original N-5 data reports. Phase III included the initiation of any supplements to the N-5 for work performed after the initial code certification.

Unit 2 Corrective Actions: The applicant continued to use the N-5 work group with computer systems to eliminate and prevent errors.

NRC Inspection Activities: The inspectors reviewed documents and held discussions with the applicant's engineering staff to verify the adequacy of the corrective actions as documented in NRC IIR 05000391/2011605 Section OA.1.11.

b. Observations and Findings

One finding of significance was identified during inspections of the Watts Bar Unit 2 Welding CAP. NCV 05000391/2012603-04, Failure to Maintain Weld Radiographs, was documented in NRC IIR 05000391/2012603 Section OA.1.4.

c. Conclusions

Over a period of several years the NRC either inspected or determined non-applicability of each of the 26 sub-issues comprising the Welding CAP. The inspectors concluded that with the exception of NCV 05000391/2012603-04, Failure to Maintain Weld Radiographs; and minor issues; the reviewed records and observed activities met the

requirements of 10 CFR Part 50, Appendix B; Bechtel's QA and Special Processes Manuals; the applicant's QA Program; and the code of record. The inspectors also concluded that the Welding CAP was being completed in a manner equivalent to Unit 1 and any differences were either not applicable to Unit 2 or were more conservative. Although Temporary Instruction (TI) 2512/032 requires a final inspection after the applicant certifies the CAP complete, sufficient inspection of programs, systems, and components have been performed to provide reasonable assurance that it will be completed adequately. An additional final verification inspection is planned once all CAPs and Special Programs are certified complete by the applicant prior to fuel load. Therefore, this CAP and the associated TI, 2515/032, Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan, are closed for Unit 2.

OA.1.8(Closed) Quality Assurance Records Corrective Action Program (Temporary Instruction 2512/028, Inspection Procedures 55050, and 49065)

a. Inspection Scope

The inspectors continued inspection efforts of the QA records CAP that were discussed in the following NRC IIRs:

- 05000391/2008006, Section E.1.3 (ADAMS Accession No. ML081210735);
- 05000391/2010603, Section OA.1.1 (ADAMS Accession No. ML102170465);
- 05000391/2010604, Section OA.1.3 (ADAMS Accession No. ML103060240);
- 05000391/2011602, Section OA.1.1 (ADAMS Accession No. ML110800483);
- 05000391/2011608, Section OA.1.13 (ADAMS Accession No. ML11311A082);
- 05000391/2011610, Section OA.1.3 (ADAMS Accession No. ML12034A202);
- 05000391/2013608, Section OA.1.7 (ADAMS Accession No. ML13316A776);
- 05000391/2013610, Section OA.1.8 (ADAMS Accession No. ML14049A158);
- 05000391/2014602, Section OA.1.17 (ADAMS Accession No. ML14086A063);
- and
- 05000391/2014603, Section OA.1.11 (ADAMS Accession No. ML14129A381).

This CAP involved the applicant's identification and resolution of historic quality assurance records. The inspectors reviewed a sample of conduit, valve, mechanical equipment, piping, and ductwork QA records. The inspectors reviewed the applicant's sample assessment of the records to verify that the records specified the correct component type and location, that the functional specifications were met, that the required QA/QC inspections were performed, and that they were complete and legible. To verify that records were retrievable, the inspectors observed document control personnel locate independent samples of records from within the vault.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspection samples that were needed for the closure of this item have been completed. However, Temporary Instruction 2512/028 requires that a final inspection be completed after TVA certifies that the CAP is completed. This final inspection will be covered under another item, Final Corrective Action Program/Special Program Inspection. Therefore, based on the review of the applicant's final closure package, the results of this inspection and past inspections, this item is closed.

OA.1.9 (Closed) Design Basis Verification Program Corrective Action Program and Independent Design Inspection (TI 2512/019)

a. Inspection Scope

The inspectors continued inspection efforts initiated in NRC IIRs 05000391/2010605, Section OA.1.10 (ADAMS Accession No. ML110410680); 05000391/2011606, Section E.1.1 and E.1.2 (ADAMS Accession No. ML111370681); and 05000391/2014603, Section OA.1.12 (ADAMS Accession No. ML14129A381) regarding the applicant's implementation of design requirements. The Design Basis Verification Program CAP review focused on a review of the applicant's design basis development, calculations, procedures, and system descriptions. The Independent Design Inspection part of the CAP included a vertical slice review evaluation of the adequacy of the design and construction of WBN Unit 2 structures, systems, and components. The inspectors reviewed a sample of Design Criteria Documents to verify that the requirements related to the original steam generators had been reinstated, and that the revisions were accurate.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the review of the engineering documents, the inspectors concluded that the applicant adequately addressed the issues identified in the Temporary Instruction. The inspection samples that were needed for the closure of this item have been completed. Both the Temporary Instruction and the Independent Design Inspection items are closed. However, Temporary Instruction 2512/019 requires that a final inspection be completed after TVA certifies that the CAP is completed. This final inspection will be covered under another item, Final Corrective Action Program/Special Program Inspection. Therefore, based on the results of this inspection and past inspections, this item is closed.

OA.1.10 (Closed) Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase II (Temporary Instruction 2515/182)

a. Inspection Scope

Background: In 2009, the nuclear power industry developed an initiative to address buried piping integrity through inspections and assessments of site-specific

components. The scope and milestones of the initiative were revised for the last time in February 2013. The applicant's goals and required actions (commitments made by the applicant) resulting from this underground piping and tank initiative were captured in Nuclear Energy Institute (NEI) document NEI 09-14, "Guideline for the Management of Buried Piping Integrity," Rev. 3 (ADAMS Accession No. ML13130A322). Under the underground piping and tanks integrity initiative, each site is to develop and implement either a site-specific or company program for buried piping and underground piping and tanks. On November 17, 2011, the NRC issued TI 2515/182 (ADAMS Accession No. ML13114A318) to gather information related to the industry's implementation of this underground piping and tank integrity initiative. On August 8, 2013, the NRC revised the TI to achieve consistency with the revisions to NEI 09-14. On August 7, 2013, the NRC issued IIR 05000390/2013003 (ADAMS Accession No. ML13220A385) documenting the results of Phase I of this TI for Watts Bar Nuclear Plant.

