



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

August 05, 2011

Mr. Ashok S. Bhatnagar
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2011605**

Dear Mr. Bhatnagar:

On July 2, 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 July 14, 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, this 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 05000391/2011605 w/attachment

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Letter to Ashok S. Bhatnagar from Robert C. Haag dated August 5, 2011.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2011605

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2011605

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd
Spring City TN 37381

Dates: May 22 – July 2, 2011

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

Enclosure

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a six-week period of inspections in the areas of quality assurance, identification and resolution of construction problems, construction activities, fire protection, 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) Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the failure to adequately implement corrective actions associated with construction deficiency reports (CDRs) and issues identified in an NRC Bulletin (BL). (Section Q.1.1)
- A SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified by the inspectors because field as-built pipe support configurations did not match the design drawings. The inspectors identified four examples where field engineering and quality control (QC) failed to adequately install and identify non-conformances, related to pipe support installations, in accordance with applicable instructions, procedures, and drawings. (Section C.1.3)
- The inspectors concluded that concerns pertaining to several Three Mile Island (TMI) action items, BLs, Temporary Instructions (TIs), and 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), in-service inspection activities; refurbishment; and fire protection.

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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. This review included corrective actions associated with historical construction deficiency reports, commitments, and other open items including NRC generic communications. The review and inspection of these open items to be resolved and completed by the applicant are discussed below and in detail in Section IV, Other Activities (OA), of this and previous NRC inspection reports.

b. Observations and Findings

The inspectors identified the following violation:

Introduction: A violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the failure to adequately implement corrective actions associated with construction deficiency reports (CDRs) and issues identified in an NRC Bulletin (BL).

Description: During the inspection period, the inspectors identified four examples where the applicant failed to adequately implement corrective actions associated with the following items:

- CDR 391/81-67: Qualification of Epoxy Grout for Safety-Related Applications:

During the inspection period, an inspection was conducted to verify the completion of corrective actions associated with Nonconformance Report (NCR) 3567R (CDR-391/81-67). The CDR is discussed in Section OA.1.3 of this report. Corrective actions for this issue included identification, review, and analysis of the use of unqualified epoxy grout in safety-related applications. Inspectors reviewed the as-built walkdown packages and design calculations associated with the four remaining supports which utilized epoxy grouted anchor bolts. Based on questions raised by the inspectors, deficiencies were discovered in the calculations for two of the four pipe supports. Specifically, epoxy grouted anchor bolts used in pipe supports 2-90-100 and 2-90-103 had not been identified during the system walkdowns or the review of the as-built drawings. Furthermore, the epoxy grouted anchor bolts had not been

evaluated in accordance with the requirements of Design Standard DS-C1.7.1, General Anchorage to Concrete. The applicant issued PER 357284 to address this issue and evaluate the two pipe supports with epoxy grouted anchors.

- BL 74-03: Failure of Structural or Seismic Support Bolts on Class I Components:

During the inspection period, an inspection was conducted to verify the completion of corrective actions associated with BL 74-03. The BL is discussed in detail in Section OA.1.2 of this report. During the review of the Unit 2 final closure package for BL 74-03, it was identified that the fracture toughness evaluation for three heats of upper steam generator support bolts in Engineering Calculation WBNSSG6-02 could not be located. In addition, conclusions drawn from WBP971126 indicated that problems encountered on the Unit 1 upper steam generator support bolts were the result of a misaligned splice joint as opposed to low fracture toughness, as originally documented in the Unit 2 final closure package for BL 74-03. The applicant issued PER 378538 to address this issue. Immediate actions to correct the issue included revision of the engineering calculation and issuance of a field change request (FCR) and a revision to the engineering design change request (EDCR). The FCR and revised EDCR were issued to ensure that problems encountered with the Unit 1 upper steam generator support bolts did not occur on Unit 2.

- CDR 391/84-17: Deficient Welds for Hanger Lugs on American Society of Mechanical Engineers (ASME) Code Piping:

During the inspection period, an inspection was conducted to verify the completion of corrective actions associated with CDR-391/84-17. The CDR is discussed in Section OA.1.4 of this report. Corrective actions for this issue included identification, analysis, and any necessary modifications of shear lugs on ASME and B31.1 piping where full penetration welds were prescribed. Inspectors reviewed the as-built walkdown packages and design calculations associated with three ASME piping supports containing shear lugs where full penetration welds were prescribed. The inspectors discovered a deficiency in one of the three reviewed pipe support design calculations. Specifically, the calculation was performed assuming the presence of a full penetration weld rather than using as-built measurements, as prescribed by commitments associated with the closure of CDR 391/84-17. The applicant issued PER 382103 to address this issue. As a result of this PER, an extent of condition evaluation was performed which identified a total of 53 supports designed with full penetration shear lug welds. The evaluation also revealed that, for 46 of those 53 supports, full penetration welds had been assumed in the design calculations, even though as-built walkdown data indicated that the existence of full penetration could not be verified. Corrective actions associated with this PER include ultrasonic testing (UT) of the 53 supports to determine the actual condition of the shear lug welds, revision of the design calculations using UT data, and modification of any supports not meeting design criteria.

- CDR 391/83-55: Welds on Structural Steel in Main Steam Valve Rooms:

During the inspection period, an inspection was conducted to verify the completion of corrective actions associated with CDR 391/83-55. The CDR is discussed in Section OA.1.12 of this report. Corrective actions for this issue were performed in the 1980s and included weld re-inspection, evaluation, and re-work, as necessary. The inspectors reviewed the documentation to support closure of this CDR and noted that

it contained the instructions and drawings to rework the needed welds but did not contain records of that re-work being performed or inspected. After questioning the applicant on this issue, it was determined that no such records existed but the re-work was assumed to have been completed based on an internal memorandum dated March 14, 1985 which stated that corrective actions for the nonconformance had been completed for Unit 2 on March 6, 1985. The applicant issued PER 393639 to address this issue. As a result of this PER, the applicant plans to perform an evaluation of the welds in question.

The finding was determined to be more than minor because it represented an inadequate work activity and inadequate quality oversight function that, if left uncorrected, could adversely affect the quality of the construction and records of several safety-related structures, systems, or components (SSCs). The applicant initiated PER 403092 to document these issues. The finding was of very low safety significance because no significant breakdown had occurred in the applicant's QA program for construction related to a single work activity. This finding was related to the Work Practices component of the Human Performance cross-cutting area, as defined in Inspection Manual Chapter (IMC) 0310, because the applicant failed to ensure supervisory and management oversight of the completion of corrective actions associated with the issues noted above, such that nuclear safety was supported. (H.4(c))

Enforcement:

10CFR50, Appendix B, Criterion XVI, "Corrective Actions," requires, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected."

Contrary to the above, during the inspection period, the inspectors identified four instances where corrective actions, for conditions adverse to quality, were not adequately implemented as evidenced by the examples noted above. This finding was determined to be a Severity Level (SL) IV violation using Section 6.5 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, this violation is being treated as a non-cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy, NCV 05000391/2011605-01, "Failure to Take Adequate Corrective Action Associated with CDRs and Issues Identified in an NRC Bulletin."

c. Conclusions

The inspected activities associated with the corrective action program and closure of CDRs and other open items were not performed in accordance with applicant procedures and NRC regulations as discussed above in NCV 05000391/2011605-01; however, other activities observed were performed in accordance with applicable procedures.

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). The inspectors also verified that significant problems were documented under the corrective action program and were being properly identified, addressed, and resolved by the applicant.

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.

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 activity observed included:

- Work Order (WO) 111208178, associated with MCC bucket WBN-2-MCC-B002/3B-B

The inspectors also reviewed and inspected an activity that the licensee had screened out as not affecting Unit 1. These included, but were not limited to, the following:

- WO 111149270, associated with cable pull activities

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 procedures were being performed in accordance with procedure 25402-000-GPP-0000-N2102, Housekeeping, Revision (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. The inspectors observed nozzle dam lifting evolutions and insertions, and made observations of installed metal scaffolding to ensure vessel protection measures existed. The inspectors reviewed access controls and inspected access logs documenting personnel and equipment entry into the RPV as well as FME barriers in place above the vessel. Inspectors observed vessel internals storage conditions and assessed their adequacy in terms of protective coverings and general condition.

The following samples were inspected:

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

b. Observations and Findings

No findings of significance were identified. The core barrel and internals continued to be in their storage locations in the refueling cavity protected with temporary protective material.

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 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 conducted interviews with personnel engaged in pipe support installation and also performed work observations to confirm adequate performance of work in progress and completed work. The inspectors checked 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 the installation activities of pipe support systems on the following supports:

Pipe Support Identification Number	Drawing Revision Authorization (DRA)	Support Type
2-70-854	52526-051, Rev. 1	Rigid Support
2-63-401	52493-023, Rev. 0, 52493-047, Rev. 0	Rigid Support
47A435-13-52	52494-161, Rev. 0, 52494-162, Rev. 0	Rigid Support
2-63-347-1	52497-061, Rev. 0, 52497-062, Rev. 0, 52497-063, Rev. 0	Rigid Support
2-03A284	52430-148 Rev. 0, 52430-149 Rev.0, 52430-150 Rev 0, 52430-151 Rev. 0	Rigid/Component Support
74-2RHR-R231	52538-218 Rev. 0, 52538-219 Rev. 1	Rigid Support
2-47A450-26-342	56966-115 Rev. 0	Rigid Support
2-74-004	52535-048 Rev. 1, 52535-049 Rev. 1, 52535-050 Rev. 0, 52535-051 Rev. 0, 52535-052 Rev. 1	Rigid Support
47A055-129	54289-015 Rev. 0, 54289-016 Rev. 0, 54289-017 Rev. 0, 54289-018 Rev. 0,	Rigid Support

Pipe supports previously accepted by quality control (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 (DRA)	Support Type
47A450-25-45	52503-079, Rev. 0, 52503-080, Rev. 0	Variable Support
47A450-25-65	52503-076, Rev. 0, 52503-077, Rev. 0, 52503-078, Rev. 3	Variable Support
47A450-25-67	52503-043, Rev. 0	Rigid Support
47A450-25-224	52505-016, Rev. 1	Variable Support
47A450-25-70	52503-040, Rev. 0, 52503-041, Rev. 0	Variable Support
67-2ERCWR091-1	52509-020, Rev. 0	Variable Support
2-74-012	52535-022, Rev. 0, 52535-023, Rev. 0	Variable Support
2-68-001	52521-024, Rev. 0, 52521-025, Rev. 0	Variable Support
47A406-14-36	52485-032, Rev 0, 52485-033, Rev 0	Variable Support

2-01A-425	52457-130, Rev. 0, 52457-131, Rev. 0, 52457-132, Rev. 0	Variable Support
2-68-334	52521-051, Rev. 0, 52521-052, Rev. 0, 52521-053, Rev. 0	Variable Support
2-68-382	52521-049, Rev. 0, 52521-050, Rev. 0	Variable Support
2-47A435-14-99	52492-205, Rev. 0, 52492-206, Rev. 0	Component Support
2-68-379	52521-054, Rev. 0, 52521-055, Rev. 0, 52521-056, Rev. 0	Variable Support
2-47A432-1-50	52540-023, Rev. 1	Variable Support
2-47A435-16-72	52494-193, Rev. 0	Variable Support
2-63-026-1	52491-034, Rev. 1	Component/Variable Support
47A401-1-1	52440-054, Rev. 1, 52440-055, Rev. 0	Variable 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.

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

Pipe Support Identification Number	Work Order Number	Number of Anchors Installed
2-03A284	111045387	8
74-2RHR-R231	110936045	4
2-47A406-387	09-952375-031	4
47A055-129	110800490	4
2-62A150-1	111229478	3

The following samples were inspected:

- IP 50090 Section 02.03.a – 4 samples
- IP 50090 Section 02.03.b – 14 samples of pipe supports, including 6 pipe support installations, 5 anchor installations, and 3 anchor bolt load (pull) tests for supports 2-ISLS-998-3761, 2-ISLS-998-3760, 2-ISLS-998-3764
- IP 50090 Section 02.03.d – 18 samples, including 16 variable supports, 2 rigid supports, and 6 small bore line supports
- IP 50090 Section 02.03.e – 2 samples of component supports
- IP 50090 Section 02.03.f – 6 samples of supports and 18 anchor installations
- IP 50090 Section 02.04.c – 2 samples
- IP 46071 Section 02.02.a – 8 samples

- IP 46071 Section 02.02.b – 23 samples
- IP 46071 Section 02.03 – 18 samples

b. Observations and Findings

The inspectors identified the following violation:

Introduction: A violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified by the inspectors because field as-built pipe support configurations did not match the design drawings. The inspectors identified four examples where field engineering and QC failed to adequately install and identify non-conformances, related to pipe support installations, in accordance with applicable instructions, procedures, and drawings.

Description: During the inspection period, the inspectors performed a walkdown of installed pipe supports to determine whether their as-built configurations matched those specified by the applicable DRAs. The inspectors identified four examples where the field as-built configurations did not match the design drawings. These examples were:

- Support 47A450-25-65 failed to meet anchor spacing requirements between baseplate anchors and anchors from an adjacent support. Modification/Addition Instruction (MAI) – 5.1B, Wedge Bolt (WB) Anchor Installation, Rev. 19, requires an anchor spacing of 6 inches between 5/8-inch Expansion Shell Anchors (SSDs) and 1/2-inch WB anchors. The baseplate shown in Section B-B of DRA 52503-077 failed to consider an existing 3 3/4-inch non-conforming anchor spacing between a 5/8-inch SSD and 1/2-inch WB anchor.
- DRA 52503-078, Detail E, required the dimension between an anchor bolt and the centerline of the square tube attachment to be 4 13/16-inches on pipe support 47A450-25-65. The as-built condition measured 4 inches. The difference in measurements was not in accordance with the specified drawings and was also outside the tolerance specified in General Engineering Specification, G-32, "Bolt Anchors Set in Hardened Concrete," Section 4.1.5.
- DRA 52505-16 required the variable spring cold load setting to be at 119 lbs for pipe support 47A450-25-224. General Engineering Specification, G-43, "Installation, Modification, and Maintenance of Pipe Supports and Rupture Mitigative Devices," Section 4.2.2, states, in part, that the final cold load setting should be within +/- 5% of the required cold load setting. The inspector identified the final cold load setting at 130 pounds, which is approximately 5 pounds above the allowable tolerance threshold.
- DRA 52505-16 required a lock nut to be installed on the upper side of a turnbuckle on pipe support 47A450-25-224. The field installation and QC final acceptance did not ensure the proper installation of the lock nut.

