



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

November 8, 2013

Mr. Michael D. Skaggs
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2013608**

Dear Mr. Skaggs:

On September 28, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on October 10, 2013 with you and other members of your staff.

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

No findings were identified during this inspection.

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

M. Skaggs

2

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000391/2013608 w/Attachment

cc w/encl: (See next page)

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cc w/encl: (See next page)

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Letter to Michael D. Skaggs from Robert C. Haag dated November 8, 2013.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2013608

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2013608

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: August 18 – September 28, 2013

Inspectors: T. Nazario, Senior Resident Inspector, Construction Projects Branch (CPB) 3, Division of Construction Projects (DCP) Region II (RII)
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Approved by: Robert C. Haag, Chief
Construction Projects Branch 3
Division of Construction Projects

Enclosure

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a six-week period of inspections in the areas of quality assurance (QA), identification and resolution of construction problems, construction activities, pre-operational testing, and follow-up of other activities. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter 2517, "Watts Bar Unit 2 Construction Inspection Program." Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/info-finder/reactor/wb/watts-bar.html>.

Inspection Results

- The inspectors concluded that concerns pertaining to several open items, including two construction deficiency reports (CDRs), one unresolved item (URI), two inspection procedures (IPs), one Three Mile Island (TMI) action item (AI), and one NRC bulletin (BL), have been appropriately addressed for WBN Unit 2. These items are closed.
- Other areas inspected were adequate with no findings identified. These areas included QA; piping; mechanical systems and components; electrical systems and components; fire protection; pre-operational testing activities; various NRC inspection procedures; the Q-list corrective action program; as-built verifications; and refurbishment activities.

Table of Contents

I. QUALITY ASSURANCE PROGRAM.....	5
Q.1 Quality Assurance Oversight Activities.....	5
Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure 35007)	5
Q.1.2 Safety Conscious Work Environment (Inspection Procedure 35007 and Temporary Instruction 2512/015)	5
II. MANAGEMENT OVERSIGHT AND CONTROLS.....	6
C.1 Construction Activities.....	6
C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls.....	6
C.1.2 (Discussed) Pipe Support and Restraint Systems (Inspection Procedure 50090)	7
C.1.3 (Discussed) Reactor Coolant Pressure Boundary Piping Work Observations (Inspection Procedure 49053)	7
C.1.4 (Discussed) Reactor Vessel and Internals Work Observation (Inspection Procedure 50053).....	8
C.1.5 (Discussed) Verification of As-Built (Inspection Procedures 37051,50073, and 50075)	9
C.1.6 (Discussed) Electrical Components and Systems – Work Observation (Inspection Procedures 51053 and 37002).....	10
C.1.7 (Discussed) Electrical Cable – Work Observation (Inspection Procedures 51063 and 37002)	10
C.1.8 (Closed) Reactor Coolant Pressure Boundary Piping Record Review (Inspection Procedure 49055).....	12
C.1.9 (Closed) Structural Steel and Supports Record Review (Inspection Procedure 48055)	13
F.1 Fire Protection.....	15
F.1.1 Fire Protection (Inspection Procedure 64051).....	15
P.1 Pre-Operational Activities	16
P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 71302)	16
P.1.2 (Discussed) Preoperational Test Procedure Review (Inspection Procedures 70300 and 70343)	17
P.1.3 (Discussed) Preoperational Test Witnessing (Inspection Procedures 70312 and 70443)	18
IV. OTHER ACTIVITES	19
OA.1.1 (Discussed) Q-List Corrective Action Program (Temporary Instruction 2512/029)	19
OA.1.2 (Discussed) Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance (Inspection Procedures 50073 and 50075, Temporary Instruction 2512/109)	21
OA 1.3 (Discussed) Unresolved Safety Issue A-47, Safety Implication of Control Systems in LWR Nuclear Power Plants (Inspection Procedure 92701).....	22

OA.1.4	(Discussed) Construction Deficiency Report 391/87-18: Deficiencies in installation of electrical conduit and conduit supports (Inspection Procedure 51055)	24
OA.1.5	(Discussed) Construction Deficiency Report 391/86-59: Qualification of ASCO solenoid valve conduit connector configuration (Inspection Procedure 51055) ..	24
OA.1.6	(Discussed) Violation (VIO) 391/86-21-02: Instrument valves, Foxboro transmitters, and instrument panels not seismically qualified (Inspection Procedure 51055)	26
OA.1.7	(Discussed) Quality Assurance Records Corrective Action Program (Temporary Instruction 2512/028)	27
OA.1.8	(Closed) Unresolved Item 05000391/2013613-01, Potential Inadequate Corrective Actions for Piping Misalignment (Inspection Procedure 92701).....	28
OA.1.9	(Closed) TMI Action Item II.K.3.5: Automatic Trip of Reactor Coolant Pumps During Loss-Of-Coolant Accident (LOCA) (Inspection Procedure 92701)	29
OA.1.10	(Closed) Construction Deficiency Report 391/89-05: Failure of Auxiliary Feedwater Steam Generator Level Controllers (Inspection Procedure 92701)...	30
OA.1.11	(Closed) IE Bulletin 79-27: Loss of Non-Class 1E Instrumentation and Control Power System Bus during Operation (IP 35007)	32
OA.1.12	(Closed) CDR 391/86-21: Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit Loading (IP 35007)	33

V. MANAGEMENT MEETINGS..... 33

X1 Exit Meeting Summary..... 33

REPORT DETAILS

Summary of Plant Status

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

I. QUALITY ASSURANCE PROGRAM

Q.1 Quality Assurance Oversight Activities

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

a. Inspection Scope

The inspectors continued to review problem evaluation reports (PERs) and service requests (SRs), 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 actions associated with the following PERs:

- PER 781296, Inadvertent 1A component cooling water system (CCS) pump start due to startup group maintenance activity
- SR 685106, Reactor pressure vessel mirror insulation non-conformance

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 safety-related concerns identified by the applicant's and contractor's employee concerns program. The inspectors also met with the employee concerns program coordinator to discuss program and personnel changes.

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

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

Specific work activities observed included work associated with:

- Work Order (WO) WO 114825125, Splice ID WBN-SPL-2PP625-1 for System 072 which included overhead work in the Auxiliary Building Elevation 692'
- WO 111307969, 2-PMP-070-0131-A Startup Test and PER 781296, Inadvertent 1A CCS pump start due to startup group maintenance activity
- PER 783250, Dow Corning silicon foam used on penetration seals

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

b. Observations and Findings

No findings were identified. The inspectors reviewed immediate corrective actions following an inadvertent Unit 1 pump start that occurred on September 12, 2013, as a result of Unit 2 work activities. The inadvertent pump start had no significant adverse effect on nuclear safety. Corrective actions included a stand down with personnel and reinforcement of human error prevention tools.

c. Conclusions

Overall, adequate management oversight and controls were in place, for observed construction activities that could potentially impact the operating unit, and an adequate level of protection had been implemented with the exception of the inadvertent Unit 1 pump start.

C.1.2 (Discussed) Pipe Support and Restraint Systems (Inspection Procedure 50090)

a. Inspection Scope

The inspectors observed one dynamic pipe support (snubber) installation for support 72-2CS-R149, reviewed the associated procedures, and reviewed two snubber installation records for 72-2CS-R149 and 63-2SIS-R276. The inspections were completed to verify that the work activities, relative to dynamic pipe support systems, were completed in accordance with NRC requirements and the applicant's approved procedures. The inspectors observed the snubber installation to verify the support was free of damage and corrosion, pre-installation checks were completed, correct materials were used, extension rods and connecting joints were not deformed, the snubber was installed with the correct pin-to-pin and cold setpoints in accordance with the design specifications, and measuring and test equipment (M&TE) was properly controlled and calibrated. Design and installation records were reviewed to verify that the design inputs, to include field changes and vendor specifications, were properly translated to the field installation procedures and that the pipe support installation was completed in accordance with the approved drawing and design specifications.

The following sample was inspected:

- IP 50090 Section 02.03.c - one sample

Documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The installations of the dynamic supports (snubbers) were completed in accordance with the approved drawings and procedures.

C.1.3 (Discussed) Reactor Coolant Pressure Boundary Piping Work Observations (Inspection Procedure 49053)

a. Inspection Scope

The inspectors observed the nondestructive examination (NDE) liquid penetrate (PT) examinations for the steam generator (SG) 2 tube sheet plug welds to verify the examinations were completed in accordance with procedure GQP 9.7, "Solvent, Removable Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials, and Cladding," Revision (Rev.) 15. In addition, the inspectors reviewed six PT

examination records for SGs 1 and 2 to determine whether the reports, evaluation data, and results, were in accordance with approved procedures and American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) code 1971 edition through 1973 summer addenda.

Documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The NDE was completed in accordance with the approved procedures and the records reviewed were in compliance with the ASME B&PV code 1971 edition through 1973 summer addenda.

C.1.4 (Discussed) Reactor Vessel and Internals Work Observation (Inspection Procedure 50053)

a. Inspection Scope

The inspectors conducted inspections of the reactor pressure vessel (RPV) and reactor vessel internals storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, "Housekeeping," Rev. 8. The inspectors observed the use of platforms and scaffolding inside the vessel to verify the scaffolding was treated to prevent the spread of accidental fires. The core barrel and internals were inspected to verify storage locations were adequate and controls were in place to protect from construction damage.

The following samples were inspected:

- IP 50053 Section 02.01.c - one sample
- IP 50053 Section 02.02.a - one sample
- IP 50053 Section 02.03.b - one sample
- IP 50053 Section 02.03.c - one sample

b. Observations and Findings

No findings were identified.

c. Conclusions

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

C.1.5 (Discussed) Verification of As-Builts (Inspection Procedures 37051, 50073, and 50075)

a. Inspection Scope

The inspectors performed an as-built inspection of the flood mode boration system, System 084, to verify that construction drawings and specifications correctly reflected the as-built condition of the plant. The flood mode boration system, as described in the system description document, WBN2-84-4001, Rev. 2, is considered an essential system designed to perform a primary safety function by providing borated makeup water for the reactor coolant system (RCS) when the plant experiences a design basis flood. The inspectors reviewed applicant procedures to verify administrative controls were in place to ensure completion of as-built design documents, drawings, specifications, calculations, and critical documents required by operators. In addition, inspectors verified the applicant's use of appropriate mark-up documents until the final documents are updated. This review included verification of the following:

- Schedule for completion of as-built design documents has been established.
- Procedures governing generation and completion of as-built design documents including design modifications, were adequate (i.e., drawings, specifications, and incomplete calculations).
- Administrative controls and responsibilities have been clearly established.
- Status of reviewed, approved, and revised changes that had not yet been incorporated in to the as-built design

Inspectors also performed field inspections to verify location, configuration, and component identification for pipe supports, pipe welds, and piping to determine whether the design drawings and specifications reflected as-built conditions, for a sample of sections of system 084, which had been modified in support of Unit 2 construction activities. The inspectors walked down the as-built installation of the flood mode boration system auxiliary charging pumps 2A and 2B, reviewed the as-built drawings, and installation WOs to verify that the as-built final design drawings matched the actual installation. In addition, the inspectors reviewed the NRC-identified nonconformance report, PER 781247, which documented the failure of the applicant to provide adequate acceptance criteria from the vendor manual in the installation instructions for the 2A and 2B auxiliary charging pumps. The nonconformance record review was conducted to verify that the corrective actions were properly documented, were completely processed through the established corrective action program, and that the records were stored appropriately in the approved electronic database.