Inspection Activities: The inspectors reviewed records and procedures related to the applicant's program for the Unit 1 and Unit 2 buried piping and underground piping and tanks, in accordance with Phase II of TI 2515/182, to confirm that the applicant's program contained attributes consistent with Sections 3.3.A and 3.3.B of NEI 09-14, "Guideline for the Management of Buried Piping Integrity," Rev. 3, and to confirm that these attributes were scheduled and/or completed by the NEI 09-14 deadlines. The inspectors interviewed applicant staff responsible for the buried piping program, and reviewed program related activities to determine if the program attributes were accomplished in a manner that reflected acceptable practices in program management.

The applicant's buried piping and underground piping and tanks program was inspected in accordance with paragraph 03.02.a of the TI, and it was confirmed that activities, which correspond to completion dates specified in the program, which had passed since the Phase I inspection are conducted, have been completed. The applicant's buried piping and underground piping and tanks program was inspected in accordance with paragraph 03.02.b of the TI, and responses to specific questions found in <http://www.nrc.gov/reactors/operating/ops-experience/buried-pipe-ti-phase-2-insp-req-2011-11-16.pdf>, were submitted to the NRC Headquarters staff. Additionally, the inspectors reviewed the applicant's risk ranking process and implementation of the inspection plan using the guidance of paragraph 03.04 and 03.05 of the TI.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

On the basis of the sample selected for review, the inspectors determined that the applicant implemented a buried piping and underground piping and tanks program consistent with the commitments and industry requirements in NEI 09-14. The inspectors completed the inspection requirements for Phase II of TI-2515/182, and this TI is considered closed.

OA.1.11 (Closed) Construction Deficiency Report 391/82-80: Unqualified EDS Nuclear Embedment Plates (Inspection Procedure 35007)

a. Inspection Scope

Background: The deficiency was initially reported to the NRC on December 2, 1982, as non-conforming report (NCR) WBN CEB 8217 in accordance with 10 CFR 50.55(e). The issue was documented as CDR 390/82-84 for Unit 1 and CDR 391/82-80 for Unit 2.

The CDR concerned the lack of qualification for embedment plates. In 1978, EDS Nuclear Incorporated notified TVA by letter of the completion of their verification effort for TVA support embedment plates having EDS-designed pipe support loads. Several supports were identified in 1981, for the RCS and the component cooling water system piping at Watts Bar Nuclear Plant, which exceeded the allowable loads provided to EDS by TVA. TVA had already approved the EDS drawings and had issued them to its construction forces before the receipt of the vendor analysis was completed. Revised EDS support designs had been incorporated into the plant design under engineering change notice (ECN) 2958.

The deficiency involved a failure by TVA design personnel to either understand or comply with the directions of TVA's Division of Engineering Design Engineering Procedure 1.26, "Nonconformance Reporting and Handling by EN DES," which was in effect at that time.

The applicant analyzed the embedded plates that EDS had indicated as being overloaded and provided engineering justification for the design or modification of the embedment plates to reduce the plate stresses and anchor loads. Revised EDS support designs had been incorporated into the plant design under ECNs 2958 and 4241. After interviews with responsible applicant representatives and a review of the completed corrective actions for Unit 1, the inspectors determined that CDR 390/82-84 was adequately resolved for Unit 1 as documented in NRC IR 50-390/84-39 (ADAMS Accession No. ML082390462).

The Unit 2 corrective actions associated with NCR WBN CEB 8217 required instrument support 2-094-A600-105-18 (47A600-105-18) to be installed in accordance with ECN 2958. This Unit 2 corrective action is addressed in PER 144186. In IIR 05000391/2013612 (ADAMS Accession No. ML13088A066), it was documented that TVA design engineering determined that support 2-094-A600-105-18 was no longer required per calculation 290106, Rev. 2. Upon further review of the applicant's construction progress, it was determined that support 2-094-A600-105-18 was attached to support 2-90-106. TVA revised the engineering evaluation to remove support 2-094-A600-105-18 in its entirety except for the base plate, which was utilized in the modification of support 2-90-106-2, by implementing field change requests (FCRs) 63252A and 63702.

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

- reviewed PER 144186 to verify the corrective actions were implemented for Unit 2;
- reviewed WO 115567524 to verify that instructions were included to modify the support;

- reviewed engineering closure documentation for CDR 391/82-80;
- reviewed EDCR 54251, FCR 63252A, and FCR 63702 to verify the design changes were documented;
- interviewed design engineers and reviewed design calculation 2-90-106, Rev. 3, to verify the pipe support analysis which include the base plate and bolt stresses was acceptable and completed in accordance with WB-DC-40-31.9, "Criteria for Design of Piping Supports and Supplement Steel in Category I Structures," Rev. 22; and
- Reviewed the civil feature load sheet to support calculation 2-90-106, Rev. 3, and calculation Sals 2912-2-90-106, Rev. 1, to verify that the pipe support cumulative attachment loads for the concrete crane wall embedded plates #11 and #12, at the MK 2 location of elevation 702 were acceptable and in accordance with design standard DS-C1.7.1, "General Anchorage to Concrete," Rev. 4.

b. Observations and Findings

No findings were identified.

c. Conclusions

The corrective actions in place are adequate. Based on the inspectors' review of the engineering complete package for CDR 50-391/82-80, the inspectors determined that the item is closed.

OA.1.12 (Closed) Construction Deficiency Report 391/86-59: Qualification of ASCO Solenoid Valve Conduit Connector Configuration (Inspection Procedures 51053 and 51055)

a. Inspection Scope

Background: The subject deficiency was initially reported to the NRC on July 11, 1986, with an interim report (ADAMS Accession No. ML 082401906) issued on August 11, 1986; and the final report (ADAMS Accession No. ML073550911) issued on October 5, 1987. After a review, the NRC determined this deficiency was associated with VIO 50-391/86-18-01 issued as part of NRC Inspection Report (IR) 50-390/86-18 and 50-391/86-18 (ADAMS Accession No. ML072480305).

