



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

June 14, 2012

Mr. Michael D. Skaggs
Senior Vice President
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Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2012604**

Dear Mr. Skaggs:

On May 19, 2012, 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 June 4, 2012, with Mr. Hruby and other members of your staff.

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

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

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

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 05000391/2012604 w/Attachment

cc w/encl: (See next page)

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Letter to Michael D. Skaggs from Robert C. Haag dated June 14, 2012.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2012604

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2012604

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd
Spring City TN 37381

Dates: April 1, 2012 – May 19, 2012

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OA.1.15

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

Enclosure

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a 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/info-finder/reactor/wb/watts-bar.html>.

Inspection Results

- A Severity Level (SL) IV Non-Cited Violation (NCV) of 10 CFR 50.9 “Completeness and Accuracy of Information,” was identified by the inspectors for failure to provide information to the NRC that was complete and accurate. Specifically, TVA’s response to a NRC request for information (RFI) regarding a concrete crack in the Watts Bar auxiliary building contained inaccurate and incomplete information.
- The inspectors concluded that concerns pertaining to several open items, including Unresolved Items (URIs), NCVs, Generic Letters (GL), 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 electrical systems and components; mechanical systems and components; Corrective Action Programs (CAPs); NRC GLs; CDRs, and refurbishment.

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REPORT DETAILS

Summary of Plant Status

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

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

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Generally, the issues identified in the PERs were properly identified, addressed, and resolved.

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1 Construction Activities

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

a. Inspection Scope

The inspectors independently assessed applicant controls, associated with Unit 2 construction work activities, to prevent adverse impact on Unit 1 operational safety. The inspectors attended routine Unit 1/Unit 2 interface meetings to assess the exchange and sharing of information between the two site organizations. Periodic construction and planning meetings were observed 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 select construction work locations to

verify that controls to protect the operating unit provided an adequate level of protection and had been properly implemented.

Specific work activities observed included:

- Work order (WO) 08-953901-006 pertaining to the hydrostatic testing of component cooling system (CCS) relief valves
- WO 09-954099-006 involving the welding of sensing line in the sampling and water quality system

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

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

C.1.2 Reactor Vessel and Internals Construction Refurbishment Process (IPs 50053 and 37002)

a. Inspection Scope

The inspectors performed inspection activities associated with the reactor vessel stud hole remediation, performed under WO 112924650. The inspectors attended a demonstration mock-up, which was utilized to validate tooling, logistical support, and procedural sequencing. The inspectors reviewed the procurement package for the reactor vessel stud hole sleeves to verify that the appropriate technical and quality requirements were incorporated. The inspectors also reviewed the Westinghouse Quality Release documentation, including the QA data packages for the reactor vessel sleeve and sleeve key to verify that the technical and quality requirements were as specified in design output documentation. The inspectors reviewed deviations and the corrective actions associated with several deviation notices (61763, 61764, and 61765) initiated over the course of the manufacturing and work. The inspectors observed the milling operations, sleeve insertion, keying, surface finishing, and acceptance testing associated with the sleeve installation. The inspectors observed the relocation and setup of the milling apparatus as well as the programming and sequencing operations of the human-machine interface module. Inspectors observed foreign material exclusion (FME) control measures and also reviewed qualification records to verify that personnel performing the reactor vessel stud hole repairs were properly qualified and had received required training. Additional documents reviewed are listed in the attachment.

The following sample was inspected:

- IP 37002 Section 02.02.a.1 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Licensee refurbishment and repair activities associated with the reactor vessel stud hole sleeving were performed in compliance with regulation and licensee commitments, as well as applicable licensee procedures and work implementing instructions.

C.1.3 Mechanical Components – Work Observation and Construction Refurbishment Process (IPs 50073 and 37002)

a. Inspection Scope

The inspectors observed work activities associated with the construction refurbishment of safety-related check valves. Specifically, the inspectors observed work on WBN-2-CKV-062-0563 under WO 08-953901-006. The inspectors also observed storage, handling and protection of equipment, and installation, which included verification that tolerances/clearances were met; appropriate drawings and work procedures were available; and hold points were observed. Additional documents reviewed are listed in the attachment.

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 and procedures.

C.1.4 Mechanical Components – Work Observation and Construction Refurbishment Process (IPs 50073 and 37002)

a. Inspection Scope

The inspectors observed the licensee's corrective action implementation for PER 512558, which corrected misalignment between the new 2A containment spray heat exchanger shell/divider plate assembly and the installed original heat exchanger bowl. Holes 33, 37, 41, 45, and 61 required boring out to allow for the threaded stud to be fully extended through the plate such that fasteners could be attached to the two sides. The inspectors observed milling operations and FME control measures, reviewed craft and contractor qualifications for the work, and performed independent measurements. The inspectors observed the torque of the fasteners at final assembly and all associated hold points. The inspectors also interviewed craft, supervision, engineering and licensing personnel regarding associated installation attributes. The inspectors independently verified that materials installed were as specified by design output. Additional documents reviewed are listed in the attachment.

The following sample was inspected:

- IP 50073 Section 02.02.c – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Licensee refurbishment and installation activities associated with the subject WO were performed in compliance with regulation and licensee commitments, as well as applicable licensee procedures and work implementing instructions.

C.1.5 Nuclear Welding General (IP 55050)

a. Inspection Scope

The inspectors observed installation of Tennessee Valley Authority (TVA) Class “G” tube instrumentation lines utilizing automatic orbital gas tungsten arc welding (GTAW) for two square-groove butt joints performed autogenously (without weld filler metal) to determine whether welding was conducted in accordance with the Bechtel Field Welding Checklist, WR-5. Specifically, the inspectors observed the following to determine whether the safety-related welding and repair were performed in accordance with the American National Standards Institute (ANSI), Power Piping Code, 1973 Edition of B31.1, including the 1973 Summer Addenda:

- Welding procedure was at the work station
- Weld joint was prepared, cleaned, and inspected
- Automatic orbital GTAW was controlled in accordance with a qualified welding procedure specification (WPS)
- Welding operators P498 and P576 were qualified to American Society of Mechanical Engineers (ASME) Section IX

The inspectors reviewed welding records for field welds FW-2 and FW-3 using Bechtel weld map drawing I-580 and work order 09-954099-006 to determine that contents of related documents were in accordance with the requirements of the ANSI B31.1 code and welding program. The inspectors reviewed welding procedure P8-T-Ag-a-1, Revision 2, with supporting procedure qualification records to determine whether WPS qualification was performed in accordance with ASME Section IX. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that the observed welding activities and reviewed welding records met the requirements of the ANSI, Power Piping Code, 1973 Edition of B31.1, including the 1973 Summer Addenda.

C.1.6 Electrical Components and Systems – Work Observation (IP51053)

a. Inspection Scope

The inspectors inspected the in-process installation of safety-related conduits 2PM9682F, 2PM9681D, and 2PM9683G for System 3, Main Feed Water, within the Auxiliary Building. The work was conducted inside the Auxiliary Building at elevation 713'. The inspectors reviewed WO 113292945, contained in Engineering Document Construction Release (EDCR) 53217, to verify that work done was in compliance with the latest revision of Modification and Addition Instructions (MAI) 3.1 and Mechanical

Category I Support Conduit Typical drawing 47A056-214 Rev. Q. The inspectors inspected the mounting hardware for the conduit supports, train identification (colored tapes and tags), and pull fittings to maintain control of raceway total bend degree below 360. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that the conduit installation met requirements.

C 1.7 Reactor Pressure Vessel and Internals Installation and Storage (IP 50053)

a. Inspection Scope

The inspectors walked down accessible portions of the reactor pressure vessel (RPV) and internals to determine whether requirements for storage, preservation, housekeeping, quality control inspection, access control, and protection were met. The inspectors observed that the applicant implemented adequate foreign material exclusion controls associated with activities in the vicinity of the reactor vessel and internals. This included a protective covering over the top of the reactor vessel and internals to prevent entry of foreign objects and debris and the entry control of tools, equipment, and personnel.

On April 12, 2012, the inspectors entered the refueling cavity to verify that internals storage requirements were adhered to; protection and protective coverings were in place; storage supports were adequate; and controls were effective in preventing unwanted introduction of foreign material and transient combustibles. On April 17, 2012, the inspectors observed surveillance walkdowns (conducted by the applicant's contractor PCI) of the reactor vessel and vessel head to confirm that adequate measures were in place to protect these components from nearby construction activities such as the reactor vessel stud hole remediation.