The following samples were inspected:

- IP 37051 Section 02.01.a - one sample
- IP 37051 Section 02.01.b.1 - one sample (Piping Systems-Flood Mode Boration, System 084)
- IP 37051 Section 02.01.c - one sample
- IP 50073 Section 02.04 - two samples
- IP 50075 Section 02.03.b - one sample

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The as-built piping, supports, and components for selected modified sections of System 084 were in accordance with available drawings, field changes, specifications, and procedures. The nonconformance issue documented in PER 781247 was adequately documented and processed.

C.1.6 (Discussed) Electrical Components and Systems – Work Observation (Inspection Procedures 51053 and 37002)

a. Inspection Scope

The inspectors observed general electrical testing of 2-FCV-070-0100-A under WO 111480829, “Perform GTE-11.” The inspectors reviewed the latest revision of the applicable test procedures, drawings, and vendor documents to verify they were available as required and used by personnel performing the testing. Test apparatuses were reviewed to verify calibration and the inspectors confirmed that all equipment and components utilized could achieve the necessary levels of accuracy and tolerance to adequately document testing results. The inspectors observed test personnel documenting test results as testing was performed and reviewed personnel qualifications to verify applicant staff were properly trained and qualified for the duties they were performing. The inspectors reviewed testing discrepancies to verify they were properly identified and recorded for resolution.

The following sample was inspected:

- IP 51053 02.02.g – one sample

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that adequate measures were in place to ensure the applicant was performing construction testing in accordance with applicable regulatory requirements, standards, and site procedures.

C.1.7 (Discussed) Electrical Cable – Work Observation (Inspection Procedures 51063 and 37002)

a. Inspection Scope

The inspectors observed and inspected applicant personnel performing medium voltage power cable terminations and splices involving application of stress cones for dielectric stress control. The inspectors reviewed work packages to verify that the latest approved revision of applicable construction specifications, drawings, and procedures were

available and used by the installers, as well as relevant vendor instructions as referenced by site procedures. The inspectors reviewed materials and their associated records to verify that they were as specified. Crimping tools were inspected to verify that they were in proper working order and properly calibrated and controlled. Cable marking was observed to verify that it matched installation and in-process records and that cable identification was preserved through the splice or termination process. Activities were observed to verify that the cable was physically protected from insulation or jacket damage, bending radius violations, and moisture or environmental contamination. The inspectors witnessed quality control (QC) personnel verification of dimensions and attributes throughout the termination or splice application and independently verified certain measurements and cable attributes. Qualifications and training of craft and QC personnel was reviewed to verify that all licensee requirements for this work had been met by those involved. The terminations or splices were inspected to verify that the terminations were of the correct type, properly located, and appropriately tight for the application. The inspectors reviewed in-process records to verify that installation and inspection activities were being documented throughout and that non-conformances were identified, dispositioned, and addressed in accordance with site procedures.

Specific work activities observed included work associated with:

- WO 114825125, EDCR (Engineering Document Construction Release) 55121 PER 595694 SR 776079 Field Change Request (FCR) 61651 SYS 072 211 BC CABLE TERMINATIONS, Splice ID WBN-SPL-2PP625-1 affecting WBN-2-MTR-072-027-A
- WO 113228892, SR 777972, 778560, 780718 SYS 072 EDCR 55121 FCR 57130, 56071 affecting WBN-2-MTR-072-010-B
- WO 114565720, EDCR 55121 SYS 074, 211,292 CABLE TERMINATIONS, affecting WBN-2-MTR-074-020-B termination at 2-BD-211-B/14-B
- WO 114565720, EDCR 55121 SYS 074, 211,292 CABLE TERMINATIONS, Splice ID WBN-SPL-2PP587 affecting WBN-2-MTR-074-020-B

Additionally, inspectors followed up on licensee disposition and corrective actions associated with NRC identified PER 782452 (September 19, 2013), "Verification of Dimensions IAW Vendor Instructions," to verify that the licensee adequately captured the concern and implemented corrective actions commensurate with the apparent inadequacies.

The following samples were inspected:

- IP 51063 02.01.d (in-process) – four samples (stress cone terminations/splices on containment spray and RHR motors)
- IP 51063 02.01.e (completed work) – two samples (stress cone termination on containment spray and RHR motor cable ends)
- IP 51063 02.02.c (in-process installation) – four samples

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that adequate measures were generally in place to ensure the applicant was prepared for splices/terminations and that procedures were adequate and appropriately followed during the splicing and terminating operations, with appropriate QC oversight.

C.1.8 (Closed) Reactor Coolant Pressure Boundary Piping Record Review (Inspection Procedure 49055)

a. Inspection Scope

Background: As described in Inspection Manual Chapter (IMC) 2517 (Agencywide Documents Access and Management System (ADAMS) Accession Number [No.] ML13136A301), TVA addressed WBN Unit 1 construction quality issues as part of the implementation of its nuclear performance plan (NPP). The results of the NRC inspection program were published in NUREG-1528, "Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1" (ADAMS Accession No. ML073450842). In 1985, construction on Watts Bar Unit 1 and Watts Bar Unit 2 was stopped due to the identification of multiple construction QA issues. TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to finish the Unit 2 plant. As part of confirming that all issues and inspection requirements will be completed for Unit 2, a review of all NRC inspection reports was initiated to determine the status of the required IPs, contained in NRC IMC 2512, in effect at the time construction was stopped. This effort was called the reconstitution process. The NRC used the results of the reconstitution process to identify areas which require additional inspections. NRC integrated inspection report (IIR) 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IP 49055 and determined that the requirements of the IP were met for Unit 2. In addition, new reactor pressure boundary piping work or activities performed in areas covered by IP 49055 would be inspected. The majority of the reactor coolant pressure boundary piping work activities were completed and inspected prior to Unit 2 construction reactivation in 2007. The inspection scope, for new work, included a sample of weld repairs, cleanliness, sensing line, and instrument line work activities.

Inspection Activities: The purpose of this IP was to review a sample of reactor coolant pressure boundary piping records to determine if the applicant's system for preparing, reviewing, and maintaining records met the applicable requirements to include NRC requirements and Safety Analysis Report (SAR) commitments. The following table lists the inspections that were performed under this IP.

IP Section	Inspection Report
02.01 Receipt and Installation Records	05000391/2010602 (ADAMS Accession No. ML101230144) 05000391/2013605 (ADAMS Accession No. ML13220A640)
02.02 Non-Conforming Reports (NCRs)	05000391/2010602 05000391/2010603 (ADAMS Accession No. ML101230144)
02.03 Personnel Qualification Records	05000391/2010602 05000391/2013605
02.04 Audit and Surveillance Records	05000391/2010602

Section 02.05 required an expansion of the sample size as appropriate. At this time the additional sampling sections are not required.

b. Observations and Findings

No findings were identified.

Below is a summary of each section of IP 49055:

- Section 02.01 – Complete
- Section 02.02 - Complete
- Section 02.03 – Complete
- Section 02.04 - Complete
- Section 02.05 - Inspection not required

c. Conclusion

The inspectors determined that the records associated with the reactor coolant pressure boundary piping met the applicable requirements. IP 49055 is considered closed; however, if additional reactor coolant pressure boundary piping activities are performed, inspections may be performed at the NRC's discretion.

C.1.9 (Closed) Structural Steel and Supports Record Review (Inspection Procedure 48055)

a. Inspection Scope

Background: The purpose of this IP was to confirm documentation met requirements for approximately half of the activities described in IP 48053 and a small sample of additional activities. This IP includes receipt inspection and material certification, installation inspections, nonconformance/deviation records, training/qualification records, and QA audits. As documented in NRC IIR 05000391/2009602 (ADAMS Accession No. ML091210420), the reconstitution of this IP determined that the requirements for satisfying this IP were accomplished and documented in previous construction inspection reports. New construction work or activities performed in areas covered by this IP were reviewed as part of the rework inspection effort.

Inspection Activities: The inspectors reviewed records for Unit 2 to determine whether:

- records were legible, complete, reviewed by QC personnel, and readily retrievable;
- the licensee's system for preparing, reviewing, and maintaining records was effectively implemented;
- records reflected work accomplishment consistent with specifications and procedures; and
- records indicated any potentially generic problems, management control inadequacies, or other weaknesses that could have safety significance.

The inspectors reviewed documentation generated for a representative sample of the new construction work activities for structural steel and supports reviewed using IP 48053, "Structural Steel and Supports Work Observation" to determine whether the applicant's system for documenting safety-related work was functioning properly.

Receipt inspection and material certification records were reviewed to verify that required performance tests, nondestructive tests, and environmental qualification (EQ) tests were performed; material characteristics and other specification requirements were met; and the records classification system was adequate. The inspectors reviewed closed WO packages to verify records confirmed that components were installed as specified, the required inspections were performed, acceptance criteria were defined, test records quantitatively indicated test results and acceptance criteria, and required protection was provided after installation. The inspectors reviewed a sample of PERs to verify that item's status and corrective actions were included, the appropriate structural review was performed, and the structural engineering review ensured that the structures were adequately designed for the as-built loading conditions. The inspectors reviewed a sample of training and qualification records for craft and QC inspectors to verify the records were complete and current, the QC personnel were adequately qualified for their assigned duties and responsibilities, and the craft personnel were trained in their assigned tasks. Although no QA audits were performed for new structural steel work, the inspectors reviewed a sample of surveillance reports and associated documentation to verify that deficiencies identified during surveillances were corrected and that corrective actions were adequate.

The following samples were inspected:

- IP 48055 Section 02.01.a – seven samples
- IP 48055 Section 02.01.b – five samples
- IP 48055 Section 02.02.a – ten samples
- IP 48055 Section 02.02.b – six samples
- IP 48055 Section 02.02.c – no samples – Audits were not performed on new work and these records were unavailable for inspection.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors reviewed the applicant's documentation for the new construction work and determined that the documentation requirements were met concerning materials receipt, storage, fabrication, erection, inspection, and testing of steel structures and supports. The inspectors concluded that the applicant has satisfied the intent of the IP. IP 48055 is considered closed; however, if additional structural steel and support activities are performed, inspections of completed records may be performed at the NRC's discretion.

F.1 Fire Protection

F.1.1 Fire Protection (Inspection Procedure 64051)

a. Inspection Scope

The inspectors performed a walkdown of construction areas to determine whether construction activities and areas met procedure requirements for fire protection. The inspectors took a limited set of field-verifiable attributes from preventive maintenance guidance into the field and evaluated 10 fire suppression devices. The inspectors reviewed labeling, accessibility, cartridge weight, extinguisher agent, and material condition of fire extinguishers to verify no evidence of deterioration was present, the extinguisher agent was free of contamination, and cartridge weight met the preventive maintenance specifications. The inspectors reviewed preventive maintenance instructions to determine whether records of these 10 fire suppression devices met procedure inspection requirements.

