



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

Report Nos.: 50-390/95-46 and 50-391/95-46

Licensee: 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 Units 1 and 2

Inspection Conducted: June 12 - July 8, 1995

Inspectors: J. B. Brady  
J. B. Brady, Lead Inspector

8/1/95  
Date Signed

B. R. Crowley, Reactor Inspector  
R. W. Wright, Project Engineer  
G. B. Kuzo, Reactor Inspector  
H. Wang, Reactor Inspector (NRR)

Contractor: W. Marini, Pegasus Inc.

Approved By: P. E. Fredrickson  
P. E. Fredrickson, Branch Chief  
Division of Reactor Projects

8/1/95  
Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the area of Employee Concerns Special Program corrective actions, construction inspection reconstitution program review, HVAC Duct and Supports Corrective Action Program (CAP), Moderate Energy Line Break Special Program (SP), 50.55(e) Items, and Actions of Previous Inspection Findings.

Results:

No violations or deviations were identified. The overall quality of the corrective actions inspected was acceptable. The nine closed Corrective Action Tracking Documents (CATDs) reviewed adequately resolved the associated employee concerns. However, two of the nine CATDs were found to have administrative deficiencies in the closure packages, para. 2.1. The three CATD

Enclosure

status packages reviewed showed that the completion of the defined corrective actions will resolve the employee concerns.

TVA is resolving problems with the quality of the contractor's work associated with the MELB SP. The HVAC CAP has been adequately implemented. All hardware modifications associated with the CAP have been completed. TVA is still in the process of verifying and closing corrective action and work documents. IFI 390/95-46-01 was opened to perform further inspection of these documents after closure by TVA, para. 3.2.

The report documents the completion of the construction inspection reconstitution document review and, where appropriate, the inspection results for the following inspection procedures:

- 35100 Review of QA Manual, para. 4.3
- 49061 Safety Related Piping - QA Review, para. 4.4
- 49063 Safety Related Piping - Work Observation, para. 4.5
- 49065 Safety Related Piping - Record Review, para. 4.6
- 52051 Instrument Components and Systems - Procedure Review, para. 4.7
- 52053 Instrument Components and Systems - Work Observation, para. 4.8
- 52055 Instrument Components and Systems - Record Review, para. 4.9
- 80210 Environmental Protection, para. 4.10

Based on the document review and inspection reconstitution of these construction inspection procedures, the reconstitution of these procedures was considered complete.

Additional inspection activity and report review will be conducted to complete Inspection Procedures 46071, Concrete Expansion Anchors, para. 4.1 and 45055, Geotechnical/Foundation Activities Records Review, para. 4.2.

## REPORT DETAILS

### 1.0 Persons contacted

#### 1.1 Licensee Employees

- \*J. Adair, Lead Civil Engineer
- \*A. Capozzi, Concerns Resolution Staff Site Representative
  - R. Baron, Nuclear Assurance and Licensing Manager
  - T. Dean, Nuclear Licensing Engineer
- \*W. Elliott, Engineering Manager
  - M. Harding, Manager Concerns Resolution
- \*T. Harrison, Project Manager
  - D. Kehoe, Site Quality Manager
- \*P. Pace, Compliance Licensing Manager
  - M. Reeves, Acting Closure Manager, Engineering
- \*J. Scalice, Site Vice President
- \*B. Schofield, Site Licensing Manager
  - G. Stevens, Civil Engineer
- \*O. Zeringue, Senior Vice President Operations

Other TVA employees contacted included engineers, technicians, and other administrative personnel.

\*Attended exit interview

#### 1.2 NRC Personnel

- \*G. Walton, Senior Resident Inspector
- \*J. Jaudon, Deputy Director for TVA Construction
- \*M. Peranich, MC 2512 Project Manager

\*Attended exit interview

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

### 2.0 Employee Concerns Special Program CATDs (TI 2512/15)

The Employee Concerns Special Program was established to resolve the approximately 6000 employee concerns received prior to February 1, 1986. The employee concerns included those obtained from the confidential interviews conducted by a contractor (QTC), NSRS concerns that were still open, items generated from the SWEC review of incoming NRC correspondence, and items generated by the ECSP evaluators. The concerns were grouped into nine categories (Construction; Engineering; Operations; Material Control; Welding; Intimidation, Harassment, Wrongdoing, or Misconduct; Management and Personnel; Quality Assurance/Quality Control; and Industrial Safety). The concerns in each category were then sorted into 107 subcategories. The subcategories were broken down into elements, which grouped the concerns by issue. Concerns were then investigated by issue. The ECSP investigations found that some concerns

could not be substantiated or that corrective actions were already completed (class A), in some cases that concerns were substantiated but did not represent a problem (class B), in some cases the corrective actions were underway but not completed (class C), and in some cases corrective action needed to be initiated (class D and E). The ECSP issued Corrective Action Tracking Documents (CATDs) for validated issues in which the ECSP believed that additional corrective actions were needed (class D and E). Corrective actions for the issues identified in the CATDs were developed by the responsible line organization and concurred in by ECSP. These corrective actions were called CATD corrective action plans (CATD CAPs). The programmatic aspects of ECSP were accepted by NRC in a letter dated October 6, 1987.