The following samples were inspected:

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

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

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

C.1.8 Reactor Pressure Vessel and Internals Records Review (IP 50055)

a. Inspection Scope

The inspectors reviewed ten surveillance records to determine whether the RPV had been inspected and protected at the required frequency and whether non-conformances/deviations were recorded and dispositioned appropriately. The inspectors reviewed personnel records for a PCI individual to ascertain whether the personnel performing the surveillances were appropriately qualified for their assigned duties and responsibilities. The inspectors verified legibility, completeness, and retrievability of these records. The inspectors also reviewed PER 486731 and associated corrective actions to determine whether issues identified during a recent QA audit of reactor coolant system (RCS) component surveillances had been adequately resolved. Additional documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 50055 Section 02.02b – 1 sample
- IP 50055 Section 02.02c – 10 samples
- IP 50055 Section 02.02d – 1 sample
- IP 50055 Section 02.02e – 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors reviewed records pertaining to the protection of the reactor vessel and head. These records indicated that the applicant work in this area was accomplished in accordance with NRC requirements and TVA commitments.

C.1.9 Safety-Related Components Record Review (IP 50075)

a. Inspection Scope

The inspectors reviewed surveillance records to determine whether the applicant had conducted storage inspections of the steam generators, reactor coolant pumps, and pressurizer at the required frequency, and that non-conformances/deviations were recorded and dispositioned appropriately. The inspectors also performed walkdowns to independently verify that special storage requirements such as protective coatings, access control signs, locks, and FME barriers were in place.

The following samples were inspected:

- IP 50075 Section 02.02c – 9 samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The applicant met storage requirements for the steam generators, reactor coolant pumps, and pressurizer.

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Construction Deficiency Report (CDR) 391/93-05, Inappropriate Selection of Valve for Use as a Throttle Valve in the Safety Injection System (IP 35007)

a. Inspection Scope

This issue involved the installation of 12 globe valves for throttling in the safety injection system in lieu of the needle valves required by the drawings on Unit 1. This item was associated with Violation 50-390/93-66-02. The manufacturer had shown that cavitations could occur with use of the globe valves. The applicant fixed Unit 1 by installing orifices in the piping. For Unit 2, the applicant plans to install a Westinghouse redesigned Copes Vulcan throttle valve in lieu of the Borg-Warner globe valves and orifices. The inspectors reviewed the documentation included in the applicant's engineering complete package which included TVA letters dated December 22, 1993 and May 24, 1994, previous NRC documentation of the issue, and excerpts from EDCR 54783. In addition, the inspectors reviewed Westinghouse calculation CN-SEE-I-10-41, Watts Bar Unit 2 Sump Debris Downstream Effects Evaluation for ECCS Valves, Rev. 1.

b. Observations and Findings

No findings of significance were identified. The applicant does not plan to duplicate the Unit 1 corrective actions; however, another design has been developed. The applicant appropriately evaluated potential effects of sump debris in the new design.

c. Conclusions

The applicant's planned actions to correct this problem are adequate. This item remains open pending inspection of the new valves installation.

OA.1.2 (Discussed) CDR 391/94-04, Potential Freezing of Main Steam Pressure Transmitter (PT) Sense Line (IP 35007)

a. Inspection Scope

This issue resulted from an event at the applicant's Sequoyah plant. Two PTs in the main steam system froze unexpectedly. The problem of freezing instrumentation had been identified in 1979 leading to NRC Bulletin 79-24, Freezing Lines. The earlier actions by the applicant had apparently not been adequate to prevent the subject transmitters from freezing. These lines were located near the air intake for the main steam vault such that low temperature air could cause freezing. The Unit 1 action was to heat trace the associated instrument lines. The applicant evaluated these lines and all other lines for the need for freeze protection to address this CDR and NRC Bulletin 79-24. For the two Unit 2 PTs (2-PT-1-009A and 2-PT-1-020A) the applicant plans to move these to a new location, which is not susceptible to freezing, due to a fire protection concern. This is being performed by engineering design change request

(EDCR) 53684B. Scoping for the other susceptible instruments and piping is included in EDCR 57933. The applicant has contracted with the Thermon Company to provide specific freeze protection design for each configuration and to install the equipment. The inspectors reviewed the documentation contained in the applicant's engineering complete package which included the historic NRC documentation, previous applicant commitments, and EDCRs 57933 and 53684B.

b. Observations and Findings

No findings of significance were identified. Moving the PTs to an area not susceptible to freezing is considered an acceptable action. The applicant has adequately scoped which equipment needs to be protected from freezing; however, actions are not yet implemented.

c. Conclusion

The applicant's planned actions to correct this problem are adequate. This item remains open pending review of final design and installation of freeze protection equipment.

OA.1.3 (Discussed) Electrical Cable Issues CAP – Sub-issue: Cable Bend Radius Deficiencies, (TI 2512-016, and IP 51063)

a. Inspection Scope

Background: The Electrical Cable Issues Corrective Action Plan (CAP) was initiated based on various employee concerns, conditions adverse to quality (CAQ) documents, and NRC findings related to cable installation and routing. One of the sub-issues identified was excessive bending of cable with the potential of damaging and adversely affecting cable performance.

Inspection Activities: The inspectors reviewed WO 110993281, associated with Systems 062 – Chemical and Volume Control System, System 067 – Essential Raw Cooling Water System, System 070 – Component Cooling Water System, and System 074 – Residual Heat Removal System, and all part of EDCR 55121, Rev. A, which was also covered in the review. The inspectors reviewed the Unit 2 Cable Bend Radius (CP 1.7) Closure Report (Tab 12) signed on January 14, 2011, which listed all 361 low voltage cables and five medium voltage cables identified that failed the required criteria for cable bend radius. The inspectors reviewed WO 110993968, associated with Systems 030 - Reactor Building Ventilation and 062 – Chemical and Volume Control System, to assess the adequacy of the methods used by the applicant to identify cable bend radius deficiencies and the plan of action in resolving the issue by retraining the cable, replacing the cables, or replacing the raceway or pull box where the deficiency was located. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

All documentation developed was adequate and properly detailed. Additional review of representative samples of work remains to be performed prior to closure to this CAP sub-issue and cable deficiencies.

OA.1.4(Discussed) CDR 391/82-76, Cable Bend Radius Deficiencies (IP35007)a. Inspection Scope:

Background: TVA inspections and reviews, and previous NRC inspection findings indicated programmatic violations of bend radius standards. Specifically, TVA engineering standards lacked a documented basis for deviations from industry bend radius standards, and installations existed where bends did not meet the relaxed TVA standards. In addition, WBN cable installation procedures have not always been consistent with the applicable design requirements.

Inspection Activities: The inspectors reviewed the applicant's engineering complete open item closure report, including referenced documents and actions associated with PER 145015, which was issued to track required Unit 2 actions for CDR 391/82-76. The inspectors also interviewed responsible personnel in conjunction with the reviews.

The inspectors reviewed calculation EDQ00299920090005, "Cable Bend Radius-Evaluation and Disposition of Unit 2 Class 1E Cables for Bend Radius Violations", Rev. 0, to ensure all Unit 2 Class 1E cables were evaluated for compliance with General Engineering Specification G-38, "Installation, Modification, and Maintenance of Insulated Cables Rated Up To 15,000 Volts" Rev. 20. EDCR 55121 was reviewed to ensure that cables identified in calculation EDQ00299920090005, which failed the minimum bend radius requirements, would be retrained or replaced as specified. The following WOs were sampled to verify that implementing documents included appropriate work scope to retrain or replace cables not meeting minimum bend radius requirements. Additional documents reviewed are listed in the attachment.

- WO 110988157
- WO 110990162
- WO 113019992
- WO 110993222

b. Observations and findings

No findings of significance were identified.

c. Conclusion

The inspectors determined that WBN Unit 2 Class 1E cable bend radius deficiencies were sufficiently identified and implementing documents issued to resolve this issue were adequate. Additional inspection of field work is required prior to closure.

OA.1.5(Discussed) CDR 391/86-03, Minimum Bend Radius Requirements to the Equipment Pigtail Extensions (IP35007)a. Inspection Scope:

Background: A condition was identified at WBN in which electrical terminations involving pigtail extensions were made without applying minimum bend radius limitation requirements specified in TVA Electrical Standards. The subject extensions were TVA installed wiring used for electrical connection to flow solenoid valves (FSVs) for WBN Unit 2.

Inspection Activities: The inspectors reviewed the applicant's engineering complete open item closure report, including referenced documents and actions associated with PER 143706, which was issued to track required Unit 2 actions for CDR 391/86-03. The inspectors interviewed responsible personnel in conjunction with the reviews.

The inspectors reviewed calculation EDG0029920990007, "Evaluation of Unit 2 Class 1E Splices in Mild and Harsh Environments" Rev. 01, to assess the extent of identified splices and to ensure subject splices, associated with FSVs, were within the scope of the calculation. Review of procedure 254402-000-GPP-000-TI216, "Watts Bar Unit 2 Completion Project Refurbishment Program" Rev. 07, confirmed that all Unit 2 FSVs would be replaced as part of the refurbishment program.