On May 25, 2011, the applicant initiated PER 380115 to document the non-conforming conditions identified by the inspectors. The applicant initiated corrective actions for the pipe supports listed above, some of which included rework, engineering evaluations, and re-analysis, as needed.

This finding was determined to be more than minor because it represented an inadequate work activity and inadequate quality oversight function that, if left uncorrected, could adversely affect the quality of the construction and records of a safety-related system, essential raw cooling water (ERCW). The finding was of very low safety significance because this condition was identified by the inspectors before the system was placed in service, the rework was of limited scope, and the engineering evaluation and reanalysis of the as-built pipe supports determined the supports to be acceptable. The cause of this finding was directly related to the Work Practices component of the Human Performance cross-cutting area, as defined in IMC 0310, because the applicant failed to appropriately communicate human error prevention techniques, such as self checking, and proper documentation of activities which contributed to the non-conforming conditions. (H.4 (a))

Enforcement: 10 CFR Part 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 and shall be accomplished in accordance with these instructions, procedures, or drawings."

Section 6.1.3 of Bechtel procedure 25402-000-GPP-0000-N3504, Pipe and Instrument Tubing Supports, requires that all materials, work, and services shall fully comply with the design drawings, specifications, applicable codes, and standards. Additionally, Section 6.3.1 requires that the quality control engineer inspect and verify all inspection attributes for safety-related and quality-related activities. These inspection attributes include orientation, configuration, and dimensions as defined in Attachment B of the procedure. Finally, Section 6.3.7 requires that the field engineer verify that hangers and supports are installed in accordance with design output documents, including drawings.

Contrary to the above, the inspectors identified four examples where the installation activities were not accomplished in accordance with the applicable procedures and DRAs. 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 because it was entered into the corrective action program as PER 380115, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 5000391/2011605-02, "Failure to Adequately Install Pipe Supports and Identify Non-Conformances."

c. Conclusions

The inspected activities associated with pipe supports were not performed in accordance with applicant procedures and NRC regulations as discussed above in NCV 05000391/2011605-02; however, other activities observed were performed in accordance with applicable procedures.

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

a. Inspection Scope

The inspectors observed activities and reviewed documentation associated with the receipt and storage of safety-related mechanical components. Walkdowns of on-site and off-site storage areas were performed to verify that storage and protection of components were in accordance with manufacturer's instructions and established

procedures. The inspectors verified that special storage requirements, such as rotation of pumps and motors, were performed if required. Inspectors also reviewed QA surveillance documentation to verify adequacy and proper frequency of surveillances. The inspectors reviewed deficiencies discovered during surveillances to verify that they were entered into the applicant's corrective action program and properly addressed.

The inspectors observed storage conditions and reviewed procurement and receipt documentation for the following components:

- Motor operated valve (MOV) actuator, 2-MVOP-72-0039A
- MOV actuator, 2-MVOP-03-0116A-A
- MOV actuator, 2-MVOP-03-0126B-B
- Unit 2 turbine-driven auxiliary feedwater (AFW) pump

Documents reviewed are listed in the Attachment.

The following samples were inspected:

- IP 50073 Section 02.02.b – four samples
- IP 50073 Section 02.03.b – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The observed activities related to receipt and storage of safety-related mechanical components were adequate.

C.1.5 Electrical Components – Work Observation and Construction Refurbishment Process (IPs 51053 and 37002)

a. Inspection Scope

The inspectors observed work activities associated with the construction refurbishment of safety-related motor control center retrofit replacement breakers under WO 111208178. The inspectors also observed item in-process storage attributes including identification, storage conditions, and satisfaction of storage requirements. Handling activities from in-process storage to installation were observed to ensure that adequate protections were afforded. The inspectors observed installation activities associated with the work and returned to compare the completed work to licensee procedural requirements and design output documentation.

Specifically, the inspectors observed the following activities:

- Storage, handling and protection
- Installation which included verification that tolerances/clearances were met; appropriate drawings and work procedures were available; and holdpoints were observed.

- Verified the latest approved revision of applicable construction specifications, drawings, and/or construction procedures were available and used by the installers.
- Verified components were as specified, such as type, size or rating, and material.
- Verified components were installed in the proper location and orientation by qualified craft personnel using suitable equipment and tools.
- Verified associated mounting hardware, supports, and anchors were of the type (welded, bolted, etc.) and material specified and were properly located.
- Verified the component identification was properly established and maintained.

The following samples were inspected:

- IP 51053 Section 02.02.b – one sample
- IP 51053 Section 02.02.c – one sample
- IP 51053 Section 02.02.d – one sample
- IP 51053 Section 02.02.e – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Field refurbishment of safety-related electrical components was performed per the approved refurbishment program and procedures.

C.1.6 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 (SAR) 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 111149270 on two separate occasions. Specifically, inspectors observed the pushing of 12 cables from 2-JB-2928233-B to 2-PENT-293-52-B, and later observed the pushing of the same 12 cables through penetration 14157A.

The inspectors verified the following attributes:

- 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 samples were inspected:

- IP 51063 Section 02.02.c – two samples

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 properly performing cable pull activities with appropriate QC oversight.

C.1.7 Observations of Unit 2 New Fuel Receipt Activities (IP 60501)

a. Inspection Scope

During the inspection period, the inspectors conducted observations of new fuel receipt inspection and storage activities to ensure that they were consistent with licensee fuel handling procedures and regulatory requirements under the authority of 10CFR70, “Domestic Licensing of Special Nuclear Material.” These observations took place on the refueling floor in the WBN 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 rigged and suspended from the building crane, lowering of the elements into the appropriate storage locations, and visual inspection of the fuel inserts. The inspectors also verified the new fuel receipt inspection activities and the results were properly documented in accordance with the applicable fuel handling procedure.

The following samples were inspected:

- IP 60501 Section 02.02.a - two samples
- IP 60501 Section 02.03.a - two samples
- IP 60501 Section 02.04.a - two samples
- IP 60501 Section 02.04.b - two samples
- IP 60501 Section 02.04.c - two samples
- IP 60501 Section 02.04.d - two 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.1.8 Verification of As-Builts (IP 37051)

a. Inspection Scope

The inspectors reviewed pipe supports and pipe welds to determine whether as-built design and construction drawings and specifications correctly reflected the as-built condition of the plant. The specific supports and associated welds are discussed in Section C.1.3 of this report.

Systems covered by these inspections included:

- Residual heat removal (RHR – System 74)
- Containment spray (CS – System 72)
- Safety injection (SI – System 63)
- Chemical and volume control (CVC – System 62)
- Auxiliary feedwater (FW – System 3)
- Component cooling water (CCS – System 70)
- Essential raw cooling water (ERCW – System 67)
- Reactor coolant system (RC – System 68)

b. Observations and Findings

The inspectors have identified and documented a number of deficiencies in as-built configurations as findings within Section C.1.3 of this report and applicable sections of previously issued inspection reports. Inspection of the applicant's HAUUP corrective actions are ongoing.

c. Conclusions

The inspected activities of associated pipe supports were not performed in accordance with applicant procedures and NRC regulations as discussed above in Section C.1.3 of this report and applicable sections of previously issued inspection reports; however, other activities observed were performed in accordance with applicable procedures.

C.1.9 Electrical Components and Systems – Work Observation (IP 51053), and Electrical Components and Systems – Record Review (IP 51055)

a. Inspection Scope

The inspectors conducted direct observations of in-process cable installation activities under WO 09-953531-04 and interviewed responsible electrical craft workers, quality control inspectors, and construction field engineers. The review was performed to verify cables were correctly identified, protected against damage, and routed and installed in accordance with approved engineering documents and work instructions.

The inspectors also conducted direct observations of in-process equipment installations, interviewed responsible field engineers, and reviewed records of completed work associated with the electrical equipment items (listed below). The review was performed to verify required records were being prepared as work progressed and that incomplete

installations were being controlled and protected in accordance with approved procedures. Specifically, the inspectors reviewed the following WOs:

- WO 08-951178-002, Rev. 1, Re-Install Motor for Centrifugal Charging Pump 2A-A after Refurbishment
- WO 09-954179-002, Rev. 2, Implement EDCR 54633B to Install Conduits and Supports to Meet 10 CFR 50 Appendix R Separation Requirements; including conduits 2VC06020-A (2-inch), 2VC6014-A (1-inch) and 2PP3035-B (1-inch).
- WO 08-951176-002, Re-install Auxiliary Feedwater (AFW) Pump Motor 2A-A after Refurbishment; and EDCR-2 54640, Install new cable and conduit for the motor terminations.

In addition to the above, the inspectors inspected a sample of panels in the control room and auxiliary instrument room to observe terminated wires including those using crimped wire lugs. Panels 2-M-5, 2-R-73, and 2-R-74 were inspected to verify that wires terminated using wire lugs were crimped according to specified procedures. The inspectors interviewed responsible personnel and reviewed applicable documentation to verify acceptable criteria for wire termination was established and followed. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the completed work was implemented according to the respective design drawings and approved instructions. Cables in the auxiliary instrument room were terminated according to specified procedures, and the identification and corrective actions of cable deficiencies were adequate.

C.1.10 Inservice Inspection – Review of Program (IP 73051), and Inservice Inspection – Review of Procedures (IP 73052)

a. Inspection Scope

By letter to the NRC dated December 24, 1987, the licensee documented its intent to conduct all construction welding activities in accordance with the code of record for construction (ASME Section III 1971 edition through the summer 1973 addenda). As a result, no ASME Section XI repair and replacement program was needed during the period of construction for Watts Bar Unit 2. However, it was the licensee's intent to establish a Unit 2 repair and replacement program based on the Unit 1 program following the completion of construction. Therefore, the inspectors reviewed TI-100.014, "ASME Section XI Repairs and Replacements, Unit 1", Rev. 0, with the understanding that the eventual Unit 2 program would closely follow the Unit 1 program.

The Unit 1 repair and replacement program was reviewed for compliance with the requirements in ASME Section XI, 2001 edition through 2003 addenda, IWA-4000; and supplementary NRC requirements in 10 CFR 50.55a. Documents reviewed are listed in the Attachment.

The inspectors performed the following samples:

- IP 73051 Section 02.04 – one sample
- IP 73051 Section 02.05 – one sample
- IP 73052 Section 02.04 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

For the sample reviewed, the Unit 1 repair and replacement program met the 2001 edition through 2003 addenda of the ASME Boiler and Pressure Vessel (B&PV) Section XI. Therefore, there would be reasonable assurance that the Unit 2 program would meet the requirements of the ASME B&PV Section XI, provided the Unit 2 program closely mimicked the Unit 1 program.

C.1.11 Preservice Inspection (PSI) – Observation of Work Activities (IP 73053)

a. Inspection Scope

The inspectors reviewed WO 111475127 for the repair of defects discovered on the 2B containment spray inlet and outlet nozzle reinforcement pads (weld numbers 2-072A-T017-44 and 2-072A-T017-45). The defects were found during liquid penetrant examinations performed as part of PSI activities. The inspectors verified all activities were performed in accordance with Bechtel's quality assurance program for welding, and the TVA nuclear quality assurance program for nondestructive examination (NDE). Welder certification records and welding procedures were reviewed to verify welder qualification to perform the welding was in accordance with the welding procedure specification. The certified material report was reviewed for the ER 316/316L weld filler metal. The final liquid penetrant (PT) exam was reviewed, including a review of the examiners' certifications, and consumable certifications. Documents reviewed are listed in the Attachment.

The inspectors performed the following samples:

- IP 73053 Section 02.04 - two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Repairs conducted on the 2B containment spray heat exchanger inlet and outlet nozzle reinforcement pads were completed in accordance with the requirements of the quality assurance manuals and the requirements of the ASME B&PV Code.

C.1.12 Preservice Inspection Data Review and Evaluation (IP 73055)

a. Inspection Scope

The inspectors reviewed NDE records of PSI UT associated with two welds within the reactor coolant pressure boundary to verify compliance with the ASME B&PV Code Section XI PSI requirements. SIF-D197-10 was a 10 inch safety injection field weld to the reactor coolant system (RCS) loop 2 cold leg, and RHRF-D031-01 was a 14" residual heat removal field weld to the RCS loop 4 hot leg. Calibration sheets were reviewed to ensure adequate verification was performed. Final data sheets were reviewed to verify final review by a Level III examiner, and that any recordable indications were correctly dispositioned (no recordable indications were observed). Examiner certifications were reviewed to ensure the qualification requirements of Section XI, and 10 CFR 50.55a were met, and the UT procedure (N-UT-64, Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds) was reviewed to verify the requirements of Section XI and 10 CFR 50.55a were met. Documents reviewed are listed in the Attachment.

The inspectors performed the following samples:

- IP 73055 Section 02.04 – two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The PSI examinations of welds SIF-D197-10 and RHRF-D031-01 met the requirements of the PSI code of record (ASME B&PV Code 2001 edition through 2003 addenda) and the requirements of 10 CFR 50.55a.

III. OPERATIONAL READINESS ACTIVITIES

F.1 Fire Protection (IP 64051)

a. Inspection Scope

The inspectors reviewed procedures for the use and control of transient combustible and flammable materials, ignition sources, and fire protection impairments. The inspectors observed fire watch training to verify compliance with the ignition source fire watch training procedure. The inspectors performed walkdowns of Unit 2 construction areas to inspect the condition of fire detection, fire suppression, and emergency lighting devices. The inspectors also reviewed preventive maintenance records for the fire protection system devices observed during the walkdown. The inspectors observed fire watch activities in the Unit 2 reactor, auxiliary, and control buildings. The inspectors observed and interviewed fire watch personnel involved in hot work activities, as well as roving and continuous fire watch personnel. The inspectors verified that fire watch personnel had adequate knowledge of their responsibilities and applicable procedures and that the location of the nearest functioning fire extinguisher and telephone was known.