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

- WO 114565720, EDCR 55121 SYS 074, 211,292 CABLE TERMINATIONS, affecting WBN-2-MTR-074-020-B termination at 2-BD-211-B/14-B

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

Temporary Hose stations:

- 2-THS-26-750-90 U2 Annulus El. 750 Az. 90
- 2-THS-26-730-90 U2 Annulus El. 730 Az. 90
- 2-THS-26-710-90 U2 Annulus El. 710 Az. 90
- 2-THS-26-ANN-ENT E of U2 Reactor building
- 2-THS-26-LWR-CONT Raceway Lower Containment

Portable Fire Extinguishers:

- U2-FW-6 U2 Safety Trailer
- U2-FW-21 U2 Safety Trailer
- U2-FW-23 U2 Safety Trailer

- U2-FW-27 U2 Safety Trailer
- U2-FW-29 U2 Safety Trailer
- U2-FW-43 U2 Safety Trailer
- U2-FW-53 U2 Safety Trailer
- U2-FW-68 U2 Safety Trailer
- U2-FW-78 U2 Safety Trailer
- U2-FW-95 U2 Safety Trailer

The following samples were inspected:

- IP 64051 Section 02.07 – 15 samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant generally implemented adequate fire protection measures and controls to support Unit 2 construction activities and minimize impact on Unit 1 operational activities.

P.1 Pre-Operational Activities

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

a. Inspection Scope

02.01 (Weekly Inspection Activities): The inspectors conducted weekly tours of various accessible areas of the facility to assess equipment conditions, general plant conditions, and adherence to regulatory requirements. The areas inspected during this inspection period are listed below. The areas were inspected for fire hazard and availability of firefighting and extinguishing equipment (further discussed in Section F.1.1). Preoperational testing and maintenance activities in progress were observed to verify they were being conducted in accordance with the applicant's procedures. The inspectors engaged in discussions with test and maintenance personnel to verify the individuals had an understanding of the procedures being used and were following proper sequencing and work practices. While touring the areas, the inspectors observed work practices such as cable pulling, test instrumentation installation and storage, construction work, and FME controls to ensure methods used were in accordance with applicant procedures. Additionally, the inspectors reviewed problems identified during the preoperational testing to ensure they were being adequately documented and assessed. The following systems were inspected:

- System 072-containment spray (CS)
- System 067-essential raw cooling water (ERCW)
- System 070-component cooling water (CCS)

02.02 (Monthly Inspection Activities): During this inspection period, the inspectors reviewed the turnover package for the Unit 2 portion of the component cooling water system (System 70) as part of Startup Manual Procedure (SMP) 4.0, "System Completion and Turnover," Rev.9, to verify jurisdiction controls were appropriate and applicant procedures were followed. Additionally, the inspectors reviewed the turnover package to ensure required preventative maintenance was incorporated into a schedule for accomplishment.

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

b. Observations and Findings

No findings were identified. The preoperational test program implementation verification inspections commenced during the inspection period and, therefore, the total number of systems being tested was limited. The applicant plans to turnover additional systems in the future at which point IP 71302 will be performed on a recurring basis.

c. Conclusions

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

P.1.2 (Discussed) Preoperational Test Procedure Review (Inspection Procedures 70300 and 70343)

a. Inspection Scope

Background: The purpose of IMC 2513, Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase, issue date January 1, 1984, is to verify through direct observation, personnel interviews, and review of facility records that:

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

IMC 2513 defines the minimum inspection program for a finding of readiness for license issuance (IP 94300, Status of Plant Readiness for an Operating Licensee). IMC 2513 requires the procedural review of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspection was performed in relation to satisfying the required procedural review.

Inspection Activities:

The inspectors reviewed pre-operational test procedure 2-PTI-072-02 to verify that the procedure contained the following administrative good practice attributes:

- the title described the purpose of the procedure;
- the cover page had appropriate information and approval signatures;
- each page had appropriate identification information and the last page was clearly identifiable;
- a clear statement of procedure purpose/objectives;
- planning information such as prerequisites, precautions, required tools, reference documents, and coordination requirements;
- clearly identified and appropriate QC hold points;
- signoff requirements including concurrent and independent verification steps established where appropriate;
- equipment alignment instructions are clear and concise;
- actions to be taken within the steps are specifically identified (20 percent sample);
- graphs, charts, tables, data sheets, and work sheets are clearly usable;
- clear instructions for system restoration;
- guidance for follow-up actions and points of contact;
- overall, clear concise steps for testing with action critical (acceptance criteria); steps identified (20 percent sample);
- clear quantitative acceptance criteria with acceptability and contingencies; and
- overall sequence of the procedure consistent with the obtaining the intended result.

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

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was written in a manner consistent with the guidance of procedure SMP-8.0, "Watts Bar Nuclear Plant Unit 2 Administration of Preoperational Test Instructions," Rev. 9.

P.1.3 (Discussed) Preoperational Test Witnessing (Inspection Procedures 70312 and 70443)

a. Inspection Scope

The inspectors witnessed the performance of pre-operational testing to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The inspectors performed the following activities associated with this test observation:

- All test personnel were on station and had the latest revision of the procedure.
- Test prerequisites were performed (50 percent sampling).
- Plant systems were in service to support the test (50 percent sampling).
- Test equipment was installed and within calibration.
- Testing was performed in accordance with the approved procedure.
- Testing interruptions and continuations were handled in accordance with approved procedures.
- Testing events and discrepancies were properly documented.
- Testing was executed and coordinated properly.
- Data was properly collected.
- Temporary equipment was installed and tracked appropriately.
- Administrative test controls were properly followed.
- Test personnel were using approved drawings and vendor manuals.

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

The specific test observed was as follows:

- 2-PTI-072-02, Containment Spray System Air Flow Test, Rev. 1 under WO 114806911, SYS 072 Perform 2-PTI-072-02.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that testing was being conducted in a manner consistent with the guidance of procedure SMP-9.0, "Watts Bar Nuclear Plant Unit 2 Conduct of Test," Rev. 2. The inspectors observed that, when problems were encountered, testing was promptly suspended, the problems were documented, and management was immediately notified. The inspectors concluded that testing activities were performed in accordance with the test instructions, and communications and test staff were adequate to support testing. A preliminary review of the test data indicated, with the exception of the test deficiency notices, acceptance criteria had been met.

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Q-List Corrective Action Program (TI 2512/029)

a. Inspection Scope

Background: This Corrective Action Program (CAP) program was developed after TVA identified the following issues with the WBN Unit 1 Q-List Program:

- Multiple Q-Lists existed.
- Project personnel were inadequately trained.
- Safety and quality related classifications were lacking or incorrect.
- The Q-List contained incorrect component identifications.

As part of corrective action for the Unit 1 CAP, TVA developed a new Q-List, compared it to the old Q-List and reviewed records for maintenance and modification activities to assure that these activities had the appropriate QA program controls applied to them. This effort resulted in over 5000 Unit 1 component classification upgrades. The resulting final Q-List and development plan was previously reviewed by the NRC and the Q-List CAP was closed for Unit 1 in NRC inspection report 50-390/94-27 and 50-391/94-27 (ADAMS Accession No. ML072530549). In this report, the NRC inspection team concluded:

- The development and implementation of the new Q-List was satisfactory.
- The historical reviews done by TVA, concerning the effects of the differences between the classification of items on the old and new list, were technically sound.
- These reviews showed that the differences in classification of plant items resulted in no technical differences in the way work or maintenance was completed.

The Q-List has been incorporated into the Master Equipment List (MEL) maintained in the MAXIMO database. The safety-related and quality-related component classifications for both units were merged into the MEL from the updated Q-List. The MEL is intended to be a record of the final, as-installed hardware and components to be used to support operation, maintenance, and modifications.

In lieu of developing and comparing a new Unit 2 Q-List to the old Unit 2 Q-List, the applicant used the Unit 1 Q-List as the basis for the Unit 2 Q-List. The Unit 2 construction completion MEL was copied from the Unit 1 MEL with the unit designator changed to Unit 2 and all the data initially shown as unverified. Also, the Unit 2 components required for Unit 1 operation were removed from the Unit 2 list because they were already turned over to Unit 1 operations. For those components which had the same unique identifier (UNID) and function in both units, classification for Unit 2 was based on Unit 1 but verified to be correct. For those systems where the components in Unit 2 had a different UNID than the same components in Unit 1, the applicant evaluated the components in the Unit 2 MEL for proper classification. The applicant evaluated existing safety-related and quality-related components by program and system to determine acceptability as "use as is". Components not meeting the programmatic acceptability requirements were, or are planned to be, replaced or refurbished to ensure the appropriate quality level is achieved.

Inspection Activities: The inspectors reviewed the Unit 2 Q-List CAP engineering complete closure package to ensure that the proposed actions would satisfy the concerns that initiated the Q-List CAP. The inspectors reviewed a sample of completed actions associated with the Q-List CAP to evaluate whether the program was adequately developed and implemented. The inspectors reviewed several implementing procedures associated with the Q-List CAP to determine if the corrective actions were adequately captured and communicated. Several procedures for entering, changing, and verifying information on the MEL and in MAXIMO were also reviewed to evaluate the adequacy of

administrative controls. The inspectors reviewed a sample of training records and interviewed personnel responsible for updating and verifying information in MAXIMO to verify that they were adequately trained.

The inspectors reviewed MEL records of installed hardware for a sample of safety-related components in the component cooling water system (System 70). The sample was compared with the system requirements in the final safety analysis report (FSAR) to verify that the components were correctly classified and that system interfaces between safety related and quality related components aligned with the system safety function. Additionally, the inspectors completed a walkdown of the Unit 2 portion of System 70, including some of the interfaces between Units 1 and 2, to independently verify that reliable data was established in the information system including:

- The MEL accurately reflected the component status in the field.
- The components were appropriately labeled in the field.
- The MEL contained correct component safety and quality classifications, UNIDs, and locations.
- The hardware information, such as type of component and manufacturer, was accurately documented in the MEL.

The most recent self-assessment of the MEL, a sample of PERs and associated corrective actions, and a sample of surveillance reports were reviewed to verify that the Q-List CAP was being implemented appropriately within the MEL. The inspectors also reviewed the process for replacing and updating component identification tags in the field to verify that the components maintained traceability and that any updated information was documented in the MEL.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Because the Q-List captures the final, as-built components, the Unit 2 Q-List is still in an early stage of completion and the inspectors were not able to evaluate the adequacy of program implementation. Therefore, additional inspection activities are required prior to closure of the Q-List CAP. Specifically, further inspections will be required to monitor the implementation of the Q-List CAP once a larger portion of the Q-List is finalized.

OA.1.2 (Discussed) Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and Surveillance (Inspection Procedures 50073 and 50075, Temporary Instruction 2512/109)

a. Inspection Scope

Background: This generic letter (GL) 89-10 (ADAMS Accession No. ML8906290082) highlighted industry generic problems with motor operated valves (MOVs) and requested licensees to provide additional assurance of the capability of safety-related MOVs to

perform their intended functions by reviewing MOV design bases, verifying MOV switch settings (initially and periodically), testing MOVs under design-basis conditions (where practicable), improving evaluations of MOV failures and necessary corrective action, and trending MOV problems.

Inspection Activities:

The inspectors observed testing conducted on two MOVs from their respective motor-control centers (MCCs) in the 480V switchgear rooms. Specifically, the inspectors witnessed testing being conducted at the MCC and reviewed the applicant's evaluation of the MOV diagnostic test results. The valve tests witnessed and test data reviewed by the inspectors were associated with MOVs 2-FCV-67-83-B and 2-FCV-67-104-A.