The inspectors reviewed EDCRs 54117 and 54870 to verify that identified FSV splices would be replaced as specified. WO 111091659 was sampled to ensure implementing documents would replace splices as identified in calculation EDG0029920990007. Additional documents reviewed are listed in the attachment.

b. Observations and findings

No findings of significance were identified.

c. Conclusion

The inspectors determined that the minimum bend radius requirements associated with pigtail extensions would be adequately addressed through the replacement of all Unit 2 FSV's which contain the identified deficiencies. Additional inspection of field work is required prior to closure.

OA.1.6 (Discussed) Electrical Cable Issues CAP – Sub-issue: Computerized Cable Routing System Verification and Validation (CCRS) (TI 2512-016, and IP 35007)

a. Inspection Scope

Background: CCRS was used to document information regarding cable routing. The information included cable route in tray and conduits, cable type, cable weight, cable splices, circuit function, separation, etc. Concerns regarding the adequacy of CCRS were expressed and documented in various condition adverse to quality reports, employee concerns and NRC inspections. CCRS at WBN has been replaced by software called Integrated Cable and Raceway Design System (ICRDS). Cable and raceway data for both Units 1 and 2 have been transferred into ICRDS. Additionally, ICRDS software has been verified and validated in accordance with the TVA QA procedures.

Inspection Activities: The inspectors reviewed Engineering Complete Package 113147226, issued on April 18, 2012. Included in the Engineering Complete Package is the Closure Report for CCRS Software and Database Verification and Validation (CP 1.11), which was reviewed to assess the methods used by the applicant to verify adequacy of cable lengths, fidelity to current plant configuration, cable weights, mark numbers, conduit fill calculations, cable sizes, and routing issues. The inspectors reviewed calculation EDQ00299920090014, "Unit 2 Class 1E and Appendix R Cables-As-Constructed ICRDS Data Verification," Rev. 0. The inspectors reviewed the documentation generated for identifying discrepancies between installation records and data recorded within ICRDS. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The reviewed documentation was adequate and properly detailed. Additional inspection to close this CAP Sub-issue involves confirmation that the applicant's methodology for incorporating signal tracing information into ICRDS is adequate.

OA.1.7 (Discussed) CDR 391/85-22, 125VDC Undervoltage Condition on Vital Control System to Auxiliary Feedwater Components (IP 35007)

a. Inspection Scope

Background: A design review identified a condition in which some components of the auxiliary feed water pump turbine (AFPT) control circuit may not receive adequate voltage to ensure their operation. This condition was due to a voltage drop in the circuit feeder cable from the 125 Volt (V) Direct Current (DC) vital batteries to the affected components. The 125V DC vital batteries would be the power supply source for the AFPT control circuit components when there is a loss of all Alternating Current (AC) power.

The root-cause was that WBN Design Criteria WB-DC-30-2, "Design Criteria for 125V Battery System," did not define the battery system voltage range (105V DC – 140V DC) and voltage drop calculations were not performed using the lower DC voltage limits as the source voltage. This condition was documented as NCR WBNEEB8520 (CDR 391/85-22).

Inspection Activities: The inspectors reviewed the applicant's engineering complete open item closure report, including referenced documents and actions associated with PER 143658, which was issued to track required Unit 2 actions for CDR 391/85-22. The inspectors also interviewed responsible personnel, in conjunction with the reviews, and conducted field observations. The inspectors performed a walkdown of the 125V DC feeder to verify status of the corrective action identified in the engineering complete package.

The review included design criteria NPG-DCD-WB-DC-30-27, "AC and DC Control Power Systems" Rev. 31, which superseded WB-DC-30-2, to ensure the appropriate voltage range was included in specified design documents. The inspectors also reviewed calculation EDQ00023620070003, "125V DC Vital Battery System Analysis" Rev. 12, to verify adequacy of minimum available voltage at each battery board and downstream control buses with one cell removed. Calculation EDQ00023620070003 identified that the AFPT normal feeder cable 2SG220A (1/2C #12) needed to be replaced with a larger sized cable (2/1C # 2/0). EDCR 54636 and WO 10662077 were reviewed to ensure that cable 2SG220A would be replaced with a larger sized cable to reduce voltage drop and ensure adequate DC voltage supply to all affected AFPT control circuit components. This WO is still in process. The installed conduit 2VC6036A was inspected to assess the adequacy of the conduit size and routing for cable 2SG220A increased size. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The reviewed documentation developed for resolution of CDR 391/85-22 was adequate. Additional field inspection of the installed modified feeder cables is required prior to closure.

OA.1.8 (Discussed) Vendor Information CAP (TI 2012-031, IP 51053, 52053, and 50073)

a. Inspection Scope:

Background: As described in NRC IIR 05000391/2012602, the inspectors previously inspected selected portions of the applicant's efforts to address the CAP. Specifically, the inspectors reviewed the applicant's implementation of the CAP, which included reviewing and evaluating the Vendor Information program procedures, vendor revision process, and vendor re-contact program. The inspectors also performed walkdowns of several mechanical and electrical components that required vendor documents to be in the Vendor Information program.

Inspection Activities: The inspectors reviewed the applicant's response to GL 90-03 and the associated procedures provided in the response to verify that the commitments made by TVA in their response to GL 90-03 were present in the current Vendor Information program.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions:

Additional inspection activities are still required prior to closure of the Vendor Information CAP; specifically, the inspectors will review TVA's corrective actions from the recent non-cited violation (NCV) on Stow remote valve operators (described in inspection report 05000391/2012603, section C.1.2).

OA.1.9 (Discussed) CDR 391/87-23, Failed Motor Pinion Keys & Motor Shaft in Limitorque Operator (IP50075)

a. Inspection Scope

Background: In the late 1980's motor-operated valves (MOVs) were found with cracked shafts and deformed keys inside of MOV actuators. For Watts Bar Unit 1 the problems were reviewed and issues determined to be conditions adverse to quality were corrected. For WBN Unit 2, the licensee initiated CDR 87-23 and multiple corrective action documents to address these problems. CDR 87-23 was initiated to address the problem of cracked motor shaft and deformed motor pinion gear keys on MOVs.

Inspection Activities: The inspectors reviewed TVA's engineering complete closure package to ensure that proposed actions would satisfy the concerns identified in CDR 391/87-23. Specifically, the inspectors reviewed EDCR-2 54850 and EDCR-2 54851, and various correction action documents to verify that they addressed the problems of MOV actuator failures resulting from having high stem speeds and/or weaker material parts that lead to failures of MOV actuator components.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

All documentation reviewed to date was adequate and properly detailed. Additional observations and review of documents related to this issue are needed prior to closure to this CDR.

OA.1.10 (Discussed) CDR 391/89-01, Limitorque Worm Shaft Clutch Gear Failure (IP 50075)

a. Inspection Scope

Background: In the late 1980's MOVs were found with failed gears on components inside of MOV actuators. For Watts Bar Unit 1 the problems were reviewed and issues determined to be conditions adverse to quality were corrected. For Watts Bar Unit 2 the applicant initiated a CDR and multiple corrective action documents to address these problems. CDR 89-01 was initiated to address the problem of a failed worm shaft clutch gear on an MOV.

Inspection Activities: The inspectors reviewed TVA's engineering complete closure packages to ensure that proposed actions would satisfy the concerns identified in CDR 391/89-01. Specifically, the inspectors reviewed EDCR-2 54850 and EDCR-2 54851, and various correction action documents to verify that they addressed the problems of MOV actuator failures resulting from having high stem speeds and/or weaker material parts that lead to failures of MOV actuator components.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

All documentation reviewed to date was adequate and properly detailed. Additional observations and review of documents related to this issue are needed prior to closure to this CDR.

OA 1.11 (Closed) Safety-Related Components – Procedure Review (IP 50071)

a. Inspection Scope

The purpose of this IP was to determine whether:

- The technical requirements detailed in the Watts Bar Unit 2 Safety Analysis Report (SAR) associated with safety-related components have been adequately addressed in the construction specifications, drawings, and work procedures, and whether the established system of management controls is adequate.
- QA plans, instructions, and procedures for safety-related components have been established in the applicant's QA manual and whether these documents conform to the QA program as described by the SAR.

- Specifications or procedural inadequacies associated with safety-related components indicate any potentially generic problems or other weaknesses with the preparing technical organization.

Section 02.01 of this IP requires the completion of NRC IP 35100, which was completed and documented in IIR 05000391/2009602, Attachment 3.

Section 02.02 of this IP requires a determination on whether adequate implementing procedures are included or referenced in the QA manual in the area of safety-related components. With the exception of subsection (e), these requirements were completed and documented in IIR 05000391/2009602, Attachment 3.

Section 02.02.e of this IP requires a determination as to whether the QA manual and implementing procedures include specifications and installation procedures for motor-operated valves that address the concerns discussed in IE Circular 77-01 and NRC report AEOD/C203. The inspectors reviewed MI-0-16-01, Limitorque Motor Operator Repair and Adjustments, and MI-0.16.01, Limitorque Motor Operator Adjustment Guideline, Type SMB and SB, to verify that they addressed the aforementioned concerns by providing detailed information relative to the setting of torque switches, limit switches, and limit switch bypasses.