The following samples were inspected:

- IP 64051 Section 02.01 – one sample
- IP 64051 Section 02.04 – one sample
- IP 64051 Section 02.07 – ten samples
- IP 64051 Section 02.08 – one sample

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

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

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Electrical Conduits and Conduit Supports Corrective Action Program (CAP)(TI 2512/018, IP 51053)

a. Inspection Scope

The inspectors sampled several segments of non-modified and modified safety-related conduit supports associated with the Electrical Conduits and Conduit Supports CAP. This included the review and field verification of the relevant sections of the engineering evaluation walkdown documentation packages. The engineering evaluation walkdowns performed by the licensee consisted of a visual review of as-constructed installation to verify the seismic adequacy, structural integrity, and falling interaction hazards of pre-existing, safety-related seismic category IE conduits and supports by using qualification criteria guidelines and technical procedures, including documentation forms. Calculation WCG-2-308, "Engineering Walkthrough and Evaluation of Safety Related Conduit and Conduit Supports," Rev. 0, provides the qualification criteria and guidelines for the engineering evaluation walkdowns. Additional documents reviewed are listed in the Attachment.

The inspectors verified allowable conduit spans between supports, conduit configurations, conduit fittings, and any missing parts or mismatched support components for the following non-modified category IE conduit and conduit segments:

- Conduit segment in 2-VC-293-4456B between conduit supports 1809 and 6086
- Conduit 2-VC-293-4462B
- Conduit 2-VC-293-4474B

The inspectors reviewed drawings, procedures, and instructions pertaining to conduit supports to determine if they had been adequately evaluated and completed. The inspectors conducted interviews with personnel engaged in conduit support installation to confirm adequate performance of work in progress and completed work. The inspectors checked the actual installation of conduits to determine whether the proper material, bolts, anchors, and support were installed. The inspectors assessed whether

design changes were subject to adequate design control, including consideration of the impact of the change on as-built records.

The inspectors reviewed FCR 55015A, FCR 54613A, WO 08-956627-017, and WO 08-956627-007 to verify whether the category IE conduits and supports were installed in the proper location, orientation, and were using the appropriate mounting hardware material and identification tag. The inspectors verified that one-hole clamp supports have three components: 1) the strap, 2) the spacer, and 3) the anchor bolt assembly. The inspector also verified that each strap matched the spacer of the same manufacturer and that the support span was within allowable limits. The following conduit segments are associated with FCR 55015A and 54613A, respectively:

- Conduit segment in 2-VC-293-2188A between conduit supports 8956627-017-1 and 8956627-017-7
- Conduit segment in 2-PM-293-6586E between conduit support 8956627-007-3 and junction box 2-JB-293-3039E

The following samples were inspected:

- IP 51053 Section 02.02.e - one sample
- IP 51053 Section 02.02.f - one sample
- IP 51055 Section 02.05.c - two samples

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The inspectors concluded that the observed activities associated with the conduit installation were performed in accordance with procedures and that all work associated with this installation was inspected, documented, and completed as required. Additional inspection is required for this CAP.

OA.1.2 (Discussed) BL 74-03: Failure of Structural or Seismic Support Bolts on Class I Components (IP 35007)

a. Inspection Scope

Background: In March 1974, the NRC issued BL 74-03, "Failure of Structural or Seismic Support Bolts on Class I Components," as a result of bolt failures found at the Haddam Neck pressurized water reactor. During a visual inspection, several steam generator seismic support hold-down bolts were observed to be loose. Subsequent inspections identified a number of bolts that were unable to perform their design function. A preliminary evaluation indicated the bolts had failed in tension, but it was later ascertained that the failures were the result of stress corrosion. BL 74-03 was originally addressed for Units 1 and 2 based on the requirements of NUREG-0577, "Potential for Low Fracture Toughness and Lamellar Tearing on PWR Steam Generator and Reactor Coolant Pump Supports," and documented in Calculation WBNSG6-002, Rev. 0.

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

- Reviewed the applicant's open item closure report, NCO080008029, Rev. 0 and Rev. 1, which was issued to track and provide necessary documentation required to close Unit 2 actions for BL 74-03.
- Reviewed the revised Engineering Calculation WBNSSG6-002, Rev. 001, to determine the final disposition related to three heats of upper steam generator support bolts.
- Reviewed PER WBPER971126 to develop an understanding of issues originally encountered with the Unit 1 upper steam generator support bolts.
- Reviewed FCR 57884-A and EDCR 55880, Rev. A, to verify that actions taken for Unit 1 to address issues related to upper steam generator support bolts were adequately addressed for Unit 2.

b. Observations and Findings

A violation of regulatory requirement was identified for failure to take adequate corrective actions for a non-conformance associated with the use of seismic support bolts. This violation is discussed in Section Q.1.1 of this report.

c. Conclusions

The applicant failed to take appropriate corrective actions to resolve the original construction deficiency as discussed in Section Q.1.1 of this report; therefore, additional inspection will be required to verify acceptable completion once all associated actions including those referenced in NCV 05000391/2011605-01 are complete.

OA.1.3 (Discussed) CDR 391/81-67: Qualification of Epoxy Grout for Safety-Related Applications (IP 35007)

a. Inspection Scope

Background: In August 1981, the applicant discovered a condition where unqualified epoxy grout had been used on anchor bolts for supports and hangers inside containment. Specifically, the epoxy grout had not been qualified for radiation bombardment or for use in environments exceeding 120° Fahrenheit. This condition was originally identified in historical NCR 3567R on August 19, 1981. The NRC tracked this issue as CDR 390/81-71 for Unit 1 and CDR 391/81-67 for Unit 2. The applicant revised general engineering specification G-32, "Bolt Anchors Set in Hard Concrete," on August 25, 1982, and civil design standard DS-C1.7.1, "General Anchorage to Concrete," on May 31, 1983, to preclude any further use of epoxy grouted anchors in safety-related applications. Based on review of corrective actions identified by the licensee, CDR 390/81-71 was closed for Unit 1 in NRC inspection report (IR) 50-390/84-15, dated March 26, 1984. On April 27, 1984, Engineering Change Notice (ECN) 4793 was initiated to correct supports affected by deficient epoxy grouted anchor bolts identified in NCR 3567R. On February 13, 1986, the applicant submitted to the NRC a final report for closure of NCR 3567R (CDR 391/81-67) for Unit 2.

In February 1987, the applicant identified an additional Unit 1 support containing epoxy grout for which the required analysis had not been performed. On February 18, 1987, the applicant submitted a revised final report for NCR 3567R to the NRC. In the report, the applicant stated that all epoxy grout in safety-related applications would be identified

during the conduct of the Unit 1 HAAUP CAP. The Unit 1 HAAUP CAP committed the applicant to review and verify the adequacy of 100 percent of the safety-related supports and hangers. This review included steps to identify and analyze the use of epoxy grout in safety-related applications. The applicant has committed to performing the same HAAUP CAP for Unit 2.

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

- Reviewed the applicant's open item closure report including any actions associated with PER 143703, which was issued to track required Unit 2 actions for historical NCR WBN 3567R.
- Reviewed a sample of piping system walkdown packages, drawings, and stress calculations to verify that epoxy grout was removed from safety-related applications or properly analyzed.
- Reviewed General Engineering Specification G-32, "Bolt Anchors Set in Hardened Concrete," and TVA Design Standard DS-C1.7.1, "General Anchorage to Concrete," to verify that revisions to preclude the use of epoxy grout had been incorporated.
- Reviewed the historical document implementation plan for the Unit 2 HAAUP CAP to verify incorporation of commitments to identify and evaluate epoxy grout.
- Reviewed Watts Bar Unit 2 Procedure WDP-PD-2, "Walkdown Procedure for Piping and Pipe Supports," to verify the existence of measures to identify epoxy grout.
- Reviewed the "Review of Unit 2 Pipe Support Designs for Epoxy Grouted Anchors per NCR WBN 3567R" to evaluate the review methodology.
- Reviewed the final report for Qualification of Epoxy Grout for Safety-Related Application- Watts Bar reportable deficiency (WBRD)-50-391/81-67, dated February 13, 1986.
- Reviewed the revised final report for Qualification of Epoxy Grout for Safety-Related Application- WBRD-50-390/81-71, WBRD-50-391/81-67, NCR WBN 3567 and SCR WBN CEB 8570, dated January 12, 1987.
- Reviewed the revised final report for Qualification of Epoxy Grout for Safety-Related Application- WBRD-50-390/81-71, WBRD-50-391/81-67, dated February 18, 1987.
- Reviewed PER 357284, which the applicant initiated to address the violation discussed below, in order to verify inclusion of actions to review and analyze the unidentified/unevaluated epoxy grouted anchor bolts discovered during this inspection.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

A violation of regulatory requirement was identified for failure to take adequate corrective actions for a nonconformance associated with the use of unqualified epoxy grout on safety-related pipe support anchor bolts. This violation is discussed in Section Q.1.1 of this report.

c. Conclusions

The applicant failed to take appropriate corrective actions to resolve the original construction deficiency as discussed in Section Q.1.1 of this report; therefore, additional

inspection will be required to verify acceptable completion once all associated actions including those referenced in NCV 05000391/2011605-01 are complete.

OA.1.4 (Discussed) CDR 391/84-17: Deficient Welds for Hanger Lugs on ASME Code Piping (IP 35007)

a. Inspection Scope

Background: In March 1984, the applicant identified a welding issue concerning the lack of full penetration on shear lug welds. Specifically, some ASME piping shear lug welds were not full penetration welds in accordance with the design drawings. In addition, some welds did not extend the full length of the shear lug. To address this issue, the applicant initiated NCR WBN 5559 and reported these issues to the NRC as CDR 50-390/84-17 and CDR 50-391/84-17 for Units 1 and 2, respectively. These issues were downgraded to non-reportable in a report dated May 1984, but were reopened when similarly deficient welds were discovered in January 1987. The applicant issued Significant Condition Report (SCR) W-518-P to document these deficiencies for Unit 1; SCR WBN 7192 was initiated to document the potential for this condition in Unit 2. The root cause of these deficiencies was determined to be poor craftsmanship, inadequate supervision, and inadequate inspection by the QC welding inspector.

The applicant's corrective actions for these deficiencies included an analysis of all shear lug welds determined to be full penetration welds, on ASME and B31.1 in Category I structures. The analysis utilized ASME Code Case N-318, as endorsed by NRC Regulatory Guide 1.84. To prevent recurrence of inadequate weld penetration, the applicant incorporated a QC hold point for back gouging into the welding operations sheet. Based on a review of incorporated and planned corrective actions, CDR 390/84-17 was closed for Unit 1 on August 8, 1989, in NRC inspection report 50-390/89-04. The applicant clarified their corrective action plan for the deficient shear lug welds on December 10, 1992, in the third revised final report to the NRC. This report committed the applicant to the following:

- NCO870074021: as a result of the HAAUP CAP, the as-built condition of lugs on ASME and non-ASME piping in Category I structures will be shown on revised design drawings.
- NCO870074024: Where full-penetration welds are specified for lugs on ASME and B31.1 piping, reanalyze in accordance with ASME Code Case N-318 to determine the required size for fillet welds or partial penetration welds.
- NCO870074026: Shear lug welds will require reinspection to determine if the existing fillet welds are of sufficient size to meet design requirements where full penetration welds were called for.
- NCO870074030: For lug welds not meeting minimum requirements established by the reanalysis utilizing ASME Code Case N-318, fillet welds meeting the minimum requirements will be added.

These commitments were incorporated and completed in the Unit 1 HAAUP CAP. The applicant committed to performing the same HAAUP CAP for Unit 2.

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

- Reviewed the applicant's open item closure report including any actions associated with PER 172745, which was issued to track required Unit 2 actions for CDR 391/84-17.
- Reviewed TVA's third revised final report for WBRD-50-390/84-17 and WBRD-50-391/84-17, "Deficient Welds for Hanger Lugs on ASME Code Piping," dated December 10, 1992, to identify and evaluate the applicant's commitments to address CDR 391/84-17.
- Reviewed the Unit 2 HAAUP CAP implementation plan to verify incorporation of commitments to evaluate shear lug welds captured by CDR 391/84-17.
- Reviewed Watts Bar Unit 2 Procedure WDP-PD-2, "Walkdown Procedure for Piping and Pipe Supports," to verify incorporation of measures to record as built shear lug weld data.
- Reviewed Design Criteria WB-DC-40-31.9, "Criteria for Design of Piping Supports and Supplemental Steel in Category I Structures," Section 3.16, to verify incorporation of requirements to resolve issues associated with CDR 391/84-17.
- Reviewed a sample of piping and support walkdown packages and calculations to verify that corrective actions to address deficient shear lug welds associated with CDR 391/84-17 were adequate and properly implemented.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

A violation of regulatory requirement was identified for failure to take adequate corrective actions for a non-conformance associated with the use of deficient welds for hanger lugs on ASME code piping. This violation is discussed in Section Q.1.1 of this report.

c. Conclusions

The applicant failed to take appropriate corrective actions to resolve the original construction deficiency as discussed in Section Q.1.1 of this report; therefore, additional inspection will be required to verify acceptable completion once all associated actions including those referenced in NCV 05000391/2011605-01 are complete .

OA.1.5(Discussed) Environmental Qualification (EQ) Special Program (SP) (TI 2512/036)

a. Inspection Scope

The inspectors observed construction activities associated with the EQ SP to verify the activities were performed in accordance with the requirements of 10CFR50.49. The inspectors interviewed program owners, contractors and quality control inspectors associated with WO 110958243 for 2-PENT-293-44-A cable 2V4437. The inspectors reviewed EQ binder WBNEQ-SPLC-004, Environmental Qualification of Raychem Heat Shrink Cable Splices, the Integrated Cable and Raceway Design System (ICRDS) tracking database, and craft personnel training records. Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. The inspectors determined that the EQ cable splice kit was qualified material and the qualifying documentation was in the EQ binder, WBNEQ-SPLC-004. The inspectors reviewed calculation EDQ00299920090011 Rev. 002 Appendix B, "WBN Unit 2 List of 10 CFR 50.49 Cables," and determined that cable 2V4437 was identified as being located in a harsh environment. The inspectors reviewed the ICRDS cable tracking database and determined that the cable location was adequately documented. Further, the inspectors reviewed the craft qualification records and determined that training in EQ splicing was documented.

c. Conclusions

The inspectors determined that the inspected samples were in compliance with requirements. Activities are still in process and will require further inspection.