The inspectors reviewed the applicant's engineering complete package review, of the diagnostic tests performed on these two MOVs, and compared the valve setup and test results to verify they were in accordance with TVA's corporate MOV program.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. While the field static (no flow) diagnostic tests are complete for these two valves, the remaining work is to conduct static and dynamic diagnostic testing of the safety-related valves contained in the WBN Unit 2 MOV program. The same procedures for MOV testing are utilized for both units at WBN.

c. Conclusions

The inspectors concluded that testing of safety-related MOVs is being conducted in accordance with the applicant's procedures and MOV test program. Additional MOV testing needs to be observed both under static and dynamic test conditions.

OA 1.3 (Discussed) Unresolved Safety Issue A-47, Safety Implication of Control Systems in Light Water Reactor 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 a Westinghouse pressurized water reactor (PWR) with two of three coincident logic for automatic main feedwater isolation and feedwater pump trip on steam generator high-high level. This is a safety grade trip in the reactor protection system. One of the three level transmitters for each loop provides an isolated output to the steam generator level control system located in a cabinet separate from the protection circuit. Based on this, Watts Bar is considered a Group 1 plant.

NRC technical report designations (NUREGs) 1217 and 1218 concluded that the overflow protection system for Group 1 plants is satisfied by providing adequate protection which includes demonstrating the evaluation of common mode failures due to fire.

For Unit 2, TVA issued framework letter dated January 29, 2008, Watts Bar Nuclear Plant (WBN) Unit 2 – Regulatory Framework for the Completion of Construction and Licensing for Unit 2 (ADAMS Accession No. ML080320443), Enclosure 2, Item 075, GL89-19, Request for Actions Related to Resolution of Unresolved Safety Issue A-47; Safety Implication of Control Systems in LWR Nuclear Power Plants -- Perform evaluation of common mode failures due to fire.

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

The inspectors reviewed a sample of cable routing used in the safe shutdown analysis calculations EDQ00099920090012, "Unit 1 and Unit 2 Appendix R Safe Shutdown Analysis", Rev. 2, and EDQ00099920090013, "Appendix R- Unit 2 Cables Required or Safe Shutdown", Rev. 2. The review included a sample of conduit and grounding drawings, fire protection compartmentation drawings, and associated integrated cable and raceway design system (ICRDS) data, to verify that the steam generator hi-hi level protection and the level control system routing met the fire protection requirements of GL 89-19. In addition, the inspectors reviewed the safe shutdown analysis, for the Appendix R credited steam generator level instrumentation, to determine if instrumentation selection was accurate, cables met separation requirements, and the analysis supported safe shutdown. The inspectors interviewed the fire protection engineer, responsible for the safe shutdown analysis, to determine if the data (equipment, cables, cable runs, and fire areas) used in the software program credited for safe shutdown fire analysis was accurate and the design control measures were established to manage the as-constructed safe shutdown fire analysis. In addition, the inspectors discussed, with the fire protection engineer, the safe shutdown design strategy for the planned use of manual actions to satisfy the Appendix R requirements for the steam generator hi-hi level protection and the level control system.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The design methodology for the steam generator hi-hi level protection and the level control system routing met the fire protection requirements of GL 1989-19. Although the applicant did not meet the separation criteria for the level instrumentation, the applicant's design includes the strategy to credit manually stopping the auxiliary feedwater pumps to satisfy Appendix R requirements. The motor-driven auxiliary feedwater pumps were designed to stop from the main control board (MCB) using their respective switches. The turbine-driven auxiliary feedwater pump was designed to stop by closing one of three in-series valves (2-FCV-1-17-A, or 2-FCV-1-18-B, or 2-FCV-1-52) to isolate steam. The as-designed Safe Shutdown Analysis accurately identified the cabling, routing, and fire areas for the listed valves. Additional inspection activities are recommended prior to closure of Unresolved Safety Issue A-47.

OA.1.4 (Discussed) Construction Deficiency Report 391/87-18: Deficiencies in Installation of Electrical Conduit and Conduit Supports (Inspection Procedure 51055)

a. Inspection Scope

Background: On December 9, 1985, TVA reported a problem in accordance with 10 CFR 50.55(e) relative to various discrepancies on conduits and conduit supports of Unit 1 and Unit 2. These conduit and conduit support discrepancies were reported to the NRC under CDR 390/86 -14 and 391/87-18 for Unit 1 and 2, respectively. NRC IIR 05000391/2013605 (ADAMS Accession No. ML13220A640), Section OA.1.8, documented previous inspection results and background details of CDR 391/87-18.

Inspection Activities: The inspectors interviewed applicant staff and reviewed the applicant's engineering complete closure package, including referenced documents and actions associated with PERs 143879, 144966, and 144177, to determine if the corrective actions associated with the hardware deficiencies in conduit and conduit supports were resolved and properly documented. The inspectors observed the as-built condition of several conduits, identified in these PERs, and compared them against PER records, engineering evaluation walkdown packages, and engineering drawings to determine if they matched the as-built condition. The following conduit segments were walked-down by the inspectors:

- Conduit segment of 2-2PM-292-7267G as shown in page 12 of Limited Scope Walkdown (LSWD) 497.
- Conduit segment of 2-3VC-293-3449B as shown in page 10 of Walkdown Package WBN2-C-293-817-06.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Corrective actions were conducted in accordance with the PERs' corrective action plan, and the as-built condition matched final drawings and records. CDR 391/87-18 will remain open pending the review of programmatic aspects developed, by the applicant, for addressing previously identified issues associated with loose, damaged and missing hardware, and conduit parts.

OA.1.5 (Discussed) Construction Deficiency Report 391/86-59: Qualification of ASCO Solenoid Valve Conduit Connector Configuration (Inspection Procedure 51055)

a. Inspection Scope

Background: The subject deficiency was initially reported to the NRC on July 11, 1986, with an interim report issued on August 11, 1986, and the final report issued on October 5, 1987. After a review, the NRC determined this deficiency was associated with notice

of violation 50-391/86-18-01, issued as part of NRC Inspection Report 50-390/86-18 and 50-391/86-18 (ADAMS Accession No. ML072480310).

The notice of violation concerned TVA'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 Institute of Electrical and Electronics Engineers (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, 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, as appropriate, revised and issued drawings, calculations, walkdowns and procedures to ensure that conduits attaching to instruments and equipment were properly installed and documented, and to prevent recurrence.

Inspection Activities: The inspectors interviewed applicant staff and reviewed the applicant's engineering complete closure package, including referenced documents and actions associated with PER 143758 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.

The inspectors observed the as-built condition of several instrument panels, identified in this PER, and compared them against the LSWD-0528, Rev. 0, package to determine if they matched the as-built condition. The following instrument panels were walked-down by the inspectors:

- 2-PNL-276-L016
- 2-PNL-276-L349A
- 2-PNL-276-L349B
- 2-PNL-276-L027
- 2-PNL-276-L439A
- 2-PNL-276-L665
- 2-PNL-2-L-513

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Corrective actions were conducted in accordance with the PER's corrective action plan, and the as-built condition matched final drawings and records. Additional document review is planned to be performed to ensure that changes to procedures, instructions, and drawings do not affect original commitments for this CDR. Supplementary field observations are recommended to verify whether implemented corrective actions adequately accepted and corrected discrepancies on existing installations and control future rework and installations.

OA.1.6 (Discussed) Violation (VIO) 391/86-21-02: Instrument Valves, Foxboro Transmitters, and Instrument Panels Not Seismically Qualified (Inspection Procedure 51055)

a. Inspection Scope

Background: On February 12, 1987, NRC-identified Violation (VIO) 391/86-21-02 was issued as part of NRC Inspection Report 50-390/86-21 and 50-391/86-21(ADAMS Accession No. ML082280243). NRC inspectors identified three examples where instrument and equipment installations did not match configurations used during seismic qualification. The VIO concerned TVA's failure to ensure that vendor information, specifically seismic qualification reports and calculations, was correctly translated into specifications, drawings, procedures, instructions, and the field installation as required by 10 CFR Part 50, Appendix B, Criterion III.

This VIO included both hardware and documentation deficiencies. The deficiencies resulted mainly from modifications which impacted equipment seismic qualification. The examples included additional unused mounting holes in B-19 transmitter support brackets, conduit attachments to Foxboro N-E10 transmitters, and bolting configurations on floor mounted instrument panels, that were not consistent with the seismically qualified condition. For Unit 2, the applicant's corrective action was to perform seismic analyses to address the deficient conditions and to replace all the Foxboro transmitters and support brackets existing in the plant with Rosemount transmitters.

Inspection Activities: The inspectors interviewed applicant staff and reviewed the applicant's engineering complete closure package, including referenced documents and actions associated with PERs 143758, 143701, and 143538 and commitment tracking number 114113692, 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 several instrument racks installed in series and associated with PER 143758. These instrument racks were compared against LSWD-0528 and installation drawings to determine if these matched the as-built condition. The instrument racks associated with the following instrument panels were walked-down by the inspectors:

- 2-PNL-276-L016
- 2-PNL-276-L349A
- 2-PNL-276-L349B

The inspectors observed the as-built condition of several Rosemount transmitters, including support brackets, associated with PERs 143758 and 143701. These transmitters were compared against design and installation drawings to determine if these matched the as-built condition. The following newly installed Rosemount transmitters were walked-down by the inspectors:

- FT-70-215A
- FT-70-215B

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Corrective actions were conducted in accordance with the PERs' corrective action plan, and the as-built condition matched final drawings and records. Additional document review is planned to ensure that changes to procedures, instructions, and drawings do not affect original commitments for this violation. Supplementary field observations are recommended to verify whether implemented corrective actions adequately accepted and corrected discrepancies on existing installations and control future rework and installations.

OA.1.7 (Discussed) Quality Assurance Records Corrective Action Program (Temporary Instruction 2512/028)

a. Inspection Scope

Background: The background of this CAP is outlined in NRC IIR 05000391/2010603 (ADAMS Accession No. ML102170465).

Inspection Activities: The inspectors interviewed responsible program management to determine the progress of activities implemented by the applicant, to assess the status of quality assurance records. In addition, the inspectors examined samples of in-process record assessments that were being processed by electrical engineering. The assessments of records for electrical cables, cable trays, conduits, equipment, and instruments were inspected to evaluate the assessments' scope, diversity of records selected, and quality of records selected.

Documents and records reviewed for this inspection are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors determined that further inspection is recommended to evaluate the completed assessments performed by the applicant and to obtain sufficient samples to assure that the program objectives would be met.

OA.1.8 (Closed) Unresolved Item 05000391/2013613-01, Potential Inadequate Corrective Actions for Piping Misalignment (Inspection Procedure 92701)

a. Inspection Scope

Background: This issue was documented due to challenges experienced by the applicant regarding piping alignment to many components leading to a concern about the adequacy of the processes for piping alignment. The issue was first documented in PER 52882 which documented that multiple pumps had been affected and that personnel were not following procedures. The applicant also documented this problem in PER 719716 to address questions associated with the unresolved item (URI). This item was left open pending observation of field work, review of corrective actions, and evaluation of procedure adequacy.

Inspection Activities: The inspectors observed field work, reviewed the two PERs and associated corrective actions, reviewed procedure changes that were implemented and held discussions with applicant personnel.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. Observations and reviews showed that the existing procedure controls were in place to ensure final piping alignment to components was correct. Inefficiencies had occurred due to procedures not adequately being tied to one another and weaknesses in craft knowledge. Information contained in the original PER 528852 led to corrective actions which were not documented in the PER. These included proposed procedure enhancements and establishment of a team to improve the alignment process. The original PER stated that personnel had not followed procedures for the alignment process on some non-safety-related pumps. This statement was contained in the 'corrective action plan' portion of the PER. In addition, a corrective action for PER 719796 was to evaluate the previous PER. However, since processes existed to eventually ensure proper alignment, these were considered to be minor documentation weaknesses. Corrective action for PER 719796 did result in craft training and procedure improvements.

c. Conclusions

Processes were in place to ensure final alignment met requirements; therefore, this URI is closed without escalation to a violation.