A deviation process was later established to allow for changing the CATD CAPs. The deviation process established a Senior Review Panel to review the changes and determine their acceptability. In addition, the process classified the deviations into three levels based on safety significance and established criteria for when NRC concurrence was needed. Level I deviations were defined as deviations from technical specifications, the design basis, FSAR, or cause a reduction in safety margins. Level II deviations were those that affect multiple plants, programmatic areas of weakness, deviate from the techniques or methods established in commitments, or involve organizational changes that directly affect CATD CAP closure. Level III deviations were described as all other changes. The deviation process was accepted by NRC in a letter to TVA dated April 15, 1991.

The results of the investigations for Sequoyah were initially published in element reports. NRC reviews of the Sequoyah element reports were contained in letters to TVA dated March 11, 1988 and November 11, 1988. Later, the collective results for all the plants were published in category reports and subcategory reports, which were submitted to the NRC on February 6, 1989. The NRC published the results of its subcategory report sample review for Browns Ferry Unit 2 restart (15 of 107) on May 31, 1990. For both Sequoyah and Browns Ferry, NRC inspection of the ECSP corrective action implementation was accomplished under TI 2515/74.

For Watts Bar, NRC initially planned to review a sample of the subcategory reports, similar to the Browns Ferry review. However, because NRC had reviewed all of the 29 Watts Bar CAPs and SPs which included the ECSP corrective actions for those areas, the NRC concluded in NUREG 0847 Supplement 9 that its commitment to review the ECSP subcategory reports for Watts Bar was completed. NRC inspection of the ECSP corrective action implementation at Watts Bar is being accomplished under TI 2512/15. These inspections indicated that approximately 10% of the CATD corrective actions had not been adequately accomplished to resolve the associated employee concern(s) and that 15% - 20% of the CATD closure packages contained deficiencies. In addition, NRC inspections indicated that some of the corrective actions which were already in place prior to ECSP investigation but not complete (Class C employee concerns) may not have been completed (IR 390,391/93-24).

As a result of the NRC inspection findings, TVA initiated the Lookback Project to ensure that all employee concern corrective actions (Class C and CATDs)

were completed and the employee concerns were adequately resolved. Initial NRC inspection of the Lookback Project effort on Class C employee concerns (IR 390,391/93-83) identified a lack of attention to detail, particularly in relation to documentation. However, Lookback Project management had already recognized this weakness and was well along in correcting the problem. Similar reviews were conducted by the Lookback Project for CATDs and the same documentation method was used. NRC inspection (IR 390,391/94-10) identified that the level of detail in the documentation had improved and was adequate.

As a result of NRC questions about the ECSP classification of concerns and Lookback Project findings when conducting the Class C reviews, the Lookback Project undertook a review of the classification of Class A and B employee concerns. The NRC review of that effort was documented in IR 390,391/94-30. The results were that the original ECSP classifications did not always meet the classifications described in the subcategory reports. The Lookback Project reclassified the Class A and B concerns into legitimate and not legitimate, upgrading approximately 1/3 of the unsubstantiated concerns reviewed. The basis for the upgrade was that corrective action was being taken for the associated concerns. However, the NRC review revealed that some Lookback reviews were shallow in depth and missed the proper classification also. The employee concerns that were reclassified as legitimate were to be associated with the Lookback review for the associated corrective action. NRC review during the QA Records CAP inspection (IR 390,391/94-40) indicated that Lookback was having some problems with implementation of the links to the associated corrective actions, particularly where investigations into wrong doing were involved. That appeared to be an organizational interface problem due to the sensitive nature of wrong doing investigations.

A QA Audit of the CATD program was conducted in the fall of 1994 (NA-WB-94-0105). The Audit concluded that the CATD packages prepared by the line organization needed improvement. Corrective action for the audit was to train personnel responsible for preparing the CATD packages and to conduct feedback sessions with the line about current findings from the CATD review process (Lookback, QA independent verification, and CRS overview). Trending of the CATD package rejections was also a corrective action that began after the audit. The trending effort was the first time that QA management had taken an active role in establishing the quality standard for CATD closure. All previous QA involvement was in conducting the independent review for closure. Results of those reviews were not used by QA management to establish a quality standard.

