UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-390/95-06 and 50-391/95-06

Applicant: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-390 and 50-391   License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: January 22 through February 18, 1995

Inspectors: ______________________ 3/14/95
G. A. Walton, Senior Resident Inspector   Date Signed
Construction

M. M. Glasman, Resident Inspector, Watts Bar
J. F. Lara, Resident Inspector, Watts Bar

Consultants: R. M. Compton (paragraph 7.3)
W. S. Marini (paragraphs 6.2, 7.2)

Approved by: ______________________ 3/16/95
P. E. Fredrickson, Chief   Date Signed
TVA Construction Branch
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted in the areas of construction work activities, quality assurance effectiveness, damaged, loose or missing hardware walkdowns, review of the Hanger Analysis and Update Program, review of 10 CFR 50.55(e) reports, and actions on previous inspection findings.

Results:

One violation with two examples was identified involving improper tool usage on a stainless steel weld and improper segregation of mechanical abrasive and cleaning tools in tool issue areas (paragraph 2.6).

Enclosure

One unresolved item was identified pertaining to coordination of insulation installation and walkdowns to identify damaged, loose, and missing hardware (paragraph 4.2).

Construction activities reviewed included coating preparations; cable replacement; flexible conduit installations; Class 1E cable separation; internal panel separation; damaged, loose, or missing hardware walkdowns; and Hanger Analysis and Update Corrective Action Program recurrence controls. No deficiencies were identified during inspection of these activities.

In addition, quality assurance effectiveness was addressed. These reviews indicated that a quality assurance assessment of the master fuse list was effective. Quality Assurance, however, failed to identify that mechanical abrasive and cleaning tools were not properly segregated in four separate site tool rooms. Quality Assurance review of open items closures was also reviewed, with satisfactory results.

Nine open items were closed. One construction deficiency report involving cable damage at splices remains open pending NRC verification of corrective actions.

REPORT DETAILS

1.0 Persons Contacted

1.1 Applicant Employees:

M. Bajestani, Startup Manager
*K. Boyd, Site Licensing Program Administrator
*W. Elliott, Engineering and Modifications Manager
*A. Harrison, Project Manager
*D. Herrin, Compliance Licensing Engineer
*W. Lewellyn, Compliance Licensing Engineer
*D. Malone, Quality Engineering Manager
*R. McIntosh, Project Manager
C. Nelson, Maintenance Support Superintendent
*D. Nunn, Vice President, New Plant Completion
*P. Pace, Compliance Licensing Supervisor
*D. Quick, Consultant
B. Schofield, Site Licensing Manager
*J. Simmons, Project Director, Raytheon Constructors, Incorporated
*W. Skiva, Manager of Trending/Human Perforance Enhancement System
*D. Stewart, Vice President Staff
S. Tanner, Special Projects Manager
J. Vorees, Regulatory Licensing Manager
*O. Zeringue, Senior Vice President for Operations

Other applicant employees contacted included engineers, technicians, nuclear power supervisors, and construction supervisors.

1.2 NRC Personnel:

*P. Fredrickson, TVA Construction Branch Chief
*M. Glasman, Resident Inspector
*K. Ivey, Resident Inspector
*J. Lara, Resident Inspector
*P. Van Doorn, Senior Resident Inspector, Operations
*G. Walton, Senior Resident Inspector, Construction

1.3 NRC Contractors:

*R. Compton
*W. Marini

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2.0 CONSTRUCTION ACTIVITIES

Various construction activities were reviewed by the inspectors during the inspection period to evaluate the work effort to applicable procedures, codes, and standards. The results of the more significant inspection efforts are summarized as follows:

2.1 WO 94-05038-00, Replace Cables (TI 2512/16)

This WO pertained to the replacement of System 68 cables 1PS302E, 1PS303E, 1PS304E, and 1PS305E routed from panel 1-PNL-202-1/1B to junction box 1-JB-292-6758-E. The cables were being replaced due to one of the cables containing jacket damage.

The inspector reviewed the in-progress WO documentation and verified that the cable pull calculations accurately reflected the cable to be installed. CCRS cable sheets identified the cable type and mark number (WHB-2) required to be installed; these were verified through inspection of the respective cable reels. At the time of the inspector's review, the old cables had been removed and conduit 1PS704E was being cleaned to prepare for the new cables being pulled. Adequate swabbing and lubrication of the conduit was observed in preparation for the cable installations. No deficiencies were identified with the preparations for the cable installation.

2.2 Flexible Conduit Installations (TI 2512/20)

During the inspection of general plant areas, the inspector identified four Class 1E flexible conduits and associated cables disconnected from the end device components. The conduits were located in the auxiliary building (Elevation 737, Column A5-U) and were identified as 1VC3116A, 1VC4286A, 1VC4288B, and 1VC4289B. Review by the applicant determined that WO 94-01977-00 had been previously issued to reconnect conduit 1VC3116A, and WO 9502646-00 had been issued to delete the cables associated with the remaining three conduits. The inspector reviewed the WO scope and determined that the WO addressed the concerns.

2.3 Class 1E Cable Physical Separation (TI 2512/20)

The inspector identified a Class 1E Division A cable routed in free air in physical contact with redundant division conduit 1M3385B. Electrical physical separation drawing 45W3000-1 requires that a minimum of 1-inch separation be provided between Class 1E cables routed in free air and redundant division conduits. The Division B conduit was previously inspected for physical separation as part of the applicant's corrective actions to resolve raceway separation violations identified by the NRC as documented in IR 50-390/94-18. The applicant provided the inspector with the walkdown inspection results for conduit 1M3385B. The inadequate physical condition was properly identified during the conduit walkdowns and corrective actions were requested through WR C255006. Based on the fact that the applicant previously identified this deficiency and corrective actions were being developed, the inspector determined that the applicant's actions were acceptable.

