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

September 30, 2011

Mr. Ashok S. Bhatnagar
Senior Vice President
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Tennessee Valley Authority
6A Lookout Place
1101 Market Street
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SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED INSPECTION REPORT 05000391/2011607

Dear Mr. Bhatnagar:

On August 20, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on September 1, 2011, with Mr. David Stinson 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, with the conditions of your construction permit, and with fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

During this inspection period, your evaluations and methodologies to address issues associated with a number of Corrective Action Programs (CAPs) and Special Programs (SPs) were reviewed by the NRC staff.

Based on the results of this inspection, the enclosed report documents two NRC-identified findings which were determined to involve violations of NRC requirements. However, because these findings were Severity Level IV violations and were entered into your corrective action program, the NRC is treating them as non-cited violations consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest the non-cited violations in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Senior Resident Inspector at the Watts Bar Unit 2 Nuclear Plant.

In accordance with 10 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).

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000391/2011607 w/Attachment

cc w/encl: (See next page)

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Letter to Ashok S. Bhatnagar from Robert C. Haag dated September 30, 2011.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED INSPECTION REPORT 05000391/2011607

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-391
Construction Permit No.:	CPPR-92
Report No.:	05000391/2011607
Applicant:	Tennessee Valley Authority (TVA)
Facility:	Watts Bar Nuclear Plant, Unit 2
Location:	1260 Nuclear Plant Rd Spring City TN 37381
Dates:	July 3 – August 20, 2011
Inspectors:	T. Nazario, Senior Resident Inspector, Construction Projects Branch (CPB) 3, Division of Construction Projects (DCP) Region II (RII) W. Lewis, Resident Inspector, CPB3, DCP, RII J. Lizardi, Resident Inspector, CPB3, DCP, RII J. Seat, Resident Inspector, CPB3, DCP, RII P. VanDoorn, Senior Project Engineer, CPB3, DCP, RII, Sections Q.1.4, C.1.11, OA.1.4, OA.1.15 and OA.1.16 G. Crespo, Senior Construction Inspector, Construction Inspection Branch (CIB) 1, Division of Construction Inspection (DCI), RII, Sections C.1.7, C.1.8, C.1.9, C.1.10, E.1.1, OA.1.2, OA.1.11, OA.1.12, OA.1.13, and OA.1.14 C. Jones, Senior Construction Inspector, CIB1, DCI, RII, Sections C.1.12, OA.1.7, and OA.1.25 T. Steadham, Construction Inspector, CIB3, DCI, RII, Sections OA.1.3, OA.1.5, OA.1.6, OA.1.17, OA.1.18, OA.1.19, OA.1.20, OA.1.21, OA.1.22, OA.1.23, and OA.1.24. D. Harmon, Construction Inspector, CIB3, DCI, RII, Sections OA.1.8, OA.1.9, OA.1.10, and OA.1.26 J. Heisserer, Senior Construction Inspector, CIB3, DCI, RII, Section C.1.13 R. Mathis, Construction Inspector, CIB1, DCI, RII, Sections C.1.9, C.1.10, OA.1.11, OA.1.2, OA.1.13, and OA.1.14 C. Smith-Standberry, Construction Inspector, CIB1, DCI, RII, Sections C.1.9, C.1.10, OA.1.11, OA.1.2, OA.1.13, and OA.1.14 L. Dumont, Construction Inspector, CIB1, DCI, RII, Section C.1.12 P. Heher, Construction Inspector, CPB2, DCP, RII, Section C.1.13 M. Magee, Construction Inspector, CPB4, DCP, RII, Section C.1.14

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

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

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

Inspection Results

- A Severity Level (SL) IV non-cited violation (NCV) of 10 Code of Federal Regulations (CFR) 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," was identified where established measures were not sufficient to assure that purchased equipment conformed to the procurement requirements. Specifically, engineering specifications, for commercial grade dedications of purchased equipment, did not sufficiently identify the acceptance criteria that were necessary for verifying the equipment conformed to the critical characteristics and procurement documents. (Section C.1.13)

- A violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified, in that, passive refurbishment procedures allowed closure of systems without adequately considering cleanliness and appropriate corrective actions for identified conditions. (Section OA.1.16)

- The inspectors concluded that concerns pertaining to several Generic Letters (GLs), Bulletins (BLs), Temporary Instructions (TIs), and construction deficiency reports (CDRs) have been appropriately addressed for WBN Unit 2. These items are closed.

- Other areas inspected were adequate with no findings of significance identified. These areas included various Unit 2 Corrective Action Programs (CAPs)/Special Programs (SPs); electrical systems and components; mechanical systems and components; nuclear welding; nondestructive examination (NDE), commercial grade dedication activities; and refurbishment.

Table of Contents

I. QUALITY ASSURANCE (QA) PROGRAM 6

Q.1 QA Oversight Activities 6
Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure (IP) 35007) 6
Q.1.2 Safety Conscious Work Environment (IP 35007) 6
Q.1.3 Corporate Management Meeting (IP 30050) 7
Q.1.4 Identification and Resolution of Construction Problems (IP 35007) 8

II. MANAGEMENT OVERSIGHT AND CONTROLS 8

C.1 Construction Activities 8
C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls 8
C.1.2 Reactor Pressure Vessel (RPV) Internals and Protection of Installed Plant Equipment during Construction Activities (IP 50053) 9
C.1.3 Pipe Support and Restraint Systems (IPs 50090, 46071, and TI 2512/023) 9
C.1.4 Anchor Bolt Installation (IPs 50090, 46071, and TI 2512/023) 11
C.1.5 Electrical Cable – Work Observation (IPs 51063 and 37002) 13
C.1.6 Observations of Unit 2 New Fuel Receipt Activities (IP 60501) 13
C.1.7 Electrical Components and Systems – Work Observation (IP 51053) 14
C.1.8 Cable Signal Tracing – Work Observation / Cable Issues CAP - Subissue: CCRS (TI 2512/016, IP 51053) 15
C.1.9 Electrical Components and Systems – Work Observation (IP 51053) 15
C.1.10 Electrical Cable – Work Observation (IP 51063) 16
C.1.11 Construction Refurbishment Process – WBN Unit 2 (IPs 37002 and 71111.07) 17
C.1.12 Electrical Components and systems–Work Observation (IP 51053 and 37002). 18
C.1.13 Inspection of Commercial Grade Dedication Programs (IP 43004) 19
C.1.14 Containment Spray Pump Receipt Inspection and Storage (IP 35065 and 51053) 24

IV. OTHER ACTIVITIES 25
OA.1.1 (Discussed) Electrical Conduits and Conduit Supports Corrective Action Program (CAP)(TI 2512/018, IP 51055) 25
OA.1.2 (Discussed) Cable Testing (IP 51063) 26
OA.1.3 (Discussed) Instrument Line CAP (TI 2512/026, IPs 49063 and 49065) 27
OA.1.4 (Discussed) Inspection of Watts Bar Nuclear Plant Moderate Energy Line Break (MELB) Special Program (SP) (TI 2512/040) 28
OA.1.5 (Discussed) Motor Operated Valve Torque Switch and Thermal Overload Relay Bypass Capability Electrical Issues CAP Sub-issue (TI 2512/020, IPs 51051, 51053, and 51055) 29
OA.1.6 (Discussed) NRC Generic Letter (GL) 95-07: Pressure Locking and Thermal Binding of Power-Operated Gate Valves (IP 50073) 31
OA.1.7 (Discussed) Inspection of Watts Bar Nuclear Plant Radiation Monitoring System.. Special Program (TI 2512/041and IP 92702) 32
OA.1.8 CDR (Discussed) CDR 391/83-55 Welds on Structural Steel in Main Steam Valve Rooms (IPs 55100 and 55050) 33
OA.1.9 (Discussed) Welding CAP Sub-issue 12: North/South Valve Rooms (IP 55100 TI 2512/032) 34
OA.1.10 (Discussed) Welding CAP Sub-issue 11: Main Steam Impingement Sleeve (IP 55100 and TI 2512/032) 35

OA.1.11 (Closed) Safety Evaluation Report Supplement 22 (NUREG-0847) - Appendix HH,Item No. 21, Electrical Penetration Assembly (EPA) Test Configuration (IP 51053) 35
OA.1.12 (Closed) Electrical Issues CAP – Sub-issue: Contact and Coil Rating (TI 2512/020) 36
OA.1.13 (Closed) Cable Issues CAP – Sub-issue: Cable Pullbys (TI 2512/016) 37
OA.1.14 (Closed) Electrical Issues CAP – Sub-issue: Flexible Conduits (TI 2512/020) 38
OA.1.15 (Closed) Inspection of Watts Bar Nuclear Plant Microbiologically Induced Corrosion (MIC) SP (TI 2512/039) 39
OA.1.16 (Closed) URI 05000391/2011603-01, Potential Inadequate Coordination of Refurbishment Activities to Assure System Quality (IP 92701) 39
OA.1.17 (Closed) CDR 391/91-09, Limitorque SMB-00 Torque Switch Roll Pin Failures (IP 51055) 41
OA.1.18 (Closed) CDR 391/89-03, Potential Failure of Melamine Torque Switches in Limitorque Actuators (IP 51055) 41
OA.1.19 (Closed) CDR 391/92-03, Limitorque Actuator Failure Caused by Excessive Keyway Depth (IP 51055) 43
OA.1.20 (Closed) CDR 391/87-21, Limitorque Motor Actuator Component Interchangeability (IP 51055) 43
OA.1.21 (Closed) CDR 391/85-49, Inadequate Slope on the Instrument Sense Lines (IP 49065) 44
OA.1.22 (Closed) CDR 391/85-42, Questionable Compression Fittings on Instrumentation Tubing (IP 49065) 45
OA.1.23 (Closed) CDR 391/85-34, Instrumentation Branch Lines may not be Qualified (IP 49065) 46
OA.1.24 (Closed) URI 05000391/2011603-04, Control of Revision to Procedure Used to Perform Valve Testing (IP 50075) 47
OA.1.25 (Closed) Inspection of Electrical Components and Systems – Records (IP 51055) 47
OA.1.26 (Closed) CDR 391/80-111 Faulty Fillet Welds– Piping (IPs 55050,and 57050) 49
OA.1.27 (Closed) SSER 23 Appendix HH Open Item: 76 51

V. MANAGEMENT MEETINGS 51

X.1 EXIT MEETING SUMMARY 51

REPORT DETAILS

Summary of Plant Status

During the current inspection period, 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 (QA) PROGRAM

Q.1 QA Oversight Activities

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

a. Inspection Scope

During this inspection period, the inspectors reviewed problem evaluation reports (PERs), as part of TVA's corrective action program to verify that issues being identified under the corrective action program were being properly identified, addressed, and resolved by TVA.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Generally, the PERs reviewed were properly identified, addressed, and resolved.

Q.1.2 Safety Conscious Work Environment (IP 35007)

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 (ECP) to verify that significant problems were documented under the corrective action program and were being properly identified, addressed, and resolved by TVA.

b. Observations and Findings

No findings of significance 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.

Q.1.3 Corporate Management Meeting (IP 30050)

a. Inspection Scope

This inspection procedure is intended to inform the construction permit (CP) holder of its responsibilities for assuring the acceptable implementation of the QA and Environmental Protection Programs, in addition to informing the CP holder of the NRC's authority and obtaining information from the utility relating to the project.

Background: TVA received a CP for Watts Bar Units 1 and 2 in 1973 under 10 CFR Part 50. Construction continued until 1985, when WBN Unit 1 was thought to be essentially complete and nearly ready to receive an operating license (OL), as documented in NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant (WBN), Units 1 and 2," through Supplement 4. WBN Unit 2 construction was suspended at about that time, with major structures in place and equipment such as reactor coolant system piping installed. On October 13, 1999, TVA filed a request for extension of the completion date for Unit 2, and by letter dated July 14, 2000, TVA informed the NRC that WBN Unit 2 met the NRC's definition for deferred nuclear plant units as described in the Commission's Policy Statement on Deferred Plants, 52 FR 38077 (Oct. 14, 1987). On October 24, 2000, the NRC issued an order extending the Unit 2 construction permit to December 31, 2010.

In August 2007, the TVA Board decided to resume construction of Unit 2, and TVA notified the Office of Nuclear Reactor Regulation (NRR) in accordance with the Commission Policy Statement on Deferred Plants via letter dated August 3, 2007.

On January 29, 2008, TVA submitted a regulatory framework letter for the completion of construction and licensing activities for Unit 2, and on July 7, 2008, NRC issued an order extending the WBN Unit 2 CP completion date to March 31, 2013.

Inspection Activities: Since that time the NRC has held numerous public meetings with varying levels of management both at the site and at NRC offices. During these meetings the NRC and TVA discussed some of the items outlined in IP 30050 (meeting summaries can be found on NRC's public website, http://www.nrc.gov/info-finder/reactor/wb/watts-bar/meeting-summary.html). In addition, the resident inspectors have informed TVA of its responsibilities as the CP holder and of NRC's authority and its inspection program on a continuing basis. These communications have taken place at the highest levels of TVA and Bechtel and have included the QA organization and managers.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

As a result of previous and ongoing efforts in this area, the inspectors concluded that the intent of this procedure has been satisfied not only during the original construction period but also during the current reactivation of WBN Unit 2 as noted above; therefore, this IP is considered closed.

Q.1.4 Identification and Resolution of Construction Problems (IP 35007)

a. Inspection Scope

During this inspection period, the inspectors reviewed the applicant's process for review of licensee event reports (LERs) from Unit 1 for Unit 2 implications. The inspectors also independently reviewed nine LERs that could have potentially affected Unit 2 equipment.

b. Observations and Findings

No findings of significance were identified. A review of the problem description list of LERs showed that most would not have affected equipment. However, the inspector selected nine that may have affected equipment, thus having implications for Unit 2, for review. The applicant has established a process for the licensing group to review each of the LERs for Unit 2 implications. The inspector did not identify any issues that needed to be addressed for Unit 2.

c. Conclusions

An inspection of a smart sample of Unit 1 LERs indicated that no implications for Unit 2 were missed. In addition, TVA plans to continue its review of Unit 1 LERs for implication on Unit 2.

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1 Construction Activities

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

a. Inspection Scope

During the inspection period, 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 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 selected 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 selected 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 selected construction work locations to verify controls to protect the operating unit provided an adequate level of protection and had been properly implemented.

Specific work activities observed included:

- New fuel handling and receipt inspection as discussed in Section C.1.6 in this report

The inspectors also reviewed and inspected activities that the applicant had screened out as not affecting Unit 1. These included, but were not limited to anchor bolt installation activities as identified in Section C.1.3, Pipe Support and Restraint Systems, of this inspection report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate management oversight and controls were in place to identify construction activities which could potentially impact the operating unit, and an adequate level of protection had been implemented.

C.1.2 Reactor Pressure Vessel (RPV) Internals and Protection of Installed Plant Equipment during Construction Activities (IP 50053)

a. Inspection Scope

The inspectors conducted inspections of the RPV storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and inspection (quality control (QC)) procedures were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, Housekeeping, Rev. 8. During the inspection period, the inspectors entered the RPV to observe the condition of the RPV and to ensure that housekeeping measures were in place. Access controls were verified by the inspectors including a review of access logs documenting entry into the RPV.

The following samples were inspected:

- IP 50053 Section 02.01.c - 1 sample
- IP 50053 Section 02.03.b - 1 sample
- IP 50053 Section 02.03.d - 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate controls were in place to protect the RPV, core barrel, and internals during the inspection period.

C.1.3 Pipe Support and Restraint Systems (IPs 50090, 46071, and TI 2512/023)

a. Inspection Scope

The inspectors reviewed a sample of design documents and interviewed personnel associated with the design of pipes and pipe supports. Specifications, drawings, calculations, implementing procedures, and design inputs were among the documents reviewed. Specifically, the inspectors reviewed several drawing revision authorizations,

piping analysis, and pipe support calculations to determine whether the design and design change process were adequately performed and controlled commensurate with the original design. In addition, the inspectors verified that the technical requirements, acceptance criteria, and required documentation were properly specified in design and procurement documents, and that the unverified assumptions were properly closed. The consistency of the design output documents was also sampled as subsequently documented in this inspection report section.