QA set the CATD quality standards for trending equivalent to those previously established for CAQ closures. Trending initially indicated that CATD package quality from the line organization was unacceptable with a cumulative acceptance rate of less than 50% through February 1995. These trends were being reported to management as part of the Nuclear Assurance weekly report. Corrective action was taken by the line organizations resulting in improvement. The results for April 1995 showed significant improvement over the previous 6 months, with an acceptance rate of approximately 86%. The cumulative average from October 1994 through April 1995 is now approximately 70%, as compared to 39% through February 1995.

TVA instituted a program to develop status packages prior to complete closure of the CATDs. The status packages are called modified packages by TVA. The purpose of this effort was to allow the review organizations to do early review of the line corrective action, to assess whether the line was following the CATD corrective action plans, and whether the corrective action would resolve the employee concerns when completed. The TVA guidance for status packages was that 100% of the engineering must be complete and over 50% of the field work must be complete. The line organization prepares the package and identifies what work is left to be completed to close the package (punch list). The package then receives a Lookback Project Review, a QA organization independent verification, and a CRS review. Any differences between the organizations on the punch list must be resolved prior to the package being accepted.

## 2.1 Review of CATD Corrective Actions for the DBVP CAP

The inspectors reviewed CATD closure packages to determine whether the corrective actions taken resolved the associated employee concerns and whether the guidance contained in SSP 1.02, Concerns Resolution was followed. All of the CATD packages reviewed had been through the Lookback Project. The review included the associated subcategory report sections, the applicable employee concerns, the CATD, the associated corrective action plan, the CATD closure package (including corrective action documents), the lookback project data sheet, and field verification of corrected hardware. For non-plant specific (NPS) CATDs, the review included whether all actions required to resolve the identified concerns, as they pertained to WBN, were complete and acceptable. Actions required to resolve these concerns at other TVA nuclear sites were not addressed in this report. For those that were partial closures (closed for Unit 1 only), the inspectors' review included verification that all Unit 1 actions were complete and acceptable, and that remaining Unit 2 actions were specifically identified and not needed for Unit 1 startup. For those that were modified packages, the inspectors determined whether the corrective actions, including implementation to date, would result in the employee concerns being resolved when the corrective action was complete. The following CATD packages were reviewed with comments as indicated:

### 2.1.1 10900-NPS-04 Ampacity

This CATD was issued because the adequacy of installed cables was questionable due to the ampacity tables issued in Design Standard DS-E12.6.3. The corrective action was to perform a sampling program, bound the problem and correct the deficiencies. This CATD was specific to the bounding of the problem including the issuance of design calculations, the issuance of a revised Design Standard DS-E12.6.3, and the issuance of design output documents. The ampacity program was reviewed by the NRC in NUREG 0847 SSER 7, Appendix P, and SSER 9, Appendix Y and was determined to be acceptable. This area was also included within the scope of the Electrical IDI inspection conducted in early 1991 and documented in IR 50-390/91-201. The IDI found that the electrical systems calculations regenerated as a part of the DBVP were of consistently high quality, that the regenerated calculations had revealed numerous deficiencies in electrical design and equipment application, and that corrective actions for those deficiencies were in progress. The

ampacity program and implementation were reviewed in IR 50-390/94-81 to determine if the field implementation matched the approach previously accepted including the methodology for this CATD. The conclusion was that the ampacity program matched the intent of the originally accepted program and was being acceptably implemented. The inspector reviewed the Lookback data sheet, CATD CAP, and closure folder and determined that all aspects of the CATD had been adequately covered in the review contained in IR 50-390/94-81. The employee concerns are considered resolved.

2.1.2 20106-WBN-01           The TVA Engineering and Configuration Assurance  
30704-WBN-06           Program (ECAP) for Watts Bar had not been completed.

The original corrective action was the implementation of the ECAP. The CATD CAPs were revised to replace ECAP with the DBVP. CATD 20106-WBN-01 was specific to adopting the program while CATD 30704-WBN-06 was specific to complete implementation of the program. The inspector reviewed the closure folder for CATD 30704-WBN-06, the status package for CATD 30704-WBN-06, and the Lookback data sheets for both. The NRC has issued TI 2512/19 to review the DBVP. Inspection reports 50-390/93-66 and 94-69 document the 75% milestone NRC review of the DBVP. In general, DBVP implementation to date has been determined by NRC to be acceptable. No further review of this CATD will be performed since this issue and DBVP are identical. The concerns are considered resolved when DBVP is complete and NRC has accepted the implementation.