OA.1.6 (Discussed) Welding CAP Sub-issue 7: Temporary Attachments – Piping (IPs 55050, 57070, and TI 2512/032)

a. Inspection Scope

Background: The Welding CAP was initiated in the mid-1980s to address several welding related issues. Sub-Issue 7, "Temporary Attachments - Piping," was created to address an employee concern that the documentation of required NDE of thermocouple removal areas could not be located.

The corrective actions on Unit 1 consisted of MT (magnetic particle examination) of the removal areas. No rejectable indications were found; however, four welds were found to have exceeded minimum wall thickness requirements due to grinding.

Ongoing corrective actions on Unit 2 consisted of MT examinations of the welds in question. Because the exact thermocouple locations could no longer be found, the applicant was doing examinations out to four inches from the edge of the weld, on both sides, all the way around the pipe circumference to ensure coverage. Areas showing pipe wall thickness reduction due to activities such as grinding received UT thickness measurements.

Inspection Activities: During this inspection period, the inspectors discussed wall thickness issues with the applicant's responsible engineering and NDE personnel. Also, the inspectors reviewed UT thickness measurement report UT-130 to verify that wall thickness reductions were being adequately identified and inspected. Additional documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The reviewed records and discussed activities for this welding CAP sub-issue 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. Due to previous inspection

activities, documented in NRC inspection report 05000391/2011-603, Section OA.1.8, this sub-issue requires no further inspection and can be closed with the Welding CAP.

OA.1.7 (Discussed) Electrical CAP Sub-Issue: Computer Cable Routing System Software and Database Verification and Validation (TI2512/016)

a. Inspection Scope

Background: The TVA CAP for cable issues included a sub-issue which required actions to resolve historical concerns with the adequacy of information in the cable routing database. CAP actions had been previously implemented to verify and validate cable routing information in the ICRDS database; however, the NRC also questioned whether as-installed cable lengths were used in engineering calculations (ref: ML091460633).

Inspection Activities: The inspectors conducted direct field observations of in-process cable pull activities performed under WO 111179560, and interviewed electrical craft and a QC inspector to verify as-installed values for cable length were obtained and recorded in quality records.

In addition, the inspectors interviewed responsible engineering personnel and reviewed records of completed cable installations performed under WO 111611051 to verify that as-installed cable lengths were recorded and submitted to engineering for entry into ICRDS.

The inspectors reviewed the written instructions contained in the WOs and procedures for installation and termination of electrical cables to verify written guidance had been established for obtaining as-installed cable lengths.

b. Observations and findings

No findings of significance were identified. The observations of work activities under WO 111179560 verified that electrical craft workers examined the footage markers on the cable jackets to obtain values for cable length and recorded the values in the cable installation data sheets.

The review of WO 111611051 found that records of as-installed cable lengths were documented in MAI 3.2 Data Sheet 1, "Cable Installation/Pullback Data Sheet," for the portions of the installation outside of the termination enclosures. Records of additional cable lengths that extended into termination enclosures were documented on MAI-3.3 Data Sheet 3, Cable Termination Data Sheet.

The review of MAI 3.2 verified that the procedure required workers to record as-installed values for cable length. Specifically, Section 6.4.D stated that the actual "installed cable length" is the length of scheduled cable in the route $\pm 5\%$ and shall be documented on the cable pull data sheet (Data Sheet 1)."

c. Conclusion

The inspectors determined that documentation of as-installed values for cable lengths were required by procedure and that workers were recording the values for engineering

follow up. However, further inspection samples will be required to verify the recorded values for as-installed cable lengths were being incorporated into cable sizing calculations.

OA.1.8 (Discussed) Unresolved Item (URI) 391/87-01-01: Clarification of Issues Concerning ECN 4214 (IP 92701)

a. Inspection Scope

Background: A 1987 inspection of Unit 1 questioned the installation of apparently undersized solenoid valves in the control air supply for annulus purge valves 1-FSV-30-54A and 1-FSV-30-62A. The 1/4-inch solenoid valves were not consistent with the original design which specified 1-inch supply lines. Although an engineering change notice (ECN) had been issued to approve the smaller valves (ECN 4214), the inspectors determined that engineering had not provided an adequate justification for the change. It was determined that further review was needed to determine whether the valves excessively constricted the air flow to the air operators on the safety-related valves. In addition, the inspectors determined that the licensee's evaluation of the valve actuator for EQ compliance was not clear; specifically in regards to use of a nonqualified rubber hose for control air supply and questionable qualification status of Teflon tape.

The applicant's corrective action review (CAQR WBP870322) subsequently discovered that the valves had a closing time requirement that the smaller valves could not support. In a 1994 inspection (390/1994-55), inspectors closed the URI on Unit 1 to a violation of 10 CFR 50 Appendix B, Criterion III for the failure to identify the design input requirement for valve closure time. At that time, the inspectors stated that issues involving Unit 2 would remain on hold and would be evaluated at a future date.

Inspection Activities: The inspectors reviewed closure package documentation for Unit 2, interviewed responsible licensing and engineering personnel, and reviewed documentation established for PER 143837 to identify the status of corrective actions. They reviewed engineering construction releases EDCR 54172, Rev. A, and EDCR54923, Rev. A, to verify corrective actions taken for Unit 1 were properly extended to Unit 2.

b. Observation and Findings

No findings of significance were identified. The inspectors found that EDCRs 54172 and 54923 provided for replacement of six solenoid valves in System 30. Copies of material requisitions contained in the EDCR document packages required the replacement valves to be 1-inch ASCO solenoid valves.

c. Conclusions

The inspectors determined that the issues associated with adequacy of EQ and failure to identify design inputs were adequately dispositioned for Unit 2. However, further inspection is needed to verify requirements are correctly translated into implementing WOs, and to verify that procurement documents require valves to meet a four second closing time.

OA.1.9 (Discussed) NOV 86-02-01, Failure to follow procedures resulted in improperly installed solenoid valves/seismic (IP 92702)a. Inspection Scope

Background: A 1985 URI identified a concern where seismic-qualified solenoid valves in the SI system were not properly mounted to their supports. A follow-up inspection in 1986 closed the URI to a violation with three examples:

- During the original installation (prior to 1984), craft workers failed to obtain a field change request to document and justify the variances from the mounting method.
- The non-conforming installations failed to use vendor-supplied mounting brackets which were necessary to maintain environmental qualification of the valves.
- During a subsequent replacement of the valves in 1984, craft workers again failed to obtain a field change request as required by site procedures

As documented in NCR 6566 and CDR 391/86-14, a total of 32 improperly mounted solenoids were found during Unit 2 walkdowns.

Inspection Activities: The inspectors interviewed responsible engineering and licensing personnel and reviewed corrective actions documented in PER 143711, "Use of All-Thread Bolts to Mount Solenoid Valves," to determine the status of actions to address the issue on Unit 2.

The following EDCRs were reviewed to determine whether engineering requirements adequately identified the valves that required replacement, and properly addressed the requirements for maintaining seismic and environmental qualification.

EDCR 53235, Rev. A
EDCR 54870, Rev. A
EDCR 53421, Rev. A
EDCR 53036 Rev. A
EDCR 53580 Rev. A
EDCR 53327 Rev. A
EDCR 52495 Rev. B

b. Observation and Findings

No findings of significance were identified. The inspectors found that seven EDCRs had been issued and a FCR was under development which were to provide for replacement of the non-conforming valves identified in CDR 391/86-14. No WOs containing detailed mounting requirements had yet been issued.

c. Conclusions

The inspectors determined that the improperly mounted solenoid valves on Unit 2 had been identified and that engineering requirements to replace the valves were being developed. However, further inspection of actual valve installations will be required to verify mounting configurations conform to the qualified configurations.

OA.1.10 (Discussed) Welding CAP Sub-Issue 25: Establish Boundaries of ASME Section III Jurisdiction (TI 2512/032)a. Inspection Scope

Background: The Welding CAP was initiated in the mid-1980s to address several welding related issues. Sub-Issue 25, "Establish Boundaries of ASME Section III Jurisdiction," was created to address TVA identified examples of changes in TVA piping class that resulted in an incorrect determination of ASME Code applicability.

The corrective actions on Unit 1 were to review flow diagrams of systems containing ASME Section III piping to identify other instances of incorrect Code applicability. Eight welds were incorrectly identified and subsequently evaluated and corrected.

Inspection Activities: Corrective actions for Unit 2 were conducted under PERs 920195, 940064, and 144214, and included a review of Unit 2 flow diagrams for systems 062 (chemical and volume control) and 070 (component cooling). Two welds were discovered which were required to be removed and remade (2-070A-T329-32 and 2-070A-T330-28); however, these welds were associated with a portion of piping that was later abandoned in place per EDCR 54782. The inspectors reviewed associated PERs and DRAs, and conducted interviews with plant staff to verify completion of corrective actions. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that the corrective actions completed for Unit 2 were sufficient. This sub-issue requires no more inspection and will be closed with the Welding CAP.

OA.1.11 (Discussed) Welding CAP Sub-Issue 26: N-5 Code Data Report Program (TI 2512/032)a. Inspection Scope

Background: The Welding CAP was initiated in the mid-1980s to address several welding related issues. Sub-Issue 26, "N-5 Code Data Report Program," was created to address errors noted in the original ASME N-5 documentation during the Unit 1 review process.

The corrective actions on Unit 1 involved creation of an N-5 working group which completed a full review of Unit 1 N-5 reports and established new procedures for documenting N-5 data reports as documented in significant corrective action report (SCAR) WBP900145SCA.

Inspection Activities: The inspectors conducted interviews with plant staff and reviewed SCAR WBP900145SCA. The inspectors reviewed NGDC PP-6, "Completion of Partial ASME Section III N-5 Data Reports," Rev. 6 which documents the five Unit 2 partial N-5 data reports that existed at the resumption of Unit 2 construction activities. Two of the five were related to the additional diesel generator building and, therefore, will not be

used. The remaining three were subject to review and field verification. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors concluded that the corrective actions completed for Unit 2 were sufficient. This sub-issue requires no more inspection and will be closed with the Welding CAP.

OA.1.12 (Discussed) CDR 391/83-55: Welds on Structural Steel in Main Steam Valve Rooms (IP 55050)

a. Inspection Scope

In September 1983, the applicant notified the NRC that welds on structural steel in the north and south valve rooms were not in compliance with drawing and welding specification requirements. To restore compliance, the applicant performed weld reinspection, evaluation, and rework as necessary in the 80s. However, this item remained open for Unit 2 and was tracked in PER 172793 (closed March 2011).

The inspectors reviewed a package submitted to the NRC for closure of this CDR to verify completeness and adequacy of corrective actions. Documents reviewed are listed in the Attachment.

b. Observations and Findings

A violation of regulatory requirements was identified for failure to take adequate corrective actions for a non-conformance associated with welds on structural steel in the main steam room. This violation is discussed in Section Q.1.1 of this report.

c. Conclusions

The applicant failed to take appropriate corrective actions to resolve the original construction deficiency as discussed in Section Q.1.1 of this report; therefore, additional inspection will be required to verify acceptable completion once all associated actions including those referenced in NCV 05000391/2011605-01 are complete.

OA.1.13 (Discussed) Followup on Traditional Enforcement Actions (IP 92702)

a. Inspection Scope

Background: A Notice of Violation (NOV), VIO 05000391/2010603-08, documented the failure of TVA's seismic test program to use suitable mounting methods that adequately reflected the most adverse condition during qualification of Heinemann Molded Case Circuit Breakers (MCCBs), and for failing to perform adequate reviews and verification of design suitability for subsequent manufacture configuration changes to the Heinemann MCCBs. TVA's 1992 seismic qualification of their commercial Heinemann MCCBs did not satisfy by testing the requirement to simulate the intended service mounting of the

components as specified in Sections 6.1.1 and 6.4 of IEEE 344-1975. TVA's letter dated June 9, 2011, outlined the corrective actions completed to address the violation.

Inspection Activities: The inspectors reviewed and evaluated the corrective actions as outlined in the corrective action letter, calculations, qualification reports; conducted interviews with responsible personnel; and inspected actions taken to resolve the NOV. The inspection activities evaluated whether the applicant's program meets the applicable qualification criteria in TVA commitments, and NRC regulations.

b. Observations and Findings

No findings of significance were identified. The inspectors noted that TVA contends that, because the MCCBs unique clamped arrangement is a firmly fit arrangement, they considered it the same as a device mounted on a panel. Therefore, the mounting for the 1992 seismic qualification met the requirements of IEEE 344-1975 Section 6.4 and thus the qualification of the MCCBs is in full compliance with requirements. The inspectors have determined that a device mounted on a panel is not physically representative of the MCCBs unique clamped arrangement because the shakes, rattles, and bangs imparted by the hardware to the MCCBs are not represented. The inspectors noted that TVA determined the required response spectrum (RRS), the most adverse conditions to which the MCCBs would be subjected, by using the highest recorded accelerometer data of 2.72g from the original 1974 qualification. TVA rounded the acceleration to 3g for the test response spectrum (TRS) used for future device testing in order to ensure that the TRS enveloped the RRS. The inspectors noted that the accelerometer was not located at the highest level of MCCBs, and that there is no analysis to determine the RRS at the upper level of MCCBs. The inspectors noted that TVA also claimed a seismic qualification reporting and testing standardization (SQURTS) database as a means of qualification for future procurements of the MCCBs. However, the SQURTS testing emphasizes that it used the manufacturer's recommended mounting of 4 - 6X32 screws for testing, which does not simulate the intended service mounting of TVA's MCCB configuration. The inspectors noted that the SQURTS testing configuration does not directly apply to the current MCCB clamped mounting configuration. The inspectors noted that TVA used a non-safety or quality-related calculation, WCG2893, to determine a test load to demonstrate the stability MCCBs. The test applied a 10lb force to one MCCB at a time in any one direction while visually inspecting for movement thereby demonstrating that the MCCBs are firmly fit. The inspectors noted that the test did not include the additional forces, shakes, rattles and bangs introduced by the unique mounting hardware of the MCCBs during design basis conditions.