The inspectors reviewed drawings, procedures, and instructions pertaining to pipe support and restraint systems to determine if they had been evaluated and approved by appropriate applicant personnel. The inspectors also conducted interviews with the craft and QC personnel to develop an understanding of the level of knowledge related to the installation of the piping and tubing supports. Interviews related to piping and tubing supports included discussions regarding unistrut pipe clamps and associated tightening requirements. The inspectors also performed work observations to confirm adequate performance of in progress and completed work including unistrut pipe clamp installation, bolt tightening, and QC verification. The inspectors also observed installation equipment to verify proper control and calibration as well as personnel training records. The inspectors assessed whether personnel had the latest revisions of applicable drawings and whether significant modifications to supports had been approved by appropriate personnel. The inspectors witnessed portions of ongoing installation activities for the following pipe supports:

Pipe Support Identification Number	Drawing Revision Authorization	Support Type
H-469-4B-1-3	56214-377, Rev. 0	Rigid Support
2-47A435-13-96	53311-243, Rev. 0	Rigid Support

Pipe supports previously accepted by QC were sampled to verify their compliance with NRC requirements and applicant commitments. The inspectors conducted walkdowns of the following installed safety-related pipe supports:

Pipe Support Identification Number	Drawing Revision Authorization	Support Type
47A450-26-214	52503-127, Rev. 0, 52503-128, Rev. 0	Component Support
47A450-25-43	52503-084, Rev. 0	Component Support

Specifically, the inspectors performed a visual inspection to verify adequate support clearances and installation, and the absence of deformation and corrosion. Independent measurements were also performed to determine whether the installed configuration of pipe supports was consistent with final as-built drawings and whether weld surfaces met the applicable codes and standards. Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 50090 Section 02.01.c – 2 samples
- IP 50090 Section 02.01.d – 2 samples
- IP 50090 Section 02.02.a – 4 samples
- IP 50090 Section 02.02.b – 2 samples
- IP 50090 Section 02.03.a – 4 samples
- IP 50090 Section 02.03.b – 2 samples, pipe supports

- IP 50090 Section 02.03.d – 2 samples of rigid supports, including one small bore line support
- IP 50090 Section 02.03.e – 2 samples of component supports

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The activities observed related to pipe supports were adequate and completed in accordance with applicable drawings and specifications.

C.1.4 Anchor Bolt Installation (IPs 50090, 46071, and TI 2512/023)

a. Inspection Scope

The inspectors reviewed engineering specifications, procedures, and work order (WO) packages associated with the preparation and installation of concrete expansion anchors. The inspectors conducted interviews with the craft, QC, and training coordinators to develop an understanding of the level of knowledge related to anchor bolt and baseplate installation. Interviews related to baseplate and anchor bolt installation focused on: preliminary baseplate hole layout, anchor bolt hole drilling, bolt hole depth and perpendicularity, cleaning requirements, and baseplate installation and anchor setting. Additional discussions covered anchor bolt installations with grouted baseplates, which require the use of sleeve materials (bond breakers) to prevent bonding of the repair material to the anchor and affecting associated torquing requirements. The inspectors also observed ongoing field activities related to the anchor bolt installation. Concrete anchor installation classroom training of craft personnel was also observed. The inspectors performed a detailed review of the G-32 Engineering Specification and Modification/Addition Instruction (MAI)-5.1A thru E for adequacy and to ensure that requirements of the engineering specification were properly translated into the MAI's.

QC-accepted anchors of various bolt diameters were sampled to determine whether their as-built configuration was in compliance with NRC requirements and applicant commitments. The inspectors conducted walkdowns of the following installed safety-related pipe supports:

Pipe Support Identification Number	Drawing Revision Authorization	Number of Anchors Installed
47A450-25-41	52503-004, Rev. 0	5
47A450-25-53	52507-083, Rev. 1	8
47A450-25-56	52507-057, Rev. 1, 52507-058, Rev. 0	2
47A450-25-57	52507-061, Rev. 1, 52507-062, Rev. 1, 52507-063, Rev. 1	8
47A450-25-66	52503-034, Rev. 1, 52503-035, Rev. 2	4
47A450-25-168	52503-073, Rev. 0	6

The inspectors also observed applicable controls of specific processes and activities for anchor bolt installation at various phases of work. Some of the attributes observed include anchor bolt hole drilling, initial installation torque, minimum spacing between bolts, slippage of nut during installation, and material traceability. The work observations included:

Pipe Support Identification Number	Work Order Number	Number of Anchors Installed
2-47A406-387-13	09-952395-031	4
2-47A406-387-14	09-952395-031	4
63-2SISR222-1	110932752	4
63-2SISR232-1	11092752	4
H-555-18-52-2	111156692	4
47A060-26-68	111061025	2
626-4513	110739571	8
2-ISLS-997-5140	08-951354-007	3
2-ISLS-997-5138	08-951354-007	4
2-47A435-12-121	112171721	4
2-47A406-14-70	111059113	4
2-47A560-39-1	111155255	4
74-2RHR-R028	110948054	3
2-ISLS-997-5022	111567759	3
626-4513	110739571	8
47A060-26-27	111061025	4
2-ISIL-997-5138	08-951354-008	4
62-2LCV-R52	111125064	1
2-62A148	111229478	4
2-62A150	111229478	8
2SISR024	111099108	2
47A060-74-4E	111226770	10
2-47A435-13-96	112163021	4

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 50090 Section 02.01.f – 1 sample
- IP 50090 Section 02.03.b – 100 samples, including one hundred concrete anchor installations, and 1 anchor bolt load (pull) tests for support 2-ISLS-998-3735
- IP 50090 Section 02.03.f – 33 samples of anchor as-built verifications
- IP 46071 Section 02.02.a – 100 samples
- IP 46071 Section 02.02.b – 100 samples
- IP 46071 Section 02.01.c – 6 samples
- IP 46071 Section 02.03 – 33 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The activities observed related to anchor bolt installation and verification were adequate and completed in accordance with applicable drawings and specifications.

C.1.5 Electrical Cable – Work Observation (IPs 51063 and 37002)

a. Inspection Scope

The inspectors assessed whether activities relative to safety-related electric cable systems were being controlled and accomplished in accordance with NRC requirements, safety analysis report commitments, and applicant procedures. This was accomplished by inspecting supervision and independent evaluation of work performance, work in progress, and completed work. The inspectors reviewed a portion of cable pull activities associated with WO 111940255, which installed cable 2V2232A from 2-MCC-213-A1/8A to 2-FCV-62-98A.

The inspectors verified that:

- Latest approved revisions were utilized
- Specifications were complete
- Cable tensions were within limits
- Conduit/raceway was acceptable for use
- Cable protection was adequate
- Segregation was maintained
- Cable identification was preserved
- Bending radius was maintained within limits
- Boundary conditions were specified and appropriate
- QC inspectors were present and performing their assigned tasks
- Installation and inspection activities were being documented during the activity

The following sample was inspected:

- IP 51063 2.02.c – 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that adequate measures were in place to ensure the applicant was prepared for the cable pull/push and that procedures were adequate and followed during the pull/push operations, with appropriate QC oversight.

C.1.6 Observations of Unit 2 New Fuel Receipt Activities (IP 60501)

a. Inspection Scope

The inspectors conducted observations of new fuel receipt inspection and storage activities to ensure that they were consistent with applicant fuel handling procedures and regulatory requirements under authority of the 10 CFR Part 70 license. These

observations took place on the refueling floor in the common auxiliary building for Units 1 and 2.

The inspectors observed opening of the shipping containers, radiation and contamination survey of the elements prior to rigging, rigging and removal of the fuel elements from the containers, visual receipt inspection of the elements while suspended from the building crane, lowering of the elements into the appropriate storage locations, visual inspection of the fuel inserts, and reassembly of the empty shipping containers. These observations included storage protection attributes for dust, damage, and flooding, as well as shipping container inspections for external damage, security seal integrity, shock indicator evidence, and loose material and parts. The inspectors also verified that the results of the new fuel inspection activities were properly documented in accordance with the applicable fuel handling procedure, and included a review of manufacturer shipping, regulatory, and quality documents.

The following samples were inspected:

- IP 60501 Section 02.02.a - 2 samples
- IP 60501 Section 02.03 - 2 samples
- IP 60501 Section 02.04 - 2 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate new fuel receipt inspection and storage controls were verified for the inspected samples.

C.1.7 Electrical Components and Systems – Work Observation (IP 51053)

a. Inspection Scope

The inspectors observed construction activities associated with WO110710395 for WBN-2-MISC-292 and conduits 2NM3377K, 2NM3378K, 2NM3367J, 2NM3368J, 2PM9537G, 2PM9539F, and 2PM9573E to verify that conduits installed were as specified and that required identification was properly established and applied. The inspectors reviewed the WO package contents and inspected the daily log for concurrence with work accomplished to verify that proper documentation and procedures were available for the installers. The inspectors interviewed the job foreman to get a clearer understanding of all the aspects of the installation. The inspectors reviewed Field Change Request (FCR) 55551-A for proper documentation of support spacing applied to the conduits for part of the scope inside the Auxiliary Building at elevation 713' close to column lines A12 – A13. The inspectors reviewed Conduit Installation Data Sheets for conduits 2PM9537G and 2PM9539F for QC inspector verification of spacing span (W17). Documents were reviewed are listed in the Attachment.

The following samples were inspected:

- IP 51053 Sections 02.02.d - 7 samples

b. Observations and Findings

No findings of significance were identified. The observed installed conduits were adequately protected from damage, QC inspections were identified as scheduled to be performed prior to completion of the work, and nonconformances were identified and handled in accordance with established procedures.

c. Conclusions

The inspectors concluded that construction activities inside the Auxiliary Building for safety-related conduit installation were adequate.

C.1.8 Cable Signal Tracing – Work Observation / Cable Issues CAP - Subissue: CCRS (TI 2512/016, IP 51053)

a. Inspection Scope

Background: Part of the Unit 2 CAP for the cable sub-issue on the computerized cable routing system (CCRS) will be to signal trace all safety-related and Appendix R cables that are shown as installed in the Integrated Cable and Raceway Design System (ICRDS), but do not have pull cards available or missing QA records. This CAP was developed after TVA determined that inadequate cable installation practices may have caused damage to installed cables. Specifically the CCRS did not have adequate cable information (i.e., as installed length did not match as designed length, routing in CCRS was not correct). TVA replaced the CCRS program with a new program, ICRDS and transferred the data which included Unit 1 and 2 cables. TVA verified and validated the transfer of data to ICRDS program in accordance with TVA Quality Assurance procedures. The purpose of the signal trace is to verify the routing and lengths of cables for comparison with information in ICRDS.

Inspection Activities: The inspectors observed signal tracing construction activities associated with WO111940255 for System 062, Chemical and Volume Control System, for safety related cable 2PL6156B to verify adequacy of implementation. The inspectors witnessed the staff performing the tracing set up following proper peer-to-peer verification procedures and securing the work area.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The signal tracing was effective in identifying actual discrepancies between ICRDS records and actual location of the cable at the opposite end from the originating point.

C.1.9 Electrical Components and Systems – Work Observation (IP 51053)

a. Inspection Scope

The inspectors reviewed Unit 2 construction design and work activities associated with electrical construction activities for overall compliance with NRC requirements and construction license commitments. The inspectors reviewed documentation on Work

Orders WO#09-954179-007, WO#09-952395-008 and WO#09-952395-009 for the installation of conduits 2VC6070B, 2VC5202A, 2VC5203A, 2VC5204A, and 2VC5205A and associated supports 111384966-158 and 111384966-187. The inspectors inspected completed work to verify the installation of four conduits: 2VC5205A, 2PLC5164A, 2PLC5138A, and 2PLC5139A. The inspectors reviewed additional work order package content in WO#09-954179-022 and focused on work daily logs, house-keeping documentation, field change requests (FCRs), methods to address conduit support structures, and material lists. The inspectors reviewed Conduit Installation Data Sheets for conduits 2PM9424D, 2PM9413D, and 2VC6030B for Quality Control inspector verification of completion. The inspectors verified the physical characteristics of the conduits, as well as adequate installation according to construction specifications, drawings, and/or construction procedures. The inspectors reviewed separation criteria to verify that conduits had appropriate physical and electrical separation and independence between redundant conduits. The inspectors reviewed the latest approved revision of applicable construction specifications, drawings, and construction procedures to verify that they were available and used by the installers. The inspectors verified that the work steps were identified and controlled. The inspectors reviewed installed conduits to determine that they were installed in accordance with design and construction specifications, work procedures, and that components were in the correct location, configuration, and orientation.

The following samples were inspected:

- IP 51053 Section 02.01.b – 1 sample
- IP 51053 Sections 02.02.e - 4 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that work order packages, procedures, and completed construction activities inside the Reactor Building for safety related conduit installation were adequate.

C.1.10 Electrical Cable – Work Observation (IP 51063)

a. Inspection Scope

The inspectors conducted direct observations of in-process cable installation activities under Work Order WO 11-094198-001 and interviewed responsible electrical craft workers, quality control inspectors, and construction field engineers. Work Order WO 11-094198-001 included the Raychem splice termination of cable 2PL3041B to motor WBN-2-MTR-030-0176B. The review was performed to verify cables were identified correctly, protected against damage, terminated in accordance with approved engineering documents and work instructions, and maintained proper bending radius. The inspectors reviewed cable entry to terminating point to verify the terminations were identified correctly, located properly, and connected per design documents. The inspectors assessed whether the latest approved revision of applicable construction specifications, drawings and procedures were available and used by the installers. The

inspectors observed the applicant's QC inspectors actively performing their assigned tasks during the installation.

The following sample was inspected:

- IP 51063 Sections 02.02.c - 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that for the observed construction activities inside the Auxiliary Building for the termination of safety related cable were adequate.

C.1.11 Construction Refurbishment Process – WBN Unit 2 (IPs 37002 and 71111.07)

a. Inspection Scope

The inspectors reviewed implementation of the passive refurbishment program. This included reviews of the final results for the essential raw cooling water system (ERCW) system, PERs associated with passive refurbishment, two QA surveillances, and the residual heat removal (RHR) heat exchanger A eddy current test report and the associated tube plugging criteria. In addition, the inspectors reviewed PERs, procedures, and corrective actions implemented for Unresolved Item (URI) 05000391/2011603-01, Potential Inadequate Coordination of Refurbishment Activities to Assure System Quality (also see Section OA.1.16). Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 37002 Section 02.02.d – 2 samples
- IP 37002 Section 02.02.e – 2 samples
- IP 37002 Section 02.02.f – 7 samples
- IP 71111.07 Section 02.02.c.6 & 7 – 1 sample

b. Observations and Findings

The inspectors identified one violation associated with the URI (described in Section OA.1.16). No findings of significance were identified during the other inspections. The applicant conducted adequate inspections, cleaning, and evaluations for the ERCW system. Sufficient sample inspections were performed to reasonably bound the system conditions. The RHR inspection showed that ‘A’ heat exchanger condition was satisfactory requiring no tubes to be plugged.

One problem previously identified associated with the URI was that the wrong WO was identified for evaluation of internal cleanliness of the refueling water storage tank. The applicant conducted a review of all passive inspections and identified this as an isolated case; additionally future inspection of water chemistry was planned for system cleanliness. Therefore, this aspect of the URI was considered minor.

The URI also identified that piping areas had been noted as having problems with cleanliness and/or rust, however, the systems were closed (reassembled) without addressing these problems. One area was piping near valve 2-FCV-1-16 (steam line to the auxiliary feedwater pump). The applicant had disassembled and adequately hydrolazed this piping which was previously inspected by the NRC. The other area (ERCW piping near valves 2-CHK-67-562B and 562D) was flushed and re-inspected. The inspection results showed adequate cleanliness for this piping. The applicant implemented corrective actions for these NRC identified problems. These included procedure changes to disallow inspection waivers for corrosion susceptible systems, require passive inspections to consider general cleanliness, and implement a hold point to require the passive refurbishment group to approve system closure. In addition, the applicant conducted broad reviews for extent of condition and conducted personnel briefings. These corrective actions were considered adequate to address the problems described by the URI, however, a non-cited violation (NCV) was identified (see Section OA.1.16).

c. Conclusions

The passive inspections and cleaning were considered adequate for the ERCW passive components. The tubing in the A RHR heat exchanger met requirements. The applicant implemented thorough and adequate corrective actions for the previously identified URI.

C.1.12 Electrical Components and systems – Work Observation (IP 51053 and 37002)

a. Inspection Scope

The inspectors interviewed construction project engineers and craft workers, examined completed work, observed in-process work, and reviewed documentation for completed installations.

The observations of work were performed to determine: 1) whether work and acceptance testing was guided by documented instructions or drawings; 2) whether installed components were adequately identified and placed in the specified configurations; 3) whether installed equipment and adjacent equipment were protected against possible damage; 4) whether documentation of work was complete and timely; 5) and whether field changes and nonconforming conditions were properly identified and dispositioned. Documents reviewed are listed in the Attachment.

The inspection samples included work performed under the following work packages:

- WO 08-951055-002, Bracing and installation of NIMS component drawers in the main control room
- WO 08-951175-002, Refurbishment of motor on MD Auxiliary Feedwater Pump 2A-A
- WO 08-951177-003, Insulation integrity testing of 6.9 kV power cables to motor for the Centrifugal Charging Pump Motor 2B-B
- WO 08-951178-002, Installation of refurbished motor for Centrifugal Charging Pump 2A-A
- WO 09-951135-004, Rework of electrical components and circuits to eliminate an interference with a containment platform.
- WO 09-952395-013, Electrical work to support replacement of Limitorque actuators on Chemical & Volume Control System valves

- WO 09-954179-010, Installation of electrical conduit and supports
- WO 09-954322-000, Replace DC Motor Starter for Aux. Feedwater Control System Valve FCV-1-51
- WO 110956294, Restoration of electrical circuits (splicing) at an electrical penetration to containment.