Section 02.03 of this IP requires a determination that the licensee has an established audit program (including audit plans, procedures, and schedules) covering safety-related work and control functions in the area of component installation. These requirements were completed and documented in IIR 05000391/2009602, Attachment 3. To provide additional assurance in the effectiveness of the applicant's audit program, the inspectors reviewed the most recent audit report pertaining to the installation of safety-related mechanical components, QA Audit Report NGDC 1103. The inspectors confirmed that this audit evaluated safety-related work and control functions in the area of component installation. The inspectors also noted that the audit results were acceptable and that identified issues were entered into the applicant's corrective action program.

Section 02.04 of this IP requires a determination that the licensee has an established program for ensuring that all site engineering, craft, nondestructive examination (NDE), and inspection personnel associated with the installation of safety-related components are qualified to perform their assigned work. These requirements were completed and documented in IIR 05000391/2009602, Attachment 3.

Some site procedures pertaining to safety-related mechanical components were written or modified subsequent to IIR 05000391/2009602 or were in effect at the time but were not selected as part of the original inspection sample. For example, Westinghouse and PCI procedures used for performing safety-related work on the steam generators and pressurizer were not part of the inspection sample for IIR 05000391/2009602.

To provide additional assurance that the intent of IP 50071 had been met, the inspectors re-performed applicable portions of the aforementioned IP sections with a focus on 15 applicant and contractor procedures that were not evaluated and documented in IIR 05000391/2009602.

In addition, some of the inspection attributes noted above such as procurement; training of personnel; NDE; cleaning, preservation, and inspection; recordkeeping; and design changes, have been previously and partially inspected as part of IP 50073, "Safety-Related Components Work Observation," and other inspection procedures including those related to NDE activities. However, for the purposes of the completion and

closure of IP 50071, these samples were not credited. Additional documents reviewed are listed in the attachment.

The following samples were inspected during this inspection period:

- IP 50071 Section 02.01 - 1 sample
- IP 50071 Section 02.02 – 15 samples
- IP 50071 Section 02.03 – 1 sample

b. Observations and Findings

No findings of significance were identified. A majority of the items in this IP have been previously addressed during recent Unit 2 construction inspections. Below is a summary of each section of IP 50071:

- Section 02.01 – Closed. These requirements were completed and documented in IIR 05000391/2009602, Attachment 3.
- Section 02.02 – Closed. These requirements, with the exception of subsection (e), were completed and documented in IIR 05000391/2009602, Attachment 3.
- Section 02.02.e – Closed. The inspectors verified that the licensee's procedures adequately addressed the issues identified by IE Circular 77-01 and NRC report AEOD/C203.
- Section 02.03 - Closed. These requirements were completed and documented in IIR 05000391/2009602, Attachment 3.
- Section 02.04 - Closed. These requirements were completed and documented in IIR 05000391/2009602, Attachment 3.

c. Conclusions

The procedures and records reviewed during this inspection period associated with safety-related components were found to conform to applicable regulatory requirements. This IP is therefore considered closed; however, if major changes to the applicant's instructions and procedures are identified through observation of future work activities associated with safety-related components, the inspectors will inspect them as necessary to satisfy the requirements in this IP.

OA 1.12 (Closed) CDR 391/86-37, Deficiencies in Embedded Plate Design & Control of Field Changes

a. Inspection Scope

Background: On March 20, 1986, the applicant notified NRC that certain Unit 1 and Unit 2 baseplate calculations failed to account for baseplate flexibility, field-installed support locations, and/or additional loads from unidentified attachments. Under design basis conditions, these deficiencies could have resulted in portions of the embedded plates or studs being overstressed or exceeding allowable concrete capacity. Significantly overstressed plates, studs, and/or concrete could result in the loss of support of the cable trays, pipes, or other components supported by the plates. This deficiency was initially reported to the NRC in accordance with 10 CFR 50.55(e) as Significant Condition Report (SCR) WBN CEB 8623.

For Unit 1, TVA performed walkdowns to ascertain field conditions, conducted engineering evaluations, and modified baseplates as required. TVA also issued a

revised design standard (DS-C1.7.1) that included consideration of baseplate flexibility, free edge effects, support location, and concrete pullout strength. TVA's resolution of this issue as it pertains to Unit 1 was evaluated by the NRC and closed in NRC IIRs 50-390/95-72 and 50-391/95-72.

Inspection Activities:

The inspectors performed the following for Unit 2:

- Reviewed the applicant's engineering complete open item closure report including the actions associated with PER 144972, which was issued to track required Unit 2 actions
- Verified that TVA's revised design standard DS-C1.7.1 included consideration of baseplate flexibility, free edge effects, and concrete pullout strength.
- Reviewed a sample of baseplate calculations to verify that they were performed in accordance with DS-C1.7.1.
- Walked down a sample of baseplates to verify that their as-installed configuration matched design and construction drawings
- Reviewed the results of NDE performed on embedded plates

Additional documents reviewed are listed in the attachment.

b. Observations and findings

No findings of significance were identified. Many baseplates were also within the scope of the Cable Tray and Cable Tray Supports CAP, which was previously inspected by the NRC and documented in IIR 50-391/2012602. Applicable insights from the CAP inspection (calculation reviews, walkdown results) were utilized during the evaluation of this issue. The inspectors also noted that, as documented in IR 50-390/89-200, an NRC team performed ultrasonic testing on a sample of embedded plates and performed direct tension pull tests on surface-mounted baseplates. The baseplates sampled met the acceptance criteria of the tests.

c. Conclusion

The inspectors reviewed the applicant's engineering complete closure package and determined that the applicant implemented or initiated appropriate actions to resolve the original construction deficiency. Based on these proposed actions, CDR 391/86-37 can now be closed; however, future inspection of completed work may be performed at the NRC's discretion.

OA.1.13 (Closed) NCV 05000391/2010605-04, Failure to Identify a Nonconformance (IP 92702)

a. Inspection Scope

Background: As described in NRC IIR 05000391/2010605, the inspectors identified that evaluation of damage to a dropped valve had not been fully documented. The bonnet for safety-related valve 2-FCV-1-16-A had been dropped in the field during installation

and received damage to the threads and pressure sealing surface. The valve had been reassembled without receiving an engineering evaluation.

Inspection Activities: The inspectors reviewed the applicant's corrective action documented in PER 324537 to determine if the applicant appropriately identified, evaluated, and resolved the concern in a timely manner. The applicant's actions included disassembly of the valve, completion of an engineering evaluation, and training of personnel to increase sensitivity to properly obtaining an engineering evaluation when appropriate. The inspectors reviewed documentation of these activities and discussed the issue with applicant personnel. The evaluation showed that the sealing surface damage did not affect the valve function and that the thread damage was minor. The threads were dressed and the valve reassembled and accepted. The thread repair was not considered an ASME pressure boundary repair. The applicant showed the inspectors two examples of PERs (413400 and 417153) where appropriate engineering evaluations were being documented.

b. Observations and Findings

No findings of significance were identified. The applicant completed appropriate corrective actions to address the finding.

c. Conclusions

Based on the activities reviewed, the inspectors concluded that NCV 05000391/2010605-04 can be closed.

OA.1.14 (Closed) NCV 05000391/2010603-09, Failure to Correctly Translate the Design Basis into Affected Drawings and Specifications (IP35007)

a. Inspection Scope

Background: In NRC IIR 05000391/2010603, the inspectors identified a SL IV NCV of 10 CFR 50 Appendix B, Criterion III, "Design Control," based on a discrepancy in the drawings and specifications released for construction under EDCR 52524. The System Description Document WBN2-63-4001, Safety Injection System, Rev.1, stated in part that "Each CLA (Cold Leg Accumulator) is provided with two diverse level measurement systems. Both systems are used to determine the operational readiness of the accumulators during steady state operations." The applicant failed to correctly translate the design basis, as described in a System Description Document, into affected drawings and specifications. Specifically, the drawings and specifications included in EDCR 52524 did not provide diverse level measurement systems for the CLA. In addition, EDCR 52424 indentified that differences existed between Unit 1 and Unit 2 without providing a justification for using a different model of transmitters on Unit 2 than that installed on Unit 1, and failed to provide a basis for specifying a difference in form and function of the level sensor (Unit 2) in comparison to the thermal dispersion devices provided (Unit 1). The applicant issued PER 226246 to address these issues.