2.4 Internal Panel Separation of Class 1E Wiring (TI 2512/20)

The applicant's Electrical Issues CAP describes the corrective actions being implemented to resolve concerns and deficiencies associated with internal panel separation of Class 1E wiring. The implementation of these corrective actions was reviewed by the NRC during the 75 percent complete status inspection (IR 50-390, 391/94-53). During this inspection period, the inspector reviewed Design Criteria Document WB-DC-30-4, Separation/Isolation, Revision 13, to evaluate the technical basis for approved exceptions to the established separation criteria. Six inches of air separation is required between redundant divisions wiring within an electrical panel.

Procedure WB-DC-30-4, Exception 19, documents exception to the 6-inch separation criteria between redundant division wires with electrical panels. The identified exceptions were applicable to various auxiliary instrument panels including 1-R-50B. The inspector questioned the documented technical basis for the justifications. The documented technical justification relied on discussions between Westinghouse and NRC personnel involved with the SQN review as part of the basis for approving the exception. No documentation was referenced to support the purported SQN discussions.

In addition, the inspector questioned whether the SQN reviews could be applied at WBN since the separation violations within the 1-R-50B panel involved TVA field cables, not vendor wiring. TVA field cables are field routed and supported within the panels; therefore, it is unlikely that the support of cable in panels at WBN is the same as was present at SQN. During the inspection period, the inspector held discussions with NE electrical personnel concerning the adequacy of the technical justification of the exceptions. These issues will receive additional review during future inspections of internal panel separation performed as part of the Electrical Issues CAP.

2.5 WO 92-12839-03, Repair or Upgrade Existing Coatings in Lower Containment

The inspector witnessed in-process work activities associated with implementation of WO 92-12839-03. These activities included removal of existing chipped coatings and QC inspection of completed surface preparation work in lower containment. These activities were limited to carbon steel surfaces. These work and inspection activities were being conducted in accordance with Procedure MAI-5.3, Protective Coatings, Revision 9. Procedure MAI-5.3 requires that, prior to surface preparation, visible oil, grease, and other contaminants be removed and that all repair areas be feathered to sound coating.

Within the general area of the SG-4 manway access platform, the inspector verified that coating preparation activities were being conducted in accordance with Procedure MAI-5.3, in that coating repair areas were properly prepared, were limited to carbon steel surfaces and features, and abrasive materials being used were approved for carbon steel. Further, the inspector determined that the craft were aware of site requirements that abrasive tools used on carbon steel are not to be used on stainless steel, as described in Procedure PAI-10.08, Issue, Control, and Accountability of Plant Tools and

Equipment, Revision 2. The inspector also found that craftsmanship was satisfactory.

The inspector then witnessed QC inspection of completed coating preparation work on pipe supports 1-ISLS-997-1783A and 1-ISLS-997-1783B. These inspection activities were properly documented on a Service Level I Coating Data Sheet contained in Procedure MAI-5.3. The inspector found that the QC inspector was thorough and knowledgeable and performed his inspection activities in a satisfactory manner.

The inspector found that these work and QC inspection activities were being conducted in a satisfactory manner.

2.6 WO 94-15534-00, Install Valve Bonnet Leak-Off Line for Valve 1-FCV-63-172 (TI 2512/23)

This WO pertained to installation of a valve bonnet leak-off line for valve 1-FCV-63-172, RHR-to-Hot Leg 1 and 3 injection isolation. The inspector observed in-process work activities and performed documentation reviews to determine if the status of work was properly documented, if welding activities were correctly documented, and if the correct tools were being used during work activities.

On February 2, 1995, during observation of gas tungsten arc welding activities, the inspector noted that the welder was cleaning his recently-completed stainless steel weld deposit with a wire brush that was not properly identified in accordance with Procedure PAI-10.08, Issue, Control, and Accountability of Plant Tools and Equipment, Revision 2, in that it was not color-coded for use on stainless steel or carbon steel. Procedure PAI-10.08, Appendix B, paragraph 2.0, requires that wire brushes, files, grinding wheels, and other mechanical abrasive tools be color-coded before initial use, and that tools for use on stainless steel be color-coded green and be kept separate from tools used on carbon steel. Further, Procedure MAI-4.2B, Pipe Installation, Revision 5, paragraph 6.1.4.b, requires that only material/tools suitable to stainless steel shall be used on stainless steel components. The primary reason for maintaining tool separation is to prevent halide contamination from tools used on carbon steel which may come in contact with stainless steel surfaces.

The failure to use a properly identified brush on a stainless steel weld is the first example of a violation of 10 CFR 50 Appendix B, Criterion V, Instructions, Procedures, and Drawings. This item will be identified as VIO 50-390/95-06-01, Failure to Properly Identify and Segregate Tools.

Tools are issued to craft personnel from four tool rooms on site. Three of these are administered by RCI and one by the applicant. Following the finding that an improperly identified wire brush was being used in the field, the inspector performed a review of the plant tool room on the east side of the turbine building to determine if this tool issue room was identifying and storing tools in accordance with Procedure PAI-10.08. This tool room was administered by RCI. As a result of this review, the inspector found numerous examples of intermingled and unidentified wire brushes, grinding rocks, files, and flapper wheels. Immediately following the NRC findings documented above, the applicant found that similar conditions existed in the other three tool issue areas. The inspector held discussions with QA pertaining to these findings. The applicant indicated that there were no documented QA audits of tool segregation in tool issue areas. With regard to this issue, QA effectiveness is discussed in paragraph 5.2 of this report.

The failure to segregate abrasive tools properly is the second example of a violation of 10 CFR 50 Appendix B, Criterion V, Instructions, Procedures, and Drawings. This item will be identified as VIO 50-390/95-06-01, Failure to Properly Identify and Segregate Tools.