2.1.3 30202-WBN-01           Degraded Voltage on Shutdown  
30202-WBN-02           Boards

These CATDs were issued to address the over-voltage and under-voltage conditions that occurred on the 6.9 kilovolt and 480 volt shutdown boards. The corrective actions were changed to the installation of new Common Station Service Transformers (CSSTs) that had automatic load tap changers. A common CATD CAP was used. The degraded bus voltage issue was reviewed in IR 50-390/94-81 including these two CATDs. The review concluded, based on document reviews and field inspections, that TVA's corrective actions would satisfactorily resolve the issue of degraded bus voltage. The inspector reviewed the Lookback data sheet and the closure folder for each CATD. Based on these and the IR 50-390/94-81 inspection, the employee concerns are resolved.

2.1.4 30713-WBN-02           Configuration Control Drawings (CCDs)

The CATD was issued because TVA's drawing system was not easy to use, particularly in relation to determining the as-built configuration of the plant from the drawings. The corrective action was to implement the configuration control drawing system through the DBVP. The current most important procedures that discuss drawing control for CCDs was Corporate Standard STD-2.7, Revision 1, Document Control; Site Standard Practice SSP-9.03, Revision 8, Plant Modification and Design Change Control; and Engineering Administrative Instructions EAI-3.05, Revision 23, Design Change Notices, and EAI 3.10, Revision 4, Drawing Categorization and Configuration Control Drawing Origination. The inspector reviewed the above procedures with

the closure package and Lookback data sheet. The inspector noted several memorandums from the plant manager that requested certain additional drawings be designated as CCDs indicating the operating organization's input into the CCD process. These changes were verified as implemented by the QA organization during the CATD closure process. The inspector noted that TVA has incorporated the drawing change and control process into the design change process.

NRC has inspected DBVP in IRs 390/93-66 and 94-69 for the 75% milestone. In addition, NRC has conducted approximately 200 inspections over the last 2.5 years. During these inspections CCDs were reviewed on numerous occasions. In particular the Preoperational test inspections for essentially all the preoperational tests reviewed numerous CCDs and the system turnover inspections have reviewed numerous CCDs for the approximately 30 systems reviewed to date. Although a violation was issued in 1991 (390/91-18-05) dealing with drawing control, it was closed in IR 390/94-35 with the corrective action acceptably implemented. Overall the NRC conclusion is that some minor drawings errors have been found, but that the CCD program has been adequate. The employee concerns are considered resolved.

2.1.5 20601-WBN-02            Management Attention to Procedural Adequacy and Adherence in Design Process Related to Configuration Control

Three CATDs were issued because configuration control had been lost. This CATD was issued to focus management attention on the importance of maintaining configuration control once it was attained. The corrective action involved providing an improved program through procedural changes and in the proper implementation of procedures. Paragraph 2.1.4 above discussed the procedures that pertain to configuration control in the design change process. These procedures are adequate to describe the configuration control process. The inspector reviewed the Lookback data sheet and closure package. Neither provided an assessment of the implementation of the procedures. After discussion with Lookback personnel, a PAC/AQ Phase V review, issued August 18, 1994, on oversight of the design control program was added to the closure package and a revision (3) made to the Lookback data sheet to take credit for that review. The PAC/AQ review concluded that although some problems have been found, procedural implementation has been acceptable indicating adequate management attention to this problem. Implementation has been reviewed during the many NRC inspections discussed in paragraph 2.1.4 above. Configuration control problems found by the NRC during recent inspections have been minor. The employee concerns are considered resolved.

2.1.6 20103-WBN-02            Design Criteria Inadequate, specifically WB-DC-30-1, WB-DC-30-3, WB-DC-30-4, and WB-DC-30-5

This CATD was issued because Watts Bar design criteria documents were found to be weak. Specific deficiencies were found for design criteria WB-DC-30-1, WB-DC-30-3, WB-DC-30-4, and WB-DC-30-5. The corrective action was to correct the specific deficiencies and perform the DBVP to issue an adequate design basis document. The inspector reviewed the Lookback data sheet and CATD closure folder containing the design criteria. The specific weaknesses noted in

Subcategory Report 24500 for these specific design criteria had been corrected. The closure folder and Lookback data sheet did not show that the design basis document portion of DBVP was completed. TVA added to the CATD package and Lookback data sheet the DBVP Unit 1 Design Basis Final Report (Revision 1) issued on November 21, 1992 (RIMS T28921123994) which stated that all design basis documents had been issued (159 system descriptions and design criteria). The NRC has issued TI 2512/19 to review the DBVP. Inspection Reports 50-390/93-66 and 94-69 document the 75% milestone NRC review of the DBVP. In general, DBVP implementation to date has been determined by NRC to be acceptable. The employee concerns were resolved

#### 2.1.7 22901-WBN-01 Orifice Plate Effects on Instrument Loop Accuracies

This CATD was issued because a less accurate method was used to calculate orifice plate sizing. The corrective action was to perform accuracy calculations and compare results with safety limits where quantitative analysis was needed. TVA's analysis showed that five orifice plates performed a safety function in relation to instruments. The calculations for these plates (1-FT-3-142 R2, 1-FT-3-147A R6, 0-FIS-67-206 R3, 1-FT-70-81A/81E R3, and 1-FE-74-12) showed that use of the more accurate calculational method resulted in no significant change in the overall instrument loop accuracy. The inspector reviewed the Lookback data sheet, closure folder, and related calculations and concluded that the employee concerns were resolved.