The VIO concerned the applicant's failure to translate design requirements, including vendor specifications, into specifications, drawings, procedures, or instructions as required by 10 CFR Part 50, Appendix B, Criterion III. The following two specific examples were cited:

- The American Switch Company (ASCO) Solenoid Valves Manual NP-1 requirements to orient solenoid valves, model 206.381, vertical and upright, were not translated into installation instructions. This failure resulted in installed equipment not meeting vendor requirements.
- Seismic requirements of IEEE 344-1975, which requires the effects of electrical connections, conduit, and sensing lines, etc., to be considered, were not translated into installation instructions. This failure resulted in inadequately installed equipment, as referenced in CDR WBRD 50-391/86-59.

The first example of this violation was also documented in CDR 391/87-11 and closed in NRC IIR 05000391/2012609 (ADAMS Accession No. ML12356A073). The second example was addressed by CDR 391/86-59. Nuclear Central Office (NCO) tracking items NCO0870290002 and NCO0870290004 were initially written to track CDR 391/86-59, and PER 143758, Rev. 1, was later used to track these commitments.

The applicant determined that the cause of this deficiency was an ineffective interface review that resulted in the failure to maintain seismic qualification of instruments and their attachments. The applicant initiated corrective actions to prevent recurrence, which included walkdowns, and revision and issuance of drawings, calculations, and procedures to ensure that conduits attaching to instruments and equipment were properly installed and documented.

Inspection Activities: Previous inspection efforts associated with this CDR were documented in IIR 05000391/2013608. The inspectors reviewed the applicant's Final Complete closure report and interviewed applicant staff to determine if the corrective actions associated with maintaining seismic qualification of category IE and I(L) instrumentation and equipment were properly resolved and documented. Specifically, the inspectors interviewed applicant staff and reviewed the applicant's drawings, seismic calculations, and qualifications associated with the ASCO Solenoid Valves, including referenced documents and actions associated with PER 143758.

The inspectors observed the as-built condition of several ASCO Solenoid Valves noting the valve orientation, mounting configuration, attachment installation, and conduit attachments. The as-built conditions were compared to the seismic qualifications, drawings, and calculations to determine if the field conditions matched the design and qualifications. The following ASCO Solenoid Valves were sampled by the inspectors:

- 2-FSV-068-0305-A
- 2-FSV-063-0064-A
- 2-FSV-067-0184-A
- 2-FSV-067-0176-A
- 2-FSV-068-0308-B
- 2-FSV-062-0072-A
- 2-FSV-032-0111-B.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the review of the final closure package and other activities completed during this and previous inspections, the inspectors determined that the applicant has implemented appropriate actions to resolve the original construction deficiency. Based on these proposed actions, the item can be closed; however, future inspection of completed work may be performed at the NRC's discretion.

OA.1.13 (Closed) Violation 391/86-21-02: Instrument Valves, Foxboro Transmitters, and Instrument Panels not Seismically Qualified (Inspection Procedures 51053 and 51055)

a. Inspection Scope

Background: On February 12, 1987, NRC identified a violation (VIO) for the applicant's failure to ensure that vendor information (i.e., seismic qualification reports and analysis) was correctly translated into specifications, drawings, procedures, instructions, and field installation as required by 10 CFR Part 50, Appendix B, Criterion III. This VIO was initially issued as VIO 390/86-21-02 for Unit 1 and 391/86-21-02 for Unit 2, as part of NRC Inspection Report (IR) 50-390/86-21 and 50-391/86-21 (ADAMS Accession No. ML082280240). The VIO included both hardware and documentation deficiencies. Four examples were identified that involved a lack of engineering documentation to demonstrate the seismic adequacy of:

1. The manner in which instrument valves were mounted;
2. A number of modified transmitter support brackets;
3. Transmitters installed with rigid conduit instead of the seismically qualified method using flexible conduit; and
4. The floor mounting method used when panels were mounted in series.

The first example of the VIO was incorporated into CDRs 390/87-01 for Unit 1 and 391/87-01 for Unit 2, as explained in NRC IR 50-390,391/91-31. For Unit 1, CDR 50-390/87-01 was closed in NRC IR 50-390,391/94-61 (ADAMS Accession No. ML 072980626). CDR 391/87-01 was closed for Unit 2 in NRC IIR 05000391/2012607 (ADAMS Accession No. ML12276A028).

The second example of the VIO was reviewed in NRC IR 50-390,391/91-31 for Unit 1, and closed for Unit 1 in NRC IR 390,391/95-30 (ADAMS Accession No. ML 072760539). For Unit 2, the applicant issued PERs 143538 and 143701 to document and resolve the corrective actions associated with the second example. The actions included replacing the affected Foxboro transmitters with new Rosemont transmitters and new mounting brackets.

The third example was essentially the same as VIO 390,391/86-18-01, Section A, Item 2, as stated in the TVA response (ADAMS Accession No. ML082280286) to IR 50-390,391/86-21. VIO 50-390/86-18-01 was closed for Unit 1 in NRC IR 50-390,391/95-55 (ADAMS Accession No. ML 072610724), because the issues associated with this VIO were already addressed by CDR 50-390,391/87-11 and CDR 50-390,391/86-59. CDR 50-390/87-11 was closed for Unit 1 in NRC IR 50-390,391/95-30, and for Unit 2 in NRC IIR 05000391/2012609 (ADAMS Accession No. ML12276A028). CDR 50-390/86-59 was closed for Unit 1 in NRC IR 50-391,391/95-69 (ADAMS Accession No. ML 072610759). CDR 391/86-59 was closed in Section OA.1.13 of this inspection report.

The fourth example required corrective actions from the applicant that resulted in an engineering evaluation for the as-built panel configurations. The installations were determined to be acceptable in their existing condition. The NRC's initial review of this evaluation was documented and closed for Unit 1 in NRC IR 50-390,391/95-30. VIO 390/86-21-02 was closed for Unit 1 in NRC IR 50-390,391/95-30. For Unit 2, the applicant issued PER 143758 to document and resolve the corrective actions associated

with this example. The seismic qualifications associated with floor mounted panels have since been updated to reflect the current as-built configuration. NRC IIRs 05000391/2013608 (ADAMS Accession No. ML13316A776) and 05000391/2013610 (ADAMS Accession No. ML14049A158) documented previous inspection results and background details of VIO 391/86-21-02.