On February 3, 1995, the applicant initiated PER WBPER950076 documenting the above conditions. This PER was subsequently upgraded to SCAR WBSCA95005. At the time of the current inspection, corrective actions, extent of condition determinations, and actions to prevent recurrence were completed for the above VIO examples. These actions were documented in SCAR WBSCA950005. The inspector verified these actions as follows:

- On February 3, the applicant suspended welding, grinding, cleaning, and other activities which utilize tools (listed in Procedure PAI-10.08, Appendix B) which are required to be color-coded for use on stainless or carbon steel. This stop work was initiated by RCI. During this work stoppage, the applicant removed all tools required to be coded in accordance with Procedure PAI-10.08 from drawers in tool issue rooms. The applicant then restocked stainless steel tool drawers with new tools. The applicant also searched all tool boxes in shop areas and in the plant and removed all improperly identified tools from these areas. Work on carbon steel resumed following completion of the tool inventory on February 4, 1995. The inspector visited all plant tool issue rooms and toured various areas of the plant and observed ongoing work activities (coating removal and repair work, welding activities, etc.) and found that the above corrective actions were being implemented satisfactorily.

- All tool room personnel and craft involved in identification, issuance, and use of tools required to be identified in accordance with Procedure PAI-10.08 were retrained in the proper storage identification and use of these tools. The applicant indicated that this training was completed on February 8, 1995. Work on stainless steel resumed following QA concurrence and completion of training. The inspector reviewed training records and found the records acceptable. The inspector also conducted interviews with tool room personnel as well as craft to determine if they were cognizant with tool use and storage requirements as they pertain to this issue. Over 20 such interviews were conducted with satisfactory results.

- The applicant indicated that specific personnel responsible for maintaining controls over tool separation in tool issue areas were laid off due to reductions in force, which took place in December 1994. Based on this, the applicant determined that the population of stainless steel welds completed since that time most likely included any welds potentially contaminated with halides from potentially contaminated tools. To determine if any welds were contaminated, the applicant selected a representative population of 58 welds (per G-29 sample plan) for swipe testing to determine if deleterious surface contamination was present. No unacceptable halide test failures that could be attributed to contaminated brushes were found by the applicant. In addition, the applicant tested the unidentified brush found being used during the NRC inspection, and no unacceptable halide levels were detected. The inspector reviewed the swipe test results and the halide test results and concurred with the applicant's determinations that no unacceptable halide levels were present on welds that could be attributed to contaminated tools.

- PCG and maintenance assigned personnel to be responsible for maintenance over tools that are required to be color-coded and segregated. In addition, a QC surveillance program was developed to ensure compliance with applicable requirements. This surveillance program is being implemented by QC. The inspector reviewed 12 quality control inspection records, and noted that the three tool rooms administered by RCI were covered by the program; however, the inspector noted that the maintenance tool room adminsitered by TVA had not been not inspected. The inspector held discussions with the applicant's QA manager, who indicated that this ommission was an oversight. This was immediately corrected, with the addition of the maintenance tool room to the QC surveillance program.

Review of the completed corrective actions and measures to prevent recurrence indicated they were adequate and comprehensive. Corrective actions for VIO 50-390/95-06-01 were completed by the end of this inspection period, and the actions reviewed by NRC representatives were found acceptable. No further deficiencies were identified. Based on this review, VIO 390/95-06-01 is closed.

During this review one violation was identified.

3.0 Damaged, Loose, and Missing Hardware (DLMH) Walkdowns (71302)

The inspector continued reviews of the applicant's implementation of Procedure MAI-1.9, Walkdown Verification for Modifications System/Area Completion and Damaged, Loose, or Missing Hardware, Revision 5. During this inspection period, the inspector reviewed DLMH walkdown activities in Elevation 713 pipe chase and coordination between completion of area or system walkdowns and application of insulation over piping.

3.1 Elevation 713 Pipe Chase Area Walkdowns

At the time of this inspection, the applicant was in the process of conducting walkdowns and repairing identified deficiencies in the Elevation 713 pipe chase. The inspector conducted confirmatory walkdowns in this area to determine if the applicant was successfully identifying deficiencies in accordance with Procedure MAI-1.9. In accordance with Procedure MAI-1.9, the inspector verified that walkdown verification attributes contained in Appendix B of Procedure MAI-1.9 were being identified by walkdown inspection personnel.

Results of this NRC confirmatory walkdown indicated that the applicant was performing these walkdowns in a satisfactory manner; however, the inspector found that the applicant failed to identify a damaged NAMCO switch connector between conduit 1VC779A and valve 1-FCV-63-64-A. The inspector informed the applicant of this deficiency, and the NAMCO connector was repaired prior to the end of the inspection period. This condition was considered to be an isolated occurrence; therefore, this item was not considered for enforcement action.

3.2 Coordination of DLMH Walkdowns and Application of Insulation

During DLMH walkdown inspections, the inspector noted that the applicant was in the process of applying insulation over safety-related piping systems and ductwork in all areas of the plant without regard as to whether Procedure MAI-1.9 area walkdowns were considered QC complete in each particular area. Procedure MAI-1.9, paragraph 1.0.C, states that corrective actions will be taken in parallel with corrective action program implementation to correct identified DLMH deficiencies. Further, Procedure MAI-1.9, paragraph 4.0, states that components that are covered with insulation are considered physically inaccessible for purposes of DLMH walkdown inspections. If covered with insulation, components rendered inaccessible to DLMH walkdown inspections would include support hardware, bolting, locking devices, and hardware associated with valves.