OA.1.9 (Closed) TMI Action Item II.K.3.5: Automatic Trip of Reactor Coolant Pumps During Loss-Of-Coolant Accident (LOCA) (Inspection Procedure 92701)a. Inspection Scope

Background: As a result of the accident at TMI-2, the NRC created a number of action items designed to improve a plant's ability to minimize accident occurrence and accident consequences. These TMI action items were initially outlined in NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident" (ADAMS Accession No. ML072470524) and later clarified in NUREG-0737, "Clarification of TMI Action Plan Requirements" (ADAMS Accession No. ML102560051).

TMI Action Item II.K.3.5 resulted from the generic reviews of small-break loss of coolant accidents. Based on these reviews, specific requirements were generated to provide for the automatic trip of reactor coolant pumps (RCPs) at PWR plants. The NRC issued several documents during the early 1980s which provided information on the resolution of this issue. In 1983 and 1984, the Westinghouse Owner's Group developed guidance on alternate means of addressing requirements for tripping RCPs. The Westinghouse Owner's Group provided technical justification to substantiate the position that RCPs not be automatically tripped but should remain operational for non-LOCA transients and other accidents where their operation was beneficial to accident mitigation and recovery.

On July 28, 1985, the NRC issued GL 85-12, "Implementation of TMI Action Item II.K.3.5, Automatic Trip of Reactor Coolant Pumps" (ADAMS Accession No. ML 8507010252). This GL approved the Westinghouse Owners Group's position for the manual tripping of RCPs. The applicant's letters to the NRC dated August 29, 1985 (ADAMS Accession No. ML082410377), and January 13, 1986 (ADAMS Accession No. ML082840480), stated that the RCPs at WBN would be tripped manually at 1400 psig reactor coolant system pressure in the event the reactor coolant system pressure was decreasing uncontrollably. This arrangement met the Westinghouse Owners Group's position.

Following NRC review of the applicant's submittals and additional information obtained from the applicant, the position for manually tripping of the RCPs was found acceptable. The requirement to manually trip the RCPs was incorporated into the WBN Unit 1 emergency operating procedures (EOPs). NRC's approval was documented in a letter to the applicant dated June 8, 1990 (ADAMS Accession No. ML073541207)

For Unit 1, the NRC reviewed TVA's calculation WBN-OSG4-188, "EOP Setpoints Verification Document," which indicated that instruments, which were to be used by the operators to monitor reactor coolant system pressure, were set at 1500 psig. Based on the accuracy of the instrumentation, the actual required calculated setpoint was 1474.5 psig and the setpoint of 1500 psig provided an additional safety margin in the conservative direction.

The NRC reviewed the WBN U1 EOPs, included in the document entitled Emergency Instructions. The EOPs implemented the Westinghouse Owners Group's emergency response guidelines and contained instructions for manually tripping the RCPs as the following criteria:

RCP Trip Criteria

-Phase B Isolation, OR

-One Changing pump OR one Safety Injection pump injecting AND Reactor Coolant System pressure decreasing uncontrolled to less than 1500 psig.

Subsequently, WBN Unit 1 revised the applicable procedures and it was discussed in NUREG-0847, "Safety Evaluation Report (SER) Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2," Supplements 4 (ADAMS Accession No. ML072060488) and 16 (ADAMS Accession No. ML072060493). These SERs identified that WBN Unit 1 had satisfied all of the requirements of NUREG-0737. NRC inspection report (IR) 50-390/95-70 (ADAMS Accession No. ML072610753) verified the resolution of the action item for Unit 1.

Inspection Activities: Based on the information provided in the background section, the objective of this inspection was to gather and evaluate sufficient information to make a determination as to whether the applicant had adequately addressed TMI Action Item II.K.3.5 for WBN Unit 2. The inspection focused on a review of the applicant's approved, but not issued, Unit 2 Emergency Operating Instructions (EOIs) to ensure the proposed procedural changes were adequately captured.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors reviewed actions associated with TMI Action Item II.K.3.5 to verify the adequacy of the applicant's actions. The inspectors concluded that the applicant's efforts were sufficient to satisfy the intent of the respective TMI Action Item. TMI Action Item II.K.3.5 is considered closed.

OA.1.10 (Closed) Construction Deficiency Report 391/89-05: Failure of Auxiliary Feedwater Steam Generator Level Controllers (Inspection Procedure 92701)

a. Inspection Scope:

Background: The subject deficiency was initially reported to the NRC on April 30, 1986, in accordance with 10 CFR 50.55(e) as NCR W-370-P. The deficiency was documented as CDR 50-390/86-51 for Unit 1. While no specific Unit 2 deficiencies had been identified, CDR 50-391/89-05 was assigned to track the applicable preventative actions. As stated in TVA's final report to the NRC issued on July 7, 1989, there had been numerous failures of the model 8800 auxiliary feedwater (AFW) system steam generator level controllers supplied by Beckman. The controllers had failed to provide rated output because of component failures on the voltage/current (V/I) boards. Excessive heat buildup was believed to have contributed to the failure, but the exact cause for the controllers failing was not known. As such, the controllers were determined to be unreliable. The primary purpose of the AFW system is to provide sufficient feedwater to

remove all primary system decay heat and reactor coolant pump heat in the event of a loss of main feedwater. The AFW steam generator level controllers are used to modulate the level control valves associated with the AFW turbine-driven and motor-driven pumps. Since the failure state of the subject controllers was indeterminate, the controller output could have caused the level control valves to regulate the steam generator level outside of the desired level operating limits which could result in degraded AFW system performance and adversely affect the safe shutdown of the plant.

TVA's initial investigation was focused on the solder that had blistered on the failed voltage/current output boards for Unit 1 controllers, LIC-3-156,-171, and -148. All other Beckman model 8800 controllers were inspected and blistering was found on other boards. As stated in the TVA's final report, the defective boards were returned to the manufacturer who determined that repairs could be made but would not certify that the repairs would meet the original procurement requirements. Additionally, it was determined that replacement parts would soon not be available as the board was no longer being produced. Therefore, TVA decided to purchase new controllers to replace the ones presently installed at Watts Bar. DCN P-03373-B was issued to replace existing Unit 1 Beckman control system and associated components with new Foxboro components. The replaced controllers are UNIDs 1-LIC-3-148, -156, -164,-171,-172, -173,-174, and -175. The NRC reviewed TVA's response for adequacy, recurrence control, and performed field inspections to verify implementation of DCN P-03373-B. The NRC concluded that the corrective actions implemented were adequate and closed the CDR for Unit 1 in NRC IRs 50-390/94-45 and 50-391/94-45 (ADAMS Accession No. ML072980547)

For Unit 2, the corrective action for the corresponding Unit 2 CDR 391/89-05 is addressed by EDCR 52343. The issued EDCR replaces the existing Beckman control system and all associated components with the new Foxboro SPEC 200 system. The replaced controllers are UNIDs 2-LIC-3-148,-156,-164,-171,-172,-173,-174, and -175.

Remaining Unit 2 Actions:

While not all field work is not completed, engineering actions to resolve the issue have been completed and the remaining modifications are being tracked by PER 172734. This commitment will be closed by the applicant after the completion of EDCR 52343.

Inspection Activities: The inspectors reviewed the applicant's engineering complete closure package, WO (09-954559-001), proposed work instructions (EDCR 52343, Rev. A), proposed drawing changes, and installed equipment to verify corrective actions related to CDR 391/89-05 were adequate.

b. Observations and Findings:

No findings were identified.

c. Conclusions:

Based on the review of the applicant's methodology for addressing this concern and the actual completed work observed this inspection period, the inspectors determined that the remaining work activities are contained within a controlled program and CDR 50-391/89-05 is closed.

OA.1.11 (Closed) Inspection and Enforcement Bulletin 79-27: Loss of Non-Class 1E Instrumentation and Control Power System Bus during Operation (Inspection Procedure 35007)

a. Inspection Scope

Background: NRC inspection and enforcement Bulletin (BL) 79-27 (ADAMS Accession No. ML7910250499) was issued in response to a reactor trip event in which a non-Class 1E inverter tripped and failed to successfully transfer loads to the alternate regulated alternating current (AC) power supply. Instrument power was lost to the integrated control system and one channel of the non-nuclear instrument instrumentation system. This rendered most of the control room indicators for the reactor coolant system and secondary plant systems inoperable. All valves controlled by the integrated control system assumed their respective failure configurations, causing an excessive cool down rate for the reactor system.

The applicant's response to the actions recommended by this bulletin was previously inspected in NRC IR 50-390/95-38 and 50-391/95-38 (ADAMS Accession ML072760552). The inspection reports documented that the applicant sufficiently addressed the recommended actions of the BL for Unit 1 operations and had provided sufficient technical bases to substantiate a determination that no design changes were required for Watts Bar.

Inspection Activities: The inspectors interviewed licensed operations personnel, reviewed the applicant's corrective action closure reports, examined electrical interconnection schematics, and assessed abnormal operating instructions (AOIs) that had been drafted to guide operator response to loss of instrument and control power events. The review was performed to determine whether adequate guidance will be provided to Unit 2 operators for a postulated loss of instrument and control power.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors determined that the applicant had implemented actions that would be sufficient to address the recommendations of BL 79-27. This inspection item, BL 79-27, is closed.

OA.1.12 (Closed) Construction Deficiency Report 391/86-21: Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit Loading (Inspection Procedure 35007)

a. Inspection Scope:

Background: Actions taken by TVA to address this deficiency for Unit 2 have been previously inspected and documented in NRC IIR 05000391/2012605 (ADAMS Accession No. ML12220A536), Section OA.1.4, and NRC IIR 05000391/2013604 (ADAMS Accession No. ML13179A079), Section OA.1.25. No findings were identified during those inspections; however, the inspectors determined that further inspection was required to verify completion of remaining Unit 2 actions.

Inspection Activities: During this inspection, commitment closure documents and QA records used to implement the remaining Unit 2 actions were examined to evaluate the scope and status of actions planned to address this area of concern. The inspectors conducted multiple walkdowns and used direct observation to verify completed work performed under field WOs issued to resolve the identified deficiencies via several implementing documents to include LSWD 542, EDCR 52934, and EDCR 55231. The field observations included verification of the accuracy of ICRDS data for cables installed in the plant and verification of corrective actions such as tray modifications, tray support modifications, tray support installation, re-torquing of tray support wedge bolts, cable installation, and conduit installation. The inspectors conducted interviews and reviewed QA records to verify that all the completed work sampled was accomplished in accordance with approved design and associated instructions, procedures, and drawings.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors determined that the applicant had implemented actions that would be sufficient to address the issues identified in CDR 50-391/86-21 and the historical concerns about the accuracy of data used in electrical calculations. This inspection item, CDR 50-391/86-21, is closed.

V. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

An exit meeting was conducted on October 10, 2013, to present inspection results to you and other members of your staff. The inspectors identified that no proprietary information had been received during the inspection and none would be used in the inspection report. The applicant acknowledged the observations and provided no dissenting comments.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant personnel

H. Baldner, TVA - Licensing
R. Baron, TVA – QA Manager
D. Beckley, Bechtel – Electrical Design
J. Boykin, TVA – QA Specialist
D. Charlton, TVA – Licensing
J. Clark, TVA – QA Specialist
T. Das, Bechtel – Engineering
J. Fisher, TVA – Licensing
B. Gillham, TVA - Licensing
R. Goyal, Bechtel – Civil Engineering
D. Helms, TVA - Engineering
R. Hruby, TVA – General Manager
J. Kepler, TVA – Control Systems Supervisor, Unit 2
K. Lovell, TVA – PM and Refurbishment
B. Mahoney, Bechtel – Field Engineering
M. McGrath, TVA – Licensing
J. O'Dell, TVA - Regulatory Compliance
R. Onis, TVA – QA Oversight
G. Scott, TVA – Licensing
N. Welch, TVA - Properational Startup Manager
O. J. Zeringue, 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 48055	Structural Steel and Support Record Review
IP 49053	Reactor Coolant Pressure Boundary Piping - Work Observation
IP 49055	Reactor Coolant Pressure Boundary Piping Record Review
IP 50053	Reactor Vessel and Internals Work Observation
IP 50073	Mechanical Components – Work Observation
IP 50075	Safety Related Components – Records Review
IP 50090	Pipe Support and Restraint Systems
IP 51053	Electrical Components and Systems – Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51063	Electrical Cable – Work Observation
IP 64051	Fire Protection
IP 70300	Preoperational Test Procedure Review
IP 70312	Preoperational Test Witnessing
IP 70343	Containment Spray System Test – Preoperational Test Procedure Review
IP 70443	Containment Spray System Test – Preoperational Test Witnessing
IP 71302	Preoperational Test Program Implementation Verification
IP 92701	Follow-up
TI 2512/015	Inspection of Watts Bar Nuclear Plant Employee Concerns Program
TI 2512/028	Inspection of Watts Bar Nuclear Plant QA Records Corrective Action Program Plan
TI 2512/029	Inspection of Watts Bar Nuclear Plant Q-List Corrective Action Program Plan
TI 2512/109	Inspection Requirements for Generic Letter 89-10, “Safety-Related Motor-Operated Valve Testing and Surveillance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

None

Closed

49055	IP	Reactor Coolant Pressure Boundary Piping Record Review (Section C.1.8)
48055	IP	Structural Steel and Supports Record Review (Section C.1.9)
05000391/2013613-01	URI	Potential Inadequate Corrective Actions for Piping Misalignment (Section OA.1.8)
TMI II.K.3.5	AI	Automatic Trip of Reactor Coolant Pumps During Loss-Of-Coolant Accident (LOCA) (Section OA.1.9)
391/89-05	CDR	Failure of Auxiliary Feedwater Steam

		Generator Level Controllers (Section OA.1.10)
79-27	BL	Loss of Non-Class 1E Instrumentation and Control Power System Bus during Operation (Section OA.1.11)
391/86-21	CDR	Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit Loading (Section OA.1.12)
<u>Discussed</u>		
50090	IP	Pipe Support and Restraint Systems (Section C.1.2)
49053	IP	Reactor Coolant Pressure Boundary Piping Work Observations (Section C.1.3)
50053	IP	Reactor Vessel and Internals Work Observation (Section C.1.4)
37051, 50073	IP	Verification of As-Builts (Section C.1.5)
51053, 37002	IP	Electrical Components and Systems – Work Observation) (Section C.1.6)
51063, 37002	IP	Electrical Cable – Work Observation (Section C.1.7)
70300, 70343	IP	Preoperational Test Procedure Review (Section P.1.2)
70312, 70443	IP	Preoperational Test Witnessing (Section P.1.3)
2512/029	TI	Q-List (Section OA.1.1)
89-10	GL	Safety-Related Motor-Operated Valve Testing and Surveillance (Section OA.1.2)
A-47	USI	Safety Implication of Control Systems in LWR Nuclear Power Plants (Section OA.1.3)
391/87-18	CDR	Deficiencies in installation of electrical conduit and conduit supports (Section OA.1.4)
391/86-59	CDR	Qualification of ASCO solenoid valve conduit connector configuration (Section OA.1.5)
86-21-02	VIO	Instrument valves, Foxboro transmitters, and instrument panels not seismically qualified (Section OA.1.6)
2512/028	TI	Quality Assurance Records (Section OA.1.7)

LIST OF DOCUMENTS REVIEWED

I. QUALITY ASSURANCE (QA) OVERSIGHT ACTIVITIES

Q.1.1 Identification and Resolution of Construction Problems

Work Orders

113558352, WBN-2-HEAD-068-001 Mirror Insulation Installation

FCRs

61852-A, Mirror Insulation Vendor Non-Conformance, inspection gap does not meet specifications, 7/31/2013

Miscellaneous

RFI 1064, Mirror Insulation top head inspection clearance requirements, 10/18/10

RFI 1204, Mirror Insulation top head rover inspection clearances, 8/30/11

VR WBC1101, Vendor Manual Revision Request, Rev. 1

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.2 Pipe Support (Snubber) Work Observations

Drawings

DRA 52502-288, Support 63-2SISR245-1, Rev. 0

DRA 52534-024, Support 72-2CSR149-1, Rev. 0

Work Orders

WO 114497039, Snubber for Support No. 63-2SIS-R245

WO 114539451, Snubber for Support No. 72-2CS-R149

M&TE

E46195, Torque Wrench, 10/15/13

E45514, Torque Wrench, 8/23/13

Calculations

WBP840904162, Calculations for pipe support 63-2SIS-R245, Rev. 2

CEB 850211921, Calculations for pipe Support No. 72-2CS-R149, Rev. 1

Miscellaneous

FCR 62073A, Pin to Pin Field Change, 9/10/13

C.1.3 Reactor Coolant Pressure Boundary Piping – Work Observations

Work Orders

114156726, WBN-2SGEN-068-SG2 Perform Tube pull/plug

114156717, WBN-1SGEN-068-SG1 Perform Tube pull/plug

Miscellaneous

PT 901364-025, TPW-SG2-CL-R32-C66, PT Examination Report, 9/17/13

PT 901364-026, TPW-SG2-CL-R45-C40, PT Examination Report, 9/17/13

PT 901364-027, TPW-SG2-CL-R45-C39, PT Examination Report, 9/17/13

PT 901364-028, TPW-SG2-CL-R46-C41, PT Examination Report, 9/17/13

PT 901364-029, TPW-SG2-CL-R46-C42, PT Examination Report, 9/17/13
 PT 901364-030, TPW-SG1-CL-R23-C14, PT Examination Report, 9/19/13

C.1.5 Verification of As-Builts

Drawings

2-47W809-7, Flow Diagram Flood Mode Boration Makeup System, Rev. 9
 47W406-17, SK 406-16 Sheet 18, Unit 2 As-Constructed Flood Mode Boration, Rev. 7
 47W406-17, SK 406-16 Sheet 19, Unit 2 As-Constructed Flood Mode Boration, Rev. 7

Work Orders

08-953712-000, WBN-2-PMP-084-0016, Auxiliary Charging Pump 2A Alignment
 08-953719-000 WBN-2-PMP-084-0021, Auxiliary Charging Pump 2B Alignment

Miscellaneous

WBN-VTD-W287-0010, Woods Type S Sure flex coupling installation instructions, Rev. 0WBN-VTD-B250-0020, BIF Hydraulic Diaphragm Metering Pumps Series 1700, Rev. 1
 MAI-2.3, Commodity Clearance, Rev. 8
 SMP-4.0, System Completion and Turnover, Rev. 9
 SMP-13.0. Boundary Drawings, Rev. 7
 0-TI-437, System Turnover – Startup to Operations, Rev. 0

C.1.9 IP 48055, Structural Steel and Supports Record Review

PERs

173029, Improper Processing of FCRs, 5/31/2009
 173054, Advance Authorization of FCR 53813 with known process problems, 8/14/2009
 244084, Undercut in weld on support 62-2CVCR172, 8/17/2010
 287603, Material Traceability on bolting material, 11/27/2010
 323983, QC Reject, Incorrect Bolting Material, 5/25/2011
 471174, NRC Id'd: QA 2 regulators installed instead of QA 1 regulators, 4/5/2012
 558196, FCR 56916 AA-09 (pg. 48) was incorrectly implemented, 12/11/12
 651792, Discrepancies between drawing and as-constructed configurations, 1/17/2013
 678033, 2542-000-GPP-0000-N1216, Attachment R was not completed as required, 2/8/2013
 735081, Hardware Nonconformance: QA3 Mat'l used in QA1 Application. SYS 3, 61, 62, 63, 68, 70, 72, 6/17/2013

Procedures

25402-000-GPP-0000-N1206, Work Order Processing, Rev. 16
 25402-000-GPP-0000-N6104, Materials Receiving, Rev. 8
 25402-3DP-G04G-00090, Engineering Evaluation for Commodity Refurbishment, Rev. 9

Surveillance Reports

25402-WBN-SR-13-2469, Reactor Coolant Pump #2 Platform Modification, 2/7/2013
 25402-WBN-SR-13-2452, Modification of Steel Access Platform for Valve Access, 2/14/13
 25402-WBN-SR-11-1612, Cable Tray Support in the Annulus (System 293), 3/11/11
 25402-WBN-SR-12-2092, Material Substitution Control, 1/11/12
 25402-WBN-SR-13-2722, Structural Bolting, 8/7/13
 25402-WBN-SR-12-2197, Reactor Building, Loop 2, LCC 2B-B, HVAC Dust Modification, 5/31/12

Work Orders

08-954513-0, Installation of Platform 48W905-04PF01U2 Located in Loop 1, Elevation 715' 8 3/8" in Accordance with EDCR 52633, Rev. 0
 08-957071-000, Modify Structural Steel Connections at Elevation 745' and AZ 37 Deg., MK 8A, in Accordance with EDCR 52912, Rev. 0
 08-957071-001, Modify Structural Steel Connections at Elevation 745' and AZ 212 Deg., Plate MK 5A, in Accordance with EDCR 52912, Rev. 0
 09-954482-001, CCC EDCR 53992 SYS 667 2-STRU066705001 – Install Platform 48W905-02PF05U2, Rev. 0
 111799534, Auxiliary Building – Miscellaneous Steel Access Platforms, Stairs, Handrails, and Support, Rev. 0

Miscellaneous

EDCR 52633, Installation of ten Unit 2 personnel access platforms, Rev. B
 Material Receiving Instruction for PO# 25402-000-FMR-NWC0-00051, MMR #10449, 4/5/2010
 Material Receiving Instruction for PO# 25402-000-FMR-SS00-00074, MMR #6174, 7/21/2009
 Material Receiving Instruction for PO# 25402-000-FMR-SS00-00132, MMR #10232, 3/25/10
 Material Receiving Instruction for PO# 25402-000-FMR-SS00-00133, MMR #10186, 3/12/10
 Material Receiving Instruction for PO# 25402-000-FMR-SS11-00004, MMR #08558, 2/23/2010
 Material Receiving Instruction for PO# 25402-000-MRA-SS00-00011, MMR #2764, 4/21/09
 Material Receiving Instruction for PO# 25402-011-MRA-JX00-00028, MMR #3574, 3/25/2009
 Watts Bar Nuclear Plant Q-List General Notes, Rev. 1
 Watts Bar Unit 2 Construction Completion Material Pick List Report MWR-03334, 4/2/2010
 Watts Bar Unit 2 Construction Completion Material Pick List Report MWR-04447, 5/11/2010
 Watts Bar Unit 2 Construction Completion Material Pick List Report MWR-00675, 9/30/2009
 Watts Bar Unit 2 Construction Completion Material Pick List Report MWR-00250, 4/30/2009