The following samples were inspected:

- IP 51053 Section 02.02.d & e – 9 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that in-process and completed work was implemented in accordance with approved instructions and drawings. For the samples reviewed in this inspection, the inspectors concluded that the applicant's requirements and NRC regulations were met.

C.1.13 Inspection of Commercial Grade Dedication Programs (IP 43004)

a. Inspection Scope

The inspectors reviewed procedure NEDP-8, "Technical Evaluation for Procurement of Materials and Services," Rev. 16, to verify that the applicant established adequate controls for performing technical evaluations of items to be dedicated, including review of materials, parts, equipment, and processes for suitability of application as established in Criterion III of 10 CFR Part 50, Appendix B. The inspectors also reviewed NEDP-8 to verify that the applicant had established adequate controls for the acceptance of commercial grade items using the criteria established in Criterion VII of 10 CFR 50, Appendix B.

The inspectors interviewed responsible engineering personnel and reviewed documents and records associated with dedication of commercial grade items for nuclear service to verify that activities associated with commercial grade dedication met applicable regulatory requirements. The inspectors reviewed engineering technical evaluations of commercial grade items to verify the evaluations identified the associated safety functions, postulated failure modes that may adversely affect the safety functions, effects of the equipment failures, and critical characteristics of the equipment that provided reasonable assurance that the items would perform their intended safety function.

The inspectors reviewed procurement data sheet (PDS) documents to verify the requirements of the technical evaluations were correctly translated into specifications for purchase and dedication of commercial grade items. The inspectors reviewed records of quality assurance vendor survey reports and records of receipt acceptance inspection to verify that the applicant had properly developed and implemented a plan for commercial grade dedication. Documents reviewed are listed in the Attachment.

The following inspection samples were reviewed:

- Stock Code BNP886P, Electrical Diode (review included the PDS, Technical Evaluation, and Material Receipt Records)
- Stock Code CEE683Y, Electrical Resistor (review included the PDS and technical evaluation)
- Stock Code BGK149L, Time Delay Fuse (review included the PDS, Technical Evaluation, Material Receiving Report, and Quality Assurance Supplier Audit)
- Stock Code BYM502Y, Cable Splice (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CPT716L, Cable Connector (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CCA090X, Differential Pressure Switch (review included the PDS and Technical Evaluation)
- Stock Code CBM188P, Tubing Caps (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CBK631B, Bearing (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CQE836A, Tubing Nuts (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CAH787V, Belt (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CPY800P, Valve (review included the PDS, Technical Evaluation, and Material Inspection Report)
- Stock Code CBK613D, Bearing (review included the PDS and Technical Evaluation)
- Stock Code CAL753X, Belt (review included the PDS, Technical Evaluation, and Commercial Grade Survey)
- Stock Code CAQ294F, Pulley (review included the PDS and Technical Evaluation)
- Stock Code CKF478V, Lubricant, Grease (review included the PDS and Technical Evaluation)
- Stock Code CEE179A, Valve (review included the PDS and Technical Evaluation)

b. Observations and Findings

.1 Commercial Grade Dedication Packages

Introduction: A Severity Level (SL) IV NCV of 10 CFR 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," was identified where established measures were not sufficient to assure that purchased equipment conformed to the procurement requirements. Specifically, engineering specifications, for commercial grade dedications of purchased equipment, did not sufficiently identify the acceptance criteria that were necessary for verifying the equipment conformed to the critical characteristics and procurement documents.

Description: The inspectors identified the following examples:

1. The technical evaluation and PDS for Stock Code BGK149L, Time Delay Fuse identified "Peak Let Through" and "Energy Let Through" as critical characteristics but did not provide acceptance values for verification. The inspectors

interviewed responsible procurement engineers and learned that in lieu of numeric acceptance criteria, receipt inspectors were expected to accept whatever performance standards were credited by the supplier on the certificate of conformance. Although the technical evaluation credited an audit of the supplier to establish acceptability of the supplier's certificate, the evaluation was not consistent with the results of the audit. The audit documented that the Chinese facility where the BGK149L fuses were manufactured was not visited by the audit team. Based on this result, the applicant's quality evaluation of the supplier's capabilities concluded that the BGK149L fuses must be dedicated after receipt. The capability of the supplier to provide a valid certificate of conformance had not been adequately verified.

2. The PDS for Stock Code CCA090X, Differential Pressure Switch, did not provide legible acceptance criteria for verification of critical dimensions. The PDS directed quality inspectors to extract values for the critical dimensions from a photocopy of vendor literature contained in the PDS package. However, the quality of the copied literature was substantially degraded to the extent that the dimensional information was not legible. In interviews with the inspectors, the applicant's personnel indicated that they have compensated for the difficulty in obtaining needed information by using uncontrolled and unapproved sources such as a vendor's internet website or informally controlled vendor literature. Such sources were not sufficient to assure that the dedication process used acceptance criteria that were validated and approved under a 10 CFR 50, Appendix B quality assurance program.

3. The PDS for Stock Code CBM188P, Tubing Caps, listed material as a critical characteristic. The acceptance criterion in the PDS was to "verify that the material is stainless steel." However, the inspectors noted that detailed instructions were not provided in the PDS, that the technical evaluation provided guidance for QC inspectors to verify stainless steel as "non-magnetic and non yellowish in color." The inspectors determined this method would not adequately verify that a material is stainless steel since many materials other than stainless steel would meet the criteria selected by the applicant.

4. The PDS for Stock Code CQE836A, Tubing Nuts, listed material as a critical characteristic. The acceptance criterion in the PDS was to "verify material is stainless steel at Central Labs. A lab report is to be provided." The PDS specified that Central Labs shall perform destructive sampling, and listed ASTM A479, 316 stainless steel, as the applicable material specification. This specification included both chemical and mechanical property requirements. The lab report provided by Central Labs was a nondestructive testing method that did not verify mechanical properties. In addition, two chemical constituents were outside of the specification limits and the material was accepted without technical justification.

The inspectors determined that this issue was more than minor in accordance with IMC 2517, because it represented an inadequate quality oversight function which, if left uncorrected, could adversely affect the quality of construction, testing, analysis, or records of a safety-related SSC component. The finding was of very low safety significance because the dedicated items had not been placed into nuclear service. No cross cutting aspects were identified by the inspectors. The applicant issued Service Request 401710 to evaluate and correct the identified deficiencies.

Enforcement: 10 CFR 50, Appendix B, Criterion VII, “Control of Purchased Material, Equipment, and Services,” requires, in part, that measures shall be established to assure that purchased material, equipment, and services conform to the procurement documents. Documentary evidence that material and equipment conform to the procurement requirements shall be available at the nuclear power plant and shall be sufficient to identify the specific requirements, such as codes, standards, or specifications met by the purchased material and equipment.

Contrary to the above, the inspectors identified four instances where the applicant failed to assure that purchased items conformed to procurement documents as evidenced by the examples above. The applicant issued Service Request 401710 to evaluate and correct the identified deficiencies. This finding was determined to be a SL IV violation using Section 6.5 of the NRC Enforcement Policy. Because this was a SL IV violation and because it was entered into the applicant’s corrective action program, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000391/2011607-01; Commercial Grade Items Do Not Conform to Procurement Documentation).

.2 Commercial Grade Dedication Program

Introduction: The inspectors identified a URI related to issues associated with the procedure governing the commercial grade dedication program.

Description: The inspectors identified an area of concern that remains unresolved pending further review by NRC and additional information from the applicant. The inspectors identified that procedure NEDP-8 did not comply with the commercial grade dedication requirements in 10 CFR Part 21 and the requirements of 10 CFR Part 50, Appendix B, Criterion III. As a result, the applicant’s commercial grade dedication activities did not properly correlate critical characteristics with safety functions to provide reasonable assurance that a commercial grade item would perform its intended safety function.

10 CFR Part 21 defines critical characteristics, in part, as “those important design, material, and performance characteristics of a commercial grade item that, once verified, will provide reasonable assurance that the item will perform its intended safety function.”

In contrast, NEDP-8 defines critical characteristics for acceptance as “identifiable and measurable attributes/variables of a commercial grade item, which once selected to be verified, provide reasonable assurance that the item received is the item specified.”

Through interviews with applicant personnel, the inspectors confirmed that critical characteristics were selected in order to verify that the item received was the item that was specified. When asked about the difference between the procedure definition of critical characteristics and the requirements of 10 CFR Part 21, TVA procurement engineering personnel noted that the procedure met the guidance of Electric Power Research Institute (EPRI) NP-5652.

In NRC GL 89-02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products," the NRC conditionally endorsed the commercial grade dedication methods described in EPRI NP-5652. In GL 91-05, “Licensee Commercial-Grade Procurement and Dedication Programs,” the NRC provided additional discussion of critical characteristics and emphasized the importance of engineering involvement in the

commercial grade dedication process to assure the suitability of all parts, materials, and services for their intended safety-related applications, as required by Criterion III to 10 CFR Part 50, Appendix B. In 1995, the NRC modified 10 CFR Part 21 to include the current definition of critical characteristics. In Information Notice (IN) 2011-01, the NRC further stated that a commercial grade dedication program could be considered adequate if it met the requirements of 10 CFR Part 21 and uses the acceptance methods described in EPRI NP-5652, as modified by GL 89-02.

In addition, the inspectors identified that Procedure NEDP-8 did not provide adequate guidance for technical evaluations of commercial grade items. The procedure did not provide adequate guidance to assure the suitability of all parts, materials, and services for their intended safety-related applications, as required by Criterion III to 10 CFR Part 50, Appendix B. In addition, the procedure did not provide adequate guidance for the technical evaluations to document how critical characteristics selected provided reasonable assurance that the item would perform it's intended safety function since the procedural definition of critical characteristics did not meet the definition of 10 CFR Part 21. Instead, the procedure used the guidance in EPRI NP-5652 to verify that the item received was the item specified.

The inspectors identified the following examples where the above mentioned problems with procedure NEDP-8 led to a failure to correlate critical characteristics to safety functions to provide reasonable assurance that the item would perform its intended safety function:

(1) The technical evaluation for Stock Code CEE179A, Valve, had pressure retention as its only required safety function. The critical characteristics listed in the PDS were configuration, material, manufacturer, part number, and weight. While these critical characteristics would ensure that the item received was the item ordered, the inspectors determined that there was insufficient documentation to demonstrate that the critical characteristics selected provide reasonable assurance that the item would perform its intended safety function.

(2) The technical evaluation for Stock Code BYM502Y, Cable Splice, listed electrical continuity and prevention of pull out under tension as the safety functions. The critical characteristics listed in the PDS were manufacturer, part number, insulation, wire size, color code, and base material. While these critical characteristics would ensure that the item received was the item ordered, the inspectors determined that there was insufficient documentation to demonstrate that the critical characteristics selected provide reasonable assurance that the item would perform its intended safety function.

(3) The technical evaluation for Stock Code CBM188P, Tubing Cap, identified no safety functions, although it was classified as safety related. After further discussions with the applicant, the inspectors learned that the safety function was pressure retention. The critical characteristics listed in the PDS were material, configuration, nominal dimensions, manufacturer and part number. While these critical characteristics would ensure that the item received was the item ordered, the inspectors determined that there was insufficient documentation to demonstrate that the critical characteristics selected provide reasonable assurance that the item would perform its intended safety function.

(4) The technical evaluation for Stock Code CBK613D, Bearing, listed integrity as a safety function and fracture/seizure as failure modes. The critical characteristics listed in the PDS were part number, manufacturer, material of construction, dimensions, configuration, and workmanship. In order to verify the material of construction, the only requirement was for the inner and outer rings of the bearing to be magnetic. While these critical characteristics would ensure that the item received was the item ordered, the inspectors determined that there was insufficient documentation to demonstrate that these critical characteristics would have ensured that the bearing perform its safety function and would not fail due to fracture or seizure.

(5) The technical evaluation for Stock Code CBK631B, Bearing, did not clearly identify the item's safety function, although design functions were listed, and listed seizure/fracture as postulated failure modes. Without a specified safety function, the inspectors determined that the applicant had insufficient documentation to demonstrate that the critical characteristics selected were adequate to address the item's postulated failure modes.

The applicant could provide no information/documentation that the item received could be verified to meet its intended safety function other than the item received was the item specified.

The applicant issued Service Request 418257 to evaluate the issues.

The inspectors determined that in order to properly evaluate the applicant's disposition of this issue, additional inspection by the NRC would be required to determine if the applicant had other adequate processes in place to provide reasonable assurance that commercial grade items will perform their intended safety function. This issue was identified as URI 05000391/2011607-02, "Commercial Grade Dedication Program."

c. Conclusions

The inspectors identified a SL IV NCV for failure to adequately ensure that commercial grade items conformed to procurement documentation. The inspectors also identified a URI for issues associated with the commercial grade dedication program that require further NRC inspection. Because the inspectors identified an unresolved item with the program itself, further inspection will be needed to fully evaluate the applicant's commercial grade dedication activities.

C.1.14 Containment Spray Pump Receipt Inspection and Storage (IP 35065 and 51053)

a. Inspection Scope

The inspectors conducted a review of the applicant's material and parts receipt and storage warehouse handling of the containment spray pump in accordance with the listed inspection procedures. The inspectors reviewed procurement documents to verify that the applicable technical requirements were identified, along with the QA and storage requirements. Specified documentation and acceptance requirements were verified to have been satisfied in the receipt process, including procedural assurances that any non-conforming conditions would be documented and appropriately addressed. Procurement Engineering Group (PEG) package number WNB2-10-006, Motors,

Containment Spray, Stator Rewind and Motor Disassembly for Transporting Into Plant, Rev. 0, was reviewed by the inspectors

The applicant's receipt inspection facilities were inspected to ensure that the facilities, staff, tools and equipment, procedures, and records retention were sufficient to support quality affecting activities. Receipt inspection activities were observed in order to verify that component identification was present and documented, physical condition was thoroughly evaluated, quality requirements were satisfied, and non-conforming components were identified and segregated. Storage conditions were observed to verify that the component is stored in the proper storage level designation and that all identification was maintained in receipt, transit, and storage. Records were reviewed to verify their availability, content, and condition were sufficient to support item qualification.

Handling activities were evaluated against procedural requirements to ensure that such activities are controlled and performed as specified.

The following samples were inspected:

- IP 35065 Section 02.01.b - one sample
- IP 35065 Section 02.02 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Applicant controls on material receipt and storage were adequate.

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Electrical Conduits and Conduit Supports Corrective Action Program (CAP)(TI 2512/018, IP 51055)

a. Inspection Scope

The inspectors reviewed various completed actions associated with the Electrical Conduit and Conduit Support Corrective Action Program (Conduit CAP) to evaluate the adequacy of the program. During this inspection, the inspectors reviewed calculations, procedures, QA surveillances, qualification records, and design input and output documents. These documents were reviewed to verify whether they were adequate and whether changes to these documents were properly controlled in accordance with Conduit CAP and TVA's Nuclear Quality Assurance Program. Calculation WCG-1-1419, "WBN Seismic/Civil Validation Program Methodology Summary Report," Section B4 and Attachment C5, was reviewed and discussed with the applicant staff to ensure that the relevant TVA design criteria and processes, as described in these parts of the calculation, were appropriately implemented. The inspectors reviewed a sample of design output documents as well as design basis documents. The inspectors held multiple interviews with the applicant staff responsible for the Conduit CAP implementation. The purpose for these interviews was, in part, to determine whether the completed actions were performed in accordance with the Unit 2 Conduit CAP implementation plan description, and to verify that the seismic evaluations associated

with unique attributes of safety-related conduits and conduit supports (e.g., thermal expansion issues, shakespace crossings, overweight conduits, Christmas tree configurations, etc.) were adequately performed.

The inspectors reviewed appropriate sections of the Unit 1 Conduit CAP implementing documents to ensure, in part, that the Conduit CAP bounding critical case attributes were appropriately incorporated on the Unit 2 implementing documents. This was done to ensure, to some extent, that some of the relevant Unit 1 historical problems were being prevented and resolved for Unit 2. WDP-C-3 was also reviewed to ensure consistent implementation of Conduit CAP walkthroughs as well as to verify consistency of seismic design evaluations performed in the field for the as-built configuration and condition of the electrical conduits and supports. The inspectors reviewed several limited scope walkthrough packages to verify that this information was appropriately used in the seismic evaluations performed by engineering personnel. The inspectors also reviewed a sample of qualification records of engineering personnel involved in the walkthroughs to ensure that they had the required training and experience to adequately perform these walkthroughs in accordance to the Conduit CAP commitments. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The inspectors reviewed a sample of actions completed as part of the Conduit CAP implementation. The inspectors concluded that the actions reviewed were performed in accordance with procedures, and that they were documented and completed as required by commitments and NRC requirements; however, further inspection will be required to confirm and verify additional actions and implementation of the Electrical Conduits and Conduit Supports CAP.