#### 2.1.8 23702-WBN-03 5th Diesel Generator ERCW Valve Operator Fuses

This CATD was issued because it was perceived that the wrong size fuses were installed for a fifth diesel generator ERCW valve. The inspector noted that the 5th diesel generator is not required for Unit 1 operation. ECN 6391, implemented by workplan 6391, replaced the fuses based on TVA calculation WBPE2158901016. This issue was reviewed in IR 390/92-27, Paragraph 8 and determined to be acceptably resolved. The employee concerns were resolved

#### 2.1.9 20501-WBN-01 Essential Calculations Program 20501-WBN-02

These CATDs were issued because the quality of existing calculations was not adequate and the essential calculation program was not complete. The corrective action was to complete the essential calculation program. The inspector reviewed the status packages and the Lookback data sheets. The NRC has reviewed calculations during the IDI inspections (390/91-201, 390/92-201, 390/93-202), the DBVP inspections (390/93-66 and 390/94-69), and various of the approximately 200 inspections conducted over the last 2.5 years. The inspections indicated that in general the Essential Calculation Program included the necessary calculations and had been adequately implemented. The open actions left to be completed includes closure of DBVP and revision of some system 90 (radiation monitoring) essential calculations. These issues are being reviewed by NRC under TI 2512/19 for DBVP and TI 2512/41 for the Radiation Monitoring Special Program. When these programs are complete and NRC determines they are acceptably implemented through the TI inspections, the employee concerns will be resolved. Consequently, no further review of this CATD is necessary.

## 2.2 Review of CATD Corrective Actions for the HAAUP CAP

The inspectors reviewed CATD closure packages to determine whether the corrective actions taken resolved the associated employee concerns and whether the guidance contained in SSP 1.02, Concerns Resolution was followed. All of the CATD packages reviewed had been through the Lookback Project. The review included the associated subcategory report sections, the applicable employee concerns, the CATD, the associated corrective action plan, the CATD closure package (including corrective action documents), the lookback project data sheet, and field verification of corrected hardware. For non-plant specific (NPS) CATDs, the review included whether all actions required to resolve the identified concerns, as they pertained to WBN, were complete and acceptable. Actions required to resolve these concerns at other TVA nuclear sites were not addressed in this report. For those that were partial closures (closed for Unit 1 only), the inspectors' review included verification that all Unit 1 actions were complete and acceptable, and that remaining Unit 2 actions are specifically identified and not needed for Unit 1 startup. For those that were modified packages, the inspectors determined whether the corrective actions including implementation to date would result in the employee concerns being resolved when the corrective action is complete. The following CATD packages were reviewed with comments as indicated:

The scope of the HAAUP CAP originally encompassed the following 16 CATDs.

11102-WBN-02,	Lack of supporting calculations for field fabricated replacement parts for vendor supplied support components.
11300-WBN-04,	Perform a 100% review of all calculations associated with Bulletin 79-02.
21201-WBN-01,	Incomplete corrective action for NCR WBNCEB8418, revision 1.
21202-WBN-01,	Potential interference of piping with plant features and lack of evidence that RWST overflow piping had been analyzed.
21801-WBN-01,	Contradictory procedures regarding adequate flexibility of piping not formally designed for thermal expansion.
21801-WBN-02,	Alternate analysis design criteria do not require evaluations for thermal expansion and thermal anchor movement.
21803-WBN-01,	No consistent method for verification of simplified analysis.
21804-WBN-01,	Procedure WBEP-EP 43.21 and Simplified Analysis Handbook conflict.

- 21806-WBN-01, Support component weights are not considered in the dynamic and gravity analyses. Zero Period Acceleration is not considered. Structural displacements at the support location are not considered.
- 21807-WBN-01, No justification for the use of a 3-way restraint at the interface of rigorous and alternate analysis piping.
- 21811-WBN-01, Incomplete implementation of PIR WBNCEB8603 commitments and insufficient detail for attachment of supports to building.
- 22001-WBN-01, Inadequate technical justification for calculation and training inadequate to preclude interpretational conflicts between Construction and QC.
- 22011-WBN-01, Corrective action for PIR WBNCEB8536 not completed.
- 22204-WBN-01, Lack of qualification documentation for modified clamp on support 74-1RHR-R61.
- 22207-WBN-01, Weld on support 47A450-25-415 does conform to design drawing.
- 80201-WBN-02, Support qualification questioned due to unrestricted use of construction tolerances.