Inspection Activities: The inspectors reviewed the content of drawings, specifications, and instructions that had been revised as part of corrective actions identified in PERs 226246, 230542, the revised EDCR 52424-B, and FCR 55970-AA-01, to verify that the applicant's corrective actions adequately addressed the issues identified in the NCV. The inspectors interviewed construction field engineers as part of the assessment of the adequacy of corrective actions in the EDCR and the FCR. The inspectors reviewed the Technical Evaluation for the difference between the Unit 1 and Unit 2 designs and the

change in the design basis that deleted the requirement for diverse level measurement systems. Additional documents reviewed are listed in the attachment.

b. Observation and Findings

No findings of significance were identified. The inspectors confirmed that all discrepancies related to the NCV were resolved in PER 226246.

c. Conclusions

Based on the review the applicant's revised EDCR and the FCR, the inspectors determined that the applicant has adequately addressed the issues indentified in NCV 05000391/2010603-09, and NCV can be closed.

OA.1.15 (Closed) Violation 391/85-36-04, Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays (IP35007)

a. Inspection Scope

Background: During an examination of field welds, inspectors observed a considerable amount of debris and miscellaneous scrap materials abandoned on top of installed unprotected cable trays at approximately the 718' elevation. The inspectors observed welding sparks and slag falling on top of class 1E unprotected cables from work in process directly above these components. These observations were documented as Violation 391/1985-36-04 of the applicable housekeeping and storage procedures and standards ANSI N45.2.3-1973, "Housekeeping during the construction phase of nuclear power plants," and TVA Quality Control Procedure WBN-QCP-1.36, "Storage and Housekeeping" Rev 6.

Inspection Activities: The inspectors reviewed the applicant's final closure package, housekeeping plant procedure 25402-000-GPP-0000-N2102, Rev. 8, and WO instructions that included a pre-job brief as part of the WO Processing procedure 25402-000-GPP-0000-N1206, Rev. 13. The inspectors also conducted a walkdown to observe plant conditions, related to housekeeping issues, and to ensure that commitments to address housekeeping issues including training, scope of pre-job briefs, and established fire-watches were adequate. The inspectors reviewed a number of WOs to assess implementation of housekeeping instructions, housekeeping zone levels, and associated instructions provided for each of the zone levels. The inspectors reviewed a listing of PERs to assess sufficient threshold for identifying deficiencies. Housekeeping Surveillance Reports were also reviewed to evaluate effectiveness of corrective actions. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based upon the review of the applicant's final closure package and the field observations of the plant, the inspectors concluded that the corrective actions for Violation 391/1985-36-04 were adequately implemented. Based on the results of this inspection, Violation 391/1985-36-04 is closed.

OA.1.16 (Closed) Generic Letter (GL) 89-02, Actions to Improve the Detection of Counterfeit and Fraudulently Marked Products (IP 92701)**a. Inspection Scope**

Background: By letter dated September 7, 2007, TVA provided the NRC with (1) a summary of the status of TVA responses to NRC generic communications issued prior to 1995 for WBN Unit 2 and (2) an initial TVA response to other Bulletins and GLs issued subsequent to the licensing of WBN Unit 1. Although TVA included generic communications as part of its regulatory framework for the completion of WBN Unit 2 in its letters dated January 29 and March 13, 2008, the discussion only addressed those items that were included within NUREG-0847, "Safety Evaluation Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2," and its supplements. Thus, in a letter dated March 20, 2008, TVA provided a comprehensive list of generic communications for WBN Unit 2 that TVA had reviewed and categorized regarding the status of completion, including action items under NUREG-0737, "TMI Clarification of TMI Action Plan Requirements," with Supplement 1. In a letter dated May 28, 2008, the NRC staff sent TVA the results of its assessment of the status of generic communications, which included topics wherein the staff did not agree with TVA's determination such as the status of GL 1989-02. Thus, the staff requested further information from TVA to reconcile the differences between TVA's determination and the staff's assessment. On July 29, 2008, TVA responded to the NRC request and provided revisions and additional justifications to reconcile the differences in the status of GL 1989-02. On the basis of its assessment and the review of the additional information, the NRC staff found that the status of GL 1989-02 for WBN Unit 2 listed in TVA's letter of March 20, 2008, with the revisions stated in the letter dated July 29, 2008, was appropriate.

Inspection Activities: The inspectors performed the following inspection activities for Unit 2:

- Reviewed the applicant's final justification for the closure of GL 1989-02.
- Reviewed applicant procedural guidance on the prevention and detection of counterfeit and fraudulently marked products.
- Performed a corrective action program database search for occurrences where counterfeit or fraudulently marked products were encountered or detected.
- Reviewed the applicant's training material for detection of counterfeit and fraudulently marked products.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors reviewed the applicant's final closure package and concluded that the applicant had implemented or initiated appropriate actions to resolve the original concern. Based on these actions, GL 1989-02 is closed; however, future inspection is possible at the NRC's discretion.

OA.1.17 (Closed) CDR 391/94-05, Radiation Monitor Cable Crimps (IP 92701)a. Inspection Scope

Background: On March 22, 1994, the applicant notified the NRC that they had identified problems with the crimping of AMP connectors to field cable mark number WWK, within the radiation monitoring system. The cable type is a composite coaxial cable of cable conductors and twisted pair conductors. It was determined, through disassembly, that the crimp of the connector sleeve to the outer jacket of the coaxial cable was so tight that it caused the dielectric of the cable to separate along the axis of the cable, which pulled the center conductor apart. The cause of the failure was due to the vendor recommending a particular crimp tool based on the assumption that Belden 9254 cable was being used, vice the WWK cable. Dimensional differences between the two types of cable caused the damage and ultimate failure. This deficiency was originally identified by the applicant in WBSCA940032. This deficiency was tracked by the NRC as CDR 390/94-05 for Unit 1 and CDR 391/94-05 for Unit 2. The applicant corrected the issue on Unit 1 through repair/replacement of damaged cable, reworking of the necessary cables using the AMP 45639-5 crimp tool, and revising the vendor manual to reflect current plant equipment. The applicant submitted a final report for the disposition of this deficiency in April 15, 1995. CDR 390/94-05 was closed for Unit 1 in NRC IR 50-390/95-38 and 50-391/95-38.

Inspection Activities: The inspectors performed the following inspection activities for Unit 2:

- Reviewed the applicant's engineering complete open item closure report including any actions associated with PER 145177, which was issued to track required Unit 2 actions for historical WBSCA940032.
- Reviewed EDCRs 54631, 52339, and ECN 3744 to ensure that adequate work instructions existed to remove the cables selected.
- Reviewed ICRDS search for mark WWK cables to validate that the cables removed in EDCRs 54631, 52339 and ECN 3744 encompassed all Unit 2 mark WWK cables.
- Reviewed EDCR 52338 and drawings 45N2620-1 and 45W1651-4 for the addition of instructions regarding proper crimp tool usage.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors reviewed the applicant's engineering complete closure package and concluded that the applicant had implemented or initiated appropriate actions to resolve the original construction deficiency. Based on these actions, CDR 391/94-05 is closed; however, future inspection of completed work is possible at the NRC's discretion.

OA.1.18 (Closed) CDR 391/87-26, Failure to Consider Reactor Core Decay Heat in Determining Most Severe Time Dependent Accident Temperature Profile (IP 92701)

a. Inspection Scope

Background: This issue and the actions surrounding its completion were addressed in NRC IIR05000391/2011602 Section OA.1.10 as closure of the Containment Cooling Special Program (TI 2512/034)

Inspection Activities: The inspectors reviewed the applicant's engineering complete closure package to ensure that previous corrective actions identified by the applicant, remain unchanged and that field work continued to be controlled by approved work instructions.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors reviewed the applicant's engineering complete closure package and concluded that the applicant had implemented or initiated appropriate actions to resolve the original construction deficiency. Based on these actions, CDR 391/87-26 is closed; however, future inspection of completed work is possible at the NRC's discretion.

OA.1.19 (Closed) CDR 391/85-48, Inappropriate Latches for Main Control Room Switch Modules (IP 52053, and 92701)

a. Inspection Scope

Background: On October 7, 1985, the applicant notified the NRC that six switch modules purchased from Electroswitch and 19 switch modules purchased from Westinghouse Electric used a fastener which prevented the modules from being properly mounted on TVA's main control room (MCR) panels. Each of the switch modules was designed to fit into a 5.19" by 3.08" panel cutout and each module used Southco fasteners to hold the modules in place once they were inserted through the MCR panel cutouts. The Southco fasteners did not make enough contact with the MCR panels to ensure rigid mounting of the switch. The cause of this problem was the fact that a Southco fastener (model No. 27-10-501-20) with a reach of 3/8" was supplied instead of the correct Southco fastener (model No. 43-1-13-1) which has a reach of 5/8". Because of the poor contact of the Southco fasteners, the switch modules were subject to being dislodged by vibration or vigorous operation action. As such, their seismic qualification could not be maintained, and during a seismic event the modules could come free from the panels. Because of module construction, no electrical failures of the switch itself were expected; however, the switch could have become mechanically inoperable and could have prevented the actuation of various safety-related devices. This deficiency was originally identified by the applicant in SCR NEB EEB 8544 and was tracked by the NRC as CDR 390/85-49 for Unit 1 and CDR 391/85-48 for Unit 2. The applicant corrected the issue on Unit 1 through replacement of the switch module fasteners with the appropriate (5/8") reach. The applicant submitted a final report for the disposition of this deficiency on December 18, 1990. CDR 390/85-49 was closed for Unit 1 in NRC IR 50-390/91-23 and 50-391/91-23. Of the original 12 switch modules applicable to Unit 2, only five were determined to remain in use.