Additionally, the inspectors noted that the MCCBs do not exactly fit into 120VAC vital instrument power boards as illustrated in the design specifications. The current configuration of the mounting hardware introduces variables not easily resolved by analysis. The inspectors determined that TVA made undocumented changes to the mounting hardware of the MCCBs by installing spacers and filler material where the MCCBs do not fit into their designed placement. The inspectors noted that the current MCCB configuration does not allow the mounting hardware to agree with the as-built design specifications of the power boards.

c. Conclusions

It is not clear to the inspectors that TVA's corrective actions return their program to full compliance with IEEE 344-1975 and Appendix B Criterion 3 as outlined in the original

violation. The inspectors have determined that a device mounted on a panel is not physically representative of the MCCBs unique clamped arrangement. The inspectors noted that there was no analysis to determine if the TRS used by TVA enveloped the RRS of the upper level MCCBs. The inspectors determined that the unique mounting hardware used by TVA may introduce shaking, rattling, and banging to the MCCBs thereby exposing them to impact frequencies that may prevent them from performing their intended safety function. Finally, the configuration control issues for the 120VAC vital instrument power boards to their original 1974 qualification appears to have degraded the original design, and undermines the direct application of that qualification to the current MCCB mounting hardware configuration. The inspectors have determined that pending further review the NOV, VIO 05000391/2010603-08, will remain open.

OA.1.14 (Closed) URI 391/87-13-04: Use of Leveling Nuts on Baseplates (IPs 46071, 50090, and TI 2512/023)

a. Inspection Scope

Background: In February 1988, the NRC opened URI 391/87-13-04, Use of Leveling Nuts on Baseplates, specifically for Unit 2, as a result of an inspection in the north valve room. This inspection item documented an observation where leveling nuts had been installed under pipe support baseplates before grouting in the north valve room of Unit 2. A detailed inspection revealed that the licensee's general construction specification (G-32) had been revised to preclude this practice unless specifically indicated on the applicable design drawing; however, the A-50 design drawing notes permitted the general use of leveling nuts under baseplates. The applicant revised the 47A050 series drawing notes to eliminate the inconsistency and later voided the drawings to preclude inadvertent use of these drawings. A new series of drawings, 48A200, was later issued to address these inconsistencies, and new calculations were issued to reanalyze supports previously installed with leveling nuts.

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

- Reviewed the applicant's open item closure report (commitment number 111889100), which was issued to track required Unit 2 actions for historical URI 391/87-13-04.
- Reviewed corrective actions which voided all the 47A050 series of drawings and replaced the 47A050 series with the 48A200 series drawings which addressed the inconsistency and the inadvertent use of leveling nuts in this application.
- Reviewed TVA Calculation WCG-1-336, "NRC Unresolved 50-391/87-13-04 Leveling Nuts for Pipe Supports," Rev. 1, which was initiated to demonstrate that the stress increase due to the use of leveling nuts for grouted baseplates for pipe supports would not have a significant negative effect in the support design. TVA concluded that supports installed using leveling nuts are acceptable as built.
- Reviewed calculations for pipe support numbers 2-63-059 (Rev. 4), 2-63-060 (Rev. 4), 2-63-062 (Rev. 5) and 2-63-065 (Rev. 4) for supports that were recently analyzed and revised to address all the items identified in Calculation No. WCG-1-336.
- Reviewed TVA Design Standard – C1.7.1, "General Anchorage to Concrete," Rev. 11, to verify that the current design approach and maximum concrete and steel allowable capacities were not affected by the use of leveling nuts.

- Reviewed civil engineering branch report 82-27, "Cyclic Testing of Anchorage to Hardened Concrete," Rev. 0, to confirm that during a seismic event the anchors will not fail during tension-compression loading cycles.
- Reviewed QCP 1.14, Rev. 21, Inspection and Testing of Bolts Set in Hardened Concrete and Control of Attachments to Embedded Features, Rev 21, and MAI 5.1A, "Expansion Shell Anchor (SSD) Installation," Rev 7, to determine that appropriate steps were and are in place for the conduct of anchor bolt pull tests in accordance with applicable regulations and standards, including BL 79-02.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on these actions the inspectors determined that the applicant had resolved the original construction deficiency for Unit 2. This item is closed for Unit 2.

OA.1.15 (Closed) CDR 391/85-38: Containment Spray System Pipe Supports (IPs 50090, 35007, and TI 2512/023)

a. Inspection Scope

Background: In January 1980, TVA notified the NRC of a potential 50.55(e) item concerning defective pipe supports. These deficiencies were originally identified in historical NCR WBN CEB 2019. Based on a previous review of completed inspections of the modified supports, the inspectors had determined that CDR 390/80-06-01 had been adequately resolved for Unit 1. However, because of the defective pipe supports and the information provided by BL 79-14, all hangers were to be re-inspected, as documented in NRC IR 05000390/82-21, 05000391/82-17. In October 1985 the applicant had notified the NRC that the CCS pipe supports for WBN Unit 2 steel containment vessel dome had several deficiencies to include incorrect plate sizes, bolt holes, and welds. These deficiencies were originally identified in historical NCR WBN CEB 6260 and NCR WBN CEB 6804 as part of the re-inspection program for Unit 2.

Inspection Activities: Initial results of the inspection of this issue were documented in IR 05000391/2010605, which looked at the programmatic and engineering aspects of the original issue including corrective actions to prevent recurrence. These corrective actions included reevaluation and qualification of all Category I pipe supports in accordance with current criteria and procedures. As part of the ongoing inspection, the inspectors verified that the final as-built installation was in agreement with applicable final drawings and design documents for the following supports:

- 47A437-4-47
- 47A437-4-50
- 47A437-4-52
- 47A437-4-68
- 47A437-4-70
- 47A437-5-46
- 47A437-5-41

- 47A437-4-49
- 47A437-5-40

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on these actions, including those documented in IR 05000391/2010605, the inspectors determined that the applicant had resolved the original construction deficiency for Unit 2. This item is closed for Unit 2.

OA.1.16 (Closed) CDR 391/86-38: Failure to Implement Disposition of Previous Nonconformance (IP 35007 and 46071)

a. Inspection Scope

Background: In June 1982, WBN NCR 3747R identified that some supports at WBN had been installed without proof load testing of anchors in accordance with General Construction Specification G-32. This issue was also documented as CDR 391/86-38 which was a Unit 2 specific issue. The disposition of NCR 3747R was to revise WBN Quality Control Procedure (QCP) 1.14, "Inspection and Testing of Bolt Anchors Set in Hardened Concrete and Control of Attachments to Embedded Plates," to include specific requirements for identifying, measuring, and testing affected support anchors. In later NCRs (WBN 6649, WBN 6651 and WBN 6674) it was identified that revisions made to QCP 1.14 through NCR 3747R were later rephrased such that the requirements were, in some cases, misinterpreted and/or referenced NCR 3747R rather than being specifically detailed.

Inspection Activities: To address this issue for Unit 2, the inspectors performed the following:

- Reviewed the applicant's open item closure report included in PER 172796 which was issued to track required Unit 2 actions for historical NCRs WBN 6649, WBN 6651, and WBN 6674.
- Reviewed the most recent version of the G-32 specification to ensure that current requirements for identifying, measuring and testing expansion anchors were clearly stated.
- Reviewed the supplement to response for Attachment 3 of PP-19 closure package for PER 172796 which documents current method(s) used within the HAAUP scope for QC documentation of anchor capacity.
- Independently selected and reviewed a sample of QC anchor capacity test results, based on the HAAUP commitment to provide 100% QC documentation for pipe support anchors.
- Reviewed a sample of QC anchor capacity test results from independently selected pipe supports within the HAAUP for traceability.
- Reviewed QCP 1.14, "Inspection and Testing of Bolts Set in Hardened Concrete and Control of Attachments to Embedded Features," Rev. 21, and MAI 5.1A, "Expansion Shell Anchor (SSD) Installation," Rev. 7, to determine that appropriate steps were and are in place for the conduct of anchor bolt pull tests in accordance with applicable regulations and standards, including BL 79-02.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on these actions, the inspectors determined that the applicant resolved the original construction deficiency for Unit 2. This item is closed for Unit 2.

OA.1.17 (Closed) Construction Deficiency Report (CDR) 391/79-18-01: Deficient Phillips Red Head Anchors (IP 46071 and IP 35007)

a. Inspection Scope

Background: In March 1979, the applicant notified the NRC that a shipment of approximately 10,000, 1/2-inch diameter self-drilling expansion anchors delivered to the site were of questionable quality. This deficiency was originally identified in historical NCR 1433R for Units 1 and 2. The issue was also documented as CDR 390/79-22-01 for Unit 1 and CDR 391/79-18-01 for Unit 2. Based on a rework/re-inspection program instituted for pipe supports, an intensive training/indoctrination program of craft personnel, and review of the certification that accessible anchors were identified, tested and replaced as required, the inspectors determined that CDR 390/79-22-01 was adequately resolved for Unit 1. The closure of CDR 390/79-22-01 was documented in IR 50-390/83-46.

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

- Reviewed the applicant's open item closure report included in PER 172791, which was issued to track required Unit 2 actions for historical NCR 1433R.
- Reviewed Partial Release from Nonconformance, Partial Release 1, to develop an understanding of the method used for closure of Unit 1 CDR 390/79-22-01, and determine whether the same method was used for Unit 2.
- Reviewed the supplement to response for Attachment 1D of the closure package for PER 172791 which documents current method(s) used within the HAAUP scope for QC documentation of anchor capacity.
- Independently selected and reviewed a sample of QC anchor capacity test results, based on the HAAUP commitment to provide 100 percent QC documentation for pipe support anchors.
- Observed anchor bolt installation training as documented in Section T.1.1, "Craft Training," of previously issued inspection reports, including IR 05000391/2011603.
- Reviewed QCP 1.14, Rev. 21, "Inspection and Testing of Bolts Set in Hardened Concrete and Control of Attachments to Embedded Features," Rev. 21, and MAI 5.1A, "Expansion Shell Anchor (SSD) Installation," Rev. 7, to determine that appropriate steps were and are in place for the conduct of anchor bolt pull tests in accordance with applicable regulations and standards, including BL 79-02.

Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on these actions, the inspectors determined that the applicant resolved the original construction deficiency for Unit 2. This item is closed for Unit 2.

OA.1.18 (Closed) CDR 391/84-19: Overstressed Pad Plates for Hydrogen Pipe Supports (IP 35007)

a. Inspection Scope

Background: In April 1984, the applicant notified the NRC that four hydrogen pipe supports, two per unit, were overstressed due to inadequate design. The specific design deficiency was a failure to consider transverse loads acting on the supports. This deficiency was originally identified in historical NCR WBN CEB 8406. The deficiency was documented in CDR 390/84-19 and CDR 391/84-19 for Units 1 and 2, respectively. The existing supports were reanalyzed and modified under ECN 4773 for Unit 1. Based on interviews with licensee representatives and reviews of supporting documentation, the inspectors determined that CDR 390/84-19 had been adequately resolved for Unit 1, as documented in NRC IR 50-390/84-45.

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

- Reviewed the applicant's open item closure report, including any actions associated with NCO850254001 and PER 172630, which was issued to track required Unit 2 actions for historical NCR WBN CEB 8406.
- Reviewed the final report to the NRC, dated January 23, 1986, stating that the required analysis and modifications to the pipe supports had been completed for Unit 2.
- Reviewed the coversheet from closed ECN 5256.
- Reviewed calculations 47A91509035 and 47A91509047.
- Reviewed excerpts from piping system walkdown packages WBN2-PD-030-1605-08, Rev. 0, and WBN2-PD-030-1604-08, Rev. 0.
- Inspected pipe supports 47A915-9-35 and 47A915-9-47 to verify that the walkdown packages and support drawings were consistent with the as-built supports.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Based on these actions, the inspectors determined that the applicant resolved the original construction deficiencies associated with CDR 391/84-19. This item is closed for Unit 2.

OA.1.19 (Closed) Three Mile Island (TMI) Action Item II.K.3.9: Proportional Integral Derivative Controller Modification (IP 35007)a. Inspection Scope

Background: This TMI action required the applicant to implement Westinghouse-recommended modification to the proportional integral derivative (PID) controller within the power-operated relief valve (PORV) opening control circuit. The original recommendation was to raise the interlock bistable trip setting; however, some plants elected to set the derivative time constant to zero within the PORV control circuit, thereby eliminating it from consideration. Either modification was acceptable to the staff. Watts Bar Unit 1 elected to set the derivative time constant to zero.

Inspection Activities: 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.

b. Observations and Findings

No findings of significance were identified. Though the licensee philosophically implemented the same action for Unit 2 as was accomplished for Unit 1, the physical implementation varied greatly. 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. Based on the inspection results, this item is closed.

OA.1.20 (Closed) TMI Action Item II.E.4.2: Containment Isolation Dependability (IP 35007)a. Inspection Scope

Background: This TMI action had seven requirements. In the original safety evaluation report (SER) of 1982, the staff concluded that the licensee met all of the requirements of NUREG-0737, Item II.E.4.2, except subsection (6) concerning containment purging during normal operation. In supplemental safety evaluation report (SSER) 3, the outstanding issue was closed and, pending the operability review of the containment purge/vent isolation valves by the staff, license condition (8) was left open. NRC completed its review later in the decade and issued a technical evaluation report for both units on July 12, 1990. NRC concluded that the isolation valves can close against the

buildup of pressure in the event of a design basis accident if the lower containment isolation valves are physically blocked to an opening angle of 50 degrees or less (SSER 5). The staff resolved License Condition 8 based upon the requirement being reflected in technical specifications.

Inspection Activities: The inspectors reviewed Unit 2 construction design activities for compliance with TMI Action Item II.E.4.2 and NRC requirements. The inspectors evaluated whether the design commitment was properly translated into design drawings, calculations, and other design documentation of mechanical components and associated items for Unit 2. Additionally, the inspectors reviewed the draft Unit 2 technical specifications to verify that the valve limits identified above were appropriately conveyed. The inspectors further reviewed licensee test documents to ensure that this design attribute was being appropriately verified. 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 lower containment vent/purge isolation valve limits, as they pertain to WBN Unit 2, are appropriately addressed in the draft technical specifications and testing. Based on the inspection results, this item is closed.

OA.1.21 (Closed) SSER 22 Appendix HH Open Item: 20

a. Inspection Scope

Resolve whether or not routine maintenance activities should result in increasing the EQ of the 6.9 kilovolt motors from Category II to Category I status in accordance with 10 CFR 50.49.