Therefore, if DLMH walkdown inspections are not properly coordinated with application of insulation, hardware required to receive DLMH inspections would not be inspected due to being rendered inaccessible. The inspector held discussions with the applicant pertaining to these concerns, and the applicant initiated PER WBPER950057 which stated that it was indeterminate if components were insulated prior to Procedure MAI-1.9 system walkdowns. The applicant subsequently initiated an extent of condition review in connection with resolution of PER WBPER950057. At the time of this inspection, this consisted of walkdowns of uninsulated sections of pipe and associated hardware, in accordance with Procedure MAI-1.9, that is scheduled for being insulated. These walkdowns, to date, have taken place in the 1A-A and 1B-B CS RHR heat exchanger rooms, and the steam-driven AFW pump room. Following completion of these walkdowns, the NRC inspector performed confirmatory walkdowns of these areas to determine if deficiencies were being correctly identified. The inspector found these walkdowns to be satisfactory, in that the inspector did not identify additional deficiencies that were not identified by the applicant.

Pending the applicant's resolution of PER WBPER950057 and a determination if insulation needs to be removed to verify acceptance of insulated material, this item will be identified as URI 390/95-06-02, Coordination of DLMH Walkdowns and Insulation Installation.

During this review no violations or deviations were identified.

4.0 REVIEW OF HAAUP CAP RECURRENCE CONTROLS (TI 2512/23)

The inspector conducted as-built inspections of two recently modified pipe supports to determine if recurrence controls documented in the HAAUP CAP continue to be effective. The inspector independently verified that these supports were built in accordance with DCN drawings. The inspector independently measured and verified the following attributes: size and type of structural steel members placement; type and size of welds; type and size of vendor-supplied hardware (struts, spring cans, pipe clamps); size of baseplates; size, number, type, and spacing of concrete anchor bolts; baseplate gaps; and proper installation of associated hardware, such as spherical bearings, locking devices, and bolting. The inspector examined the supports listed below. Each applicable DCN is also listed.

- RHR system support 1074-1-74-22, DCN F-22914-A

- Spent fuel pool support 1078-A060-78-2, DCN F-16941-A

The inspector did not identify any discrepancies between the as-built condition of these supports and the DCNs listed above. In addition, all hardware was found to be in satisfactory condition. The inspector had no further questions.

During this review, no violations or deviations were identified.

5.0 QA EFFECTIVENESS

5.1 Assessment NA-WB-95-0024, Evaluation of the Fuse Control Program at Watts Bar

During this inspection period, the QA organization completed an evaluation of the WBN fuse control program and implementation. The evaluation team reviewed the corrective actions resulting from the Operations self-assessments and performed walkdowns of available systems. The evaluation team concluded that the fuse control program was not ready to transition WBN to an operational plant status.

The WBN fuse list was developed through the implementation of the Master Fuse List SP. This program was developed to identify all Class 1E fuses required for Unit 1 operation. The applicant completed the program in 1993, and the NRC verified acceptable implementation as documented in IR 50-390/93-31. Based on recently identified problems in the area of fuse controls, the inspector discussed the results of the QA evaluation with applicant personnel. The inspector reviewed in detail the identified deficiencies associated with fuses. Based on this review, the inspector determined that identified deficiencies were being appropriately evaluated and corrective actions developed. The QA evaluation was determined to be properly focused on the readiness of the plant operations to adequately control fuses.

5.2 QA Oversight of Tool Control

As discussed in paragraph 2.6 of this report, the NRC identified that tools in tool issue areas were not properly segregated in accordance with Procedure PAI-10.08, Issue, Control, and Accountability of Plant Tools and Equipment, Revision 2. Three of the tool issue areas are administered by RCI; one is administered by TVA. The inspector discussed these findings with QA to determine the frequency and results of QA oversight activities pertaining to tool controls as outlined in Procedure PAI-10.08. The applicant, however, indicated that there were no documented audits to assess compliance with tool identification, storage, and issuance requirements as specified in Procedure PAI-10.08. This lack of oversight activity was considered to be an example of a weakness in the applicant's QA assessment program.

The applicant has corrected this concern by instituting QC surveillance inspections, as discussed in paragraph 2.6. However, following the applicant's conclusion that corrective actions for this violation were fully implemented, the inspector found that only three of the four tool rooms on site were being inspected for compliance to tool segregation requirements (the maintenance tool room was ommitted). The applicant indicated that this ommission was an oversight, and this deficiency was immediately corrected. The inspector considered the ommission of the maintenance tool room from the QC surveillance inspections to be indicative of interface problems between the QA and QC organizations.

5.3 QA Reviews of Open Items

During this inspection period the inspector assessed QA reviews of open item packages. These reviews are documented in paragraphs 6.2 and 7.2. The inspector found that these reviews were adequate to assure that these packages contained appropriate information to close each respective issue.

During these reviews, no violations or deviations were identified.

6.0 REVIEW OF 10 CFR 50.55(e) REPORTS (92700)

6.1 (Open) CDR 50-390/90-04, Cable Damage at Splices

This CDR pertained to identified cable damage at splices. The damage identified included ring cuts to the cable conductor insulation introduced during the preparations for making cable splices. As discussed in IR 50-390/94-88, during a QA assessment of the cable splice issue within the Cable Issues CAP examples of ring cut damage were identified.

The applicant is continuing a review of the deficiencies identified during the QA assessment. Corrective actions will be developed after the completion of extent of condition reviews. Based on inspection of additional splices, examples of cable damage (e.g., nicks, cuts, ring cuts) have been identified as well as splice bend radius deficiencies.

The corrective actions for this CDR have not been verified complete; therefore, this CDR will remain open pending further NRC review. The deficiencies identified during the QA assessment will be reviewed during future NRC inspections.