Inspection Activities: The inspectors performed the following inspection activities for Unit 2:

- Reviewed the applicant's final open item closure report including any actions associated with PER 172706, which was issued to track required Unit 2 actions for historical SCR NEB EEB 8544.
- Reviewed EDCRs 52370 and 52361 to ensure that adequate work instructions existed to remove and install the remaining modules.
- Reviewed MAI 3.8 Data Sheet and Material Traceability and Transfer Record for WO 08-951064-009 to ensure that the switch module for 2-HS-068-0394A was properly installed.
- Performed field walkdowns of the five installed switch modules to ensure that they were installed in accordance with approved work instructions.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors reviewed the applicant's final closure package and concluded that the applicant had implemented or initiated appropriate actions to resolve the original construction deficiency. Based on these actions, CDR 391/85-48 is closed; however, future inspection of completed work is possible at the NRC's discretion.

OA.1.20 (Closed) CDR 391/86-35, Inability to Maintain Post-Loss of Coolant Accident (LOCA) Emergency Core Cooling System (ECCS) Sump Water Level (IP 49063, 49065, 55100)

a. Inspection Scope:

Background: In 1986, the applicant notified the NRC of a deficiency that was identified with the standpipes for level transmitters 2-LT-77-410 and 2-LT-77-411. There were two 2"x3" holes in each 8" standpipe for the reactor building auxiliary floor and equipment drain (RB AFED) sump. The holes were required by design to allow venting of the standpipes in order to ensure accurate level indication. The standpipes extend outside of the RB AFED sump and the holes are located outside of the sump at/below elevation 703'. The water level in the ECCS sump and inside the reactor building crane wall in containment must be maintained to elevation 716' after a loss of coolant accident. Due to the common connections through the reactor building floor drains inside the crane wall, the RB AFED sump must also maintain the water at elevation 716'. The actions taken by the applicant to resolve this issue were to patch the holes by welding plates over the holes in the standpipes and installing a vent above the 716' elevation.

Inspection Activities: The inspectors reviewed the applicant's actions to resolve the deficiency by reviewing the work package that installed the plates to verify that the appropriate material was used and that the appropriate quality control (QC) oversight was present. The inspectors also reviewed the revised drawings and performed a walkdown of the standpipes to verify that the drawings reflected the field change, and that the plates welded over the holes in the standpipes were consistent with the work package instructions and the commitments made to resolve the deficiency.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions:

Based on the review of the applicant's closure report and the samples inspected, the inspectors concluded that the applicant adequately addressed the issues identified in the CDR. CDR 391/86-35 is closed.

OA.1.21 (Closed) Nuclear Welding General Inspection Procedure (IP 55050)a. Inspection Scope

The purpose of IP 55050 was to directly observe and determine whether safety-related welding activities were accomplished in accordance with regulatory requirements. The primary objective was to continue inspecting in-process welding while considering the 177 samples identified during the reconstitution of IP 55050 from past inspections. The following table lists the inspections that were performed to date under IP 55050.

IP Section	Inspection Report	Sample Quantity
02.01 – Base Material and Weld Filler Metal Compatibility	05000391/2009602	33
	05000391/2009604	
02.02 – Welding Procedures	05000391/2010602	21
	05000391/2010603	
02.03 – Welder Qualification	05000391/2010604	19
	05000391/2010605	
02.04 – Production Welding	05000391/2011603	21
	05000391/2011604	
02.05 – Preheat and Postweld Heat Treatment (PWHT)	05000391/2011605	4
	05000391/2011607	
02.06 – Examination of Welds	05000391/2012603	71

The weld samples shown in the above table consist of various:

- Piping systems and nuclear classifications
- Types of materials and physical dimensions
- Full penetration groove butt joints
- Small-bore piping socket welds
- Temporary attachments
- Localized repair and cut-out of welds.

The eleven inspection reports shown in the above table describe the work observations and document reviews performed by the inspectors to determine that the following items were in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code and written procedures for pressure retaining items:

- Piping and weld filler materials
- Manual GTAW and Shielded Metal Arc Welding (SMAW) processes, and automatic GTAW on tubing
- Welder/Welding Operator and NDE personnel qualifications
- Production welding

- NDE- Visual/ Magnetic Particle/ Liquid Penetrant/ and Radiography test methods and procedures
- Temporary attachments
- Repair methods on welds and base materials.

The inspectors observed welding activities to determine that the following items were accomplished in accordance with ASME Section III and written procedures:

- Use of weld travelers with proper sign-offs for QC and ANI hold points
- Welding parameters for GTAW rods and SMAW electrodes
- Methods of weld joint cleaning
- Proper use of argon backing gas for GTAW of stainless steel open-butt joints
- Weld joint alignment tolerances
- Control of preheat and interpass temperatures
- Control of post weld heat treatment (PWHT)
- Final weld dimensions and surface appearance

The inspectors reviewed the contents of records to verify completeness, accuracy, and retrievability in accordance with ASME Section III and written procedures. The inspectors reviewed the contents of Certified Material Test Reports with unique traceable heat/lot numbers for piping and weld filler metals to determine that chemical compositions and mechanical properties (including impact testing for fracture toughness) and physical dimensions were in accordance with material specifications and engineering drawings. The inspectors reviewed welding procedures to verify that process qualification variables and implementation were in accordance with ASME Sections III and IX. The inspectors reviewed welder performance qualification records to verify that welders were qualified and certifications were maintained using traceable unique identification numbers for each production weld in accordance with ASME Sections III and IX. The inspectors reviewed NDE personnel qualification and examination reports to verify that NDE methods were conducted and documented in accordance with the requirements of the NDE procedures, ASME Section V, and the following.

- ASME, Boiler and Pressure Vessel Code, 1971 Edition, Section III, Division 1, 1973 Winter Addenda
- American National Standards Institute (ANSI), Power Piping Code, 1973 Edition, B31.1, 1973 Summer Addenda
- Bechtel "Special Process Manual" 25402-000-GMX-GCE-00001
- Bechtel "General Welding Standard", GWS-1

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that safety-related production welding activities, materials, procedures, personnel qualifications, and records were found to conform to regulatory requirements. This IP is considered closed. However, for future welding activities on safety-related ASME and ANSI pressure boundaries, the NRC maintains the option to perform additional inspections per the applicable requirements of IP 55050.

OA.1.22 Inspection of Crack in Concrete Ceiling of Auxiliary Building

a. Inspection Scope

The inspectors performed a visual inspection of a crack in the concrete ceiling of the heating, ventilation and air conditioning (HVAC) room on elevation 737' of the auxiliary building. The inspectors also measured the crack's dimensions using a tape measure to ensure that the crack could be accurately documented and adequately assessed. The inspectors reviewed the root cause and engineering evaluation to determine whether an adequate technical basis was provided to accept the condition of the concrete crack.

b. Observations and Findings

The inspectors identified the following non-cited violation (NCV):

Introduction: A Severity Level (SL) IV NCV of 10 Code of Federal Regulations (CFR) 50.9, "Completeness and Accuracy of Information," was identified due to the licensee's failure to provide information to the NRC that was complete and accurate. Specifically, TVA's response to a NRC request for information (RFI) regarding a concrete crack in the Watts Bar auxiliary building contained inaccurate and incomplete information.

Description: On December 16, 2011, TVA responded to a NRC letter dated November 3, 2011, which requested information pertaining to a crack in the concrete ceiling of the HVAC room on elevation 737' of the auxiliary building. The RFI contained a series of questions that focused on TVA's evaluation, monitoring, and corrective actions for the crack. In their response, TVA stated, there was no room on elevation 737' of the Watts Bar auxiliary building designated as the HVAC room and concluded that a crack in the concrete ceiling did not exist.

During a follow-up inspection on January 4, 2012, the NRC inspectors identified that a room designated as "Unit 2 HVAC Room" existed on elevation 737' of the auxiliary building. In addition, the inspectors located a crack in the concrete ceiling of this room. The crack is approximately 0.015 inches wide, with a total length of approximately seven (7) feet. Several small sections of the crack were as wide as 0.050 inches. A pipe support anchored to the ceiling appeared to bisect the crack. Approximately 2 feet of the crack exists on one side of the support, and approximately 5 feet exists on the other side. TVA's response to the specific RFI questions dealing with their evaluation, monitoring, and correctives actions for the crack was that the questions were not applicable since no crack was found.