The inspectors interviewed the EQ program owners to determine how the applicant was addressing the 10 CFR 50.49(l) upgrade requirements as a result of refurbishment/maintenance activities performed on 6.9 kV motors. The inspectors reviewed EQ binder WBNEQ-MOT-001, "Westinghouse Motors on Residual Heat Removal (RHR), Chemical Volume and Control System (CVCS), Chemical Spray (CS) and Safety Injection System (SIS)," Tab B, Rev. 28, to verify the qualification category of the motors and Tab C-5, "Similarity," Rev. 28, to verify an EQ similarity assessment of the stator insulation was documented. Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified. An interview with the EQ program owners identified that the applicant had upgraded the qualification of the 6.9kV motors to EQ Category I based on the original qualification testing reports. The applicant stated that the original qualification testing was performed in accordance with the guidelines in IEEE-323-1974 which complies with the Category I requirements in NUREG-0588. The

inspectors reviewed the environmental qualification binder WBNEQ-MOT-001 and confirmed that the motors were identified as EQ Category 1 equipment.

c. Conclusions

The inspectors concluded that the applicant had upgraded the environmental qualification of the 6.9 kV motors from Category II to Category I. The inspectors determined that the WBNEQ-MOT-001 binder adequately documents the qualification for the 6.9 kV motors as EQ Category 1. Therefore, the inspection efforts associated with SSER22 Appendix HH Open Item 20 are complete and closed.

OA.1.22 (Closed) Inspection of Watts Bar Nuclear Plant Historic Document Review: Historic 10CFR21(Part 21) Issues (IP 35007)

a. Inspection Scope

The inspectors conducted inspection efforts focused on the process the applicant used to review, screen, and resolve historic issues. Specifically, the inspectors reviewed the process for identifying and resolving historic Part 21 issues. The inspectors reviewed procedure 25402-3DP-G04G-00501, "Historical Document Review Process" Rev. 004, interviewed personnel, and performed independent screenings of items in the WBN Unit 2 Integrated Task Equipment List (WITEL) database to ensure that appropriate measures were taken in evaluating historical items. The inspectors performed word searches of WITEL and compared the results with those provided by the applicant to ensure that appropriate justification existed for considering an item closed or that appropriate actions were planned/performed to resolve the issue for Unit 2. Specific documents reviewed are listed in the Attachment to this report.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the sample of documents reviewed complied with applicable procedural requirements. Proper justification of screening accompanied each item and planned corrective actions, when applicable, were appropriate. This item is closed.

OA.1.23 (Closed) TMI Action Item II.F.1.2.e: Verify Installation of Containment Water Level Monitors (IP 92717)

a. Inspection Scope

Background: As a result of the accident at TMI-2, the NRC created a number of action items designed to improve a plant's ability to minimize accident occurrence and accident consequences. These TMI action items were initially outlined in NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident" and later clarified in NUREG-0737, "Clarification of TMI Action Plan Requirements."

TMI Action Item II.F.1.2.e was created to ensure that a mechanism existed to measure and continuously monitor primary containment water level from the main control room.

Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants" was referenced as the guide for the design and qualification of the containment water level monitors. Subsequently, Watts Bar Unit 1 installed the required equipment and it was discussed in NUREG-0847, "Safety Evaluation Report (SER) Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2," Supplement 5. This SER identified that "The staff has verified that the applicant has installed these monitors (see Inspection Reports 50-390/84-77, dated November 14, 1984, and 50-390/84-85, dated January 8, 1985)."

Inspection Activities: Based on the information provided in the background section, the objective of this inspection was to gather and evaluate sufficient information to make a determination as to whether TVA had adequately addressed TMI Action Item II.F.1.2.e for WBN Unit 2. The inspection focused on a review of various documents describing the methodology the applicant has initiated to satisfy the TMI action item. Additional field inspection of main control room equipment installation was performed as documented in NRC IR 05000391/2010605 (Section OA.1.4). Specific documents reviewed are listed in the Attachment to this report.

b. Observations and Findings

No findings of significance were identified. Differences between the Unit 1 completion and Unit 2 resolution were identified by the applicant and reviewed by the inspectors. Primarily, these differences are a result of the applicant taking advantage of improved equipment through obsolescence of original equipment. The proposed equipment installation meets NRC regulatory requirements and satisfies the intent of the TMI Action Item regarding containment water level monitoring. The justification for the change from Unit 1 equipment, applicable regulatory requirements, work instructions, purchase memorandum forms, and procurement specifications were all reviewed to verify that the intent of the TMI Action Item is satisfied.

c. Conclusions

The inspectors reviewed various completed actions associated with TMI Action Item II.F.1.2.e to verify the adequacy of the applicant's actions. The inspectors concluded that the applicant's efforts were sufficient to satisfy the intent of the respective TMI Action Item. TMI Action Item II.F.1.2.e is considered closed.

OA.1.24 (Closed) CDR 391/91-35: Pump Support Weld Deviation on Westinghouse-Supplied Components (IP 55050)

a. Inspection Scope

Background: In September 1991, the applicant informed the NRC that welds on alignment dowels for the centrifugal charging pumps were undersized. The Unit 1 corrective actions were to inspect the welds and perform a calculation based on the actual weld size to determine their adequacy.

Inspection Activities: The Unit 2 corrective actions were the same as for Unit 1. The inspectors performed an independent visual examination of the alignment dowel welds on Safety Injection pump 2BB to verify the applicant's input to the calculations. The inspectors also reviewed the calculations (EPMMAG013091 Rev. 3) to verify the applicant's use-as-is conclusions. Lastly the inspectors reviewed the final open item

completion package (NGDC PP-19-2) for this CDR. Additional documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The documents reviewed and welds inspected for CDR 391/91-35 met the requirements of 10CFR50, App. B; TVA's QA Program. The corrective actions were identical to Unit 1. This item is closed.

OA.1.25 (Closed) CDR 391/85-51: Improper Use of Non-Qualified Cables Inside Containment (IP 35007)

a. Inspection Scope

Background: The applicant issued CDR 391/85-51 to address a historical concern about deficiencies in controlling the issuance and installation of electrical cables. The CDR reported that some cables with inadequately qualified silicone rubber insulation had been inadvertently installed in applications requiring service in harsh environments.

Inspection Activities: The inspectors conducted direct observations of new cables maintained in three temporary staging areas. The inspection sample included the following cables:

- Material Withdrawal Request 15655, 1,200 ft of 12 AWG cable, PO 41831-1
- MWR 10095, 436 ft of 14 AWG cable, PO 2056, Contract 5063 (Cable ID 1V10002B)
- MWR 11527, 400 ft of 12 AWG cable, PO 41831-1
- MWR 17743, 146 ft of 14 AWG cable (Cable ID 2SG326A)

The inspectors examined the cable tags, markings and copies of the material pick lists (i.e., "cut sheets") to verify the required information was maintained with each reel or pallet of cable in the staging areas. The inspectors observed staged cables to determine whether the staged cables had been pre-cut according to lengths specified in the ICRDS, and whether they were uniquely labeled with their ICRDS cable number.

In addition, the inspectors reviewed the EDCRs that had been identified in the corrective action plan for PER WBP940179. The PER had been issued to address the cable control issues that were applicable to Unit 2. The identified EDCRs were reviewed to verify that engineering had adequately specified requirements for replacing the Unit 2 cables that had been inadequately controlled during their original installations. The following EDCRs were reviewed:

- EDCR 55231-A, including FCR 56533-A
- EDCR-2 54903-A
- EDCR-2 53352-A, including FCR 56256-A
- EDCR-2 52639-B

b. Observations and findings

No findings of significance were identified. The inspectors determined that tagging, labeling, and documents provided with each cable were sufficient to identify the quality requirements and correct application for each. Markings embossed on the cable insulation jackets by the manufacturer facilitated traceability by depicting the TVA purchase order numbers. No untagged cable was observed in the staging areas. Only safety-related cable was observed in the staging areas.

The inspectors determined that the engineering requirements (i.e., EDCRs) had been formally approved and issued to construction for all of the identified cables. The only remaining action required by the applicant's corrective action plan was the physical installation of seven environmentally qualified cables.

c. Conclusion

The inspectors determined that the inspection sample was sufficient to verify satisfactory resolution of the CDR concern about tagging and control of electrical cable being staged from the stores warehouse. This issue is closed.

OA.1.26 (Closed) CDR 391/85-39: Corrosion Cracks in GE Type PK Test Blocks (IP 35007)

a. Inspection Scope

Background: During an inspection of the spare terminals on General Electric (GE) Type PK test blocks in 1985, two terminals fractured easily when pulled. The subject deficiency was reported to the NRC in accordance with 10 CFR 50.55(e) as NCR W-267-P. The manufacturer determined that the root cause of the failures was corrosion cracking from a sub-supplier's use of unspecified material and failure to use stress-relief annealing.

Inspection Activities: The inspectors evaluated the status and adequacy of corrective actions for the Unit 2 construction completion project by reviewing commitment closure documents and interviewing responsible personnel related to CDR 391/85-39.

Specifically, the inspectors reviewed commitment closure document "FINAL-IPS 386-CDR 391-85-39-Commitment 111409624" to assess the effectiveness of corrective actions to replace deficient studs on the GE type PK test blocks installed in environments containing stress corrosion accelerators and the evaluation of test blocks installed in the remaining areas of the plant.

The inspectors reviewed vendor correspondence, procurement documents, and receipt inspection reports. In addition, the inspectors reviewed maintenance requests A-581820, A-581821, A-581830, A-581831 to verify replacement of deficient test block studs located in environments containing stress corrosion accelerators. The inspectors also reviewed procedure MI-0.23 "Early Warning Test for PK Terminal Pins", Rev.0, to verify the testing and evaluation of test block studs installed in the remaining parts of the plant. The inspectors interviewed responsible personnel to assess the adequacy of the performed root cause analysis and the actions taken to prevent recurrence. 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 corrective actions taken for CDR 391/85-39 were adequate to identify and correct deficiencies found in the studs of the GE type PK Test Blocks and to preclude recurrence. This issue is closed.

OA.1.27 (Closed) BL 75-06: Defective Westinghouse Type OT-2 Control Switches (IP 92717)

a. Inspection Scope

Background: BL 75-06 reported that Westinghouse Electric Corporation discovered a number of defective Westinghouse type OT-2 electrical switches in the main control board of Sequoyah Station, and that these switches may also be installed in other nuclear power facilities.

TVA identified all of the Westinghouse Type OT-2 switches installed at Watts Bar (both units) and prepared instruction WBF1 E-36 to test the switches in accordance with Westinghouse Bulletin NSD-TB-75-04. This item was initially closed by the NRC in IR 50-390/8525 (Unit 1) and 50-391/85-20 (Unit 2).

Due to the historic nature of this issue and the extensive amount of time construction had been idled on Watts Bar Unit 2, TVA committed to evaluate all of the Unit 2 switches in accordance with the 25402-000-GPP-0000-TI216, "Watts Bar Unit 2 Completion Project Refurbishment Program".

Inspection Activities: The inspectors reviewed Commitment Closure Package "FINAL-IPS 121-Bulletin 1975-06-10187136" and interviewed engineering personnel to assess the effectiveness of the identification and corrective actions for the defective switches. The closure package included the Watts Bar Unit 2 completion project refurbishment program, material requisitions, purchase orders, and receipt documentation.

b. Observation and Findings

No findings of significance were identified.

c. Conclusions

The inspectors determined that the Watts Bar Unit 2 completion project refurbishment program adequately identified and will subsequently refurbish defective Westinghouse Type OT-2 switches. The inspectors concluded that the in-process activities to close TVA's response for Unit 2 to Bulletin 1975-06 were adequate, therefore the issue is closed.

OA.1.28 (Closed) PZR Penetration Nozzles and Steam Space Piping Connections in Pressurized Water Reactors and BL 2004-01 (TI-2515/160, and IPs 57080 and 92717)

a. Inspection Scope

IR 05000391/2010605 documented the initial inspection of these activities. The inspectors reviewed records associated with UT performed on the pressurizer spray nozzle-to-safe-end dissimilar metal weld (2-WP-11-SE) prior to the application of the mechanical stress improvement process, to verify it was performed in accordance with ASME B&PV Code, Section XI 2001 edition through 2003 addenda, 10 CFR 50.55a, and the licensee's commitments to BL 2004-01. The inspectors reviewed N-UT-82, "Generic Procedure for the Ultrasonic Examination of Dissimilar Metal Pipe Welds," , Rev. 4, for conformance with the licensee's QA program; and that essential variables including probe frequency, beam angle, and scanning speed met the requirements of ASME B&PV Code Section XI, Appendix VIII qualification requirements (as supported by the Electrical Power Research Institute performance demonstration Initiative (PDI)). Additionally the procedure was reviewed to ensure the calibration procedure and the reporting requirements satisfied the PDI. The inspectors also reviewed personnel certification records to verify the examiner was appropriately qualified to perform the UT exam per the PDI, that the examiner's certification had not expired, and that the required annual eye examinations had been satisfactorily completed. Additionally calibration records, and the final NDE report were reviewed. Documents reviewed are listed in the Attachment.

The inspectors performed the following samples:

- IP 57080 02.01 – 1 sample
- IP 57080 02.03 – 1 sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

UT performed on 2-WP-11-SE was performed in accordance with the requirements of the ASME B&PV Code, Section XI 2001 edition through 2003 addenda, and 10 CFR 50.55a. Per letter to the NRC dated April 1, 2010 (ML 100950044) the licensee was committed to completing a bare metal visual inspection of the upper pressurizer Alloy 600 locations during the first refueling outage. These activities will be inspected during or following the first refueling outage. All requirements for TI-2515/160 which can be completed during the construction period have been met and this item is closed. All licensee commitments for BL 2004-01 which can be completed during the construction period have been met and this item is closed.

OA.1.29 (Closed) Failure to Provide Alternate Instructions to Correctly Mark Weld Centerlines for MSIP (NCV 05000391/2010604-01)**a. Inspection Scope**

NCV 05000391/2010604-01 was associated with an inadequate procedure to mark weld centerlines for the mechanical stress improvement process of the five pressurizer spray, relief and safety nozzles. The applicant's general corrective actions were documented in PERs 280777 and 241073. The applicant's actions included an evaluation to determine the possible effect on Watts Bar Unit 1; an evaluation to verify the actual clamp location on the Unit 2 pressurizer spray, relief and safety nozzles; and correction to the procedures for marking weld centerlines on the pressurizer surge line (PI-901153-02, Instructions for Marking the Surge Nozzle Dissimilar Metal Weld Centerline – Watts Bar Unit 2 Pressurizer), and verification of the adequacy of the procedure for marking the reactor pressure vessel weld centerlines (PI-901210-02, Instructions for Marking the Dissimilar-Metal Weld Centerline on the Reactor Vessel Hot and Cold Leg Nozzles for MSIP at Watts Bar Unit 2). The inspectors reviewed the licensee's corrective action documentation (PERs), evaluations, and procedures to ensure the corrective actions were adequate. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The applicant's actions were acceptable and appropriately documented; therefore, this NCV is closed.