F.1 Fire Protection**F.1.1 Fire Protection**

WBN-0-FPS-510-EXT/INSP, Rev.5, Portable Fire Extinguisher Inspection (Construction Area) - 9/4/13
 WO 113112169 Annual Inspection and Hydrostatic Test of Fire Hose- 8/27/2012
 SR 785932 Temporary Emergency lights inoperable - 9/27/2013

IV. OTHER ACTIVITIES**OA.1.1 Q-List Corrective Action Program**PERs

151420, Duplicate Conduit Identification used, 09/03/2008
 173290, Engineer not trained to required procedure, 06/23/2009
 222068, Historical Issue: Flow modifier, 2-FM-62-140, is improperly classified as Train A, Class 1E, 03/23/2010
 388232, Q-List Errors Discovered in MEL Package 10AIC-3915, 06/16/2011
 495018, Augmented Quality Code Q22 is inappropriately applied for some electrical UNIDS at WATTS BAR, 03/02/2012
 618624, MEL Update for Valve not Performed, 10/03/2012
 687175, ASME Related: Incorrect serial numbers listed in MAXIMO for WBN U2 Cont Spray HTX, 02/25/2013
 729664, Incorrect MEL Name plate Data in WO 113144567, 05/21/2013
 742507, MEL Data not completed for certain MVOP component records, 06/18/2013

Procedures

25402-3DP-G04G-00028, Q-List and UNID Control, Rev. 3
 25402-3DP-G04G-00081, Engineering Document Construction Release, Rev. 6
 25402-3DP-G04G-00090, Engineering Evaluation for Commodity Refurbishment, Rev. 9
 25402-3DP-G04G-00503, Master Equipment List, Rev. 5
 NEDP-4, Q-List and UNID Control, Rev. 19
 NPG-SPP-09.6, Master Equipment List, Rev. 3
 SMP-4.0, Watts Bar Nuclear Plant Unit 2 System Completion and Turnover, Rev. 9
 TI-12.14, Replacement and Upgrade of Plant Component Identification Tagging and Labeling, Rev. 5
 TI-209, Plant Labeling, Rev. 3
 TI-437, System Turnover-Startup to Operations, Rev. 0

Surveillance Reports

25402-WBN-SR-11-1569, Q-List CAP (CP14) – Q-List Verification for Non-EDCR Components, 2/16/2011
 25402-WBN-SR-11-2037, Q-List Corrective Action Program – Design Complete Closure Report, 11/8/2011

Miscellaneous

Self-Assessment 25402-SA-ENG-10-023, Q-List CAP Midpoint Self-Assessment Report, 10/20/2010
 Walkdown Deficiency Log, Permanent Tags Required System 70, 1-16-13/1-23-13
 Watts Bar Nuclear Plant Q-List General Notes, Rev. 1
 Watts Bar Nuclear Plant Unit 2 Q-List Corrective Action Program Engineering Complete Closure Report, 11/29/2011

OA.1.2 Generic Letter 89-10: Safety-Related Motor-Operated Valve Testing and SurveillanceProcedures

TVA Procedure No. 0-MI-0.006, WBN Unit 0, 1, & 2, MOVATS Testing of Motor Operated Valves, Rev. 3

Drawings

2-47A8910-67-10, Mechanical Table of Motor Operated Valve Requirements (for 2-FCV-67-83-B), Rev.2
 2-47A8910-67-12, Mechanical Table of Motor Operated Valve Requirements (for 2-FCV-67-88-B), Rev.2
 2-47A8910-67-18, Mechanical Table of Motor Operated Valve Requirements (for 2-FCV-67-99-A), Rev.2
 2-47A8910-67-20, Mechanical Table of Motor Operated Valve Requirements (for 2-FCV-67-104-A), Rev.2

Work Orders

WO 113014186, WBN-2-FCV-067-0088-B MOVATS Testing of MOVs
 WO 113014217, WBN-2-FCV-067-0099-A MOVATS Testing of MOVs
 WO 113014220, WBN-2-FCV-067-0104-A MOVATS Testing of MOVs
 WO 114197974, WBN-2-FCV-067-0083-B MOVATS Testing of MOVs

Miscellaneous

2-067-0083-B, MOVATs Test Traces and Data from Diagnostic Test Performed on August 29, 2013
 2-067-0088-B, MOVATs Test Traces and Data from Diagnostic Test Performed on August 26, 2013

2-067-0104-A, MOVATs Test Traces and Data from Diagnostic Test Performed on August 27, 2013
 TP-22.0 - Attachment 8.4, Rev. 0, Motor Data Sheet for 2-067-0083-B, August 21, 2013
 TP-22.0 - Attachment 8.4, Rev. 0, Motor Data Sheet for 2-067-0099-A, August 21, 2013
 Baldor W03068-A-A, A-C Motor Performance Curves for Baldor/Reliance 48 Frame 5 ft-lb Motor Redesign, Rev. 1, May 7, 2010
 Baldor Test Report W03068-A-A001 (S/O B575631-010), Motor Performance Test Data for Type P Frame EB48 460 Volt A-C Motor, April 28, 2010

M&TE

E28641, Current Probe - C Phase (I_C) or DC Amp Probe for MVOP-001-0051-S, Cal. Due Date 2/1/2014
 E28655, Voltage Attenuator, Cal. Due Date 1/10/2014
 E32406, Current Probe - B Phase (I_B), Cal. Due Date 2/1/2014
 E32407, OPEN Coil Current Probe (OCC), Cal. Due Date 2/1/2014
 E32410, CLOSE Coil Current Probe (CCC), Cal. Due Date 2/1/2014
 E36315, Current Probe - A Phase (I_A), Cal. Due Date 2/1/2014
 E48050, MOVATs System DAMS, Cal. Due Date 6/17/2014
 E48051, MOVATs System Contacts Module, Cal. Due Date 6/17/2014
 E48052, MOVATs System universal Module, Cal. Due Date 6/17/2014
 E48053, MOVATs System Strain Module, Cal. Due Date 6/17/2014
 E48054, MOVATs System Power Module, Cal. Due Date 6/17/2014
 E48463, Multi-Meter, Cal. Due Date 2/17/2014

OA 1.3 Unresolved Safety Issue A 47, Safety Implication of Control Systems in LWR Nuclear Power Plants

Calculations

EDQ00099920090016, "Appendix R – Unit 1 & 2 Manual Action Requirements", REV.. 0

Miscellaneous

TVA letter to NRC dated February 7, 2013, Watts Bar Nuclear Plant (WBN) Unit 2 – Fire Protection Program (TAC No. ME0853) – Commitment to Provide Additional Information on Multiple Spurious Operation (MSO) Scenarios.
 NUREG-0847, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2," June 2013
 NEI 00-01, "Guidance for Post Fire Safe Shutdown Circuit Analysis", Rev. 3
 Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants", Rev. 2
 ICRDS for Cable 2PM1416E, Rev. 14
 ICRDS for Cable 2PM1223F, Rev. 14
 0-AOI-30.2 C.30 Abnormal Operating Instruction, "Fire Safe Shutdown Room 757-A22," Rev. 0 (Draft)

Drawings

45W874-5, "Conduit & Grounding Annuls Details Sheet 3," Rev. 24
 45W874-4, "Conduit & Grounding Annuls Details Sheet 2," Rev. 31
 45W826-11, "Conduit & Grounding Ceiling Plans EL 729.0 & 737.0," Rev. 34
 45W826-9, "Ceiling Plan EL 737.0," Rev. 53
 45W828-2, "Floor Plan EL 757.0," Rev. 24
 45W828-7, "Conduit & Grounding Floor Plan," Rev. 40
 45W816-2 "Ceiling Plan EL 755.0 Unit 2," Rev. 40
 45W816-1, "Floor Plan-EL 755.0 Unit 2," Rev. 36
 45W814-13, "Part Plan Detail A13," Rev. 30
 45W814-2, "Conduit & Grounding Floor Plan," Rev. 32
 45W812-6, "Conduit & Grounding Floor EL 708.0 Details," Rev. 27

45W886-3, "Conduit & Grounding Cable Tray Node Diagrams EL708.0 NV-2, NV-2E," Rev.16
 45W812-6, "Conduit & Grounding Floor Plan EL 708.0 Details," Rev. 27
 45W826-4, "Conduit & Grounding EL 729.0 &737.0 – Cols A8-A15, U-W Floor Plan and Details," Rev. 35
 45N824-8, "Conduit & Grounding EL 713 Cols A8-A15, Q-V Ceiling Plan and Details," Rev. 40
 45N824-11, "Conduit & Grounding EL 713 – Cols A11-A15, U-W Ceiling Plan and Details," Rev. 43
 45W824-28, "Conduit & Grounding Floor EL 713.0 Details," Rev. 23
 45N824-16, "Conduit & Grounding EL 713.0 Details," Rev. 19
 45W812-3, "Conduit & Grounding Floor EL 708.0 Details," Rev. 15
 45W886-2, "Conduit & Grounding Cable Tray Node Diagrams EL708.0 NV-3, NV-3A, NV-3B, NV-2F," Rev. 13
 2-47W240-3, "Fire Protection Compartmentation-Fire Cells Plan EL 729.0 & 737.0," Rev. 2
 2-47W240-2, "Fire Protection Compartmentation-Fire Cells Plan EL 708.0 & 713.0,' Rev. 3
 2-47W240-1, "Fire Protection Compartmentation-Fire Cells Plan EL 692.0," Rev. 2

OA.1.4 Construction Deficiency Report 391/87-18: Deficiencies in installation of electrical conduit and conduit supports

Procedures, Standards and Specifications:

25402-000-GPP-0000-TI216, "Watts Bar Unit 2 Completion Project Refurbishment Program," Rev. 11
 G-29B, "Material Fabrication and Handling Requirements for Austenitic Stainless Steel," Rev. 25
 N3E-934, Instrument and Instrument Line Installation and Inspection, Revision 8

Design Change Notice (DCNs):

P-01095-B
 P-01094-B

Calculations:

WCG-2-714, "Evaluation of Conduits/Supports for Disposition of Various PERs," Rev. 3

Problem Evaluation Reports (PERs):

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

Walkdown Packages:

WBN2-C-292-817-06

Limited Scope Walkdown Packages (LSWDs):

LSWD-497, "Walkdown of Unique Evaluations for Electrical Conduits and Conduit Supports for PER 143584 and PER 143879," Rev. 3

Closure Reports/Packages:

Open Items/Commitment Completion Form for: PER 143879, Rev. 1. Partial Closure (Engineering Complete) of Commitment 114113668 Dated: 8/22/2012
 Open Items/Commitment Completion Form for: PER 144966, Rev. 0. Partial Closure (Engineering Complete) Dated: 2/13/2012
 Open Items/Commitment Completion Form for: 111032056. Partial Closure (Engineering Complete) Dated: 6/19/2012

Miscellaneous Documents:

ICRDS QA Report, Conduit 2-3VC-292-1021A
 ICRDS QA Report, Conduit 2-3VC-292-1024A
 ICRDS QA Report, Conduit 2-3VC-292-1027A
 ICRDS QA Report, Conduit 2-3VC-292-1029A
 ICRDS QA Report, Conduit 2-3AC-292-1383
 ICRDS QA Report, Conduit 2-3VC-292-1384

OA.1.5 Construction Deficiency Report 391/86-59: Qualification of ASCO solenoid valve conduit connector configuration**Procedures, Standards and Specifications:**

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

G-29B, "Material Fabrication and Handling Requirements for Austenitic Stainless Steel," Rev. 25
 N3E-934, Instrument and Instrument Line Installation and Inspection, Revision 8

Drawings:

47A061-13, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 1
 47A061-13A, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 0
 47A061-13B, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 2
 47A061-13C, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 1
 47W600-0-4, "Electrical Instruments and Controls," Rev. 28
 47W600-0-14, "Mechanical Instrument and Controls," Rev. 13
 2-47W600-0-19, "Electrical Instruments and Controls," Rev. 0
 2-47W600-0-135, "Electrical Instruments and Controls," Rev. 1
 2-47W600-0-22, "Electrical Instruments and Controls," Rev. 2
 2-47W600-0-17, "Electrical Instruments and Controls," Rev. 2

Drawing Revision Authorization (DRAs):

53610-005

Engineering Design Construction Release (EDCRs):

53610
 54154

Problem Evaluation Reports (PERs):

PER 144049, "Resistors, Diodes, Terminal Blocks, Fuse Blocks, Relays, Timers, & Other Devices Have Been Added by TVA"

Service Requests (SRs):

773451
 773370

Work Order Packages:

114976229
 110791125

Closure Reports/Packages:

Open Items/Commitment Completion Form for: PER 143758, Rev. 0. Final Closure
 (Engineering Complete) Dated: 6/11/2012

Open Items/Commitment Completion Form for: PERs 143538 and 143701, Rev. 0. Partial
 Closure (Engineering Complete) Dated: 2/28/2012

Open Items/Commitment Completion Form for: 114113692. Final Closure (Engineering Complete) Dated: 5/13/2013

OA.1.6 Violation (VIO) 391/86-21-02: Instrument valves, Foxboro transmitters, and instrument panels not seismically qualified

Procedures, Standards and Specifications:

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

G-29B, "Material Fabrication and Handling Requirements for Austenitic Stainless Steel," Rev. 25
N3E-934, Instrument and Instrument Line Installation and Inspection, Revision 8

Drawings:

47A061-13, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 1

47A061-13A, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 0

47A061-13B, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 2

47A061-13C, "Mechanical Seismic Cat. 1 & 1L Instrument Supports," Rev. 1

47W600-0-4, "Electrical Instruments and Controls," Rev. 28

47W600-0-14, "Mechanical Instrument and Controls," Rev. 13

2-47W600-0-19, "Electrical Instruments and Controls," Rev. 0

2-47W600-0-135, "Electrical Instruments and Controls," Rev. 1

2-47W600-0-22, "Electrical Instruments and Controls," Rev. 2

2-47W600-0-17, "Electrical Instruments and Controls," Rev. 2

Drawing Revision Authorization (DRAs):

53610-005

Design Change Notice (DCNs):

P-01095-B

P-01094-B

Engineering Design Construction Release (EDCRs):

53610

54154

Problem Evaluation Reports (PERs):

PER 144049, "Resistors, Diodes, Terminal Blocks, Fuse Blocks, Relays, Timers, & Other Devices Have Been Added by TVA"

Service Requests (SRs):

773451

773370

Work Order Packages:

114976229

110791125

Limited Scope Walkdown Packages (LSWDs):

LSWD-528, "Flex Conduit Arrangements at Instrument Panels," Rev. 0

Closure Reports/Packages:

Open Items/Commitment Completion Form for: PER 143758, Rev. 0. Final Closure (Engineering Complete) Dated: 6/11/2012

Open Items/Commitment Completion Form for: PERs 143538 and 143701, Rev. 0. Partial Closure (Engineering Complete) Dated: 2/28/2012
 Open Items/Commitment Completion Form for: 114113692. Final Closure (Engineering Complete) Dated: 5/13/2013

OA.1.7 Quality Assurance Records Corrective Action Program

Miscellaneous

Calculation EDQ00299920080002, Rev. 0, "Cable Load Report"
 Calculation EDQ00299920080006, Rev. 11, "Unit 2 Class 1E V3 Cable Ampacity"
 Calculation EDQ00299920080019, Rev. 4, "Electrical Penetration Protection Study"
 DCN 53554, Rev. A, "Replace Ampacity and Voltage Drop Breakages"
 EDCR 52348, Rev. A, "Install/Refurbish Hydrogen Mitigation System," issued 6/12/2009
 EDCR 52363, Rev. A, "Install Components on Unit 2 Panel 2-M-6"
 EDCR 52418, Rev. A, "Install Loose Parts Monitoring System"
 EDCR 53599, Rev. A, "Install Instrument Lines and Instruments"
 ICRDS report, "Cable 2-2PM-67-2445-B," dated 10/4/1990
 ICRDS report, "Cable 2-3M-268-3356," dated 6/3/2009
 ICRDS report, "Cable Tray 0-3TRY-292-1917/1918-A," dated 5/18/1989
 ICRDS report, "Cable Tray 0-4TRY-292-1941/1942-A," dated 8/22/1992
 ICRDS Report, "Junction Box 2-JB-292-1373-B," dated 9/23/1991
 ICRDS Report, "Junction Box 2-JB-293-5029," dated 9/23/1991
 ICRDS Report, "Electrical Conduit 2-3SG-292-769," dated 4/30/2010
 Material Requisition, "EDCR 52348," dated 4/24/2009

OA.1.8 Unresolved Item 05000391/2013613-01, Potential Inadequate Corrective Actions for Piping Misalignment

Work Orders

114325220, WBN-2-Pipe-084-C piping to SYS 084 pump

Miscellaneous

RFI 1447, SYS 084 pump piping flange alignment, 6/26/13

Procedures

25402-000-GPP-000-N3503, Piping Installation, Rev. 5
 25402-000-GPP-0000-N3504, Pipe and Instrument Tubing Supports, Rev. 3
 25402-000-GPP-0000-N3506, Pressure Testing of Piping, Tubing and components, Rev. 10
 25402-000-GPP-0000-N3602, Installation of Rotating Equipment, Rev. 3

OA.1.9 TMI Action Item II.K.3.5: Automatic Trip of Reactor Coolant Pumps During Loss-Of-Coolant Accident (LOCA)

Emergency Operating Instruction 2-E-0, Reactor Trip or Safety Injection, Rev.0000
 Emergency Operating Instruction 2-E-1, Loss of Reactor or Secondary Coolant, Rev.0000
 Emergency Operating Instruction 2-E-3, Steam Generator Tube Rupture, Rev.0000

OA.1.11 IE Bulletin 79-27: Loss of Non-Class 1E Instrumentation and Control Power System Bus during Operation

Miscellaneous

Open Items/Commitment Completion Package, "B1979-27, Loss of Non-Class 1E I&C Power System Bus during Operation - Issue Emergency Procedures," dated 9/23/2013
 Drawing 1-45W703-3, Rev. 46, "125V Vital Battery Board III Single Line – Sheet 3"
 2-AOI-21.02, draft Rev. 0, "Loss of 125V DC Vital Battery Bd II"
 2-AOI-21.03, draft Rev. 0, "Loss of 125V DC Battery Bd III"
 2-AOI-25.01, draft Rev. 0, "Loss of 120V AC Vital Instrument Power Board 2-1"
 2-AOI-25.03, draft Rev. 0, "Loss of 120V AC Vital Instrument Power Board 2-III"

OA.1.12 CDR 391/86-21: Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit Loading

Procedures

MAI-3.1 Rev.25 installation of Electrical Conduit Systems & Conduit Boxes
 G-40 Rev.17 Installation, Modification and Maintenance of Electrical Conduit Cable Trays, Boxes, Containment Electrical Penetration, electrical conductor seal assemblies, Lighting and Miscellaneous Systems

Work Orders

WO 08-957127-004, Modify Supports, dated: 8/25/10
 WO 08-957127-005, Modify supports, dated: 8/18/10
 WO 08-957127-008, Re-torquing wedge bolts dated: 9/14/10
 WO 09-812367-017, Install new conduits and associated supports, dated: 10/4/2009
 WO 09-812367-050, Install new cable, dated: 6/6/11
 WO 11-3451632, CRDR LSWD 542 Sys 070, 236, and 278, dated: 2/2/13
 WO 11-1940255, LEM LSWD 1304 Sys 062, 213, 235, 278, 292, dated: 7/7/13
 WO 11-1044164, LSWD 1304 Cables to be traced, dated: 3/25/13
 WO 11-0886017 Rework/modify/repair cable tray and cable tray supports (Open)

Miscellaneous

ICRDS Report, "Cable: 2PL4789B", dated: 09/24/2013
 Drawing: 48N946-1 Rev 12
 Drawing 48W970-5 Rev. 11 (DRA 52934-009), dated: 12/15/10
 Drawing 48W970-5 Rev. 11 (DRA 52934-010), dated: 12/15/10
 EDCR 52934 Rev. A, dated: 11/20/08
 NRC IR 50-391/87-11 (ML082420096)
 NRC IIR 05000391/2012605 (ML12220A536)
 PER 209946, Dated: 5/26/2010
 SR 785095, Cable Tray Support anchor bolts out of tolerance, dated: 9/25/2013
 WBN Open Item/Commitment Closure Package, Tracking Number: PER 144974

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary feedwater
AI	Action Item
AOI	Abnormal Operating Instruction
ASME	American Society of Mechanical Engineers
B&PV	Boiler and Pressure Vessel
BL	Bulletin
CAP	Corrective Action Plan
CCS	Cooling water system
CDR	Construction Deficiency Report
CFR	<i>Code of Federal Regulations</i>
CS	Containment Spray
DCN	Design Change Notice
EDCR	Engineering Document Construction Release
EOI	Emergency Operating Instruction
EOP	Emergency Operating Procedure
EQ	Environmental Qualification
ERCW	essential raw cooling water
FCR	Field Change Request
FME	Foreign Material Exclusion
FSAR	Final Safety Analysis Report
GL	Generic Letter
ICRDS	Integrated Cable & Raceway Design System
IEEE	Institute of Electrical and Electronics Engineers
IIR	integrated inspection report
IR	inspection report
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
LOCA	Loss-of-Coolant Accident
LSWD	Limited Scope Walk-down
LWR	Light Water Reactor
M&TE	Maintenance and Test Equipment
MCB	Main Control Board
MCCs	Motor-Control Centers
MEL	Master equipment list
MOVs	Motor Operated Values
NCO	Nuclear Central Office
NCR	Non-Conformance Report
NDE	Non-destructive examination
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation (NRC)
PER	Problem Evaluation Report
PT	Penetrate test
PWR	pressurized water reactor
QA	Quality Assurance
QC	Quality Control
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
Rev.	Revision

RPV	Reactor pressure vessel
SAR	Safety Analysis Report
SER	Safety Evaluation Report
SG	steam generator
SMP	Startup Manual Procedure
SR	Service Request
TMI	Three Mile Island
TVA	Tennessee Valley Authority
UNID	Unique identifier
URI	Unresolved Item
V/I	voltage/current
VIO	violation
WBN	Watts Bar Nuclear Plant
WO	Work Order