Inspection Activities: The inspectors interviewed applicant staff and reviewed the applicant's final closure package associated with PER 143758 and engineering complete closure package associated with PERs 143701 and 143538. This included reviewing referenced documents, actions, and associated commitments 114113692 and 114113697 to determine if the corrective actions associated with the seismic qualification deficiencies were properly resolved and documented.

The inspectors observed the as-built condition of Rosemount transmitters, associated with PERs 143758 and 143701, and verified that the as-built configurations were in accordance with the design drawings and seismic qualification packages. The inspectors reviewed several WOs, calculations, drawings, and material qualification documents associated with Rosemont transmitters. These documents were reviewed to determine the adequacy of field installation, seismic qualification, and material traceability. The inspectors also reviewed outstanding design changes on the selected transmitters and confirmed that these changes were properly controlled and documented. The following Rosemount transmitters were reviewed by the inspectors:

- WBN-2-FT-070-0095
- WBN-2-FT-070-0096
- WBN-2-FT-070-0098
- WBN-2-PDT-070-0094
- WBN-2-PT-068-0322
- WBN-2-PT-068-0323
- WBN-2-PT-068-0334
- WBN-2-PT-068-0336C
- WBN-2-PT-068-0337C
- WBN-2-PT-068-0340
- WBN-2-PT-068-0342C

The inspectors observed the completed installation and reviewed associated construction documentation for these transmitters to determine whether:

- location, configuration, and installation (including mounting brackets) corresponded to the latest approved design or construction specifications and drawings,
- specified instrument components and associated items were used,
- components were correctly and permanently identified,
- cleanliness requirements were maintained or otherwise satisfied,
- installed equipment was adequately protected from adjacent construction activities,
- nonconforming components or conditions were identified and controlled in accordance with approved procedures,
- status of completion, maintenance, and readiness for preoperational testing was documented, and

- adequate provisions were taken to ensure that the validation of the environmental qualification of instrument components was maintained.

Inspectors observed a sample of instrument panels to determine if the as-built condition aligned with design drawings and seismic qualification packages. The inspectors reviewed several WOs, calculations, and drawings associated with these instrument panels. These documents were reviewed to determine the adequacy of field installation, and seismic qualification. Panels 2-L-191A and 2-L-191B were in series and were associated with PER 143758. The following instrument panels were reviewed by the inspectors:

- 2-L-191A
- 2-L-191B
- 2-L-659
- 2-L-660
- 2-L-661

The following samples were inspected:

- IP 52053 Section 02.02d – 4 samples
- IP 52053 Section 02.02e – 4 samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the review of the final closure package 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, the item can be closed; however, future inspection of completed work may be performed at the NRC's discretion.

V. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

An exit meeting was conducted on July 16, 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 finding and observations, and provided no dissenting comments.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant personnel

J. Adair, QA Oversight, TVA, Unit 2
H. Baldner, TVA Regulatory Compliance
A. Bangalore, Bechtel – Electrical Engineer
R. Baron, TVA - QA Manager, Unit 2
D. Beckley, Bechtel – Electrical Design
J. Boykin, TVA – Quality Programs
R. Brown, Bechtel – Design Engineering
J. Calle, Manager, WBN Interface & Transition
D. Charlton, TVA Regulatory Compliance
P. Cox, Bechtel – Electrical
K. Dietrich, Manager Engineering Programs
B. Enis, TVA Oversight
J. Fisher, TVA – Regulatory Compliance
S. Hilmes, TVA – Electrical
R. Hruby, TVA - General Manager Technical Services
B. Hunt, WBN Operations Dual Unit Transition Manager
Kay Lovell, TVA, Senior Manager, Refurbishment Engineering & Construction
M. McGrath, TVA – Oversight
Leon Neat, Licensed Operator Requalification (LOR) Lead
J. O'Dell, TVA - Regulatory Compliance
G. Peterson, Bechtel – Electrical
A. Pirkle, Engineering Programs
D. Reynolds, Bechtel - Construction Field Engineering
G. Scott, TVA – Regulatory Compliance
D. Shutt, Licensing
M. Skaggs, TVA – Senior Vice President
Walt Smith, Operations Training Manager
G. Thomas, Bechtel – Electrical
N. Welch, TVA - Preoperational Startup 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 37002	Construction Refurbishment Process – Watts Bar Unit 2
IP 37051	Verification of As-Builts
IP 41301	Pre-Licensing Review of Training and Qualification Programs
IP 42450B	Operating Procedures
IP 49063	Piping – Work Observation
IP 49065	Safety-Related Piping Records Review
IP 50073	Mechanical Components - Work Observation
IP 51053	Electrical Components and Systems – Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51063	Electrical Cable – Work Observation
IP 52053	Instrument Components and Systems - Work Observation
IP 52055	Instrument Components and Systems – Records Review
IP 55050	Nuclear Welding General Inspection Procedure
IP 55100	Structural Welding General Inspection Procedure
IP 70312	Preoperational Test Witnessing
IP 92701	Follow-up
TI 2512/015	Inspection of Watts Bar Nuclear Plant Employee Concerns Program
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/019	Inspection of Watts Bar Nuclear Plant Design Baseline Corrective Action Program Plan
TI 2512/021	Inspection of Watts Bar Nuclear Plant Equipment Seismic Corrective Action Program Plan
TI 2512/028	Inspection of Watts Bar Nuclear Plant QA Records Corrective Action Program Plan
TI 2512/032	Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan
TI 2515/182	Review of the Implementation of the Industry Initiative to Control Degradation of Underground Piping and tanks

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000391/2014605-01	NCV	Failure to accomplish installation in accordance with instructions, procedures, or drawings
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Closed

37002	IP	Construction Refurbishment Process – Watts Bar Unit 2 (Section C.1.5)
49063	IP	Piping – Work Observation (Section C.1.6)
2512/032	TI	Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan (Section OA.1.7)
2512/028	TI	Inspection of Watts Bar Nuclear Plant QA Records Corrective Action Program Plan (Section OA.1.8)
2512/019	TI	Inspection of Watts Bar Nuclear Plant Design Baseline Corrective Action Program Plan (Section OA.1.9)
2512/019	TI	Independent Design Inspection (Section OA.1.9)
2515/182	TI	Review of Industry Initiative to Control Degradation of Underground Piping and Tanks (Section OA.1.10)
391/82-80	CDR	Unqualified EDS Nuclear Embedment Plates (Section OA.1.11)
391/86-59	CDR	Qualification of ASCO Solenoid Valve Conduit Connector Configuration (Section OA.1.12)
391/86-21-02	VIO	Instrument Valves, Foxboro Transmitters, and Instrument Panels not Seismically Qualified (Section OA.1.13)