As discussed in IR 50-390, 391/93-45, NRC review of the original corrective action plans for these CATDs found that the proposed actions appropriately characterized the issues and provided a comprehensive approach for correcting the identified deficiencies.

Subsequently, the applicant determined that the following four CATDs were also applicable to the HAAUP CAP, bringing the total of HAAUP related CATDs to 20.

- 21804-NPS-01, Seismic qualification of flexible, short, open-ended branch lines.
- 22003-WBN-01, Items qualified by engineering judgement are not adequately supported by calculations.
- 22106-WBN-01, Excessive torque specified for pipe clamps and field modified clamps not approved by vendor.
- 22800-WBN-02, TVA lab test results for Unistrut clamps differ from those from the vendor.

Currently, the applicant considers CATD 21801-WBN-01 closed and CATDs 21804-WBN-01 and 22204-WBN-01 partially closed, indicating that all actions affecting Unit 1 are complete. The inspector reviewed the closure packages

for these three CATDs and determined that all required corrective actions have been completed, all necessary documentation has been included in the packages, and the originally identified concerns have been appropriately addressed and resolved. Although, as discussed below, all HAAUP CAP related hardware modifications are not yet complete, all specific hardware identified in these three CATDs has been appropriately corrected and/or dispositioned, and all other hardware modifications resulting from these issues are being tracked by other closely related CATDs, as referenced in the associated Subcategory Reports and/or Lookback Data Sheets.

Modified partial closure packages have been compiled for the other 17 CATDs. These packages contain documentation pertaining to all completed actions as well as a list of actions remaining to be completed to either close the CATD or partially close it for Unit 1. Also included in each package is a Lookback Data Sheet that lists each required corrective action, its current completion status, and a detailed list of actions remaining to be completed and documents which need to be added to the package to support closure of the CATD. The primary action remaining is the completion of the hardware modifications associated with the HAAUP CAP and final review and closure of the associated documentation. In all, 675 DCNs were issued as a result of the HAAUP CAP. At the time of this inspection, field work associated with approximately 95% of these DCNs had been completed.

The inspector reviewed the CATD CAPs, modified partial closure packages, and Lookback Data Sheets and determined that they reflect an accurate picture of the status of complete and incomplete actions. In addition to completion of the above referenced field work, the inspector found the following types of actions remaining to be completed in order to close the CATDs:

- update of the CATD package with hardware completion documentation;
- final closure of the DCNs;
- final closure of associated CAQRs, SCARs, PERs, etc;
- adding source notes to procedures, design criteria documents, etc; and
- adding/clarifying information in Subcategory Reports to document actual corrective actions performed.

The inspector therefore determined that, when the hardware modifications are complete, when the updating of the documentation within the CATD packages has been accomplished, and when the other routine administrative tasks listed on the Lookback Data Sheets have been completed, the original concerns will have been resolved. These issues are encompassed by the HAAUP CAP which the NRC has issued inspection procedure TI 2512/23 to address. When the HAAUP CAP is complete and NRC determines it is acceptably implemented through the TI inspections, the related employee concerns will be resolved. Consequently, no further review of these CATDs is necessary.

### 3.0 Review of Corrective Action Program Plans

Volume 4 of the TVA Nuclear Performance Plan describes the approach to be applied to implementation and completion of corrective actions associated with Corrective Action Program (CAP) Plans and Special Programs (SPs). The inspectors evaluated completed and in-process work activities described below to verify corrective actions were being completed in accordance with the CAPs and SPs and TVA procedures.

#### 3.1 Moderate Energy Line Break (MELB) Special Program (TI 2512/40)

TVA is in the process of completing the MELB SP. Field work remaining involves sealing all conduits that are below the flood levels contained in the environmental series drawings 47E235. The conduit sealing process utilizes a combination of internal and external conduit seals per DCN 20217-A.

TVA and the contractor performing this work (PCI/ICMS) discussed the results of a recent TVA QA Assessment with the inspector. TVA stated that the assessment identified deficiencies in the installation of external conduit seals by the contractor. PCI/ICMS documented the deficiencies in their corrective action program (WBN-RCA-043). The contractor showed the inspector several seals that were determined to be deficient at the Intake Pumping Station. Approximately 1/8" to 1/2" gap in the sealant on the threaded conduit connection was observed by the inspector. The deficient sealing was on conduit connections that were not easily accessible and would require a mirror by the craft personnel performing the work to ensure the sealant application was adequate. PCI/ICMS was performing a walkdown of all completed external conduit seals to determine the extent of the problem. Craft personnel performing these seals were to be briefed on the problem.

No violations or deviations were identified.