OA.1.2 (Discussed) Cable Testing (IP 51063)

a. Inspection Scope

The inspectors observed Tan-Delta Very Low Frequency and insulation resistance testing of cable 2PL754B feeding the Auxiliary Feed Water Pump motor 6.9 kV service conductors. The inspectors checked the calibration dates of the test equipment (Biddle Megger SL model Series 1 Tool#502470 and VLF equipment HVA30 Tool# E44834) used for the cable test. The inspectors reviewed the testing equipment set up at the medium voltage switchgear and at the motor end. The inspectors observed the methods used to record test results. The inspectors reviewed testing procedures, instruction manuals, and test results as they were developed.

The following sample was inspected:

- IP 51063 Sections 02.02.f - 1 sample

b. Observations and Findings

No findings of significance were identified. Insulation resistance testing provided acceptable results (tested to 2,500 volts). The Tan-Delta Very Low Frequency testing proved that phase 'A' and phase 'B' cables were within acceptable limits. However, phase 'C' cable had a very high Tan Delta reading and further review of the cable showed damage in the cable shield at the motor end. The resolution to this phase 'C' cable failure will be resolved as part of WO 08-951176-002.

c. Conclusions

The inspectors concluded that the testing was conducted appropriately and the results provided evidence of a problem with phase 'C' cable.

OA.1.3 (Discussed) Instrument Line CAP (TI 2512/026, IPs 49063 and 49065)

a. Inspection Scope

The inspectors walked down accessible portions of four safety related instrument lines that were installed under WOs 110861074 and 111135812 and reviewed the completed WO packages. The inspectors performed these activities to determine if the completed installations conformed to:

- applicable construction/installation specifications;
- QC inspection requirements;
- work performance procedures; and,
- applicable field drawings contained in the WO.

Specifically, the inspectors measured the instrument lines to determine if they were properly sloped and supported, the correct pipe size, and if the actual field configuration matched the isometric drawings. The inspectors reviewed drawings for three supports to determine if the supports and tubing clips were installed according to the drawings. The inspectors reviewed the completed WO to determine if welding was performed in accordance with ASME Section III requirements.

The inspectors also reviewed documentation for two sensing lines installed under WO 110761135. The inspectors reviewed the documentation to determine if the documentation was clear and legible, if the WO adequately documented the work performed, and if the work performed complied with the applicant's Instrument Line CAP Implementation Plan.

The inspectors walked down one in-progress safety-related modification for the safety injection sensing lines that were being installed under EDCR 52563 to determine if the applicant was effectively controlling the work and if the work was being accomplished according to the design documentation. The inspectors selected one isolation support that was modified from the original design to determine if the change was approved by engineering and that the approval was supported by a revised stress analysis. The inspectors reviewed the stress analysis to determine if the configuration of the installed support was consistent with the stress analysis and if the stress analysis was adequately performed.

The inspectors reviewed PERs related to this CAP to determine if the applicant was identifying issues at an appropriate threshold and entering them into their corrective action program. The inspectors reviewed five PERs to determine if the applicant:

- appropriately prioritized and classified the issues;
- took appropriate short-term corrective actions; and,
- identified appropriate corrective actions commensurate with the significance of the issue.

The inspectors reviewed personnel qualifications of five individuals that performed safety-related work related to this CAP to determine if they were properly trained and qualified in accordance with applicant procedures. Specifically, the inspectors reviewed the qualifications of one pipefitter, one pipefitter foreman, one field engineer, and two quality control engineers.

The inspectors reviewed the results of 16 hydrostatic tests performed under WOs 111511109 and 111519727 for the Emergency Raw Cooling Water system. The inspectors reviewed the WOs to determine if the tests met the applicable piping code and site implementing procedures and if the entire instrument lines were tested from the process piping connections to the instrument lines downstream of the instrument panel isolation valves as required by the applicant's Instrument Line CAP Implementation Plan.

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 49063 Section 02.02 - 1 sample
- IP 49063 Section 02.03 - 1 sample
- IP 49063 Section 02.04 - 1 sample
- IP 49065 Section 02.02 - 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The instrument sensing line CAP activities observed were adequate and completed in accordance with applicable drawings and specifications. Based on this limited review and the outstanding actions by the applicant, no additional conclusion is warranted for this inspection.

OA.1.4 (Discussed) Inspection of Watts Bar Nuclear Plant Moderate Energy Line Break (MELB) Special Program (SP) (TI 2512/040)

a. Inspection Scope

The objectives of this inspection were to evaluate implementation of the MELB SP. This program was established due to the fact that TVA determined that there was inadequate documentation and assurance that design requirements were met to assure MELB criteria were met. The program consists of an iterative process of walk-downs to confirm field conditions relative to flood related commodities (curbs, drains, doors, etc.),

susceptible piping, and safe shutdown equipment locations coupled with calculation being updated as required. The applicant also planned to review previous plant modifications for affects on MELB or the need to modify Unit 2 equipment similar to Unit 1. Appropriate modifications were to be initiated as necessary to provide protection of safe shutdown equipment.

Previous inspections were conducted and documented in NRC Inspection Reports 05000391/2009604, 2010602, 2011602, and 2011603. The applicant's plans were previously shown to be equivalent or exceed those performed for Unit 1. Remaining actions included completion of conduit walk-downs and implementation of modifications. During this inspection the inspectors observed installation of flood channels (curbing) being installed for safety injection and charging pumps. In addition the inspectors reviewed PER 225127, regarding manual operator actions following submergence to confirm appropriate corrective actions were implemented.

b. Observations and Findings

No findings of significance were identified. The required modifications were tracked and in progress.

c. Conclusions

Based on this limited review and outstanding actions by the applicant, no additional conclusion is warranted for this inspection.

OA.1.5 (Discussed) Motor Operated Valve Torque Switch and Thermal Overload Relay Bypass Capability Electrical Issues CAP Sub-issue (TI 2512/020, IPs 51051, 51053, and 51055)

a. Inspection Scope

The inspectors compared the applicant's plan for the Unit 2 motor operated valve (MOV) torque switch and thermal overload relay bypass electrical CAP sub-issue to determine if it was similar to the approach used for Unit 1.

The inspectors reviewed specifications, drawings, procurement documents, design change documents, and work orders to determine if NRC and Safety Analysis Report commitments related to thermal overload and torque switch bypasses were properly translated into the documents for adequate control and installation. The inspectors also reviewed the applicant's plans to test the bypasses to determine if all safety-related aspects of construction specifications, drawings, and work instructions were included in the scope of planned tests and inspections.

The inspectors reviewed specification WB-DC-30-15, Revision 5, "Design Criteria for Motor Operated Valve Thermal Overload and Torque Switch Bypass" to determine if the criteria was consistent with the criteria used for Unit 1. The inspectors reviewed calculation WBN-OSG4-095, Revision 19, "Selection Criteria for MOVs Requiring Thermal Overload Bypass and/or Torque Switch Bypass" to determine if the calculation was consistent with the requirements contained in WB-DC-30-15.

The inspectors reviewed WBN-OSG4-095 to determine if the requirements contained in the calculation were properly translated into an approved design change document,

such as an EDCR or DCN. Specifically, for each MOV identified in the calculation, the inspectors determined if the required bypasses were properly translated into the scope of the design change document. The inspectors reviewed electrical control schematics for 56 MOVs within the scope of the CAP to determine if the required bypasses were properly described on the drawings. For the thermal overload bypasses, the inspectors reviewed the proposed design to determine if the independence requirements of redundant components were met.

The inspectors reviewed procurement and installation documents for four MOVs, 2-FCV-67-83, 89, 103, and 143. The inspectors performed these reviews to determine if the actuators were properly received and inspected by the applicant. Specifically, the inspectors reviewed the procurement documents to determine whether:

- Receipt inspection documents properly and uniquely identified the received actuators; and
- Appropriate torque switch bypass requirements for each actuator were supplied to the vendor prior to fabrication.

The inspectors reviewed the installation documentation to determine if the actuators were installed using qualified procedures and whether the work instructions were appropriate to the circumstances. For the four MOVs identified above, the inspectors walked down the completed installations to determine whether:

- Actuators were installed in accordance with the work procedures and were in the correct location, configuration, and orientation;
- Fasteners were as specified and properly mounted;
- Equipment and item identifications were maintained;
- Status of completion, maintenance, and readiness for preoperational testing was documented;
- Required inspections were performed, recorded, reviewed, and evaluated by qualified personnel; and,
- Required protection was provided after installation (limit switch covers were properly installed).

The inspectors reviewed three change control records to determine if changes to the original design were being appropriately implemented and controlled. To perform this review, the inspectors assessed whether:

- Records associated with design and field changes reflected timely review and evaluation by qualified personnel and were of the type approved for that purpose; and,
- Design changes were subject to adequate design control.

The inspectors reviewed two audit reports related to this CAP sub-issue to determine whether:

- Audit records were sufficient to verify that the intended purpose and scope of the audits were achieved;
- Audit findings were reported in sufficient detail to permit a meaningful assessment by those responsible for corrective action, final disposition, and trending;

- The applicant took proper and timely follow up action on identified deficiencies; and,
- The auditing organization and personnel were independent of the work being audited.

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 51051 Section 02.02c - 1 sample
- IP 51051 Section 02.02e - 1 sample
- IP 51053 Section 02.02e - 1 sample
- IP 51055 Section 02.02c - 1 sample
- IP 51055 Section 02.05 - 1 sample
- IP 51055 Section 02.06 - 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The MOV torque switch and thermal overload bypass electrical CAP sub-issue activities reviewed were adequate and completed in accordance with applicable drawings and specifications. Based on this limited review and the outstanding actions by the applicant, no additional conclusion is warranted for this inspection.

OA.1.6 (Discussed) NRC Generic Letter (GL) 95-07: Pressure Locking and Thermal Binding of Power-Operated Gate Valves (IP 50073)

a. Inspection Scope

The inspectors observed field work activities associated with the modification of two safety-related motor-operated valves (MOVs) to determine if the modifications were similar to the actions taken for Unit 1. Specifically, the inspectors determined if the modifications complied with the applicant's commitments to GL 95-07, "Pressure Locking and Thermal Binding of Powered- Operated Gate Valves."

The inspectors observed a sample of existing safety-related valves being modified to address concerns identified in GL 95-07 to determine if the work was being accomplished in accordance with written documentation that was appropriate to the circumstances. The inspectors interviewed personnel to verify their ability to perform their assigned duties, maintain QA/QC independence, and provide adequate management support for QA/QC functions. The inspectors independently measured the size and location of the holes to determine if the holes were drilled in accordance with the applicable design change document, EDCR 55848. During valve reassembly, the inspectors also inspected the inside of accessible portions of adjacent piping to evaluate the material condition. Documents reviewed are listed in the Attachment.

The following areas were inspected:

- Identification marking, disc hole drilling, and valve reassembly for 2-FCV-063-156A per WO 08-953124-000 and EDCR 55848; and
- Identification marking, disc hole drilling, and valve reassembly for 2-FCV-063-157B per WO 08-953123-000 and EDCR 55848.

For these areas, the inspectors observed the work activities to determine if:

- Installation requirements such as proper location, placement, orientation, alignment, mounting, and flow direction were met;
- Precautions to prevent damage during valve reassembly were followed;
- Appropriate drawings and work procedures were available to installers;
- Installation requirements, construction drawings, specifications, and work procedures were technically adequate and of the latest approved issue;
- Hold points were observed;
- Design changes relevant to the work were appropriately processed through required review and approval routes and were of the latest revision;

The following samples were inspected:

- IP 50073 Section 02.02c - 2 MOV samples in safety-related systems outside the reactor coolant pressure boundary

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Field refurbishment of safety-related piping system active mechanical components was performed per the approved refurbishment program, procedures, and engineering design documents. Additional inspections will be needed to ensure program compliance with GL 95-07.

OA.1.7 (Discussed) Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program (TI 2512/041and IP 92702)

a. Inspection Scope

The inspectors assessed the adequacy of actions taken by the applicant to implement an element of the Radiation Monitoring System Special Program related to documenting calibrations of radiation monitoring instruments.

The inspectors interviewed responsible design engineers and reviewed the following sample of records from the procurement of radiation monitors under Release 77448 of purchase order 77469.

- 25402-011-V1A-HARA-00153-001, General Atomics HARA Acceptance Test and Transfer Calibration Procedure

- 25402-011-V1A-HARA-00154-001, General Atomics HARA Acceptance Test and Transfer Calibration Procedure
- 25402-011-V1A-HARA-00173-001, General Atomics HARA Calibration Procedure Ion Chamber Detectors (04033101)
- 25402-011-V1A-HARA-00175-001, General Atomics HARA Calibration Procedure Ion Chamber Detectors (04033101)

The records were reviewed to determine whether they contained sufficient information to provide traceability for primary calibrations. The inspectors checked for unique identification of calibration sources, calibration reference detectors, measurement devices, and detectors being calibrated. In addition, the records were checked to confirm calibration status of sources and calibration standards were documented and calibration due dates were compatible with dates of use. Records were checked to confirm documentation of test methodologies, accuracy and range of calibration devices, and acceptability of calibration results.

The sampled records provided documentation of primary calibrations of the following Radiation Monitoring System detectors:

- 2-RE-90-271, Upper Containment High Range Monitor
- 2-RE-90-272, Upper Containment High Range Monitor
- 2-RE-90-273, Lower Containment High Range Monitor
- 2-RE-90-274, Lower Containment High Range Monitor
- 2-RE-90-130, Containment Purge Air Exhaust Monitor
- 2-RE-90-131, Containment Purge Air Exhaust Monitor

b. Observations and findings

No findings of significance were identified.

c. Conclusion

The inspectors determined the records of primary calibrations of Radiation Monitoring System equipment reviewed in this inspection met applicable requirements and provided sufficient information to establish traceability to primary standards.

OA.1.8 CDR (Discussed) CDR 391/83-55 Welds on Structural Steel in Main Steam Valve Rooms (IPs 55100 and 55050)

a. Inspection Scope

Background: CDR 391/83-55, "Welds on Structural Steel in Main Steam Valve Rooms," was initiated in September 1983 to address several issues identified on welds in structural steel components in the main steam valve rooms. The welds shown on drawing series 48W1707 and 48W1708 were not in strict compliance with drawing and welding specification requirements.

The corrective actions on Unit 2 included 100 percent re-inspection of all of the structural steel welds in the main steam valve rooms. All full penetration welds received ultrasonic examination. Each weld found to be defective in size, configuration, or depth of penetration was dispositioned on a case-by-case basis.

During the previous inspection period NRC inspectors identified Violation 05000391/2011605-01 dealing with inadequate corrective actions to close this CDR.

Inspection Activities: During this inspection period, the inspectors performed a walk down of the welds located in the North/South valve rooms and interviewed responsible personnel. Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings of significance were identified.

c. Conclusions

The inspection results are too limited to support a conclusion at this time. This item will remain open until after resolution of Violation 05000391/2011605-01.

OA.1.9 (Discussed) Welding CAP Sub-issue 12: North/South Valve Rooms (IP 55100 TI 2512/032)

a. Inspection Scope

Background: The Welding CAP was initiated in mid 1980's to address several welding related issues. Sub-Issue 12, "North/South Valve Rooms," was created to address a concern about welding over cracks in structural steel welds in the North and South valve rooms.

The corrective actions on Unit 1 were visual and ultrasonic (UT) inspection of 236 structural steel welds. Forty-six (46) of these welds required an engineering evaluation to verify acceptability. Four welded connections with higher calculated stresses were also inspected by UT and Magnetic Particle Examination (MT). The MT testing found lamellar tearing that did not meet code acceptance requirements. The lamellar tears were repaired.

Unit 2 valve rooms had identical corrective actions performed. Structural welds received the same Visual Testing (VT) and Ultrasonic Examination (UT) as Unit 1. The applicant had performed UT and MT on fabricated beams located in the South Valve room in a manner identical to Unit 1. A lamellar tear was found and repairs were initiated as documented in Inspection Report 05000391/2011603, Section OA.1.9, however PER 346359 was still open.

Inspection Activities: The inspectors reviewed PER 346359 for compliance with the Corrective Action Program. Also, the inspectors visually examined the repairs of the lamellar tearing associated with the PER mentioned above. Corrective actions were still being implemented on this issue.

b. Observation and Findings

No findings of significance were identified.

c. Conclusions

The inspection results are too limited to support a conclusion at this time.

OA.1.10 (Discussed) Welding CAP Sub-issue 11: Main Steam Impingement Sleeve (IP 55100 and TI 2512/032)

a. Inspection Scope

Background: The Welding CAP was initiated in the mid 1980's to address several welding related issues. Sub-Issue 11, "Main Steam Impingement Sleeve," was created to address a concern about discrepancies in welds on the main steam impingement sleeve by the Unit 1 Auxiliary Building.

The welds on the Unit 1 impingement sleeves were ultrasonically examined and a slugged weld was found. This issue was at first analyzed and determined to be acceptable. However, the applicant later made a determination that the issue was to be repaired.