Discussed

87-19-06	URI	Review of Cable Separation of Non-safety-Related Cables in Close Proximity to Safety-Related Cables in Electrical Panels (Section OA.1.1)
2512/016	TI	Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation (Section OA.1.2)
391/89-04	CDR	Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Section OA.1.3)

2512/021	TI	Inspection of Watts Bar Nuclear Plant Equipment Seismic Qualification Corrective Action Program Plan (Section OA.1.4)
79-36	GL	Adequacy of Station Electric Distribution System Voltages (Section OA.1.5)
89-19	GL	Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants (Section OA.1.6)

LIST OF DOCUMENTS REVIEWED

I. QUALITY ASSURANCE PROGRAM

Q.1.1 Identification and Resolution of Construction Problems

Procedures

MAI 4.3, "HVAC Duct Systems", Rev. 9

Construction Completion Procedure 25402-000-GPP-0000-N3612, "Heating, Ventilation, and Air Conditioning (HVAC)", Rev. 0002

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.4 Post-Fukushima Diverse and Flexible Construction Activities and Structural Welding associated with Auxiliary Feedwater Storage Tank (AFWST)

Design Calculations

CDN0009992014000466, TVA Watts Bar AFSWT Tank Design Calculations, Rev. 0

CDN0009992014000482, TVA Watts Bar AFSWT Tank FEA Tank Impact due to Tornado Automobile Load, Rev. 0

Procedures

18778-000-WS-SP-0008, General Welding Procedure Specification for GMAW and FCAW, Rev. 1

18778-000-SP-CK-00004, Basic API 620 Tanks-Hydropneumatic Test Instructions, Rev. 0

Welder Procedure Qualifications

Welder 9094, 6/19/2008

Welder 921, 1/10/2014

Procedure Qualification Record

8431, FCAW, 5/17/2007

Drawings

18778-000-SP-01-000601, AFWST Bottom Installation, Rev. 0

18778-000-SP-01-000602, AFWST Plate Details, Rev. 0

18778-000-SP-01-000603, AFWST Plate Details, Rev. 0

18778-000-SP-01-000604, AFWST Annular Plate Assembly, Rev. 0

18778-000-SP-01-000605, AFWST Cutout in Annular Plate Details, Rev. 1

187778-000-SP-01-000701, AFWST Shell Section, Rev. 0
 187778-000-SP-01-000702, AFWST Shell Plate Assembly, Rev. 0

Material Test Reports

861010-187778 Order Number, Outokumpu Stainless Plate, LLC, Certificate of Analysis and Tests, 1/30/2014

ERCW

WO 114485379, DCN 60684 Stage 8 for ERCW Supply Header 2B, Fukushima Modifications (Flex)

WO 114485358, DCN 60684 Stage 7 for ERCW Supply Header 1B, Fukushima Modifications (Flex)

WO 114485347, DCN 60684 Stage 5 for ERCW Supply Header 1A, Fukushima Modifications (Flex)

G-94, Piping Installation, Modification and Maintenance, Rev. 2

Valve Diagram, 25402-011-V1F-PV02-00002-003, Rev. 3

Valve Data Sheet, 47VD20G-1-1

Magnetic Particle Exam Record for weld: 0-067C-T240-13

Weld Data Sheet for weld: 0-067C-T240-13

MAI-4.2B, Pipe Installation, Rev. 10

PIC 63304, AA-02

PIC 63305, AA-02

PIC 63306, AA-02

PIC 63307, AA-02

C.1.5 (Closed) Construction Refurbishment Process

Work Orders

09-954101-006

09-954101-008

111180809

112296388

113611349

113497787

111303579

Procedures

25402-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 11

25402-000-GPP-N1302, Refurbishment Evaluation, Rev. 11

Other

NC-WB-14-008, Watts Bar Nuclear Plant Unit 2 Quality Assurance Assessment Report NC-WB-14-008 – Refurbishment Program, dated June 4, 2014

P.1 Pre-Operational Activities

P.1.1 Preoperational Test Program Implementation Verification

Work Orders

115837408, System 063, PER 891471, WBN-2-MVOP-063-0004

III. OPERATIONAL READINESS ACTIVITIES

O.1 Operations

O.1.1 Pre-Licensing Review of Training & Qualification Programs

Procedures

NPG-SPP-17.8.1, Licensed Operator Requalification Examination Development and Implementation