#### 3.2 Heating Ventilation and Air Conditioning Duct and Supports Corrective Action Program (HVAC CAP)(TI 2512/025)

The purpose of this inspection was to determine if the HVAC CAP has been adequately implemented.

TVA has implemented the HVAC CAP in accordance with the Nuclear performance Plan and hardware modifications have been completed. The applicable site procedure for HVAC work is MAI-4.3, Revision 8, HVAC Duct Systems.

##### 3.2.1 Background

In April 1981 Stop Work Order 11 was issued when it was found that safety-related HVAC piping and ductwork was installed without a documented QA program. Corrective actions focused on development of a QA program for the existing installations within the scope of Stop Work Order 11, and the Stop Work Order was lifted. Subsequently, additional deficiencies were identified, as documented in the HVAC CAP.

The HVAC CAP, Revision 0, dated November 18, 1988, describes a program for resolution of a number of safety significant issues involving structural qualification of safety-related (Category I and I[L]) HVAC ducts and associated supports, and a comprehensive completion plan to resolve these issues. The CAP was submitted by the applicant for NRR review on November 18, 1988. Revision 0 of the CAP and the applicant's approach towards identification and resolution of problems identified in the HVAC CAP was approved by NRR in an SER, dated October 24, 1989.

The issues identified in the HVAC CAP originated from conditions adverse to quality (CAQ), NRC-identified issues, vertical slice review (VSR) discrepancy reports (DRs), 10 CFR 50.55(e) reports (CDRs), and employee concerns. These source issues are contained in the "Basis For CAP" document as Attachment 1 to the CAP. Other source documents developed during implementation of the CAP include Condition Adverse to Quality Reports (CAQRs), Corrective Action Tracking Documents (CATDs) from the employee concerns program, licensee walkdown items, Problem Evaluation Reports (PERs) and NRC identified items.

These issues were categorized into four areas, as follows:

- discrepancies in design basis;
- design output did not envelop all design parameters;
- installed configurations that do not comply with design documents; and
- discrepancies between installed configurations and inspection documentation.

The four root causes of these deficiencies, corresponding to the above four issues, were identified as follows:

- incomplete design criteria due to inadequate control and documentation of engineering judgment;
- engineering did not completely implement design criteria and did not perform adequate design reviews;
- unclear or inadequate installation requirements; and
- unclear inspection requirements.

### 3.2.2 CAP Corrective Actions

The objectives of this CAP were to assure that Category I and I(L) HVAC ductwork and associated support installations are structurally adequate, comply with design criteria, and the design criteria comply with licensing requirements.

In accordance with the above-stated objectives, the CAP identified the following actions to be completed:

- HVAC ducts and duct support design criteria will be technically adequate and consistent with the FSAR;
- design output will be in compliance with design criteria;
- construction, maintenance and QA procedures will properly implement engineering and design requirements; an
- a Critical Case Evaluation (CCE) will be developed and implemented to ensure the total population of HVAC duct and duct supports meet design criteria.

### 3.2.3 NRC CAP Inspection Activities

Significant NRC inspection activities have addressed the adequacy of TVA work associated with implementation of the HVAC CAP. Included were detailed inspections of: walkdown and CCE activities; programmatic changes; design calculations and changes; procedure and drawing changes; field inspections of in-process and completed modifications; field inspection of existing hardware; and interim QA assessments resulting from CAP corrective actions. These inspections are documented in the following NRC 50-390 IRs:

89-200	89-14	90-05
90-20	91-01	92-02
92-08	92-13	92-201
93-201	94-08	95-17
95-23	95-35	

NRC IR No. 50-390/94-08 documents a detailed team inspection of CAP implementation at 75% completion. This inspection was performed in February of 1994 and covered all aspects of CAP implementation, including field walkdown and verification of modified duct and duct supports and the QA assessments performed up to the 75% status. IRs 50-390/95-17, 95-23 and 95-35 documented additional verification of hardware modifications since the 75% inspection.

### 3.2.4 Current HVAC CAP Status

The CAP resulted in modification of 458 supports and inspection and modification (as necessary) of 12,600 linear feet of duct. At the time of this inspection, all hardware work associated with the CAP had been completed, and 30 of the 32 DCNs issued had been closed.

On June 26, 1995, TVA issued, and included in the HVAC CAP Books, a report titled, Watts Bar Nuclear (WBN) - Heating, Ventilation, and Air-Conditioning (HVAC) Duct and Duct Support Corrective Action Program (CAP) - Status Report (RIMS T21 950626 944). The Report identified 80 CAP related items in their Tracking and Reporting of Open Items (TROI) system that must be completed for CAP completion. These items included commitments to the NRC, NRC inspection

finding items, CDRs, CAQs, CAQRs, SCARs, CATDs, and VSRs. At the time of this inspection, all but 30 of these items had been closed. A sample of the closed TROI items were reviewed, as detailed in paragraph 3.2.5.2 below, to verify completion and proper closure.