Inspection Activities: The inspectors visually inspected the existing Unit 2 sleeves looking for evidence of slugging, lack of penetration, or other defects. Also, PER 144160 and SR 407753 were reviewed to verify they met the requirements of the quality assurance program description (QAPD). Corrective actions are still being implemented on this issue. Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings of significance were identified.

c. Conclusions

The reviewed documents for Unit 2 corrective actions met the requirements of 10 CFR Part 50, Appendix B; Bechtel's QA and Special Processes Manuals; TVA's QA Program; and the code of record. Because corrective actions are still being implemented and closure documents have not been prepared, this item will require additional inspection.

OA.1.11 (Closed) Safety Evaluation Report Supplement 22 (NUREG-0847) - Appendix HH, Item No. 21, Electrical Penetration Assembly (EPA) Test Configuration (IP 51053)

a. Inspection Scope

The inspectors reviewed qualification documentation, WO packages, procurement packages, and work activities associated with the Action Items No. 21 of Appendix HH to confirm that EPAs were installed in the tested configuration, consistent with the environmental qualification test report, and that feed-through modules were manufactured by the same company. Verification of the overall compliance to NRC regulatory requirements and construction permit commitments was also performed to ensure that work practices and qualification specification requirements were met. The inspectors reviewed the "Design Qualification Test Report for Electrical Penetration and Feed-through Assemblies for Watts Bar Units 1 & 2", Rev. A and Rev. D, to ensure that the qualification of Unit 1 EPAs was the same test performed in the qualification of Unit 2 EPAs. The inspectors reviewed receipt inspection documents including procurement packages, MRI# 25402-011-MRI-EWM3-0004, Rev. 1 and 4 to verify the vendor of the feed-through modules and the referenced qualification documentation met the applicable requirements. In-process work activities were observed including those associated with WO#111192465, in which inspectors were able to verify the installed configuration of

feed-through module port #4 of penetration assembly 2-PENT-293-0052. The inspectors also reviewed installed component specifications, verified the proper location and mounting of installed components in the field, and compared the configuration with the associated field drawings.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that based on the review of design drawings, procurement packages, work orders, and in-process work observation, the Unit 2 EPAs were tested in the same configuration as Unit 1 as determined by the EQ test reports, and are manufactured by the same company; therefore, this item is closed.

OA.1.12 (Closed) Electrical Issues CAP – Sub-issue: Contact and Coil Rating (TI 2512/020)

a. Inspection Scope

Background: Problem Identification Reports were issued at WBN for deficiencies where the design and procurement of inductive devices contained in the circuits did not consider the inductive load ratings of contacts or the maximum credible voltage available at the device terminals. TVA evaluated these devices at WBN that perform inductive load switching to determine if the contacts had an acceptable current rating and evaluated inductive devices to determine if the coil was qualified for the highest and lowest credible voltages. TVA then issued design output documents to require replacement of any devices that could not be qualified with appropriately rated components. Design changes to install qualified devices were issued and implemented, as required.

Inspection Activities: The inspectors reviewed calculations EDQ00223620080011a, "125 VDC Vital Power Control Voltage Analysis – Unit 2," Rev. 5 and WBPEVAR9005002, "Evaluation of Safety Related Switches and Relay Contact Loads for 125 VDC Circuits" to confirm that evaluations were performed for different types of 125V DC relays. The inspectors reviewed Design Criteria Documents WB-DC-30-27, "AC and DC Control Power Systems – (Unit 1/Unit 2)," Rev. 0031 to evaluate the proper application of these relays. The inspectors reviewed Site Installation Procedure 25402-000-GPP-0000-N3301, "Electrical Equipment Installation," Rev. 3 to determine compatibility with manufacturer and approved standards. The inspectors reviewed calculation WBPEVAR8807028, "Adequacy of Contact-to-Contact and Coil-to-Contact Isolation Between Class 1E and Non-Class 1E Circuits and Class 1E and Special Circuits," Rev. 7 to determine the adequacy of applied voltages and circuit loads. The inspectors reviewed Setpoint and Scaling Document, 2-P-3-148, Rev. 0 and drawings 2-47W610-3-7 Unit 2, "Electrical Control Diagram Auxiliary Feedwater System," Rev. 3 and 2-47W611-3-4 Unit 2, "Electrical Logic Diagram Auxiliary Feedwater System," Rev. 2 to verify actual application of these contact points within the auxiliary feed water system. The inspectors reviewed Service Request #401007 and changes to calculation WBPEVAR9005002 that modified statements identifying precious metal and alloy contact load/life curves as applicable to one manufacturer only. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. In every case except one, the ASCO SB11A pressure switch, the contact ratings were greater than the loads applied. In this one case of the ASCO switch, testing was successfully conducted at twice the voltage and current for 40,000 cycles of operation to verify the adequacy of this component. The application of this ASCO pressure switch is for use in circuits with an inductive load of 0.071 amps at 125 VDC on a contact rating of 0.05 amps at 125 VDC. The inspectors reviewed calculations for the number of cycles associated with the ASCO pressure switches (PS-3-148-B, PS-3-156-A, PS-3-164-A, and PS-3-171-B) associated with the auxiliary feedwater system. The number of cycles was calculated to be a maximum of 4680, which provides ample margin compared to the testing to 40,000 cycles.

c. Conclusions

Based on all the evaluations performed of the contact and coil ratings confirming the adequacy of these components the inspectors concluded that this CAP Sub-issue is complete and closed.

OA.1.13 (Closed) Cable Issues CAP – Sub-issue: Cable Pullbys (TI 2512/016)

a. Inspection Scope

Background: This sub-issue is based on various concerns, conditions adverse to quality documents, and NRC findings related to cable installation and routing. The root cause of these concerns was primarily the absence or incompleteness of specific guidelines in the development of design input or output documents, and in some instances, the lack of procedural details for the installation of cables.

In June 1989, TVA performed a pullback and inspection of electrical cables identifying insulation damage. This damage resulted in exposure of the conductors of five instrumentation cables in the Unit 2 Reactor Protection System. Laboratory analysis confirmed TVA's initial assessment that the damage occurred as result of cable pullby. During the scope assessment effort, additional cables were removed and additional damage was found. Non-pullby jacket damage to coaxial cables was identified during this activity.

Inspection Activities: A previous inspection documented in NRC Inspection Report 05000391/2010604 documented the inspector's programmatic review of the CAP sub-issue. The inspectors reviewed Watts Bar Nuclear Plant Cable Pullbys CAP – Closure Report to determine the adequacy of the implementation program to resolve the deficiencies associated with cable pullbys sub-issue. The inspectors reviewed Work Orders WO#10-951137-001, WO#10-9511137-002, and WO#10-951137-009 to confirm that all pullby breakages were properly identified and a work plan was established to the resolution of this CAP Sub-issue. The inspectors reviewed calculation EDQ00299920080021 Rev. 000 to verify that the approach used for Unit 1 to resolve the pullby issue is in use to resolve the issue for Unit 2.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that calculations and scheduled work procedures developed for addressing the Cable CAP Pullbys were proper to address the concerns associated with this Sub-issue. This corrective action program sub-issue is closed.

OA.1.14 (Closed) Electrical Issues CAP – Sub-issue: Flexible Conduits (TI 2512/020)

a. Inspection Scope

Background: Significant Conditions Reports, a Condition Adverse to Quality Report, and maintenance requests identified problems associated with the installation of flexible conduits at WBN. The identified problems were the inadequate length to account for seismic/thermal movement, the lack of compliance with minimum bend radius requirements, and loose fittings. On Unit 2, the approach for resolution of these issues will follow that of Unit 1. Specification G-40 (Reference TVA installation specification G-40, Section 3.2.6.3, Rev. 15) has been revised to address the identified problems listed above. Calculations have been developed that provide a list of flexible conduits attached to Class 1E pipe mounted devices to identify those flexible conduits which would experience both seismic and thermal movement. Work plans were initiated and walk downs were performed of all Class 1E flexible conduits and those found to be damaged or in noncompliance with the design documents are scheduled to be reworked.

Inspection Activities: The inspectors reviewed the applicant's Flexible Conduit Installations (CP 5.1) Closure Report, Revision 000. The inspectors reviewed Unit 2 Construction Project Procedure – 25402-000-GPP-0000-N1601, Systems Completion and Turnover, Rev 0005, which tracks walkdown discrepancy items prior to start-up turnover. This includes problems with the installation of flexible conduits. The inspectors reviewed a sampling of completed QA assessment, self assessment performed by the applicant related to this CAP sub-issue including walkdowns, and DCN and EDCR reports written documenting problem conditions. The inspectors reviewed samples of walk down results that identified flexible conduits that did not comply with the revised engineering documents. The inspectors performed walkdowns to verify the accuracy and completeness of applicant walkdown reports and to identify any additional deficiencies not addressed by the applicant's resolution activities. The inspectors reviewed historical PERs associated with the flexible conduit installation activities.

The inspectors reviewed the applicant's Significant Corrective Action Report WBSCA940041, Rev. 3 which identified 23 flexible conduits that exhibited bends radius errors and the corrective actions identified to resolve each of these cases. The inspectors reviewed newly installed flexible conduit to verify that the installation was in compliance with Specification G-40, Rev. 15. In addition, the inspectors reviewed instructions provided for the installation of scaffolds throughout the construction site and the applicant's QC inspection requirements and provided training to avoid any damage to flexible conduits due to the scaffold structure assemblies.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that walkdowns and scheduled work procedures developed to address the Electrical Issues CAP – Sub-issue on flexible conduits were adequate. This corrective action program sub-issue is closed.

OA.1.15 (Closed) Inspection of Watts Bar Nuclear Plant Microbiologically Induced Corrosion (MIC) SP (TI 2512/039)

a. Inspection Scope

The objectives of this inspection were to evaluate the implementation of the MIC SP. This program was established due to the fact that TVA had discovered MIC in Unit 1 piping and initiated special controls and monitoring. The applicant determined that similar actions were appropriate for Unit 2 piping not yet incorporated into the program. The applicant's planned actions included establishing minimum wall thickness requirements for those systems identified as potentially affected by MIC, determining MIC-susceptible locations, establishing grids for inspection locations, completing modifications to allow flushing similar to Unit 1, and updating program documents. A previous inspection documented in NRC Inspection Report 05000391/2010602 concluded that the applicant's planned actions were equivalent to Unit 1 except no inspections were planned for Unit 2 systems based on raw water system studies. An additional inspection reviewed a QA surveillance; reviewed samples of the specific grid location guidance for corrosion monitoring; and confirmed that the required modifications for MIC were scheduled. That inspection was documented in Report 05000391/2011602. An inspection documented in Report 05000391/2011603 covered field observations to verify that flushing modifications had been implemented in accordance with EDCR 54903-A. During this inspection the inspectors observed eight MIC inspection grids installed on the ERCW system. The remaining inspection activity includes verification that system chemistry controls are established for MIC prevention on Unit 2 systems.

b. Observations and Findings

No findings of significance were identified. The applicant had implemented or was tracking all actions required for the MIC Special Program.

c. Conclusions

This inspection completes the planned inspections for this Special Program, with exception of chemistry controls which will be covered in a planned operational readiness inspection. This program is closed.

OA.1.16 (Closed) URI 05000391/2011603-01, Potential Inadequate Coordination of Refurbishment Activities to Assure System Quality (IP 92701)

a. Inspection Scope

The inspectors reviewed PERs, procedures, and corrective actions implemented for Unresolved Item (URI) 05000391/2011603-01, Potential Inadequate Coordination of Refurbishment Activities to Assure System Quality, to verify the adequacy of the applicant's resolution for the URI.

b. Observations and Findings

The inspectors identified the following violation:

Introduction: A violation of 10 CFR 50, Appendix B, Crierion V, "Instructions, Procedures and Drawings," was identified, in that, passive refurbishment procedures allowed closure of systems without adequately considering cleanliness and appropriate corrective actions for identified conditions.

Description: Previous inspections identified the potential for inadequate coordination to assure the passive refurbishment process was adequate. Two areas were noted where the applicant had closed (reassembled) the piping system without adequately addressing system quality regarding cleanliness and corrosion. These involve the piping near valve 2-FCV-1-16-A (Main Steam piping to the Auxiliary Feedwater pump) and ERCW containment penetrations (ERCW piping near valves 2-CHK-67-562B and 562D). On July 15, 2011 the inspectors determined that problems which had been previously identified were the result of procedure inadequacies, in that, the procedure allowed closure of systems without adequate corrective actions for observed conditions and procedures did not adequately consider general cleanliness requirements. These problems resulted in the possibility of systems being placed into operations without meeting the cleanliness criteria and containing detrimental corrosion products. The applicant had implemented appropriate corrective actions for these problems at the time of the final inspection (see Section C.1.11).

This violation is more than minor because it represented an inadequate procedure that if left uncorrected, could have adversely affected quality of safety related systems. This problem is of very low safety significance since no safety-related system was found that did not meet design requirements. No cross cutting aspect was identified.

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," requires, in part, that "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances". Contrary to the above, passive refurbishment procedures failed to adequately address general cleanliness criteria and failed to require corrective actions for observed conditions prior to system closure. This finding was determined to be a SL IV violation using Section 6.5 of the Enforcement Policy. Because this was a SL IV violation and it was entered into the corrective action program as PER 352596, this violation is being treated as a NCV consistent with Section 2.2.2 of the NRC Enforcement Policy: NCV 5000391/2011607-03, Procedure Inadequacies for Passive Refurbishment.

c. Conclusions

The applicant implemented thorough and adequate corrective actions for the URI. This URI is closed.

OA.1.17 (Closed) CDR 391/91-09, Limitorque SMB-00 Torque Switch Roll Pin Failures (IP 51055)

a. Inspection Scope

Background: In June, 1991, the applicant notified the NRC of a 10CFR Part 21 concern related to Limitorque SMB-00 torque switches. TVA determined that Limitorque SMB-00 torque switches with potentially defective roll pins were installed on safety related valve actuators.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. The inspectors reviewed the FSAR, system descriptions, and calculations that identified the unit identification numbers (UNIDs) for safety-related MOVs. The inspectors compared this list to the scope of actuators that the applicant intended to replace to determine if the applicant's scope was adequate. The inspectors selected a sample of MOVs and reviewed purchase orders and receipt inspections to determine if the applicant procured new actuators. While on-site, the inspectors performed field walkdowns and recorded the actuator serial numbers to determine if the correct actuators were installed for each MOV sampled. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. As part of the Unit 2 refurbishment project, the applicant initiated Material Requisition No. 25402-011-MRA-JV15-00005 to purchase new actuators for all safety related motor operated valves and EDCRs 54850, 54851, and 54852 to install the actuators.

c. Conclusions

The inspectors concluded that the applicant had an adequate program in place to ensure that all safety related actuators would be replaced. If properly implemented, the existing actuators with potentially defective torque switch roll pins will be removed from all safety related systems. The inspectors continue to review applicant actions to replace and test safety related MOV actuators as part of the ongoing GL 89-10 inspection activities. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/91-09 is closed.

OA.1.18 (Closed) CDR 391/89-03, Potential Failure of Melamine Torque Switches in Limitorque Actuators (IP 51055)

a. Inspection Scope

Background: In February, 1989, the applicant notified the NRC of a 10CFR Part 21 concern related to Limitorque torque switches supplied in certain SMB-00 and SMB-000 actuators with serial numbers lower than 233218 and 354839, respectively. TVA determined that potentially defective torque switches were installed on safety related valve actuators.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. The inspectors reviewed the FSAR, system descriptions, and calculations to identify the UNIDs for safety-related MOVs. The inspectors compared this list to the scope of actuators that the applicant intended to replace to determine if the applicant's scope was adequate. The inspectors selected a sample of MOVs and reviewed purchase orders and receipt inspections to determine if the applicant procured new actuators for the selected UNIDs.

While on-site, the inspectors performed field walkdowns and recorded the actuator serial numbers to determine if the correct actuators were installed for each MOV sampled. The inspectors also reviewed procurement documents to determine if the applicant allowed melamine torque switches to be used in any of the safety related applications. The inspectors reviewed receipt inspection paperwork for nine new actuators to determine if the manufacturer's documentation certified that the torque switches were manufactured from an environmentally qualified nuclear grade material. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. As part of the Unit 2 refurbishment project, the applicant initiated Material Requisition No. 25402-011-MRA-JV15-00005 to purchase new actuators for all safety related motor operated valves and EDCRs 54850, 54851, and 54852 to install the actuators. The applicant provided the requirements for safety related actuators in specification 25402-011-3PS-MUMA-00001. Paragraph 7.2.3 of this specification required that the torque switches be manufactured of fibrite material and be environmentally qualified for use inside containment.