TPD-LOR, Fleet Licensed Operator Requalification Training Program Description

Miscellaneous

Watts Bar Unit Differences and Training Plan Report, September 2013

O.1.2 Operating Procedures

Procedures Reviewed for IP 42450B

1-GO-1 (Rev 0001), "Unit Startup from Cold Shutdown to Hot Standby"
 2-GO-1 (Rev 0000), "Unit Startup from Cold Shutdown to Hot Standby"
 OTI-47.0 (Rev 0008), "Main Turbine and MFPT Weekly Test"
 2-OTI-47.0 (Rev 0000), "Main Turbine and MFPT Weekly Test"
 SOI-1.01 (Rev 0042), "Main Steam System"
 2-SOI-1.01 (Rev 0000), "Main Steam System"
 1-SOI-2&3.01 (Rev 0008), "Condensate and Feedwater System"
 2-SOI-2&3.01 (Rev 000U2), "Condensate and Feedwater System"
 1-SOI-15.01 (Rev 0061), "Steam Generator Blowdown System"
 2-SOI-15.01 (Rev 000U2), "Steam Generator Blowdown System"
 1-SOI-55.01 (Rev 0000), "MCR Annunciator System"
 2-SOI-55.01 (Rev 000U2), "MCR Annunciator System"
 SOI-68.02 (Rev 0035), "Reactor Coolant Pumps"
 2-SOI-68.02 (Rev 0000), "Reactor Coolant Pumps"
 SOI-68.03 (Rev 0023), "Pressurizer Pressure and Spray Control System"
 2-SOI-68.03 (Rev 0000), "Pressurizer Pressure and Spray Control System"
 SOI-92.01 (Rev 0009), "Nuclear Instrumentation"
 2-SOI-92.01 (Rev 0000), "Nuclear Instrumentation"
 SOI-201.05 (Rev 0008), "6.9 KV Unit Board 2A"
 2-SOI-201.05 (Rev 0000), "6.9 KV Unit Board 2A 2-BD-201-A"
 SOI-201.06 (Rev 0009), "6.9 KV Unit Board 2B"
 2-SOI-201.06 (Rev 0000), "6.9 KV Unit Board 2B 2-BD-201-B"
 SOI-201.07 (Rev 0008), "6.9 KV Unit Board 2C"
 2-SOI-201.07 (Rev 0000), "6.9 KV Unit Board 2C 2-BD-201-C"
 SOI-201.08 (Rev 0008), "6.9 KV Unit Board 2D"
 2-SOI-201.08 (Rev 0000), "6.9 KV Unit Board 2D 2-BD-201-D"
 SOI-202.01 (Rev 0008), "6.9 KV Reactor Coolant Pump Board 1A"
 2-SOI-202.01 (Rev 0000), "6.9 KV Reactor Coolant Pump Board 2A"
 SOI-202.02 (Rev 0009), "6.9 KV Reactor Coolant Pump Board 1B"
 2-SOI-202.02 (Rev 0000), "6.9 KV Reactor Coolant Pump Board 2B"
 SOI-202.03 (Rev 0010), "6.9 KV Reactor Coolant Pump Board 1C"
 2-SOI-202.03 (Rev 0000), "6.9 KV Reactor Coolant Pump Board 2C"
 SOI-202.04 (Rev 0010), "6.9 KV Reactor Coolant Pump Board 1D"
 2-SOI-202.04 (Rev 0000), "6.9 KV Reactor Coolant Pump Board 2D"
 TI-57.002 (Rev 0021), "Verification of Normal Position for Nor-Aux Switches and Various Handswitches"

2-TI-57.002 (Rev 0000), "Verification of Normal Position for Nor-Aux Switches and Various Handswitches"

1-TRI-47-2 (Rev 0007), "Main Turbine Overspeed Test"

2-TRI-47-2 (Rev 0000), "Main Turbine Overspeed Test"

Miscellaneous

ANSI N18.7-1972, "Administrative Controls for Nuclear Power Plants"

ANSI N18.7-1976/ANS 3.2, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"

RG 1.33-1978, Revision 2, "Quality Assurance Program Requirements (Operation)"

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TVA-NQA-PLN89-A, "Quality Assurance Program Description"

IV. OTHER ACTIVITIES

OA.1.1 Unresolved Item 87-19-06, Review of Cable Separation of Nonsafety-Related Cables in Close Proximity to Safety-Related Cables in Electrical Panels

Work Orders

110920790

112808093

112809074

112809099

112809189

113166585

111832696

115432869

110920550

113536657

114455863

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OA.1.2 Cable Issues Corrective Action Program - Sub-issue: Physical Cable Separation and Electrical Isolation

Miscellaneous Documents

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WB-DC-30-4, Separation/Isolation, Rev. 23, dated 2/9/12

MAI-3.1, Installation of Electrical Conduit Systems & Conduit Boxes, Rev. 25, dated 12/4/12

Work Orders

115182635

114446977

Engineering Document Construction Release

EDCR 55125, Resolve the breakages identified by calculation EDQ00299920090006 Rev. 000 for external physical Class 1E conduit/tray separation, Rev. A, Dated 5/28/2010

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Calculations

Calculation EDQ00299920090002, "Internal Panel Separation Evaluation for Common, Unit1, and Unit 2 Enclosures Containing Unit 2 Safety Related Cables," Rev. 1, Dated 7/31/2012
Calculation EDQ00299920090006, "External Separation Evaluation for Unit 2 Raceway Containing Unit 2 Safety Related Cables," Rev. 1, Dated 11/16/2012

OA.1.3 Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs

Miscellaneous

FCR 63461A AA-02
FCR 63516A AA-02
DRA 55116-001

OA.1.4 Inspection of Watts Bar Nuclear Plant Equipment Seismic Qualification Corrective Action Program Plan

Drawings

Drawing 2-47W610-90-3, Revision 4, dated 10/20/2008
Drawing 2-47W848-10, Revision 11, dated 3/10/2009
Drawing 2-47W848-1, Revision 12, dated 3/10/2009
DRA 53276-307-1, Revision 1, dated 2/22/2013

Calculations

Calculation EDQ00299920090001, Rev. 1, "Evaluation and Disposition of Unit 2 Class 1E Flexible Conduits," dated 2/2/2012.
Calculation WCG-1-541, Rev. 0, "Acceptance Criteria for Short Lengths of Flexible Conduit," dated 6/25/1990
Calculation 06002500301, Revision 8, Summary of Piping Analysis Problem No. 060250-03-01, dated 11/19/2013
Calculation 06002500815, Revision 9, Summary of Piping Analysis Problem No. 0600250-08-15, dated 1/31/2014
Calculation 06002500902, Revision 14, Summary of Piping Analysis Problem No. 0600250-09-02, dated 11/12/2013

Work Orders

Work Order 110927632, "Implement EDCRs 55120, 52639, 55231, and PER 5491197," completed 1/20/2014
Work Order 111680283, "Miscellaneous Equipment Record," completed 3/1/2011
Work Order 113099200 (In Planning), "Delete. Rework, and/or Install Conduits and Junction Boxes"
Work Order 113536193, "Install and rework Flex Conduit 2VC2155," completed 4/9/2013
Work Order 114295704 (In Planning), "Connect Zone Switch"
Work Order 114489912, "Walkdown Flex Conduit Installations and Ensure Complete," completed 7/30/2013
Work Order 114731350, "Install and Delete Unique Conduit and Junction Box Supports," completed 7/23/2013
Work Order 114789960, Revision 1, "Tighten Conduits, and Rework End of Conduit 2VC2335B," completed 6/20/2013
Work Order 114957516, "Rework Flex Conduits at 2-FCV-68-333-A" completed 12/11/2013