V. MANAGEMENT MEETINGS**X.1 Exit Meeting Summary**

On July 14, 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
R. Smith, Engineering Manager, Bechtel
B. Briody, Maintenance and Modifications Manager, TVA, Unit 2
R. Kuhn, Quality Assurance Manager, Bechtel
R. Baron, Nuclear Assurance Project Manager, TVA, Unit 2
T. Raley, Instrumentation & Controls Manager, Bechtel
M. Pitre, Lead Field Welding Engineer, Bechtel Construction
G. Scott, TVA Licensing
R. James, Sr. Civil Engineer, Bechtel
C. Stephenson, TVA Licensing
T. Metzler, Licensing, TVA, Unit 2
D. Beckley, Electrical Design, TVA Unit 2
D. Charlton, Licensing, TVA, Unit 2
S. Clark, I&C Engineering, Bechtel
D. Ferguson, Field Engineer, Bechtel
E. Newton, Electrical Superintendent, Williams
D. Tinley, Quality Assurance, TVA, Unit 2
G. Jones, Watts Bar EQ Program
G. Spurling, Watts Bar EQ Program
B. Wilson, Bechtel Electrical Construction

INSPECTION PROCEDURES USED

IP 35007 Quality Assurance Program Implementation During Construction
IP 37002 Construction Refurbishment Process – Watts Bar Unit 2
IP 37051 Verification of As-Builts
IP 46071 Concrete Expansion Anchors
IP 50053 Reactor Vessel and Internals Work Observation
IP 50073 Mechanical Components – Work Observation
IP 50090 Pipe Support and Restrain Systems
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 57070 Nondestructive Examination Procedure Magnetic Particle Examination Procedure
Review/Work Observation/Record Review
IP 60501 Fuel Receipt and Storage
IP 64051 Procedures - Fire Prevention/Protection
IP 73051 Inservice Inspection Review of Program
IP 73052 Inservice Inspection Review of Procedures
IP 73053 Preservice Inspection - Observation of Work and Work Activities
IP 73055 Preservice Inspection Data Review and Evaluation
IP 92701 Followup
IP 92702 Followup on Corrective Actions for Violations and Deviations

IP 92717	IE Bulletins for Information and IE Information Notice Followup
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 2512/023	Inspection of Watts Bar Nuclear Plant Hanger Update Corrective Action Program Plan
TI 2512/032	Inspection of Watts Bar Nuclear Plant Welding Corrective Action Program Plan
TI 2512/036	Inspection of Watts Bar Nuclear Plant Environmental Qualification Special Program
TI 2515/160	Pressurizer Penetration Nozzles and Steam Space Piping Connections in U.S. Pressurized Water Reactors (NRC Bulletin 2004-01)

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000391/2011605-01	NCV	Failure to take adequate corrective action associated with CDRs and issues identified in an NRC Bulletin (Section Q.1.1)
05000391/2011605-02	NCV	Failure to Adequately Install Pipe Supports and Identify Non-Conformances (Sections C.1.3)

Discussed

2512/018	TI	Electrical Conduits and Conduits Supports CAP (Section OA.1.1)
74-03	BL	Failure of Structural or Seismic Support Bolts on Class I Components (Section OA.1.2)
391/81-67	CDR	Qualification of Epoxy Grout for Safety-Related Applications (Section OA.1.3)
391/84-17	CDR	Deficient Welds for Hanger Lugs on ASME Code Piping (Section OA.1.4)
2512/036	TI	EQ SP (Section OA.1.5)
2512/032	TI	Welding CAP Sub-Issue 7: Temporary Attachments – Piping (Section OA.1.6)
2512/016	TI	Electrical CAP Sub-Issue : Computer Cable Routing System Software and Database Verification and Validation (Section OA.1.7)
391/87-01-01	URI	Clarification of Issues Concerning ECN 4214 (Section OA.1.8)

86-02-01	NOV	Failure to follow procedures resulted in improperly installed solenoid valves/seismic (Section OA.1.9)
2512/032	TI	Welding CAP Sub-issue 25: Establish Boundaries of ASME Section III Jurisdiction (Section OA.1.10)
2512/032	TI	Welding CAP Sub-issue 26: N-5 Code Data Report Program (Section OA.1.11)
391/83-55	CDR	Welds on Structural Steel in Main Steam Valve Rooms (Section OA.1.12)
92702	IP	Followup on Traditional Enforcement Actions (Section OA.1.13)
<u>Closed</u>		
391/87-13-04	URI	Use of Leveling Nuts on Baseplates (Section OA.1.14)
391/85-38	CDR	Containment Spray system pipe supports (Section OA.1.15)
391/86-38	CDR	Failure to Implement Disposition of Previous Nonconformance (Section OA.1.16)
391/79-18-01	CDR	Deficient Phillips Red Head Anchors (Section OA.1.17)
391/84-19	CDR	Overstressed Pad Plates for Hydrogen Pipe Supports (Section OA.1.18)
II.K.3.9	TMI Action	Proportional Integral Derivative Controller Modification (Section OA.1.19)
II.E.4.2	TMI Action	Containment Isolation Dependability (Section OA.1.20)
Open Item 20	SSER-22 (App. HH)	Resolve whether or not routine maintenance activities should result in increasing the EQ of the 6.9 kilovolt motors from Category II to Category I status in accordance with 10 CFR 50.49 (OA.1.21)
II.F.1.2.e	TMI Action	Verify Installation of Containment Water Level Monitors (Section OA.1.23)
391/91-35	CDR	Pump Support Weld Deviation on Westinghouse-Supplied Components (Section OA.1.24)

391/85-51	CDR	Improper Use of Non-Qualified Cables Inside Containment (Section OA.1.25)
391/85-39	CDR	Corrosion Cracks in GE Type PK Test Blocks (Section OA.1.26)
75-06	BL	Defective Westinghouse Type OT-2 Control Switches (Section OA.1.27)
2515/160	TI	PZR Penetration Nozzles and Steam Space Piping Connections in Pressurized Water Reactors Section (Section OA.1.28)
2004-01	BL	Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors (Section OA.1.28)
391/2010604-01	NCV	Failure to Provide Alternate Instructions to Correctly Mark Weld Centerlines for MSIP (Section OA.1.29)

LIST OF DOCUMENTS REVIEWED

II. MANAGEMENT OVERSIGHT AND CONTROLS

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

Procedures and Specifications

25402-PRO-0007, Field Storage Control, Rev. 2, 09/09/2010
SPP-4.3, Material Storage and Handling, Rev. 8, 03/01/2010

Procurement and Receipt

Material Receiving Package, MOV Actuator, 2-MVOP-72-0039A, CPE816E, 07/30/2010
Material Receiving Package, MOV Actuator, 2-MVOP-03-0116A-A, CPE933A,
07/02/2010
Material Receiving Package, MOV Actuator, 2-MVOP-03-0126B-B, CPE933A,
07/02/2010
Material Receiving Package, Turbine Driven Auxiliary Feedwater Pump, CPB270V,
11/18/2010
Procurement Data Sheet, MOV Actuator, 2-MVOP-72-0039A, CPE816E, 07/30/2010
Procurement Data Sheet, MOV Actuator, 2-MVOP-03-0116A-A, CPE933A, 07/02/2010
Procurement Data Sheet, MOV Actuator, 2-MVOP-03-0126B-B, CPE933A, 07/02/2010

Surveillances

Report # 10-0378, Storage and Maintenance Surveillance, Warehouse #4, 05/01/2010
Report # 10-0379, Storage and Maintenance Surveillance, Warehouse #5, 05/01/2010
Report # 10-0384, Storage and Maintenance Surveillance, Spring City Warehouse,
05/01/2010
Report # 10-0413, Storage and Maintenance Surveillance, Warehouse #7, 06/01/2010
Report # 10-0414, Storage and Maintenance Surveillance, Spring City Warehouse,
06/02/2010
Report # 11-0696, Storage and Maintenance Surveillance, Warehouse #4, 02/02/2011
Report # 11-0697, Storage and Maintenance Surveillance, Warehouse #5, 05/02/2011
Report # 11-0717, Storage and Maintenance Surveillance, Spring City Warehouse,
05/03/2011
Report # 11-0718, Storage and Maintenance Surveillance, Spring City Warehouse,
06/02/2011
Report # 11-0719, Storage and Maintenance Surveillance, Warehouse #5, 06/02/2011

Problem Evaluation Reports

PER 232612, Temperature recorder TR-27 not recording properly, status date
06/08/2010
PER 232614, Temperature recorder not working properly, status date 06/02/2010

C.1.9 Electrical Components and Systems – Work Observation (IP 51053), and Electrical Components and Systems – Record Review (IP 51055)

MAI 3.3, Cable Terminating, Splicing, and Testing for Cables Rated Up to 15,000 Volts

PER 229095
 EDCR 55127, Rev. A, Install V4 and V5 cable and conduit as part of the Bulk Cable Pull
 EDCRs
 WO 112288837, Rev. 2, Auxiliary Feed Water Pump 2A-A Installation

C.1.10 Inservice Inspection – Review of Program (IP 73051), and Inservice Inspection – Review of Procedures (IP 73052)

Miscellaneous Documents

TI-100.014, ASME Section XI Repairs and Replacements, Rev 0

C.1.11 Preservice Inspection – Observation of Work and Work Activities (IP 73053)

Miscellaneous Documents

Bechtel WO-111475127, Weld repair to indications of WBN-2-HTX-072-0002B-B

C.1.12 Preservice Inspection Data Review and Evaluation (IP73055)

Procedures

N-UT-64, Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds,
 Rev 11

Miscellaneous

DRA 47W464-267A, Unit 2 Analysis Isometric of CCS Piping, Rev 0
 DRA 2-47W859-3, Rev 1

III. OPERATIONAL READINESS ACTIVITIES

F.1 Fire Protection (IP 64051)

Procedures and Standards

NPG-SPP-18.4.7, Control of Transient Combustibles, Rev. 0, 12/10/2010
 NPG-SPP-18.4.8, Control of Ignition Sources (Hot Work), Rev. 0, 12/10/2010
 NPG-SPP-18.4.6, Control of Fire Protection Impairments, Rev. 0, 12/10/2010
 TI-210, Fire Protection Engineer Periodic Inspection, Rev. 1, 05/19/2009
 TRN-32, Ignition Source Fire Watch Training, Rev. 2, 01/15/2003

Preventive Maintenance

WBN 0-FPS-510-0001A, Preventive Maintenance Instruction: Portable Fire
 Extinguishers Inspection (Package A), Rev. 9, PM9569V
 WBN 0-FPS-510-0001C, Preventive Maintenance Instruction: Portable Fire
 Extinguishers Inspection (Package C), Rev. 10, PM9600V
 WBN 0-FPS-510-EXT/INSP, Portable Fire Extinguisher Inspection List (Attachment A),
 PM 0039F

IV. OTHER ACTIVITIES

OA.1.1 Electrical Conduits and Conduit Supports Corrective Action Program (TI 2512/018, IP 51053)

Walkdown Package WBN2-C-292-816-02
 Walkdown Package WBN2-C-292-816-08
 Walkdown Package WBN2-C-292-816-52
 Walkdown Package WBN2-C-292-816-61
 Walkdown Package WBN2-C-292-816-16

OA.1.3 CDR 391/81-67: Qualification of Epoxy Grout for Safety-Related Applications (IP 35007)

Procedures and Specifications

Watts Bar Unit 2 Procedure WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, Rev. 9, 04/29/2010
 General Engineering Design Specification G-32, Bolt Anchors Set in Hardened Concrete, Rev. 23, 12/14/2005
 TVA Design Standard DS-C1.7.1, General Anchorage to Concrete, Rev. 11, 01/03/06
 Implementation Plan for the Unit 2 Hanger Analysis and Update Program (HAAUP) CAP, 02/09/2010

Problem Evaluation Reports (PER)

PER 143703, Material Qualification of Epoxy Grout Used Inside Containment Subject to Radiation, status date 03/07/2011
 PER 357284, NRC ID'D: Calculation did not Evaluate Epoxy Grout, status date 05/26/2011

Walkdown Packages

WBN2-PD-094-1542-00, "As built walk down of pipe supports, system 094, Stress Problem N3-94-01R, 02R, 03R, 04R, Support 2-90-100," Rev. 0, dated 03/10/2010
 WBN2-PD-094-1542-02, "As built Walk Down of pipe support, System 094, Stress Problem Number N3-94-01R, -02R, -03R & -04R; Hanger Support Number(s) 2-90-102," Rev. 0, dated 03/16/2010
 WBN2-PD-094-1542-03, "As built Walk Down of pipe support, System 094, Stress Problem Number N3-94-01R, -02R, -03R & -04R; Hanger Support Number(s) 2-90-103," Rev. 0, dated 03/23/2010
 WBN2-PD-094-1542-04, "As built Walk Down of pipe support, System 094, Stress Problem Number N3-94-01R, -02R, -03R & -04R; Hanger Support Number(s) 2-90-104," Rev.0, dated 03/23/2010

Calculations

Calculation 290100, Calculation for Pipe Support No. 2-90-100, Rev. 002, 08/20/2010
 Calculation 290102, Calculation for Pipe Support No. 2-90-102, Rev. 002, 08/19/2010
 Calculation 290103, Calculation for Pipe Support No. 2-90-103, Rev. 002, 08/25/2010
 Calculation 290104, Calculation for Pipe Support No. 2-90-104, Rev. 002, 08/23/2010