The inspectors reviewed POs 25157 and 44823 which were used to order new actuators from Limitorque and complete valve and actuator assemblies from a valve manufacturer, respectively. Both POs required compliance with specification 25402-011-3PS-MUMA-00001. Limitorque documentation of actuators supplied from both POs indicated that the torque switches were QC verified to be nuclear grade materials. Additionally, the certificates of compliance from Limitorque stated that the actuators complied with the requirements of specification 25402-011-3PS-MUMA-00001 without taking exception to the torque switch material requirements.

c. Conclusions

The inspectors concluded that the applicant had an adequate program in place to ensure that all safety related actuators would be replaced. If properly implemented, the existing actuators with potentially defective torque switches will be removed from all safety related systems. The inspectors continue to review applicant actions to replace and test safety related MOV actuators as part of the ongoing GL 89-10 inspection activities. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/89-03 is closed.

OA.1.19 (Closed) CDR 391/92-03, Limitorque Actuator Failure Caused by Excessive Keyway Depth (IP 51055)

a. Inspection Scope

Background: In February, 1992, the applicant notified the NRC of a failure of valve 1-FCV-72-21B. The applicant determined that the keyway in the motor pinion gear was cut too deep for the size key installed which allowed the motor pinion gear to rotate on the motor shaft. The failure of this connection would result in the loss of electrical operation of the actuator.

The applicant contacted the manufacturer who determined that this issue affected only a certain lot of 41-tooth motor pinion gears. Based on record reviews, the applicant determined that the only actuators installed on Unit 2 with 41-tooth motor pinion gears were installed on MOVs 2-FCV-72-21B and 2-FCV-72-22A.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. The inspectors reviewed procurement documents, design change documents, and completed work orders to determine if the applicant adequately addressed the issues identified by this CDR.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. The applicant purchased new actuators for 2-FCV-72-21B and 21A on PO 25157-1 and replaced both actuators under WO 111154697 on April 21, 2011, as required by EDCR 54851. Because these actuators are new, they do not contain motor pinion gears from the same defective lot from February 1992.

c. Conclusions

Because the applicant replaced both actuators with potentially defective motor pinion gears with new actuators, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/92-03 is closed.

OA.1.20 (Closed) CDR 391/87-21, Limitorque Motor Actuator Component Interchangeability (IP 51055)

a. Inspection Scope

Background: In September, 1987, the applicant notified the NRC of a deficiency with the applicant's configuration control of Limitorque actuators. The applicant identified several instances where actuator parts, settings, and entire actuators were not properly controlled leading to a generic concern with a loss of configuration control of safety related Limitorque actuators. To address the issue, the applicant initiated a program to inspect and test all safety-related actuators to restore adequate configuration control but did not complete these activities for Unit 2.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. The inspectors reviewed the FSAR, system descriptions, and calculations to identify the UNIDs for safety-related MOVs. The inspectors compared this list to the scope of actuators that the applicant intended to replace to determine if the applicant's scope was adequate. The inspectors selected a sample of MOVs and reviewed purchase orders and receipt inspections to determine if the applicant procured new actuators. While on-site, the inspectors performed field walkdowns and recorded the actuator serial numbers to determine if the correct actuators were installed for each MOV sampled.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. As part of the Unit 2 refurbishment project, the applicant initiated Material Requisition No. 25402-011-MRA-JV15-00005 to purchase new actuators for all safety related motor operated valves and EDCRs 54850, 54851, and 54852 to install the actuators. Each actuator has a unique serial number and valve identifier stamped to a metal nameplate which is riveted to the actuator housing.

c. Conclusions

The inspectors concluded that the applicant had an adequate program in place to ensure that all safety related actuators would be replaced which would ensure adequate configuration control. Work orders contain adequate controls to ensure that each actuator is installed on the valve for which it is designed. If properly implemented, the existing actuators with unknown configurations will be removed from all safety related systems. The inspectors continue to review applicant actions to replace and test safety related MOV actuators as part of the ongoing GL 89-10 inspection activities. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/87-21 is closed.

OA.1.21 (Closed) CDR 391/85-49, Inadequate Slope on the Instrument Sense Lines (IP 49065)

a. Inspection Scope

Background: In October, 1985, the applicant notified the NRC of a deficiency with complying with the minimum slope requirements for numerous instrument sensing lines. The applicant found numerous sensing lines that did not conform to the minimum slope requirements as specified in TVA drawings. The applicant considered this a generic concern that likely existed in the majority of installed sensing lines. The applicant determined that the major contributing factors that caused this problem were unclear design requirements and poor installation requirements and techniques.

As a result of several concerns related to improper instrument sensing line installation, including this CDR, the applicant developed the Instrument Line CAP to address all of the identified deficiencies related to instrument sensing line installation.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by this CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. As described in Inspection Reports 05000391/2010-604, 2010-605, 2011-604, and Section OA.1.3 of this report, the inspectors previously reviewed the applicant's actions related to improper instrument sensing line slope. Specifically, the inspectors independently measured the slope of over 24 instrument sensing lines to determine if the installation requirements and techniques adequately ensured conformance with the applicable drawings and specifications. The inspectors also reviewed design requirements to determine if they were clear and if appropriate recurrence controls remained in place. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the applicant had an adequate program in place to ensure that all safety related instrument sensing lines would be inspected and reworked as necessary. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/85-49 is closed.

OA.1.22 (Closed) CDR 391/85-42, Questionable Compression Fittings on Instrumentation Tubing (IP 49065)

a. Inspection Scope

Background: In September, 1985, the applicant notified the NRC of a deficiency with the installation of compression fittings in safety related instrument sensing lines. As a result of this issue, the applicant sampled 107 compression fittings and determined that the installation problems were the result of inadequate procedures and inadequately trained personnel. The applicant also determined that hydrostatic testing was an adequate method to identify unacceptable compression fittings.

As a result of several concerns related to improper instrument sensing line installation, including this CDR, the applicant developed the Instrument Line CAP to address all of the identified deficiencies related to instrument sensing line installation.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. As described in Inspection Report 05000391/2011604, the inspectors reviewed procedures that controlled the installation of instrument sensing lines that included compression fittings and reviewed the scope of instrument sensing lines that will be inspected and refurbished under the Instrument Line CAP.

The inspectors also reviewed training records to determine if workers who installed instrument sensing lines received training on compression fittings and that the training met the requirements of applicable site specifications and procedures. The inspectors also reviewed the applicant's actions to hydrostatically test lines containing compression

fittings and inspected a sample of 16 lines that were hydrostatically tested. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that the applicant provided adequate training and procedures to properly install, inspect, and test compression fittings. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/85-42 is closed.

OA.1.23 (Closed) CDR 391/85-34, Instrumentation Branch Lines may not be Qualified (IP 49065)

a. Inspection Scope

Background: In September, 1987, the applicant notified the NRC of a deficiency with the installation of seismic supports on instrument branch lines. Some instrument lines were not properly routed between the process root valve connection and the first seismic support. As a result, the instrument lines were not seismically analyzed in their as-built configuration.

As a result of several concerns related to improper instrument sensing line installation, including this CDR, the applicant developed the Instrument Line CAP to address all of the identified deficiencies related to instrument sensing line installation.

Inspection Activities: During an in-office inspection, the inspectors reviewed the issues identified by the CDR and the corrective actions taken or planned by the applicant to address the issues to determine if those actions adequately addressed the original issues. As described in Inspection Reports 05000391/2010-604 and 2010-605, 2011-604, the inspectors previously reviewed the applicant's actions related to the proper installation of instrument lines and their supports. These reviews included reviewing the as-built configuration of the lines to determine if they conformed to the seismically analyzed configuration.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the applicant had an adequate program in place to ensure that all safety related instrument sensing lines would be inspected and reworked to ensure the seismic qualification of safety related instrument sensing lines. Therefore, the inspectors concluded that the applicant has adequately addressed the issues identified by this CDR. CDR 391/85-34 is closed.

OA.1.24 (Closed) URI 05000391/2011603-04, Control of Revision to Procedure Used to Perform Valve Testing (IP 50075)

a. Inspection Scope

The inspectors reviewed the events and circumstances surrounding the documentation issues related to WO 111485321, 0-MI-0.006, and PER 338383 as described in URI 05000391/2011603-04. As described in the referenced URI, documents used in the official working copy of the WO did not match the most recent controlled version of the same document.

The inspectors reviewed the related documentation to evaluate the extent to which the applicant's procedures and usage, complied with 10 CFR 50 Appendix B, Criterion V, and its process for controlling procedure revisions and usage. Specifically, the inspectors reviewed the version of the procedure that was used to perform the work to determine if the applicant used the most current version of all procedures and whether any differences between the approved versions used during the actual work were material to the successful completion of the test. The inspectors reviewed PER 338383 to determine if the applicant's corrective actions were commensurate with the significance of the issue. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Corrective actions related to the issues identified by PER 338383 were appropriate to the significance of the issue. This URI is closed.

OA.1.25 (Closed) Inspection of Electrical Components and Systems – Records (IP 51055)

a. Inspection Scope

Background: In 2007, TVA initiated a construction completion project for Watts Bar Unit 2 approximately 17 years after the initial construction effort was stopped. Subsequently, the NRC conducted a review to reconstitute the status and adequacy of historical NRC inspections of the original construction project. As documented in Inspection Report 05000391/2009602, the review determined that sufficient inspections had been documented under IP 51055 to verify adequate quality of electrical construction records related to record control, receiving, storage, installation, construction testing, personnel qualifications, non-conformance and deviation, and audits. The review determined that additional inspections must be performed for IP 51055 Section 02.05, "Change Control Records." In order to obtain sufficient inspection samples under Section 02.05, inspectors were to sample an additional five Design Change Notices (DCNs) and five Engineering Document Construction Releases (EDCRs).

Inspection Activities: In this inspection, inspectors conducted an evaluation to determine whether the required number of additional inspection samples have been documented as guided by IP 51055. The inspectors reviewed the results of inspections that have been performed since May 2009 to determine whether the required samples of EDCRs

and DCNs have been obtained and whether any issues of significance were found with the records reviewed.

b. Observations and Findings

No findings of significance were identified. The following inspection reports were found to provide evaluations of records for EDCRs and DCNs.

- Inspection Report 05000391/2009604:
  DCN 51125, Modify MDAFP start circuit to improve seal-in function
  DCN 52285, Add New Unit 2 Vital Inverters
  DCN 53334, Replace 480V Cables that exhibit Ampacity and Voltage Drop Breakages
  EDCR 52862, Issue U2 control and logic diagrams for Systems 062, 063, 0068, 072, 074, 088, 094, and 099
  EDCR 53226, Add seal-in feature to MDAFWP start circuits

- Inspection Report 05000391/2010603:
  DCN 51154, Modify Reset Logic for Radiation Monitors
  EDCR 54796, Install Fuses for Radiation Monitoring System, etc.
  EDCR 54798, Install Fuses for 120 VAC Vital AC, etc.
  EDCR-2-55127, Resolve physical internal cable separation and electrical isolation breakages

- Inspection Report 05000391/2010604:
  EDCR 52938, Evaluation of Unit 2 One Hole Clamp Conduit Supports for Span Limits

- Inspection Report 05000391/2010605:
  DCN-F-17798-A, Delete Cable Numbers and Reassign Cable Numbers from Splice to Pressurizer Heaters
  EDCR 53287, Replace safety-related Class 1E MCC buckets and feeder breakers in existing compartments of MCC 480V Reac MOV BD 2A1-A
  EDCR 53292, Replace safety-related Class 1E MCC buckets and feeder breakers in existing compartments of MCC 480V Reac MOV BD 2B1-B
  EDCR 53760, Work scope #2: Pressurizer Heater Ammeter Circuits
  EDCR 54103, Work scope #2: Replacement of Circuit Breakers in Pressurizer Heater Distribution panels
  EDCR 54179, Pressurizer Backup Heater Groups 2A and 2B Electrical Connection Diagram Changes for Addition of Cable Splice Boxes
  EDCR 55116, Support Cables in Vertical Trays and Conduits Identified by Calculation EDQ 00299920090003

- Inspection Report 05000391/2011602:
  EDCR 53293, MCC Bucket and Breaker Replacement
  EDCR 55117, Replacement of Unit 2 Splices

- Inspection Report 05000391/2011603:
  DCN M-21892-A, Replace P&B MDR relays used for 10 primary safety functions
  DCN W-38605-B, Slave relay replacement
  EDCR 53112, Replace P&B slave relays with Westinghouse and Allen Bradley relays

- Inspection Report 05000391/2011605:
  EDCR 55127, Install V4 and V5 cable and conduit as part of the Bulk Cable Pull

- Inspection Report 05000391/2011606:
  DCN 53437, Replacement of 125 V Battery Chargers
  DCN 56341, Operability Restoration of Diesel Cooler ERCW Supply Valves

In summary, the following samples have been completed:

- IP 51055 Section 02.05 (DCN record packages) – 9 samples
- IP 51055 Section 02.05 (EDCR record packages) – 16 samples

In addition to the above information, the inspector's review of inspection reports issued since May 2009 identified that additional inspection samples have been documented for other types of electrical records outlined in IP 51055 as follows:

- Section 02.01 - 1 sample
- Section 02.02.a - 16 samples
- Section 02.02.b - 16 samples
- Section 02.02.c - 151 samples
- Section 02.02.d - 5 samples
- Section 02.04 - 3 samples
- Section 02.06 - 1 sample

c. Conclusions

The inspectors determined that a sufficient number of inspection samples have been completed to evaluate the adequacy of records being generated for construction of electrical components and systems. This item is closed.

OA.1.26 (Closed) CDR 391/80-111 Faulty Fillet Welds– Piping (IPs 55050, and 57050)

a. Inspection Scope

Background: Construction deficiency report 391/80-111, "Faulty Fillet Welds," was created in February 1980 to address several welding related issues. Numerous fillet welds on socket-weld fittings in safety-related systems did not meet ASME code (ASME Boiler and Pressure Vessel Code, 1971 Edition with addenda through summer 1973, Section III, Division 1, Rules for Construction of Nuclear Facility Components) and/or TVA Construction Specification G29M requirements due to insufficient weld metal buildup. This deficiency was originally identified in historical non-conformance reports (NCRs) 2806R, 2091R, 2101R, 2111R, 2120R, 2128R, and 2137R. The Applicant re-inspected 100 percent of socket welds within the scope of this CDR and performed the necessary repairs to meet ASME code of records.

The corrective actions on Unit 2 included re-inspection of all socket welds within the scope of the CDR. The welds which did not have sufficient size were repaired or, if inaccessible, were re-assessed for use-as-is.

Inspection Activities: During this inspection period, the inspectors picked random samples of welds located on several systems. They were examined using mechanical aids (fillet gauges) to verify that the following characteristics conform to ASME BPVC

Section III: appearance, shape, and size of fillet and socket welds; absence of surface defects including cracks, laps, lack of penetration, lack of fusion, porosity, slag, and undercut exceeding prescribed limits; removal of temporary attachments, arc strikes and weld spatter. The following welds were inspected:

System	Weld Number
Essential Cooling Water	2-067D-T280-1 2-067D-T280-3 2-067D-T280-6 2-067D-T280-12
Fire Protection	2-026H-T076-1 2-026H-T076-17
Safety Injection	2-063A-T023-1 2-063A-T023-2 2-063A-T023-3
Residual Heat Removal	2-074A-T034-1 2-074A-T034-2 2-074A-T034-3 2-074A-T034-4 2-074A-T034-5 2-074A-T034-6 2-074A-T034-7 2-074A-T034-8
Reactor Coolant	2-068A-T001-7 2-068A-T001-8
Component Cooling Water	2-070A-T010-1 2-070A-T010-2 2-070A-T010-3

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 55050 Section 02.06 a - 22 samples

b. Observations and Findings

No findings were identified.

c. Conclusions

The socket welds inspected met the requirements of 10 CFR Part 50, Appendix B; Bechtel's QA and Special Processes Manuals; TVA's QA Program; and the code of record. Therefore, due to this and previous inspection activities, documented in NRC Inspection Report 05000391/2011-603 Section OA.1.5, this CDR is closed.

OA.1.27 (Closed) SSER 23 Appendix HH Open Item: 76

a. Inspection Scope

Verify the derivative time constant within the power operated relief valve (PORV) opening control circuit is set to zero in WBN U2 before fuel load.

This item is previously discussed in Inspection Report 05000391/2011605, paragraph OA.1.19. The inspectors reviewed Unit 2 construction design activities for compliance with TMI action item II.K.3.9 and NRC requirements. The inspectors evaluated whether the design commitment was properly translated into design drawings, calculations, and other design documentation of electrical components and associated items for Unit 2. Specifically, drawing 08F802403-FD-2401, "Pressurizer Pressure Controls," Rev. 7, was reviewed. Additionally, the inspectors viewed the controller programming for 2PIC0680340A, Pressurizer Pressure Controller, to confirm the commitment had been fully implemented (i.e. the derivative function had been set to zero, or removed from consideration within the programming calculation).

b. Observations and Findings

No findings of significance were identified. Though the applicant philosophically implemented the same action for Unit 2 as was accomplished for Unit 1, the physical implementation was different. Where Unit 1 employed physical controllers, for which dip switch settings are utilized, and can be visually confirmed, in order to implement the desired change, Unit 2 has installed the Foxboro I/A distributed control system which employs computer logic programming to control this function. The inspectors observed applicant engineering personnel demonstrate that the variable reflecting the derivative constant within the computations was, in fact, zero.

c. Conclusions

The inspectors determined that the PORV control circuit, as it pertains to Watts Bar Unit 2, fully implements the requirements of TMI action item II.K.3.9. The inspectors were able to obtain appropriate design documentation and perform in-field verifications to make this confirmation. Therefore, the inspection efforts associated with SSER23 Appendix HH Open Item 76 are complete and closed.