6.2 (Closed) CDR 50-390/94-11, RHR Minimum Flow Check Valves Not Operable In Present Configuration

This 10 CFR 50.55(e) report involved the discovery that RHR system check valves 1-CKV-074-0544A and 1-CKV-074-0545B would not operate in their installed configuration. Although the purchase specification correctly identified that the valves were to be configured for installation in vertical pipe, it was discovered during testing that the manufacturer (Anchor/Darling) had not modified the valve discs for vertical installation. Upon discovery, the applicant initiated SCAR WBSCA940046 to provide corrective action.

In accordance with manufacturer's instructions, DCN W-31910-A was issued to modify the discs on site. This DCN provided instructions for machining the discs to remove a sufficient thickness of material to allow them to properly seat in the vertical position. Completion of the required modifications was documented in WOs 93-13952-00 and 93-13952-01.

The applicant also performed a review of all active 2-1/2" and larger swing and tilting disc check valves, and a representative sample of nonactive check valves, and found no other valves with similar configuration deficiencies. These reviews were documented in the extent of condition section (page 14 of 87) of SCAR WBSCA940046. In addition, in a letter dated January 11, 1995 (RIMS T33950112853), the applicant notified Anchor/Darling that this matter had been reported under 10 CFR 50.55(e) and notified the other TVA nuclear sites of this deficiency so that they could perform generic applicability reviews.

The inspector reviewed the above referenced SCAR, DCN, WOs, and extent of condition determinations and determined that the applicant adequately resolved the identified deficiency. Physical verification of the modified valve discs could not be performed during this review, as such verification would require disassembly of the valves.

The inspector also reviewed the applicant's QA verification of the CDR closure package prior to its submittal to NRC. The inspector found that QA reviewed the closed SCAR, DCN, WOs, and associated correspondence and identified a number of questions regarding document closure, performance of the reportability reviews, and other minor administrative details. The inspector reviewed the identified questions and responses and determined that all QA questions were adequately resolved prior to submittal of the package and that none of these QA questions involved issues impacting the technical adequacy of the resolution to the original deficiency.

6.3 (Closed) CDR 50-390/94-13, Inadequate Vertical Cable Supports

This CDR pertains to the failure to install vertical cable support and improperly installed cable supports for various plant safety systems cables. Failure of the cables in the long term was considered possible and plant safety could have been adversely impacted. The conditions discussed in the

CDR were initially identified during an NRC inspection of the Cable Issues CAP. This inspection was documented in IR 50-390/94-53 and resulted in the issuance of VIO 50-390/94-53-01, Failure to Implement DCN and WP Requirements for Electrical Modifications. The violation identified examples of failure to install supports for cables installed in vertical conduit and cable trays. The CDR final report dated October 31, 1994, stated that the corrective actions for the CDR would be implemented as part of the corrective actions for VIO 50-390/94-53-01. Corrective actions are being implemented by the applicant and will receive additional review by the NRC prior to closing VIO 50-390/94-53-01. Therefore, this CDR is being administratively closed since additional NRC reviews of these issues will be performed as part of the violation review process.

6.4 (Closed) CDR 390/94-15, Kapton Damage

This CDR pertains to the inadequate corrective actions for the repair of Kapton pigtail wires. This condition was initially identified by the NRC and considered as Example 1 of VIO 50-390/94-61-02. The CDR final report dated November 14, 1994, was included in the same response to VIO 50-390/94-61-02. The corrective actions for the CDR are being implemented as part of the corrective actions for VIO 50-390/94-61-02. Corrective actions are being implemented by the applicant and will receive additional review by the NRC prior to closing VIO 50-390/94-61-02. Therefore, this CDR is being administratively closed since further NRC reviews will be performed as part of the violation.

7.0 ACTIONS ON PREVIOUS INSPECTION FINDINGS (92901, 92902, 92903, 92904)

7.1 (Closed) IFI 50-390/92-01-07, Deficient Vertical Cable Support

This item was opened to track further NRC reviews of cable support provided in vertical conduits and cable trays. The issue of cable support in vertical raceways is included as part of the Cable Issues CAP. As documented in IR 50-390/94-53, NRC inspection of this issue identified deficiencies associated with these activities. VIO 50-390/94-53-01, Failure to Implement DCN and WP Requirements for Electrical Modifications, identifies examples of failure to install supports for cables installed in vertical conduit and cable trays. Applicant corrective actions are being implemented and will receive additional review by the NRC prior to closing VIO 50-390/94-53-01. Therefore, this IFI is being administratively closed since further NRC reviews will be performed as part of the violation review process.

7.2 (Closed) IFI 50-390/93-59-07, Follow-up to Ensure Plumbness Measurement Verified In Tolerance During Hot Functional Testing

This item involved the discovery of out-of-tolerance plumbness measurements for RCP support columns. As stated in IR 50-390, 391/94-40, plumbness measurements of the column supports for all four Unit 1 RCPs were obtained during HFT, and the results were submitted to Westinghouse for further evaluation.

As the measurement obtained from column one of RCP #2 was identified as being the most out-of-plumb (10"), that value was used as the worst case to bound all 12 Unit 1 RCP support columns. The evaluation performed by Westinghouse determined that the plumbness condition was acceptable, based on its affect on system and component stresses. The following letters document the results of the Westinghouse evaluation:

Westinghouse letter WAT-D-9912 (RIMS T33950113805)
Westinghouse letter WAT-D-9922 (RIMS T33950120800)

Upon receipt of the above evaluation results, the licensee documented the acceptability of the Unit 1 RCP support columns in calculation WCG-2042, Volume 1, Reactor Building Containment Vessel, Equipment Supports - Reactor & Other Equipment, Revision 6, dated January 22, 1995.