Work Order 115210818, "Replace Cables, Install new Junction Boxes, Replace Flex Conduit," completed 11/16/2013
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 Work Order 113109879 (In Planning), "CME EDCR 53401 – Implement FCR 59287 2-ZS-003-0156B-A"
 Work Order 09-954155-002 (In Planning), "CCI EDCR 53401 – Install Control Air from 2-ISV-032-3752-A to 2-LCV-003-0156A-A"

EDCRs

EDCR 53401, Revision A, "Reconfigure Motor Driven Auxiliary Control Valves," dated 10/19/2009
 EDCR 55120, Revision A, "Replace or Rework Unit 2 Class 1E Flexible Conduits," dated 4/22/2010
 EDCR 52341-A, Revision A, dated 6/4/2010

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PER 143778, Sample Isolation Valves FCV-90-107 thru -111 and FCV-90-113 thru -117 Are Not Supplied with Essential Control Air from the Aux Control Air System, dated 5/3/2008
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 SR 888207, NRC Identified – Missing Conduit Installation Documentation, dated 5/22/2014

Miscellaneous

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 WDP-C-3
 WDP- GEN-1
 25402-3DP-G04G-00503

OA.1.5 Generic Letter 1979-36, Adequacy of Station Electric Distribution System Voltages

Calculations

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 EDQ0009992007002, Rev. 39 "AC Auxiliary Power System Analysis", dated: 6/4/14

WBNEEBMST1060010, Rev. 76, "Auxiliary Power System Analysis on IE Buses via CSST-C and CSST-D with Auto Load Tap Changers," dated: 2/1/2001
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OA.1.6 Generic Letter 89-19, Resolution of Unresolved Safety Issue A-47: Safety Implication of Control Systems in LWR Nuclear Power Plants

Drawings

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 2-47W610-3-1A, Rev. 4 Unit 2 - Electrical Control Diagram Main Aux Feedwater System, dated: 04/16/2014
 2-47W610-3-1B, Rev. 9 Unit 2 - Electrical Control Diagram Main Aux Feedwater System, dated: 05/12/2014
 2-47W611-3-2, Rev. 10 Unit 2 - Electrical Logic Diagram Feedwater System, dated: 04/18/2014
 2-45B655-6B, Rev. 2 Unit 2 – Main Control Room – Annunciator Inputs Window Box XA-55-6B, dated: 10/11/2013
 2-69247-08F802403-FD-2101-1, Rev. 1 Unit 2 – Electrical – Steam Generator 1 to 4 Narrow Range Level Input/Validation, dated: 03/26/2014
 2-69247-08F802403-FD-2101-3, Rev. 1 Unit 2 – Electrical – Steam Generator 1 to 4 Narrow Range Level Validation Logic, dated: 03/27/2014
 2-69247-08F802403-FD-2105-3, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 Steam Generator Level & Bypass Control, dated: 04/03/2014
 2-69247-08F802403-FD-2105-2, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 Bypass Feedwater Reg Valves Control, dated: 04/03/2014
 2-69247-08F802403-FD-2106-1, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 Bypass MFW FCV's H/A Hand Station Interface, dated: 03/27/2014
 2-69247-08F802403-FD-2106-3, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 Bypass MFW FCV's H/A Hand Station Interface, dated: 04/14/2014
 2-69247-08F802403-FD-2107-2, Rev. 2 Unit 2 – Electrical – ST GEN 1 to 4 Main Feedwater Reg Valves Control, dated: 04/03/2014
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 2-69247-08F802403-FD-2108-1, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 MFW FCV's H/A Hand Station Interface, dated: 04/15/2014
 2-69247-08F802403-FD-2108-3, Rev. 1 Unit 2 – Electrical – ST GEN 1 to 4 MFW FCV's H/A Hand Station Interface, dated: 04/09/2014
 2-69247-08F802403-FD-2873-4, Rev. 1 Unit 2 – Electrical – Watts Bar Unit 2 DCS Critical LOOP Transferred to Manual Annunciation, dated: 04/18/2014
 2-69247-08F802403-FD-2873-7, Rev. 1 Unit 2 – Electrical – Watts Bar Unit 2 DCS Critical LOOP Transferred to Manual Annunciation, dated: 04/28/2014
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 45W828-7, Rev. 40 – DRA (REV. 9 dated 03/01/2014)
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 45W816-1, Rev. 36 – DRA (REV. 1 dated 07/01/2010)
 45W814-13, Rev. 30 – DRA (REV. 5 dated 07/09/2013)
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 45W874-28, Rev. 23 – Conduit & Grounding Floor EL. 713.0 Details dated: 04/22/1986
 45N824-16, Rev. 19 – “Conduit & Grounding Floor EL. 713.0 Details dated: 06/18/1985
 45N824-8, Rev. 40 – Conduit & Grounding EL. 713.0 – Cols A8-A15, Q-U Ceiling Plan & Details dated: 08/08/1986
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OA.1.8 Quality Assurance Records Corrective Action Program

Mechanical Documents

2-I&C-RB-SL-0005, Inspection 35A and 01A
 2-I&C-RB-SL-0090, Inspection 35A and 01A
 2-I&C-RB-SL-0093, Inspection 35A and 01A
 2-I&C-RB-SL-0105, Inspection 35A and 01A
 2-I&C-RB-SL-0005, Inspection 35A
 2-041-RB-SL-0018, Inspection 35A and 01A
 2-059-RB-SL-0323, Inspection 35A
 2-063-RB-SL-0094, Inspection 35A and 01A
 2-070-RB-SL-0016, Inspection 35A and 01A
 2-001-RSTR-L005, Inspection 35A, 04A and 01A
 2-003-RSTR-L002, Inspection 35A and 04A
 2-061-LSS-16/BAY, Inspection 36A
 2-072-PMP-27-A, Inspection 32, 33A and 34A
 2-081-PMP-81-7, Inspection 32, 33A and 34B

Conduit Documents

2-1R-243-2066, Inspection 25A
 2-2PM-290-6246, Inspection 25C and 35A
 2-2PS-292-703-E, Inspection 25A and 35B
 2-2RM-292-568-B, Inspection 25A and 35B
 2-3AC-292-363, Inspection 25A and 35B
 2-3PV-290-804, Inspection 25A
 2-3VC-290-1325-B, Inspection 25A and 35A
 2-3VC-292-1098-B, Inspection 25A and 35A
 2-3VC-292-461-A, Inspection 25B and 35A
 2-4PLC-292-3501, Inspection 25C and 35C