V. MANAGEMENT MEETINGS

X.1 Exit Meeting Summary

On September 1, 2011, the resident inspectors presented the inspection results to Mr. David Stinson and other members of his staff. Although some proprietary information may have been reviewed during the inspection, no proprietary information was included in this inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant personnel

D. Stinson, Site Vice President, TVA, Unit 2
M. Pitre, Lead Field Welding Engineer, Bechtel Construction
G. Scott, TVA Licensing
R. James, Sr. Civil Engineer, Bechtel
C. Stephenson, TVA Licensing
D. Beckley, Electrical Design, TVA Unit 2
D. Charlton, Licensing, TVA, Unit 2
W. Crouch, TVA Licensing
T. Dunco, Field Engineer, Bechtel
A. Hart, Field Engineer, Bechtel
D. Mather, I&C Design, Bechtel
D. Needham, Electrical Design, Bechtel
G. Reese, Electrical Superintendant, Bechtel
J. Temples, I&C Design, Bechtel
H. Denney, Instrumentation & Controls Engineer, Bechtel
B. Mahoney, Mechanical Construction Manager, Bechtel
A. Bangalore, Licensing Engineer
I. Kahn, Electrical Design Engineer
A. Aboulfaida, Electrical Design Engineer
B. Pittman, TVA Plant Support Engineer
M. Johnson, TVA Plant Support Engineer
M. DiVirgilio, Procurement Engineering, Bechtel, Unit 2
W. Elliott, Engineering, TVA, Unit 2
E. Freeman, Compliance Manager, TVA, Unit 2
M. Haghighi, Project Engineer Manager, PEG, Bechtel, Unit 2
H. Johnson, Procurement Engineering Supervisor, TVA, Unit 1
L. Lynch, Procurement Engineering, Bechtel, Unit 2
J. Rich, Welding Engineer
J. Bowden, QC Weld Inspector
R. Enis, Completion

INSPECTION PROCEDURES USED

IP 30050	Construction Permit Corporate Management Meeting
IP 35007	Quality Assurance Program Implementation During Construction
IP 35065	Procurement, Receipt, and Storage
IP 37002	Construction Refurbishment Process – Watts Bar Unit 2
IP 43004	Inspection of Commercial-Grade Dedication Programs
IP 46071	Concrete Expansion Anchors
IP 49063	Piping - Work Observation
IP 49065	Safety-Related Piping-Records 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 Restrain Systems

IP 51051	Electrical Components and Systems - Procedure Review
IP 51053	Electrical Components and Systems - Work Observation
IP 51055	Electrical Components and Systems - Record Review
IP 51063	Electric Cable – Work Observation
IP 55050	Nuclear Welding General Inspection Procedure
IP 55100	Structural Welding General Inspection Procedure
IP 57050	Nondestructive Examination Procedure Visual Examination Procedure Review/Work Observation/Record Review
IP 60501	Fuel Receipt and Storage
IP 92701	Followup
IP 92702	Followup on Corrective Actions for Violations and Deviations
IP 71111.07	Heat Sink Performance
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/018	Inspection of Watts Bar Nuclear Plant Electrical Conduit and Supports Corrective Action Program Plan
TI 2512/020	Inspection of Watts Bar Nuclear Plant Electrical Issues Corrective Action Program Plan
TI 2512/023	Inspection of Watts Bar Nuclear Plant Hanger Update Corrective Action Program Plan
TI 2512/026	Inspection of Watts Bar Nuclear Plant Instrument Lines Corrective Action Program Plan
TI 2512/032	Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan
TI 2512/039	Inspection of Watts Bar Nuclear Plant Microbe Induced Corrosion Special Program
TI 2512/040	Inspection of Watts Bar Nuclear Plant Moderate Energy Line Break Special Program
TI 2512/041	Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000391/2011607-02	URI	Commercial Grade Dedication Program (Section C.1.13)

Opened and Closed

05000391/2011607-01	NCV	Commercial Grade Items Do Not Conform to Procurement Documentation (Section C.1.13)
05000391/2011607-03	NCV	Procedure Inadequacies for Passive Refurbishment (Sections OA.1.16)

Discussed

2512/018	TI	Electrical Conduits and Conduits Supports CAP (Section OA.1.1)
51053	IP	Cable Testing (Section OA.1.2)
2512/026	TI	Instrument Line CAP (Section OA.1.3)
2512/040	TI	MELB SP (Section OA.1.4)
2512/020	TI	Motor Operated Valve Torque Switch and Thermal Overload Relay Bypass Capability Electrical Issues CAP Sub-issue (Section OA.1.5)
95-07	GL	Pressure Locking and Thermal Binding of Power-Operated Gate Valves (Section OA.1.6)
2512/041	TI	Inspection of Watts Bar Nuclear Plant Radiation Monitoring System Special Program (Section OA.1.7)
391/83-55	CDR	Welds on Structural Steel in Main Steam Valve Rooms (Section OA.1.8)
2512/032	TI	Welding CAP Sub-issue 12: North/South Valve Rooms (Section OA.1.9)
2512/032	TI	Welding CAP Sub-issue 11: Main Steam Impingement Sleeve (IP 55100 and TI 2512/032 (Section OA.1.10)

Closed

30050	IP	Corporate Management Meeting (QA.1.3)
Open Item 21	SSER 22 (App HH)	EPA Test Configuration (OA.1.11)
2512/020	TI	Electrical Issues CAP – Sub-issue: Contact and Coil Rating (Section OA.1.12)
2512/016	TI	Cable Issues CAP – Sub-issue: Cable Pullbys (Section OA.1.13)
2512/020	TI	Electrical Issues CAP – Sub-issue: Flexible Conduits (Section OA.1.14)
2512/039	TI	MIC SP (Section OA.1.15)

391/2011603-01	URI	Potential Inadequate Coordination of Refurbishment Activities to Assure System Quality (Section OA.1.16)
391/91-09	CDR	Limitorque SMB-00 Torque Switch Roll Pin Failures (Section OA.1.17)
391/89-03	CDR	Potential Failure of Melamine Torque Switches in Limitorque Actuators (Section OA.1.18)
391/92-03	CDR	Limitorque Actuator Failure Caused by Excessive Keyway Depth (Section OA.1.19)
391/87-21	CDR	Limitorque Motor Actuator Component Interchangeability (Section OA.1.20)
391/85-49	CDR	Inadequate Slope on the Instrument Sense Lines (Section OA.1.21)
391/85-42	CDR	Questionable Compression Fittings on Instrumentation Tubing (OA.1.22)
391/85-34	CDR	Instrumentation Branch Lines may not be Qualified (Section OA.1.23)
391/2011603-04	URI	Control of Revision to Procedure Used to Perform Valve Testing (Section OA.1.24)
51055	IP	Inspection of Electrical Components and Systems – Records (Section OA.1.25)
391/80-111	CDR	CDR 391/80-111 Faulty Fillet Welds– Piping (Section OA.1.26)
Open Item 76	SSER 23 (App. HH)	Verify the derivative time constant is set to zero in WBN U2 before fuel load (Section OA.1.27)

LIST OF DOCUMENTS REVIEWED

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.3 Pipe Support and Restraint Systems (IPs 50090, 46071, and TI 2512/023)

Procedures
MAI 5.1A, Expansion Shell Anchors (SSD) Installation, Rev. 7
MAI-5.1B, Wedge Bolt (WB) Anchor Installation, Rev. 21
MAI-5.1C, Undercut (UC) Concrete Anchors, Rev. 14
MAI-5.1D, Thru-Bolt Anchor Installation, Rev. 6
MAI-5.1E, Expansion Shell Anchors (SDI), Rev. 9
MAI-5.4, Concrete Removal, Repair, Grouting, And Dry Packing, Rev. 12
MAI-4.2A, Piping/Tubing Supports, Rev. 17
MAI-4.2B, Pipe Installation, Rev. 10
MAI-4.4A, Instrument Line Installation, Rev. 14

Work Orders
WO 111061025
WO 111059113
WO 111156692
WO 111155255
WO 111364172
WO 111156692
WO111364172

Specifications
Engineering Specification G-32, Bolt Anchors Set in Hardened Concrete, Rev23
Engineering Specification G-43, Installation, Modification, and Maintenance of Pipe Supports and Pipe Rupture Mitigative Devices, Rev 13

Miscellaneous
CDR 50-391/83-06

Calculations Reviewed
Piping Analysis Problem No. N3-67-09R, Rev. 8
Piping Analysis Problem No. N3-67-A75A, Rev. 4
Pipe Support Calculation No. 47A45025043, Rev. 3
Pipe Support Calculation No. 47A45025043, Rev. 3
Pipe Support Calculation 47A45025050, Rev. 2

C.1.4 Anchor Bolt Installation (IPs 50090, 46071, and TI 2512/023)

Procedures
MAI 5.1A, Expansion Shell Anchors (SSD) Installation, Rev. 7
MAI-5.1B, Wedge Bolt (WB) Anchor Installation, Rev. 21
MAI-5.1C, Undercut (UC) Concrete Anchors, Rev. 14
MAI-5.1D, Thru-Bolt Anchor Installation, Rev. 6
MAI-5.1E, Expansion Shell Anchors (SDI), Rev. 9
MAI-5.4, Concrete Removal, Repair, Grouting, And Dry Packing, Rev. 12

MAI-4.2A, Piping/Tubing Supports, Rev. 17
MAI-4.2B, Pipe Installation, Rev. 10
MAI-4.4A, Instrument Line Installation, Rev. 14

Work Orders (WO)
WO 111061025
WO 111059113
WO 111156692
WO 111155255
WO 111364172
WO 111156692
WO111364172

Specifications
Engineering Specification G-32, Bolt Anchors Set in Hardened Concrete, Rev23
Engineering Specification G-43, Installation, Modification, and Maintenance of Pipe Supports and Pipe Rupture Mitigative Devices, Rev 13

Miscellaneous
CDR 50-391/83-06

C.1.7 Electrical Components and Systems – Work Observation (IP 51053)

Work Orders
WO110710395 for WBN-2-MISC-292 to include conduits 2NM3377K, 2NM3378K, 2NM3367J, 2NM3368J, 2PM9537G, 2PM9539F, and 2PM9573E.

Procedures
Modification/Addition Instructions MAI-3.1 Installation of Electrical Conduit Systems and Conduit Boxes, Rev 0018

Miscellaneous
Field Change Request (FCR) 55551-A – WBN2 Construction Completion Project. Project No. 25402

C.1.11 Construction Refurbishment Process – WBN Unit 2 (IPs 37002 and 71111.07)

Miscellaneous
Mechanical Commodity Evaluation Report – Emergency Raw Cooling Water 067
QA Surveillance 25402-WBN-SR-11-1758, System Piping Cleanliness-Programmatic Overview
QA Surveillance 25402-WBN-SR-11-1781, ERCW System 067 Restoration and Layup
RFI 1099, RHR Heat Exchanger A Eddy Current Testing Report, dated 02/03/11
Procedure 25402-3DP-G04G-00090, Engineering Evaluation for Commodity Refurbishment, Rev. 5
PER 297685, Potential Corrosion Near Valves 2-CKV-67-562B and 2-CKV-67-562D May Require Hydrolaze

PERs
PER 352596, NRC URI Passive Refurbishment Inadequate Coordination
PER 347130, Corrosion Found in Piping between 2-FCV-67-111 and Penetration X57A
PER 349123, RWST Tank Exam Report refers to Wrong WO for Internal Cleanliness

PER 350212, Cleanliness Verification Steps Missed for the 2A and 2B Instrument Coolers
PER 355974, Safety Related Valves Assumed to be Construction Complete
PER 355978, System 067 Piping Minimum Wall Violation

C.1.12 Electrical Components and systems – Work Observation (IPs 51053 and 37002)

Problem Evaluation Reports
Service Request 415965, Documented Acceptance Criteria Were Not Sufficient for Determining the Acceptability of Test Results

C.1.13 Inspection of Commercial Grade Dedication Programs (IP 43004)

Procurement Data Sheets
PDS BNP886P, Diode for Electrical Rectifier
PDS CEE683Y, Resistor Assembly for Woodward Governor Control Box
PDS BGK149L, Time delay fuse
PDS BYM502Y, Cable Splice
PDS CPT716L, Cable Connector Kit
PDS CCA090X, Dwyer Differential Pressure Switch
PDS CBM188P, Tubing Caps
PDS CBK631B, Bearing
PDS CQE836A, Tubing Nuts
PDS CAH787V, Belt
PDS CPY800P, Valve
PDS CBK613D, Bearing
PDS CAL753X, Belt
PDS CAQ294F, Pulley
PDS CKF478V, Lubricant, Grease
PDS CEE179A, Valve

Technical Evaluations
Technical Evaluation for Diode BNP886P
Technical Evaluation for Resistor CEE683Y
Technical Evaluation for Time Delay Fuse BGK149L
Technical Evaluation for Cable Splice BYM502Y
Technical Evaluation for Connector CPT716L
Technical Evaluation for Differential Pressure Switch CCA090X
Technical Evaluation for Tubing Caps CBM188P
Technical Evaluation for Bearing CBK631B
Technical Evaluation for Tubing Nuts CQE836A
Technical Evaluation for Belt CAH787V
Technical Evaluation for Valve CPY800P
Technical Evaluation for Bearing CBK613D
Technical Evaluation for Belt CAL753X
Technical Evaluation for Pulley CAQ294F
Technical Evaluation for Lubricant, Grease CKF478V
Technical Evaluation for Valve CEE179A

Receipt Inspection and Test Reports
25402-011-MRI-E000-00003, Rev.1, Material Receiving Instruction for PO XFR-PO-87894

25402-011-MRI-ENFI-00004, Rev. 1, Material Receiving Report for PO 91503
MRR #14745, dated 07/12/2010, Material Receiving Report for PO 130137
MRR #10741, dated 03/10/2010, Material Receiving Report for PO 59953
25402-000-MRI-JXF0-00016, Rev. 0, Material Receiving Report for PO 97855
25402-011-MRI-JXP0-00017, Rev. 0, Material Receiving Report for PO 96652
25402-011-MRI-PV38-00002, Rev. 2, Material Receiving Report for PO 61806
25402-000-MRI-MA00-00037, Rev. 0, Material Receiving Report for PO 154774
25402-000-MRI-MHCM-00012, Rev. 0, Material Receiving Report for PO 64617
25402-000-MRI-MA00-00039, Rev. 0, Material Receiving Report for PO 155278
25402-000-MRI-MA00-00016, Rev. 0, Material Receiving Report for PO 159001
25402-000-MRI-MAH0-00005, Rev. 0, Material Receiving Report for PO 165762
25402-000-MRI-UC40-00368, Rev. 0, Material Receiving Report for PO 168858
25402-000-MRI-PV00-00098, Rev. 0, Material Receiving Report for PO 197326

Quality Assurance Audits and Commercial Surveys
TVA Audit 2009N-72, Cooper Bussmann (Vendor #001212601)
TVA Audit 2007V-10, HBD Industries, Inc./Thermoid

IV. OTHER ACTIVITIES

OA.1.1 Electrical Conduits and Conduit Supports Corrective Action Program (TI 2512/018, IP 51055)

Limited Scope Walkdown Packages (LSWD)
LSWD – 495, "LSWD for Snapshot Shelf-Assessment on Christmas Tree Configurations for the Conduit and Conduit Supports CAP"
LSWD – 478, "Weld Size Verification on Ractor Cavity Nozzle Inspection Openning"

Quality Assurance Surveillances
25402-WBN-SR-11-1559, "Conduit Support Corrective Action Program (CAP) – CP4
25402-WBN-SR-11-1706, "Conduit Supports – CP4 – EDCR 53104 – Closure"

Calculations/Design Procedures
WCG-2-308, "Engineering Walkthrough and Evaluation of Conduit and Conduit Supports," Rev. 1
WCG-2-866, "Evaluation of Conduit and Conduit Supports for Conduit Overweight Condition for the Unit 2 Conduit and Conduit Support CAP," Rev. 1
WCG-2-361, "Walkthrough Procedure of Unique Evaluations for Electrical Conduits and Conduit Supports," Rev. 0
WCG-2-378, "Evaluation of Typical 55 Conduit Supports," Rev. 0

Design Criteria
WB-DC-40-31.10, "Seismically Qualifying Conduit Supports," Rev. 10

Watts Bar Unit 1 Documents

Design Procedures

WP-51, "Engineering Walkthrough Procedure for the Conduit and Conduit Support Critical Evaluation," Rev. 0