The inspector reviewed the above-referenced documents and determined that they adequately resolve the originally identified condition for the Unit 1 RCP support columns, except as follows. Paperwork in the package documented that 10" was the largest out-of-plumb dimension found during HFT, and the Westinghouse evaluation and TVA calculation stated that an out-of-plumb value of 3.8 degrees was acceptable. However, there was no correlation between the 10" value and the 3.8 degree value in the package, and no evidence that those two values had been reconciled. The inspector questioned the licensee about this matter and was subsequently provided with copies of Drawings 48N412, Revision 14, and 48N411, Revision 4, which showed the actual as-installed lengths of the support columns. This information allowed the inspector to verify that the above two values do coincide. The inspector also reviewed the QA assessment of the closure package prior to its submittal to NRC and determined it to be accetable except that it had not questioned the lack of correlation between the 3.8 degree and 10" values.

This is closed for Unit 1. However, as the plumbness measurements for the Unit 2 RCP support columns cannot be taken until Unit 2 HFT, IFI 50-391/93-59-07 will remain open until such time as the measurements are taken and the results evaluated.

7.3 (Closed) DEV 50-390/94-30-01, Mortar Lined ERCW Pipe Sample Test Environment

This DEV pertained to the failure of the applicant to meet a commitment to the ACRS, as documented in the WBN SER, to maintain the samples of mortar-lined ERCW piping in the Tennessee River and perform annual inspections. In 1991 the applicant moved the samples from the river to the site holding pond without notifying the NRC or documenting a technical justification for the move. In addition, between 1988 and 1989 and between 1992 and 1993 the intervals between performance of the scheduled annual PM inspections were approximately 17 and 23 months. In addition, the applicant failed to evaluate and take corrective action when the results of the 1990 calcium ion test were significantly higher than in 1984.

The applicant responded to this DEV in a letter dated June 9, 1994. The applicant issued PER WBPER940212 to address the issues. Corrective actions included: 1) an evaluation that the conditions the samples were exposed to had not adversely affected the sample or test results; 2) relocation of the samples to a cooling tower basin; and 3) retraining of NE and site licensing personnel concerning changes to commitments. The extent of condition was determined by the applicant to be limited to this instance based on a sampling review of the implementation of commitments made in Employee Concerns Special Program Subcategory Reports. The applicant determined no corrective actions were necessary for the delays in performing the PM inspections. No cause could be determined for the first instance cited, and a failure by NE to communicate the required start date for the PM to the maintenance group was determined to be the cause of the 1992-1993 delay.

In the response dated June 9, 1994, the applicant stated that the increased calcium ion content was not evaluated at the time because there was no tracking mechanism for additional actions identified on the commitment completion form. Further, the applicant stated that the large increase in calcium ion concentration exhibited between 1984 and 1990 would be typical of mortar maintained in a water environment and, therefore, was not considered an adverse condition. The applicant's corrective action was to revise the PM to define what constituted a significant deviation for prior test results and require that such deviations be evaluated and resolved.

The NRC documented a review of the applicant's response and corrective actions in IR 50-390/94-66, noting four areas where additional clarification or action was necessary. TVA-Watts Bar provided NRC with additional information regarding the anomalous 1990 test results in a letter dated November 30, 1994. The calcium ion concentration determined during the 1994 PM testing was back down to approximately 17 percent, indicating that the 1990 results did not, in fact, accurately reflect the actual calcium content in the pipe samples. The PM was revised to require additional cleaning and inspection to assure that the samples taken for analysis are representative of the pipe samples and to require a formal evaluation if test results vary by more than five percent from the previous performance. Based on the calcium ion concentration determined in the 1994 test, no further immediate action was required regarding the ERCW pipe samples. The NRC responded to this additional information on December 16, 1994, reiterating that the anomalous 1990 results were inadequately documented and evaluated at the time of discovery.

The inspector reviewed the additional information provided in TVA's November 1994 letter and other actions taken by the applicant regarding the four areas of concern identified in IR 50-390/94-66.

- With regard to the inadequate cause analysis and recurrence control determinations in PER WBPER940212, the applicant supplemented the PER to identify additional causal factors. Although the inspector considered the new causal factors to be appropriate, the recurrence control section of the PER was not supplemented to address the new causal factors. When the inspector raised this concern, the applicant supplemented the PER to address the need for recurrence controls for the new causal factors cited by TVA. A memorandum was issued to site engineering personnel from the site engineering and materials manager reviewing this event and the importance of communicating the priority for initial performance of new PMs.

- To address the concern related to the issuance and performance of the outdated PM in September 1994 and the lack of a formal procedure for PM issue, the applicant generated PER WBPER940549. Corrective actions included revision of the partially completed PM; a review of approximately 350 open PM/WOs, which confirmed this was an isolated case, and counselling of personnel involved. Additional recurrence control was provided by issuing Revision 9 to Procedure SSP-6.03, Preventive Maintenance Program, to formalize the method of PM issuance and ensuring that revisions are properly updated in the PM program. The inspector reviewed the new procedure and the revised PM and concluded that the issue had been adequately addressed.

- The concern related to the lack of timely evaluation and corrective action for the anomalous 1990 calcium test results was addressed in the November 9, 1994, supplemental report and the NRC response of December 16, 1994.