OA.1.9 Design Basis Verification Program Corrective Action Program and Independent Design InspectionDesign Documents

WB-DC-40-70.2, Accident Analysis Parameter Checklist, Rev. 1
 WBN2-15-4002, Steam Generator Blowdown System, Rev. 2

OA.1.10 Temporary Instruction 2515/182 – Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks, Phase IIProcedures

0-FOR-26-2, 3 Year High Pressure Fire Protection Hydraulic Performance Verification, Rev. 19
 Engineering Administrative Instruction, WBN UPTI Inspection Plan, Rev. 4
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 TI-100.009, ASME Section XI System Pressure Testing Program Basis Document, Rev. 13
 TI-215, Work Permits, Rev. 17
 TVA-TSP-18.804, Excavations and Trenching, Rev. 0

Drawings

1-47W832-1, Flow Diagram Raw Service Water & Fire Protection System, Rev. 40
 1-47W832-2, Flow Diagram Raw Service Water & Fire Protection System, Rev. 36
 1-47W850-2, Flow Diagram Fire Protection Raw Service Water, Rev. 37
 17W302-10-5, Mechanical – Essential Raw Cooling Water Control Air & HPFP Piping
 17W302-10-6, Mechanical – Essential Raw Cooling Water Control Air & HPFP Piping
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 PER 284235, Look for possible leak on System 26 A-train header, 11/15/10
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 SR 767175, EEP 2014-03-29 - Underground Piping and Tank Integrity Program (UPTI), 8/15/13
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Work Orders

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 WO 112592854, UPTI Inspection Package – High Pressure Fire Protection, 11/02/11
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 Program Health Report – UPTI/Buried Piping, 01/01/2013-06/30/2013
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OA.1.12 Construction Deficiency Report 391/86-59: Qualification of ASCO Solenoid Valve Conduit Connector Configuration

Work Orders

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EDCRs

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Calculations

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NCO860415024

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 45W883-3, Conduit and Grounding Penetration Sealing and Fire Stop Details, Rev. 12
 47A054-33E, Mechanical Category I Support Control Lines, Rev. 0
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Procedures and Standards

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OA.1.13 Violation 391/86-21-02: Instrument Valves, Foxboro Transmitters, and Instrument Panels not Seismically Qualified

Calculations

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 WCGACQ1094, Seismic Qualification of Unit 2 Wall Mounted Angle Frame Panels
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Drawings

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 2-47W600-17, Mechanical Instruments and Controls, R2
 2-47W600-22, Electrical Instruments and Controls, R3
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PERs

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 143701, Panel-Mounted Instrument Brackets Deficient
 172742, NCO860415024
 866743, Transmitter spacing not adequate to allow calibration

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25402-3DP-G04G-00028, Q-List and UNID Control, Rev. 3
 25402-3DP-G04G-00081, Engineering Document Construction Release, Rev. 17
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Rev. K

Vendor Manuals

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00809-0100-4388, Rosemont 1153 Series D Alphaline Nuclear Pressure Transmitter, Rev. BA

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Work Orders

09-954326-028

110892444

110892447

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LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AFI	Area for Improvement
AFW	Auxiliary Feedwater
AFWST	Auxiliary Feedwater Storage Tank
ANSI	American National Standards Institute
ASCO	American Switch Company
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CAQR	Condition Adverse to Quality Report
CATD	Corrective Action Tracking Document
CB&I	Chicago Bridge & Iron
CCS	Component Cooling Water System
CDR	Construction Deficiency Report
CFR	<i>Code of Federal Regulations</i>
CSST	Common Station Service Transformer
DCN	Design Change Notice
DOE/WEP	Department of Energy's Weld Evaluation Project
DRs	Discrepancy Reports
DRA	Drawing Revision Authorization
ECN	Engineering Change Notice
EDCR	Engineering Document Construction Release
ERCW	Essential Raw Cooling Water
ESQ CAP	Equipment Seismic Qualification Corrective Action Program
FCAW	Flux-Cored Arch Welding
FCR	Field Change Request
FSAR	Final Safety Analysis Report
GDC	General Design Criteria
GL	Generic Letter
GOs	General Operating Instructions
HAAUP	Hanger and Analysis Update Program

HVAC	Heating, Ventilation, and Air Conditioning
ICRDS	Integrated Cable and Raceway Design System
IDR	Independent Weld Deviation Report
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IIR	Integrated Inspection Report
IR	Inspection Report
LCC	Lower Compartment Cooler
LOF	Lack of Fusion
LOP	Lack of Penetration
LOR	License Operator Requalification
M&TE	Measuring and Test Equipment
MEL	Master Equipment List
MOV	Motor Operated Valve
MT	Magnetic Particle Testing
NCR	Nonconformance Report
NCV	Non-cited Violation
NDE	Nondestructive Examination
NEI	Nuclear Energy Institute
No.	Number
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
OTIs	Operating Test Instructions
PIC	Post-Issuance Change
PER	Problem Evaluation Report
PQR	Procedure Qualification Record
PT	Penetrant Testing
QA	Quality Assurance
QC	Quality Control
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
Rev.	Revision
RG	Regulatory Guide
RHR	Residual Heat Removal System
RWST	Refueling Water Storage Tank
SALP	Systematic Assessment of Licensee Performance
SCAR	Significant Corrective Action Report
SER	Safety Evaluation Report
SIs	Surveillance Instructions
SIC	Supplier Information Center
SIS	Safety Injection System
SL	Severity Level
SOIs	System Operating Instructions
SR	Service Request
SSCs	Systems, Structures, and Components
TI	Temporary Instruction (NRC)
TIs	Technical Instructions
TRIs	Technical Requirements Instructions
TVA	Tennessee Valley Authority
URI	Unresolved Item
UT	Ultrasonic Testing
V	Volt
VIO	Violation
WBN	Watts Bar Nuclear Plant

WINCISE	Westinghouse In-Core Information Surveillance & Engineering
WO	Work Order
WP	Welding Project