TI-2006, “Engineering Walkthrough and Evaluation of Plant Conduit and Conduit Supports,” Rev. 1

Initial Assessment Report
WCG-1-1415, “Conduit and Conduit Support Walkthrough and Critical Case Evaluation Program,” Rev. 3

OA.1.3 Instrument Sensing Line CAP (TI 2512/026, IPs 49063 and 49065)

Procedures
MAI-4.5, Rev. 5, Pipe and Tube Bending, 08/20/1999

Design Control Documents
FCR 56439-A, Issue Sense Line Engineered Support Drawings Listed on DRA 53618-021 and 53618-022
DRA 52563-096, Mechanical Pipe Support No. 2-47A435-302-4

Work Orders
111511109, Perform Pressure Test on Sense Lines System 67 Panel 2-L-2C Sections B and C
111519727, Perform Pressure Test on Sense Lines System 67 Panel 2-L-329 Sections A and B
110861074, Fabricate and Install New Instrument Lines for EDCR 52424
111397094, Perform Pipe Bender Qualification
111135812, Inspection of Sense Lines 2-SENL-70-328A/329A from Root Valves to Panel Isolation Valves for EDCR 53392
110761135, Fabricate and Install New Instrument Lines for EDCR 53611
08-951354-005, Fabricate and Install New Instrument Lines for EDCR 52563
08-951354-006, Fabricate and Install New Instrument Lines for EDCR 52563

PERs
243562, Instrument Mounting Plate Design Change not Adequately Documented via Calculation, 8/6/10
247424, Design Hold Removed on EDCR 53618-A Prior to Issuing Calcs, 8/30/10
299588, NRC-Identified an Improperly Installed Two Piece Clamp, 12/15/10
345521, New Turbine Impulse Pressure Loops & Sense Lines Were Found with Inadequately Specified TVA Class Designation and Q-List Classification, 3/25/11
354280, NRC-Identified Discrepancies Between drawings 2-47W600-0-7 and 47W600-0-8 and Calculations, 4/13/11

Miscellaneous
Selected Personnel Qualification Documentation
Calculation 47A061013, Rev. 6, Civil Calculation for Typical Support No. 47A061-13
Calculation 247A435302004, Structural calculation for Pipe Support No. 2-47A435-302-4

OA.1.5 Motor Operated Valve Torque Switch and Thermal Overload Relay Bypass Capability Electrical Issues CAP Sub-issue (TI 2512/020, IPs 51051, 51053, and 51055)

Procedures
NETP-115, MOV Program, Rev. 0
G-50, Torque and Limit Switch Settings for Motor Operated valves, Rev. 7
0-PI-OPS-17, 18 Month Locked Valve Verification, Rev. 46

25406-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 6

Design Control Documents
EDCR 54499, Install Thermal Overload and Torque Switch Bypasses, Rev. A
EDCR 54850, Install MOV Actuator Assemblies in Systems 3, 63, 67, and 70, Rev. A
DCN 56341, Restore Valves for 1/2-FCV-067-66A/67B, Rev. A
DCN 55477, Replace Valve Actuators in Systems 67 and 70, Rev. A
FCR 56376, Rev. A
FCR 57111, Rev. A

Calculations
WBN-OSG4-095, Selection Criteria for MOVs Requiring Thermal Overload Bypass and/or Torque Switch Bypass, Rev. 19
WBN-OSG4-078, Unit 2 Electrical Equipment Required for Unit 1 Safe Shutdown, Rev. 0
WBN-OSG4-129, Unit 2 Equipment Within the Unit 1 Operational Boundary, Rev. 8
WBN-OSG4-182, Functional Requirements of Mechanical Components in Systems 62, 63, 67, and 81, Rev. 21
MDQ0029992009-0310, Generic Letter 89-10 MOV Population for Watts Bar Unit 2, Rev. 1

Work Orders
111126877, Install/Replace MOV Assemblies, 2/16/11
111158185, Install/Replace MOV Assemblies and Replace Thermal Overloads, 2/24/11
110831880, Verify Wires are Installed and Terminated, 12/18/10
110951911, Lift/Re-Land Cables, 2/4/11
111208621, Lift/Re-Land Cables, 2/3/11
112388277, Perform System 67 Leak Rate Tests, 6/30/11

Drawings
DRA 54499-013, Rev. 0
DRA 53292-070, Rev. 0
DRA 54499-009, Rev. 1
DRA 53293-073, Rev. 0
DRA 53288-056, Rev. 0
DRA 53293-062, Rev. 0
DRA 53343-015, Rev. 0
DRA 53290-084, Rev. 0
DRA 53287-150, Rev. 0
DRA 53292-070, Rev. 0
DRA 54499-002, Rev. 0
DRA 54499-003, Rev. 0
DRA 53287-044, Rev. 0
DRA 53293-026, Rev. 5
DRA 53293-042, Rev. 5
DRA 53288-056, Rev. 0
DRA 54499-128, Rev. 0
DRA 53554-032, Rev. 0
DCA 53287-150, Rev. 0
DCA 54912-155, Rev. 2
DCA 54912-136, Rev. G
DCA 54912-327, Rev. 5

DCA 56341-101, Rev. 1
DCA 56341-102, Rev. 2
1-15E500-1, Key Diagram Station Aux Power System, Rev. 34
1-15E500-2, Key Diagram Station Aux Power System, Rev. 39
2-45B2767-15A, Wiring Diagram MOV Board 2A2-A Compt. 15A, Rev. H
2-45B2766-15D, Wiring Diagram MOV Board 2A1-A Compt. 15D, Rev. 0
2-45B2769-7D, Wiring Diagram MOV Board 2B2-B Compt. 7D, Rev. 5
2-45B2769-10B, Wiring Diagram MOV Board 2B2-B Compt. 10B, Rev. 5
1-45W760-270-2, Wiring Diagram Miscellaneous System Schematic Diagram, Rev. 25
2-45W760-270-2, Wiring Diagram Miscellaneous System Schematic Diagram, Rev. 1
2-45W760-3-3, Wiring Diagrams Main & Aux Feedwater System Schematic Diagram, Rev. 0
2-45W760-3-4, Wiring Diagrams Main & Aux Feedwater System Schematic Diagram, Rev. 0
2-45W760-3-5, Wiring Diagrams Main & Aux Feedwater System Schematic Diagram, Rev. 0
2-45W760-3-6, Wiring Diagrams Main & Aux Feedwater System Schematic Diagram, Rev. 0
2-45W760-26-5, Wiring Diagrams Hi Press. Fire Protection System Schematic Diagram, Rev. 0
2-45W760-62-3, Wiring Diagrams Chemical & Volume Control System Schematic Diagram, Rev. 0
2-45W760-63-2, Wiring Diagrams Safety Injection System Schematic Diagram, Rev. 0
2-45W760-63-6, Wiring Diagrams Safety Injection System Schematic Diagram, Rev. 0
2-45W760-63-8, Wiring Diagrams Safety Injection System Schematic Diagram, Rev. 0
2-45W760-67-5, Wiring Diagrams ERCW System Schematic Diagram, Rev. 2
2-45W760-67-6, Wiring Diagrams ERCW System Schematic Diagram, Rev. 1
1-45W760-67-14, Wiring Diagrams ERCW System Schematic Diagram, Rev. 11
2-45W760-67-17, Wiring Diagrams ERCW System Schematic Diagram, Rev. 0
2-45W760-70-5, Wiring Diagrams Component Cooling System Schematic Diagram, Rev. 0
2-45W760-70-8, Wiring Diagrams Component Cooling System Schematic Diagram, Rev. 1
2-45W760-72-2, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 1
2-45W760-72-3, Wiring Diagrams Containment Spray System Schematic Diagram, Rev. 0
2-45W760-74-2, Wiring Diagrams Residual Heat Removal System Schematic Diagram, Rev. 1
2-45W760-74-3, Wiring Diagrams Residual Heat Removal System Schematic Diagram, Rev. 1
2-45W760-74-4, Wiring Diagrams Residual Heat Removal System Schematic Diagram, Rev. 0

SRs and PERs
SR 413951, Argon Bottles not Properly Secured, 8/9/11
SR 412288, NRC Identified Unsecured Cart in Aux Building, 8/5/11
PER 143775, Calculation Identified MOVs that Do Not Require Bypasses, 5/3/08
PER 411343, NRC Identified Issues in Design Output Documents, 8/2/11
PER 144948, Listed valves do not Conform to FSAR Description, 5/14/08

Procurement Documents
PO 25157-1, Limitorque Actuators, 3/26/10
Material Receiving Inspection Instruction 25402-011-MRI-JV15-00005, Limitorque Actuators, 7/2/10
PO 44823, Butterfly Valves, 11/18/09
Material Receiving Inspection Instruction 25402-011-MRI-JV08-00001, Butterfly Valves, Rev. 1

Miscellaneous
Unit 1 Torque Switch and Overload Relay Bypass Capability for Active Safety Related Valves Closure Report, Rev. 0
Unit 2 Torque Switch and Overload Relay Bypass Capability for Active Safety Related Valves (CP 5.4) Closure Report, Rev. 0

Watts Bar Unit 2 Technical Requirements Manual (developmental)
WB-DC-30-15, Motor Operated Valve Thermal Overload and Torque Switch Bypass Design Criteria, Rev. 5
Surveillance No. 25402-WBN-SR-10-1448, SR valve Torque and Overload Bypass Capability CAP Implementation, 12/17/10
Surveillance No. 25402-WBN-SR-10-1439, SR valve Torque and Overload Bypass Capability CAP Implementation, 12/20/10
System Description WBN2-3B-4002, Auxiliary Feedwater System, Rev. 1
System Description WBN2-63-4001, Safety Injection System, Rev. 1
System Description WBN2-67-4002, Essential Raw Cooling Water System, Rev. 1
System Description WBN2-70-4002, Component Cooling Water, Rev. 2

OA.1.6 NRC Generic Letter (GL) 95-07: Pressure Locking and Thermal Binding of Power-Operated Gate Valves (IPs 50073)

Work Orders
08-953124-000, Modify 2-FCV-063-156A per GL 95-07, 8/5/11
08-953123-000, Modify 2-FCV-063-157B per GL 95-07, 8/10/11

EDCRs
55848, Modify Valves per GL 95-07, Rev. A

OA.1.8 CDR 391/83-55 Welds on Structural Steel in Main Steam Valve Rooms (IPs 55100 and 55050)

PERs
PER 393639

OA.1.10 Welding CAP Sub-Issue 11: Main Steam Impingement Sleeve (IP 55100 and TI 2512/032)

PERs
PER 144160
SR 407747

Procedures
25402-MGT-003, Corrective Action Program, Rev. 11

Miscellaneous
CAQR WBP900279

OA.1.12 Electrical Issues CAP – Sub-issue: Contact and Coil Rating (TI 2512/020)

Calculations
EDQ00223620080011a - 125 VDC Vital Power Control Voltage Analysis – Unit 2 Rev. 5.
WBPEVAR9005002 – Evaluation of Safety Related Switches and Relay Contact Loads for 125 VDC Circuits
WBPEVAR8807028, Rev. 7 – Adequacy of Contact-to-Contact and Coil-to-Contact Isolation Between Class 1E and Non-Class 1E Circuits and Class 1E and Special Circuits

Design Criteria Documents

WB-DC-30-27- AC and DC Control Power Systems – (Unit 1/Unit 2), Rev. 0031

Drawings
2-47W610-3-7 Unit 2 - Electrical Control Diagram Auxiliary Feedwater System, Rev. 3
2-47W611-3-4 Unit 2 – Electrical Logic Diagram Auxiliary Feedwater System, Rev. 2

Miscellaneous
Setpoint and Scaling Document – 2-P-3-148, Rev. 0

OA.1.17 CDR 391/91-09, Limitorque SMB-00 Torque Switch Roll Pin Failures (IP 51055)

Procedures
25406-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 6

Design Control Documents
EDCR 54850, Install MOV Actuator Assemblies in Systems 3, 63, 67, and 70, Rev. A
EDCR 54851, Install MOV Actuator Assemblies in Systems 3, 62, 72, and 74, Rev. A
EDCR 54852, Install MOV Actuator Assemblies in Systems 1, 3, 26, and 68, Rev. A
DCN 56341, Restore Valves for 1/2-FCV-067-66A/67B, Rev. A
DCN 55477, Replace Valve Actuators in Systems 67 and 70, Rev. A

Work Orders
111126877, Install/Replace MOV Assemblies, 2/16/11
111158185, Install/Replace MOV Assemblies and Replace Thermal Overloads, 2/24/11

Procurement Documents
Material Requisition No. 25402-011-MRA-JV15-00005, Rev. 4
PO 25157-1, Limitorque Actuators, 3/26/10
Material Receiving Inspection Instruction 25402-011-MRI-JV15-00005, Limitorque Actuators, 7/2/10
PO 44823, Butterfly Valves, 11/18/09
Material Receiving Inspection Instruction 25402-011-MRI-JV08-00001, Butterfly Valves, Rev. 1

OA.1.18 CDR 391/89-03, Potential Failure of Melamine Torque Switches in Limitorque Actuators (IP 51055)

Design Control Documents
EDCR 54850, Install MOV Actuator Assemblies in Systems 3, 63, 67, and 70, Rev. A
EDCR 54851, Install MOV Actuator Assemblies in Systems 3, 62, 72, and 74, Rev. A
EDCR 54852, Install MOV Actuator Assemblies in Systems 1, 3, 26, and 68, Rev. A
DCN 56341, Restore Valves for 1/2-FCV-067-66A/67B, Rev. A
DCN 55477, Replace Valve Actuators in Systems 67 and 70, Rev. A

Work Orders
111126877, Install/Replace MOV Assemblies, 2/16/11
111158185, Install/Replace MOV Assemblies and Replace Thermal Overloads, 2/24/11

Procurement Documents
Material Requisition No. 25402-011-MRA-JV15-00005, Rev. 4
PO 25157-1, Limitorque Actuators, 3/26/10

Material Receiving Inspection Instruction 25402-011-MRI-JV15-00005, Limitorque Actuators, 7/2/10
PO 44823, Butterfly Valves, 11/18/09
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Miscellaneous
Specification 25402-011-3PS-MUMA-00001, Class 1E and Non-Class 1E Valve Electric Motor Operators, Rev. 1
Procedure 25406-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 6

OA.1.19 CDR 391/92-03, Limitorque Actuator Failure Caused by Excessive Keyway Depth (IP 51055)

Miscellaneous
EDCR 54851, Install MOV Actuator Assemblies in Systems 3, 62, 72, and 74, Rev. A
WO 111154697, Install New Actuators for 2-FCV-72-21B and 21A on PO 25157-1, April 21, 2011
PO 25157-1, Limitorque Actuators, 3/26/10

OA.1.20 CDR 391/87-21, Limitorque Motor Actuator Component Interchangeability (IP 51055)

Procedures
25406-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, Rev. 6

Design Control Documents
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EDCR 54851, Install MOV Actuator Assemblies in Systems 3, 62, 72, and 74, Rev. A
EDCR 54852, Install MOV Actuator Assemblies in Systems 1, 3, 26, and 68, Rev. A
DCN 56341, Restore Valves for 1/2-FCV-067-66A/67B, Rev. A
DCN 55477, Replace Valve Actuators in Systems 67 and 70, Rev. A

Work Orders
111126877, Install/Replace MOV Assemblies, 2/16/11
111158185, Install/Replace MOV Assemblies and Replace Thermal Overloads, 2/24/11

Procurement Documents
Material Requisition No. 25402-011-MRA-JV15-00005, Rev. 4
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LIST OF ACRONYMS

AFW	auxiliary feedwater
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CAP	Corrective Action Program
CCRS	Computerized Cable Routing System
CDR	Construction Deficiency Report
CFR	Code of Federal Regulations
CGD	commercial grade dedication
CP	construction permit
ECP	Employee Concerns Program
EDCR	Engineering Design Change Request
EPA	electrical penetration assembly
EPRI	Electric Power Research Institute
ERCW	essential raw cooling water
FCF	field change request
FSAR	Final Safety Analysis Report
GL	Generic Letter
ICRDS	Integrated Cable and Raceway Design System
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure (NRC)
LER	Licensee Event Report
MIC	microbiologically induced corrosion
MOV	motor operated valve
MT	Magnetic Particle Examination
NCR	non-conformance report
NCV	non-cited violation
NIMS	Nuclear Instrument Monitoring System
NRC	Nuclear Regulatory Commission
PDS	procurement data sheet
PER	Problem Evaluation Report
PIR	Problem Identification Report
PORV	power operated relief valve
QA	quality assurance
QC	quality control
RHR	residual heat removal
RPV	reactor pressure vessel
SAR	Safety Analysis Report
SL	severity level
SP	Special Program
SR	service request
TI	Temporary Instruction
TVA	Tennessee Valley Authority
URI	Unresolved Item
UT	Ultrasonic Examination
VT	Visual Examination
WBN	Watts Bar Nuclear Plant
WO	work order