The incomplete and inaccurate information provided by TVA was considered as Traditional Enforcement because not providing the NRC with complete and accurate information that was going to be used in the NRC's decision making process could impact the NRC's ability to perform its regulatory function. This violation was determined to be a SL-IV violation using Section 6.9 of the NRC's Enforcement Policy because the inaccurate information did not cause the NRC to reconsider a regulatory position. The condition of the crack was not significant enough to cause the applicant to re-work any part of the structure. Therefore, the regulatory position as to the ability of the structure to perform its intended safety function has not changed. Cross-cutting aspects are not assigned to traditional enforcement violations.

Enforcement: Title 10 CFR 50.9 requires that information provided to the NRC be complete and accurate in all material respects. Contrary to the above, on December 16, 2011, the licensee provided information to the NRC which was not complete or accurate.

Specifically, TVA's response to a NRC request for information concerning a crack in the auxiliary building contained information that was incomplete and inaccurate. This information was intended to be used in the NRC's decision making process. This finding was determined to be a SL IV violation using Section 6.9 of the Enforcement Policy. Because this was a SL IV violation and the examples supporting the violation were entered into the applicant's corrective action program as PER 491403, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000391/2012604-01, Failure to submit complete and accurate information.

c. Conclusion

The response from the applicant associated with the crack in the concrete ceiling of the auxiliary building was not complete and accurate in accordance with NRC regulations as discussed above in NCV 05000391/2012604-01.

V. MANAGEMENT MEETINGS

X.1 Exit Meeting Summary

On June 4, 2012, the inspectors presented the inspection results to Mr. Hruby 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

A. Bangalore, Bechtel – Electrical Engineer
D. Beckley, Bechtel – Electrical Engineer
G. Scott, TVA - Licensing
A. Hart, Bechtel – Construction Supervisor
J. Boykin, TVA – Quality Control
P. Cox, Bechtel - Designer
J. Howell, Bechtel - Field Engineer
R. Johnson, TVA - Site Support Manager
I. Khan, Washington Group - Electrical Engineer
J. Martin, Bechtel - Quality Manager
P. Olson, TVA - Start-up Manager
J. Smith, Bechtel - Quality Control Engineer
R. Stockton, TVA – Licensing

INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction
IP 37002	Construction Refurbishment Process – Watts Bar Unit 2
IP 49063	Piping – Work Observation
IP 49065	Safety-Related Piping – Records Review
IP 50053	Reactor Vessel and Internals Work Observation
IP 50055	Reactor Vessel and Internals Record Review
IP 50071	Safety-Related Components – Procedure Review
IP 50073	Mechanical Components – Work Observation
IP 50075	Safety-Related Components – Records Review
IP 51053	Electrical Components and Systems – Work Observation
IP 51063	Electrical Cable – Work Observation
IP 52053	Instrument Components and Systems – Work Observation
IP 55050	Nuclear Welding General Inspection Procedure
IP 55100	Structural Welding General Inspection Procedure
IP 92701	Follow-up
IP 92702	Follow-up on Corrective Actions for Violations and Deviations
TI 2512-016	Inspection of Watts Bar Nuclear Plant Cable Issues CAP
TI 2512-031	Inspection of Watts Bar Nuclear Plant Vendor Information CAP

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000391/2012604-01	NCV	Failure to submit complete and accurate information (Section OA.1.22)
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Discussed

391/93-05	CDR	Inappropriate Selection of Valve for Use as a Throttle Valve in the Safety Injection System (Section OA.1.1)
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391/94-04	CDR	Potential Freezing of Main Steam Pressure Transmitter Sense Line (Section OA.1.2)
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2512-016	TI	Electrical Cable Issues CAP – Sub-issue: Cable Bend Radius Deficiencies (Section OA.1.3)
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391/82-76	CDR	Cable Bend Radius Deficiencies (Section OA 1.4)
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391/86-03	CDR	Minimum Bend Training Radius Requirements to the Equipment Pigtail Extensions (Section OA.1.5)
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2512-016	TI	Electrical Cable Issues CAP – Sub-issue: Computerized Cable Routing System Verification and Validation (CCRS) (Section OA.1.6)
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391/85-22	CDR	125VDC Undervoltage Condition on Vital Control System to Auxiliary Feedwater Components (Section OA.1.7)
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2012-031	TI	Vendor Information CAP (Section OA.1.8)
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391/87-23	CDR	Failed Motor Pinion Keys & Motor Shaft in Limitorque Operator (Section OA.1.9)
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391/89-01	CDR	Limitorque Worm Shaft Clutch Gear Failure (Section OA 1.10)
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Closed

50071	IP	Safety-Related Components – Procedure Review (Section OA.1.11)
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391/86-37	CDR	Deficiencies in Embedded Plate Design and Control of Field Changes (Section OA.1.12)
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05000391/2010605-04	NCV	Failure to Identify a Nonconformance (Section OA.1.13)
05000391/2010603-09	NCV	Failure to Correctly Translate the Design Basis into Affected Drawings and Specifications (Section OA.1.14)
391/85-36-04	VIO	Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays (Section OA.1.15)
89-02	GL	Actions to Improve the Detection of Counterfeit and Fraudulently Marked Products (Section OA.1.16)
391/94-05	CDR	Radiation Monitor Cable Crimps (Section OA.1.17)
391/87-26	CDR	Failure to Consider Reactor Core Decay Heat in Determining Most Severe Time Dependent Accident Temperature Profile (Section OA1.18)
391/85-48	CDR	Inappropriate Latches for Main Control Room Switch Modules (Section OA.1.19)
391/86-35	CDR	Inability to Maintain Post-LOCA ECCS Sump Water Level (Section OA.1.20)
55050	IP	Nuclear Welding General Inspection Procedure (Section OA.1.21)

LIST OF DOCUMENTS REVIEWED

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.2 Reactor Vessel and Internals Records Review and Construction Refurbishment Process (IPs 50053 and 37002)

WO 112924650, Rev. 0, U2 RB Reactor Pressure Vessel Perform Stud Hole Remediation/Machining on WBN-2-RPV-068-U2
 QR-11-1567, thru Rev. 2, Reactor Vessel Sleeve and Sleeve Key
 PER 543267, Reactor Vessel Stud Hole Sleeve Machining Depth Issue
 PER 548390, No Step in WO to Document a Specific Work Activity

C.1.3 Mechanical Components – Work Observation and Construction Refurbishment Process (IPs 50073 and 37002)

WO 08-953901-006, CCM ASME III – EDCR 53121 Sys 062 Replace Missing Valves Upstream of RCP 4 Seal Water Inj
 DRA 53121-002
 DRA 53121-132
 DRA 53121-135

C.1.4 Mechanical Components – Work Observation and Construction Refurbishment Process (IPs 50073 and 37002)

WO 113336379, Rev. 1, CCM PER 512558 EDCR 56145-A AA-08, AA-09
 PER 512558, 2A Containment Spray Heat Exchanger Bolting Nonconformance
 PER 552176, Drilling on CS Heat Exchanger 2-HTX-072-002A

C.1.5 Nuclear Welding General (IP 55050)

WO 09-954099-006, Rev. 1, CCI EDCR2 53919 Sys 043 2-FCV-043-0020
 WM-I-580, Rev. 1
 GWS-AATW, Rev. 2, Bechtel General Welding Standard
 P8-T-Ag-a-1, Rev. 2, Bechtel Welding Procedures Specification for Autogenous Automatic Orbital Gas Tungsten Arc Welding of Austenitic Stainless Steel Tubes

C.1.6 Electrical Components and Systems – Work Observation:

Work Order: WO – 113292945 / EDCR2-53217
 Field Change Request No.: 58258-A approved on 4/2/12.
 ICDRS – Raceway Standard Reports for 2PM9682F, 2PM9681D, and 2PM9683G.