Historic Documents

Final Report for Qualification of Epoxy Grout for Safety-Related Application- WBRD-50-391/81-67, dated Feb 13, 1986.
 Review of Unit 2 Pipe Support Designs for Epoxy Grouted Anchors per NCR WBN 3567R, dated 07/22/1986
 Revised Final Report for Qualification of Epoxy Grout for Safety-Related Application- WBRD-50-390/81-71, WBRD-50-391/81-67, NCR WBN 3567 and SCR WBN CEB 8570, dated Jan 12, 1987
 Final Report for Qualification of Epoxy Grout for Safety-Related Application- WBRD-50-390/81-71, WBRD-50-391/81-67, dated 02/18/1987

OA.1.4 CDR 391/84-17: Deficient Welds for Hanger Lugs on ASME Code Piping (IP 35007)Procedures and Specifications

Watts Bar Unit 2 Procedure WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, Rev. 9, 04/29/2010
 Watts Bar Design Criteria WB-DC-40-31.9, Criteria for Design of Piping Supports and Supplemental Steel in Category I Structures, Rev. 21, 08/13/2008
 Implementation Plan for the Unit 2 Hanger Analysis and Update Program (HAAUP) CAP, 02/09/2010

Problem Evaluation Reports (PER)

PER 172745, Tracking for NCO870074021, NCO870074024, NCO870074026, and NCO870074030, status date 04/18/2011
 PER 382103, NRC ID'D: Weld evaluation of lugs for pipe support calculation 742RHRR213 Rev. 1 was not conservative, status date 06/29/2011

Walkdown Packages

WBN2-PD-074-2389-81, "As built Walk Down of pipe supports, System 074, Stress Problem Number N3-74-04A, Hanger Number 74-2RHR-RR213," Rev. 0, dated 08/25/2009

Calculations

Calculation 742RHRR213, Calculation for Pipe Support 72-2RHR-R213, Rev. 001, 04/19/2010
 Calculation 201A303, Calculation for Pipe Support No. 2-01A-303, Rev. 003, 09/02/2009
 Calculation 47A45025351, Calculation for Pipe Support No. 47A450-25-351, Rev. 004, 03/03/2011

Historic Documents

Third Revised Final Report WBRD-50-390/84-17 and WBRD-50-391/84-17, Deficient Welds for Hanger Lugs on ASME Code Piping, dated December 10, 1992

OA.1.5 Environmental Qualification Special Program TI 2512/036Procedures/Programs

MAI-3.3, Cable Terminating, Splicing, and Testing for Cables Rated Up to 15,000 Volts, Rev. 0028
 General Engineering Specification, G-38.
 WB2-354, Bechtel Electrical Training, Bechtel Crimping, Splicing and Terminations, Revision 0.

Environmental Qualification Documents/Calculations

Environmental Qualification Document Package, WBNEQ-SPLC-004, IE Electrical Equipment Requiring Environmental Qualification under 10CFR50.49.
 EDQ00299920090011, REV 002 Appendix B, WBN Unit 2 List of 10 CFR 50.49 Cables

Work Orders

WO 110958243, CCE EDCR2 53554 54172 53756 52694 54903 55244 SYS 293 063 2-PENT-293-0044-A

OA.1.6 Welding CAP Sub-issue 7: Temporary Attachments – Piping (IPs 55050, 57070, and TI 2512/032)

UT-130

OA.1.10 Welding CAP Sub-issue 25: Establish Boundaries of ASME Section III Jurisdiction (TI 2512/032)Corrective Action Program Documents

PER 144214, Welds attaching class C piping to the post-accident sampling chiller, 2/2/1994
 WBPER 940064, ASME boundaries of jurisdiction, 2/3/1994
 WBPER 920195, Corrective action requirements, Rev 0, 8/10/1992
 WBPER 920195, ASME component boundaries, Rev 1, 10/15/1992

Miscellaneous

BIT #1717, 3/3/2009

OA.1.11 Welding CAP Sub-issue 26: N-5 Code Data Report Program (TI 2512/032)Procedures

NGDC-PP-6, Completion of TVA Partial ASME Section III N-5 Data Reports, Rev 6

Miscellaneous

ASME Certificates of Authorization 'NA' and 'NPT' (N-1480 and N-1481)

OA.1.14 URI 391/87-13-04: Use of Leveling Nuts on Baseplates (IPs 46071, 50090, and TI 2512/023)

Drawing 1-48A200-1, "Pipe Support General Installation Requirements and Tolerances," Rev. 2

Drawing 1-47A050-101, "Mechanical Hanger Drawing General Notes," Rev. 3

Drawing 1-47A050-101, "Mechanical Hanger Drawing General Notes," Rev. 4

TVA's Memo from G.R. Ashley (TVA) to G.A. Walton (NRC) – WBN Unresolved item (URI) 391/87-13-04.

NRC Inspection Report No. 50-390/87-13 for Unit 1 and 50-391/87-13 for Unit 2

Excerpt from DCN P02133, "Deletion of note on 47A050, Rev.3"

DCN P02266, "Deletion of the 47A050 General Notes"

DCN S16000, "Conversation of construction spec."

CAQR No. WBT880429, Rev. 0

Memo from J.A Thompson, Construction Manger to H. B. Bounds, Project Engineer, "FCR H-17414 reply memorandum," dated Aug. 6, 1987

OA.1.16 CDR 391/86-38: Failure to Implement Disposition of Previous Nonconformance (IP 35007 and 46071)

Open Items/Commitment Completion Report

Tracking Number: PER 172796, CDR 391/86-38

Construction Specification

General Engineering Specification G-32 for Bolts Anchors Set in Hardened Concrete, Rev. 23

Pipe Hanger Anchor Capacity Test Results/Summary

Unique ID: 2003B-03B-2AFW-R66, Lot H-17643

Unique ID: 2074-74-2RHR-R213, Lot H-10882

Unique ID: 2074-74-2RHR-R214, Lot H-10704

Unique ID: 2063-63-S-SIS-R177, Lot H-10811

Unique ID: 47A437-1-25, Lot H-11608

Unique ID: 2067-A450-25-154, Lot H-18755

Unique ID: 03B-2AFW-R172, Lot H-18398

Unique ID: 2067-A450-26-79, Lot H-18219

Unique ID: 2067-A430-26-64, Lot H-18117

Unique ID: 2067-A060-67-98, Lot H-18453

OA.1.17 CDR 391/79-18-01: Deficient Phillips Red Head Anchors (IP 46071 and IP 35007)

Open Items/Commitment Completion Report

Tracking Number: PER 172791

Nonconformance Partial Release

Partial Release from Nonconforming Status, Release #1, NCR No. 1433R, Contract No. 78K54-551776

Supplements

Supplement to Response for Attachment 1D of PP-19 Closure Package for PER 172791

Pipe Hanger Anchor Capacity Test Results/Summary

Unique ID: 2003B-03B-2AFW-R66, Lot H-17643
 Unique ID: 2074-74-2RHR-R213, Lot H-10882
 Unique ID: 2074-74-2RHR-R214, Lot H-10704
 Unique ID: 2063-63-S-SIS-R177, Lot H-10811
 Unique ID: 47A437-1-25, Lot H-11608
 Unique ID: 2067-A450-25-154, Lot H-18755
 Unique ID: 03B-2AFW-R172, Lot H-18398
 Unique ID: 2067-A450-26-79, Lot H-18219
 Unique ID: 2067-A430-26-64, Lot H-18117
 Unique ID: 2067-A060-67-98, Lot H-18453

OA.1.18 CDR 391/84-19: Overstressed Pad Plates for Hydrogen Pipe Supports (IP 35007)Problem Evaluation Reports

PER 172630, Tracking for NCO850254001, status date 01/20/2011

Walkdown Packages

WBN2-PD-030-1605-08, "As built Walk Down of pipe support, System 030, Stress Problem Number N3-30-05R, Hanger Support Number 47A915-9-35," Rev. 0, 12/04/2009

WBN2-PD-030-1604-08, "As built Walk Down of pipe support, System 030, Stress Problem Number N3-30-06R, Hanger number(s) 47A915-9-47," Rev. 0, 12/01/2009

Calculations

Calculation 47A91509035, Calculation for Pipe Support No. 47A915-9-35, Rev. 3, 05/21/2010

Calculation 47A91509047, Calculation for Pipe Support No. 47A915-9-47, Rev. 3, 05/21/2010

Historic Documents

NCO850254001, Pad Plates – Hydrogen Pipe Supports, status date 08/12/2008
 Internal memo from J.A. Raulston to R.O. Barnett and attached NCRWBNCB8406, Rev. 1, dated 04/26/1984

Overstressed Pad Plates for Hydrogen Pipe Supports, Final Report to the NRC, dated 01/23/1986

ECN 5256. Redistribute Loads on CB&I Plates by Adding Stiffener Plates to the Legs of Supports 47A915-9-35 and 47A915-9-47, dated 07/25/1985

OA.1.20 TMI Action Item II.E.4.2: Containment Isolation Dependability (IP 35007)

NUREG-0847, Safety Evaluation Report Related to the Operation of the Watts Bar Nuclear Plant, including supplements 2, 3, and 5

Letter from P. S. Tam, NRC, to O. D. Kingsley, TVA, dated July 12, 1990

2-TSD-30J-1, Reactor Building Purge Air System, Rev. 1

2-PTI-030J-01, Containment Purge, Rev. 0000

GTI-02, Air Operated Valve/Damper Functional Test, Rev. 0000

SR 3.6.3.7, Containment Isolation Valves

OA.1.21 SSER 22 Appendix HH Open Items 20Procedures/Programs

DS-M18.14.1, Design Standard for Environmental Qualification of Electrical Equipment in Harsh Environments, Rev. 001
25402-3DP-GEE-00001 Rev 000, "Equipment Environmental Qualification Program"

Environmental Qualification Documents/Calculations

Environmental Qualification Document Package Binder, WBNEQ-MOT-001,
Westinghouse Motors on RHR, CVCS, CS and SIS" Tab B, Revision 28.
Environmental Qualification Document Package Binder, WBNEQ-MOT-001,
Westinghouse Motors on RHR, CVCS, CS and SIS, Tab C-5 Similarity, Revision 28

OA.1.22 Inspection of Watts Bar Nuclear Plant Historic Document Review (IP 35007)

HDR 21806
HDR 21745
HDR 24040
HDR 24557
HDR 25359
HDR 28013
HDR 33040
HDR 26088
HDR 34404
HDR 37258
HDR 43425
HDR 43424

OA.1.23 TMI Action Item II.F.1.2.e, "Verify Installation of Containment Water Level Monitors" (IP 92717)

TVA TMI Action Item II.F.1.2.e Commitment Closure Package
NUREG-0847, SER 5 dated November 1990
NRC IIR 50-390/84-77, dated November 14, 1984
NRC IIR 50-390/84-85, dated January 8, 1985
Regulatory Framework Letter from TVA to NRC dated October 28, 2010
EDCR 52419, Rev. A
FCR 57598, Rev. A
DCN 39608

OA.1.24 CDR 391/91-35: Pump Support Weld Deviation on Westinghouse-Supplied Components (IP 55050)

PER 144230
PP-19-2 for CDR 91-35
Calculation EPMMAG013091 Rev. 3

OA.1.26 CDR 391/85-39, Corrosion Cracks in GE Type PK Test Blocks (IP 35007)

Miscellaneous Documents

111409624, Commitment Closure package for CDR 391/85-39
MR 581835, Perform Tests in Compliance with MI-0.23
PR 371972, GE Type PK Test Block and Studs Purchase Requisition

Procedures/Programs

MI-0.23, Rev. 0, "Early Warning Test for PK Terminal Pins"
WB 11.6, Rev. 0, "Commitment Action Tracking"

OA.1.28 PZR Penetration Nozzles and Steam Space Piping Connections in Pressurized Water Reactors and BL 2004-01 (TI-2515/160, and IPs 57080 and 92717)

Procedures

N-UT-82, Generic Procedure for the Ultrasonic Examination of Dissimilar Pipe Welds, Rev 4
N-GP-18, Ultrasonic Testing Supplements, Rev 17

OA.1.29 Failure to Provide Alternate Instructions to Correctly Mark Weld Centerlines for MSIP (NCV 05000391/2010604-01)

Procedures

PI-901153-02, Instructions for Marking the Surge Nozzle Dissimilar Metal Weld Centerline – Watts Bar Unit 2 Pressurizer, Rev 0
PI-901210-02, Instructions for Marking the Dissimilar-Metal Weld Centerline on the Reactor Vessel Hot and Cold Leg Nozzles for MSIP at Watts Bar Unit 2, Rev 0

Corrective Action Program Documents

PER 241073, NRC identified weld centerline markings, 7/22/2010
PER 280777, NRC non-cited violation 5000391/2010604-01, 11/4/2010

LIST OF ACRONYMS

AFW	auxiliary feedwater
ASME	American Society of Mechanical Engineers
BL	Bulletin
CAP	Corrective Action Program
CDR	Construction Deficiency Report
CFR	<i>Code of Federal Regulations</i>
CCS	component cooling system
CS	containment spray
DCN	design change notice
DRA	design revision authorization
ECN	engineering change notice
ECP	Employee Concerns Program
EDCR	engineering document construction release
EQ	environmental qualification
ERCW	essential raw cooling water
HAAUP	Hanger Analysis and Update Program
ICRDS	Integrated Cable and Raceway Design System
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IR	Inspection Report (NRC)
MAI	Modification Addition Instruction
MCCB	molded case circuit breaker
MCR	main control room
MOV	motor-operated valve
MT	magnetic particle testing
NCR	nonconformance report
NCV	non-cited violation
NDE	nondestructive examination
NOV	notice of violation
NRC	Nuclear Regulatory Commission
PDI	performance demonstration initiative
PER	problem evaluation report
PORV	power operated relief valve
PSI	preservice inspection
QA	quality assurance
QC	quality control
RCS	reactor coolant system
Rev.	revision
RHR	residual heat removal
RPV	reactor pressure vessel
RRS	required response spectrum
SAR	safety analysis report
SCAR	significant corrective action report
SCR	significant condition report
SER	safety evaluation report
SI	safety injection
SL	severity level
SQRSTS	seismic qualification reporting and testing standarization

SSER	Supplement to Safety Evaluation Report
SSD/SDI	expansion shell anchors
TI	Temporary Instruction (NRC)
TRS	test response spectrum
TVA	Tennessee Valley Authority
TMI	Three Mile Island
URI	unresolved item
UT	ultrasonic testing
WBN	WBN Nuclear Plant
WITEL	integrated task equipment list
WO	work order