- The inspector's last concern in IR 50-390/94-66 related to the inadequate justification for concluding that no deviations from the commitments were identified, and thus there was reasonable assurance that deviations to commitments were limited to the ERCW pipe sample issues provided in the Report On the Lookback Project's Relook at Subcategory Reports for Deviations to Commitments. The Lookback Project revised this report on January 9, 1995, to clarify that the initial review had only determined that there had been programmatic controls (such as CAPs, SPs, or CATDs) to capture all commitments in subcategory reports and had not been intended to evaluate the adequacy of the implementation of those controls. The revised report further addressed the implementation effort, concluding that, although numerous implementation deficiencies were identified, the overall Lookback Project review program had evaluated or would evaluate the actions taken for each commitment and provide assurance that all were properly implemented at WBN. The inspector agreed that the revised report more accurately described the situation regarding subcategory report commitments at WBN. However, the completion statement for corrective action item 8 in completed PER WBPER940212 still referenced the initial lookback report and restated its conclusions that deviations to commitments were limited to the ERCW mortar-lined pipe and that other commitments were being properly implemented. The issue in this DEV was not that the commitment had not been implemented at all, but that it was not implemented correctly. The revised lookback report acknowledged that additional commitments were identified that were not implemented correctly and therefore the step 8 completion statement and the extent of condition statement in the PER were incorrect. When this issue was identified to TVA, PER WBPER940212 was again supplemented to reference the revised Lookback Project evaluation and clarify the reference to the conclusions of that evaluation, and the extent of condition conclusion in the PER. The applicant performed a search of TROI for PM-related commitments and verified compliance with nine of those commitments and six specific PMs.

The inspector concluded that the actions taken by the applicant have now adequately addressed the various issues related to the placement and inspection of the mortar lined ERCW pipe samples. This deviation is closed.

7.4 (Open) VIO 50-390/94-61-02, Inadequate Corrective Action

This VIO documented examples of inadequate corrective actions to resolve deficiencies associated with damaged Kapton insulated wires at electrical penetrations. During this inspection, the inspector continued inspections of the ongoing repairs of the damaged wires. These corrective actions were previously reviewed as documented in IR 50-390/94-88. During this inspection, the inspector performed additional reviews of the implemented corrective actions.

The applicant's response to the identified VIO stated that additional reviews would be performed of other Kapton insulated wires not located at containment electrical penetrations. This action was also documented in SCAR WBSCA940055. The components to be inspected included terminal boxes located in the main steam valve vault rooms. The applicant's inspection of the Kapton insulated wires within applicable terminal boxes did not identify damaged wires. The inspector performed an independent inspection of the installed Kapton wires at terminal boxes 1-TB-001-0022A-A and 1-TB-001-0022C-B. A discrepancy was identified pertaining to cable identification within the above terminal boxes. As-constructed drawing 45N1630-59 identified the wiring within terminal box 1-TB-001-0022A-A as 1V8158A. However, the inspector noted that the wiring was identified as 1V8085A and 1V8605A. The inspector determined that the wiring identification was in error since the 1V8085A and 1V8605A identification numbers pertained to the two field cables which were spliced to cable 1V8158A prior to the cables entering the terminal box. A similar condition was identified at terminal box 1-TB-001-0022C-B. The applicant initiated WR C139467 to re-identify the wires in both terminal boxes and to inspect other boxes for similar conditions. The inspector determined that these actions were appropriate and had no further concerns in this matter.

The inspector reviewed completed WO 94-20914-20, which documented the repair of damaged Kapton insulated conductors at containment electrical penetration 1-PENT-293-0038-D. The completed repairs were in conformance with the requirements provided in Procedure MAI-3.3, Cable Terminating, Splicing, and Testing For Cables Rated Up To 15,000 Volts, Appendix F, Revision 13. No deficiencies were identified in the WO documentation with respect to the implemented repairs in that the repair requirements in Procedure MAI-3.3, Appendix F, were properly implemented. As part of the corrective actions for SCAR WBSCA940055, personnel involved with the repair of damaged Kapton insulated wires were to have received specialized training in the recognition of damage, approved repair methods, and precautions necessary to prevent subsequent damage to the Kapton wires.

During the review of WO 94-20914-20, the inspector verified that the craftsmen and field engineers had attended the required training as evidenced by the attendance roster for the specialized course. However, the involved QC inspector was not identified in the training attendance roster as having received the required training. Based on interviews with the involved QC inspector, other personnel present during the training, and the personnel who presented the training, the applicant determined that the QC inspector had attended the required training class but had not signed the attendance roster. Additional reviews by the applicant identified an additional QC inspector who had also failed to sign the attendance roster. The applicable training records were amended through late entry signatures that the QC inspectors had attended the required training. The inspector concluded that the supporting basis for the late entries was adequate.

One of the approved repair methods for the damaged Kapton wires includes the use of RTV-3140 silicone applied to the damaged area. Procedure MAI-3.3, Appendix F, provides the implementing instructions for the application of RTV-3140 silicone on non-Class 1E circuits. The inspector was provided with a list of penetrations which contained circuits which were repaired with RTV-3140. The following penetrations were identified:

Class 1E Penetrations	Port-Wire Numbers
1-PENT-293-0006-A	6-1, 8-1, 9-1, 15-1, 16-1, 18-1, 22-1, 24-1
1-PENT-293-0015-A	8-1
1-PENT-293-0016-B	9-1, 13-1
1-PENT-293-0037-A	4-13, 4-16, 5-5, 6-18, 12-30, 12-31, 12-32, 12-36
1-PENT-293-0044-A	5-1, 7-11

Non-Class 1E Penetrations	Port-Wire Numbers
1-PENT-293-0010	10-12
1-PENT-293-0011	16-1, 25-1, 28-2
1-PENT-293-0012	6-4, 10-5, 21-11
1-PENT-293-0013	21-3
1-PENT-293-0022	5-24
1-PENT-293-0026	5-4
1-PENT-293-0032	1-1
1-PENT-293-0034	8-28
1-PENT-293-0035	1-6, 13-1
1-PENT-293-0039	4-1, 4-4, 4-31, 4-36
1-PENT-293-0040	10-19
1-PENT-293-0046	6-10
1-PENT-293-0053	12-5, 12-9, 12-13, 13-12, 20-15

The inspector reviewed the classification of the field cables associated with the above port wires and verified that all of the cables were either classified as non-Class 1E or the port wires were spared or abandoned circuits. Additional NRC reviews are planned in this area as additional WOs are closed.