C.1.7 Reactor Pressure Vessel and Internals (IP 50053)

PCI ASME Quality Assurance Manual, Rev 7
 PCI GQP-18.2, Quality Assurance Surveillance Plan for Field Services, Rev 4
 PCI ASME Component Storage QA Surveillance Plan 901220 R1

C.1.8 Reactor Pressure Vessel and Internals (IP 50055)

PCI ASME Quality Assurance Manual, Rev 7

PCI GQP-18.2, Quality Assurance Surveillance Plan for Field Services, Rev 4
 PCI Nonconformance Report 901220-131
 PCI Form No 901220-03, Quality Surveillance Report Log
 PER 499065, ASME Surveillance of ASME Component Storage
 Quality Surveillance Activity Report No. S-901220-I528 (2/01/12)
 Quality Surveillance Activity Report No. S-901220-I534 (2/08/12)
 Quality Surveillance Activity Report No. S-901220-I535 (2/14/12)
 Quality Surveillance Activity Report No. S-901220-I537 (2/21/12)
 Quality Surveillance Activity Report No. S-901220-I540 (2/24/12)
 Quality Surveillance Activity Report No. S-901220-I541 (3/01/12)
 Quality Surveillance Activity Report No. S-901220-I543 (3/07/12)
 Quality Surveillance Activity Report No. S-901220-I544 (3/09/12)
 Quality Surveillance Activity Report No. S-901220-I546 (3/20/12)
 Quality Surveillance Activity Report No. S-901220-I547 (3/23/12)

C.1.9 Safety-Related Components Record Review (IP 50075)

PCI ASME Quality Assurance Manual, Rev 7
 PCI GQP-18.2, Quality Assurance Surveillance Plan for Field Services, Rev 4
 PCI Nonconformance Report 901220-131
 PCI Form No 901220-03, Quality Surveillance Report Log
 Quality Surveillance Activity Report No. S-901220-I528 (2/01/12)
 Quality Surveillance Activity Report No. S-901220-I534 (2/08/12)
 Quality Surveillance Activity Report No. S-901220-I535 (2/14/12)
 Quality Surveillance Activity Report No. S-901220-I537 (2/21/12)
 Quality Surveillance Activity Report No. S-901220-I540 (2/24/12)
 Quality Surveillance Activity Report No. S-901220-I541 (3/01/12)
 Quality Surveillance Activity Report No. S-901220-I543 (3/07/12)
 Quality Surveillance Activity Report No. S-901220-I544 (3/09/12)
 Quality Surveillance Activity Report No. S-901220-I546 (3/20/12)
 Quality Surveillance Activity Report No. S-901220-I547 (3/23/12)

IV. OTHER ACTIVITIES

OA.1.3 Electrical Cable Issues CAP – Sub-issue: Cable Bend Radius Deficiencies:

Unit 2 Cable Bend Radius (CP 1.7) Closure Report - January 14, 2011
 Engineering Complete Package, Tracking Number: PER 145015
 EDCR 55121, Rev. A
 Work Order WO - 110993281
 Work Order WO – 110993281
 Work Order WO - 110993968

OA.1.4 Cable Bend Radius Deficiencies (CDR 82-76):

WBN Engineering Complete Closure Package, Tracking Number: PER 145015
 Calculation EDQ00299920090005 Rev. 0, "Cable Bend Radius-Evaluation and Disposition of
 Unit 2 Class 1E Cables for Bend Radius Violations"
 EDCR 55121
 Work Order WO 110988157
 Work Order WO 110990162
 Work Order WO 113019992
 Work Order WO 110993222

OA.1.5 Cable Bend Radius Requirements to the Equipment Pigtail Extensions. (CDR 86-03):

WBN Engineering Complete Closure Package, Tracking Number: PER 143706
 Calculation EDG0029920990007 Rev. 01, "Evaluation of Unit 2 Class 1E Splices in Mild and Harsh Environments"
 EDCR 54117
 EDCR 54870
 WO 111091659
 PER 542175

OA.1.6 Electrical Cable Issues CAP – Sub-issue: CCRS (Computerized Cable Routing System Verification and Validation):

Engineering Complete Package 113147226 issued on April 18, 2012
 Closure Report for CCRS Software and Database Verification and Validation (CP 1.11),
 Calculation EDQ00299920090014 – Unit 2 Class 1E and Appendix R Cables-As-Constructed ICRDS Data Verification, Rev. 0, dated 3/22/2012.

OA.1.7 125VDC Undervoltage Condition on Vital Control System to Auxiliary Feedwater Components (CDR 391/85-22):

WBN Engineering Complete Closure Package, Tracking Number: PER 143658.
 Calculation EDQ00023620070003, "125V DC Vital Battery System Analysis", Rev. 12, dated 7/7/2011.
 NPG-DCD-WB-DC-30-27 Rev. 31, "AC and DC Control Power Systems"
 EDCR 54636
 WO 10662077

OA 1.11 Safety-Related Components – Procedure Review (IP 50071)

25402-000-GPP-0000-N3523, Air Operated Valve Refurbishment and Setup (SR/QR), Revision 0001
 25402-000-GPP-0000-N3527, Check Valve (SR/QR), Revision 00002
 25402-000-GPP-0000-N3537, Manual Diaphragm Valve Refurbishment (SR/QR), Revision 0003
 25402-000-GPP-0000-N3541, Bench Setpoint Testing of Relief/Safety Valves (SR/QR), Revision 0001
 25402-000-GPP-0000-N3543, Air Operated ITT Grinnell Diaphragm Valve Refurbishment (SR/QR), Revision 0002
 25402-000-GPP-0000-N3601, Vessel, Tank, Stationary, and Non-Rotating Equipment, Revision 0002
 25402-000-GPP-0000-N3507, Testing of HVAC Systems, Revision 0001
 25402-000-GPP-0000-N3529, Pressure Retaining Bolted Connections (SR/QR), Revision 0002
 25402-000-GPP-0000-N3602, Installation of Rotating Equipment, Revision 0003
 25402-011-V1A-MG00-00428-003-WBT-D-3007 Westinghouse MG00 RHR Heat Exchanger Design Specification, Revision 0005
 25402-011-V1A-MG00-04260-001-WBT-D-3124 Westinghouse MG00 PCI Quality Assurance Traveler Watts Bar 2 RCP CCW Outlet Pipe Adjustment
 WDI-STD-135, Manual Ultrasonic Examination of Reactor Coolant Pump Flywheels, Revision 0000
 25402-011-MRA-JV15-00005, Flowserve (Limiterque) Electric Motor Actuators for WBN2CCP, Revision 007

25402-000-GPP-0000-N1301, Construction Project Specific Procedures, Revision 0009
 TVA Quality Assurance Audit NGDC 1103
 TVA Procedure MI-0.16.01 Limitorque Motor Operator Repair and Adjustment Guidelines for SMB-000, Revision 0019
 TVA Procedure MI-0.16.01 Limitorque Motor Operator Adjustment Guideline, Type SMB and SB Revision 0001
 PCI ASME Quality Assurance Manual, Rev 7
 PI-901340-SG4, Watts Bar 2 Steam Generator Loop 4 (SN 1611) Channel Head Electropolishing

OA 1.12 Construction Deficiency Report (CDR) 391/86-37: Deficiencies in embedded plate design & control of field changes

IR 50-390/89-200, Watts Bar Broad-Based Construction Assessment
 WCG-2-853, Evaluation of Embedded Plate 48N946-2A-136
 WCG-2-862, Selection of Critical Embedded Plates for Cable Tray Supports
 DS-C1.7.1, General Anchorage to Concrete, Rev 11
 WCG-2-854, Evaluation of embedded plate 48N955-5B-16
 WCG-2-864, Evaluation of embedded plate 48N946-2B-191
 WCG-2-868, Evaluation of embedded plate 48N946-1B-147
 WCG-2-872, Evaluation of embedded plate 48N946-2B-264

OA.1.14 NCV 05000391/2010603-09; Failure to Correctly Translate the Design Basis into Affected Drawings and Specifications:

EDCR 52424 Rev. B dated 10/29/2009
 FCR 55970-AA-01
 Drawing 2-47W600-1951
 System Description Document WBN2-63-400, rev.1
 PER 226246
 PER 230542
 Service Request 542113

OA.1.15 Violation 391/85-36-04, Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays:

WBN Final Closure Package, Tracking Number 172671
 "Housekeeping" - plant procedure 25402-000-GPP-0000-N2102, Rev. 8 dated 4/23/2010
 "Work Order Processing" – plant procedure 25402-000-GPP-0000-N1206, Rev. 13 dated 5/4/2011
 TVA Quality Control Procedure WBN-QCP-1.36, Rev 6, "Storage and Housekeeping,"

LIST OF ACRONYMS

ACRONYMS:

AC	Alternating Current
AFPT	Auxiliary Feedwater Pump Turbine
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CAQ	condition adverse to quality
CCRS	computerized cable routing system
CCS	component cooling system
CDR	construction deficiency report
CFR	Code of Federal Regulations
DC	Direct Current
DRA	Drawing Revision Authorization
ECCS	emergency core cooling system
EDCR	engineering design change report
FCR	Field Change Request
FME	foreign material exclusion
FSAR	Final Safety Analysis Report
FSV	Flow solenoid valve
GL	generic letter
GTAW	gas tungsten arc welding
HVAC	heating, ventilation, and air conditioning
ICRDS	integrated cable and raceway design system
IIR	integrated inspection report
IP	inspection procedure
LOCA	loss of coolant accident
MAI	Modification/Addition Instruction
MCR	main control room
MOV	motor operated valve
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
PER	problem evaluation report
PT	pressure transmitter
PWHT	post weld heat treatment
REV.	Revision
QA	quality assurance
QC	quality control
RB AFED	reactor building auxiliary floor and equipment drain
RCS	reactor coolant system
RFI	request for information
RPV	reactor pressure vessel
SAR	safety analysis report
SCR	significant condition report
SL	severity level
TVA	Tennessee Valley Authority
WBN	Watts Bar Nuclear Plant
WO	Work Order
WPS	welding procedure specification