7.5 (Closed) VIO 50-391/94-11-01, Examples of Failure to Follow Procedures

This VIO was reviewed and documented as closed for Unit 1 in IR 50-390, 391/94-82. However, the corrective actions taken for this VIO also corrected Unit 2. This VIO is closed for Unit 2 based on the evaluations documented in the above-referenced report.

7.6 (Closed) VIO 390/94-75-01, Failure to Identify Loose Hardware In Safety Injection Pump Rooms

This VIO documented the applicant's failure to identify damaged, loose, or missing hardware in the A and B SI Pump Rooms in accordance with Procedure MAI-1.9 area walkdowns. These walkdowwns were conducted to support system turnover for testing and room area turnover. At the time of the inspection, these rooms were turned over to operations. The hardware deficiencies which were not identified by the applicant included loose valve position indicator rods, loose valve limit switch mounting hardware, a loose limit switch cap plug, and a pipe support strut in contact with a MOV actuator.

In the applicant's response to this VIO, dated January 19, 1995 (RIMS T04950119048), the applicant stated that the deficiencies documented in the subject VIO were not documented on the Procedure MAI-1.9 Discrepancy Log in accordance with Appendix B of Procedure MAI-1.9, because walkdown personnel failed to identify the deficiencies; focused on specific attributes and only observed the system for obvious deficiencies. In addition, the applicant indicated that lack of effective access controls and a number of maintenance and startup activities following completion of the system walkdown may have contributed to these deficiencies.

The applicant's corrective actions included repair of the identified deficiencies, instituting access controls over turned-over rooms, and inclusion of additional requirements to Procedure PAI-5.01, System Preoperational Checklist, Revision 6. The inspector reviewed and verified these corrective actions as follows:

- The damaged hardware cited in VIO 390/94-75-01 was repaired and found to be in satisfactory condition.

- Access controls to turned-over rooms continues to be implemented by the applicant in accordance with Standing Order 94-019, Access Control, in that doors to turned over rooms are locked. If doors cannot be locked due to work activity, personnel in each room must be listed on access control logs posted outside the room.

- The inspector conducted a tour of eight engineered safety features pump rooms to determine if access controls were being implemented. Results of this inspection indicated that doors were secured by locks or they were posted.

- The inspector reviewed Procedure PAI-5.01 to determine if the revisions to this procedure appropriately focused on enhancing attention to detail on the part of walkdown personnel engaged in area turnover and acceptance walkdowns.

Based on the results of the above inspections and reviews, the inspector considered the corrective actions to be satisfactory.

8.0 EXIT INTERVIEW

The inspection scope and findings were summarized on February 17, 1995, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Dissenting comments were not received from the applicant. Proprietary information is not contained in this report.

Item Number	Status	Description and Reference
390/90-04	Open	CDR - Cable Damage at Splices (paragraph 6.1)
390/92-01-07	Closed	IFI - Deficient Vertical Cable Support (paragraph 7.1)
390/93-59-07	Closed	IFI - Follow-up to Ensure Plumbness Measurement Verified In Tolerance During Hot Functional Testing (paragraph 7.2)
390/94-11	Closed	CDR - RHR Minimum Flow Check Valves Not Operable In Present Configuration (paragraph 6.2)
391/94-11-01	Closed	VIO - Examples of Failure to Follow Procedures (paragraph 7.5)
390/94-13	Closed	CDR - Inadequate Vertical Cable Supports (paragraph 6.3)
390/94-15	Closed	CDR - Kapton Wires (paragraph 6.4)
390/94-30-01	Closed	DEV - Mortar Lined ERCW Pipe Sample Test Environment (paragraph 7.3)
390/94-61-02	Open	VIO - Inadequate Corrective Action (paragraph 7.4)

390/94-75-01	Closed	VIO - Failure to Identify Loose Hardware In Safety Injection Pump Rooms (paragraph 7.6)
390/95-06-01	Open/Closed	VIO - Failure to Properly Identify and Segregate Tools (paragraph 2.6)
390/95-06-02	Open	URI - Coordination of DLMH Walkdowns and Insulation Installation (paragraph 3.2)

9.0 LIST OF ACRONYMS AND INITIALISMS

ACRS	Advisory Committee on Reactor Safety
AFW	Auxiliary Feedwater
CAP	Corrective Action Program
CATD	Corrective Action Tracking Document
CCRS	Computerized Cable Routing System
CDR	Construction Deficiency Report
CFR	Code of Federal Regulations
CS	Containment Spray
DCN	Design Change Notice
DEV	Deviation
DLMH	Damaged, Loose or Missing Hardware
ERCW	Essential Raw Cooling Water
HAAUP	Hanger Analysis and Update Program
HFT	Hot Functional Testing
IFI	Inspector Follow-up Item
IR	Inspection Report
MAI	Modifications Addition Instruction
NE	Nuclear Engineering
NRC	Nuclear Regulatory Commission
PAI	Plant Administrative Instruction
PCG	Plant Completions Group
PER	Problem Evaluation Report
PM	Preventive Maintenance
QA	Quality Assurance
QC	Quality Control
RCI	Raytheon Constructors, Inc.
RCP	Reactor Coolant Pump
RHR	Residual Heat Removal
RIMS	Records Information Management System
RTV	Room Temperature Vulcanizing
SCAR	Significant Corrective Action Report
SER	Safety Evaluation Report
SP	Special Program
SQN	Sequoyah Nuclear Plant
SSP	Site Standard Practice
TI	Temporary Instruction
TROI	Tracking and Reporting of Open Items

TVA	Tennessee Valley Authority
VIO	Violation
WBN	Watts Bar Nuclear Plant
WO	Work Order
WR	Work Request