### 3.2.5 Current Inspection Activities

Since the inspections listed in paragraph 3.2.3 above had verified the walkdown and inspection process, the programmatic changes, the design process, the modifications to hardware, and the intermediate QA assessments, this final inspection concentrated on verifying overall adequacy of CAP implementation by reviewing QA Assessments and completed CAP associated documents as detailed below.

#### 3.2.5.1 Independent Verification Plan (IVP) for Heating, Ventilation, and Air Conditioning Duct and Duct Supports Corrective Action Program Plan

The purpose of the IVP for the HVAC CAP was to provide a method to identify and determine the status of the verification activities of CAP issues as primary quality activities which require verification. Administration and implementation of the IVP is described in procedure QAI-5.01, Quality Verification Process, Revision 2.

The inspectors reviewed the IVP for the HVAC CAP, including audits and assessments, detailed below, to assess the effectiveness of QA and the adequacy of the verification assessments and audits for the HVAC CAP.

- NA-WB-94-0142, Assessment of Heating, Ventilating, and Air Conditioning Duct and Duct Support Corrective Action Program

The purpose of the TVA assessment was to evaluate the implementation and adequacy of the CAP plan relative to engineering and field modifications since the 75% assessment. The assessment was completed in May, 1995, and included: evaluation of 31 supports and 9 duct segments to verify compliance with DCNs and work documents, verification of completion of NRC open items from previous inspections, adequacy of closure of licensing commitments, verification of corrective actions for CATDs associated with the CAP, verification of adequacy of closed CAQs, and verification of loose and missing hardware inspections for HVAC.

A number of minor discrepancies were identified by the assessment. However, TVA concluded that the number of discrepancies was less than in previous assessments. One PER (WBPER950213) was issued because a drawing revision did not incorporate all requirements from a previous revision. One Drawing Deviation was issued because 2 welds shown on a DCA were inaccessible and could not be made. Five Work Requests (WRs) were issued to correct minor hardware discrepancies. Nuclear Engineering (NE) evaluated the findings and determined that none of the items identified were safety significant. No conditions were found on installed hardware that were not covered by bounding calculations. TVA concluded that the HVAC CAP was being adequately implemented.

In addition to the assessment review, the inspectors reviewed the following closed documents to verify problems identified in the assessment were corrected:

WBPER950213  
 WR C259623 and WO 95-06088-00  
 WR C247273 and WO 94-04275-00\*  
 WR C332623 and WO 95-07580-00  
 WR C250152 and WO 94-14625-00\*  
 WR C273482 and WO 95-05534-00

\* Problems identified in these documents were identified in previous assessments. TVA's current assessment verified that corrective actions for the problems had been completed.

The inspectors concluded that the assessment was a detailed evaluation of corrective actions and resulted in good findings. The assessment indicated effective QA involvement in ensuring that HVAC systems are constructed in accordance with requirements and that the HVAC CAP was effectively implemented.

- QA Audits

In addition to the QA assessment, the inspectors reviewed QA Audits WBA92209 and WBA92214 related to the HVAC CAP. The audits were detailed evaluations of various HVAC corrective actions that provided further assurance that the HVAC CAP was being adequately implemented.

3.2.5.2 Review of Closed HVAC Corrective Action Documents, NRC Items, and Work Documents

As noted in paragraph 3.2.4 above, 50 TROI items related to the HVAC CAP have been closed. In addition, 30 of 32 DCNs have been closed. The inspectors reviewed a sample of each item type to verify proper closure and the adequacy of corrective actions. These reviews are detailed in the following paragraphs:

- CATDs

The scope of the HVAC Duct and Supports CAP encompassed one CATD, 11103-WBN-06. This CATD identified configuration and documentation discrepancies between as-designed and as-built conditions for four supports (1030-DW920-02H-0110, 0030-DW920-01H-1804, 0030-DW920-01H-1805, and 1030-DW920-02H-0109). These discrepancies were documented in NCR W-580-P, which was later incorporated into the scope of SCAR WBN870316SCA.

As discussed in IR 50-390, 391/94-08, NRC review of the original corrective action plan for this CATD found that the proposed actions appropriately characterized the issue and provided a comprehensive approach for correcting the identified deficiencies. Subsequently, on September 20, 1994, the applicant revised the corrective action plan, via a Level Iib CAP deviation, to document that the identified deficiencies had been included within the

scope of the HVAC CAP walkdown program conducted in accordance with TI-2012, HVAC Duct and Duct Support Critical Case Walkdowns, Revision 0. The inspector reviewed this revision to the corrective action plan and determined that it was adequate to assure that the originally identified deficiencies would be appropriately dispositioned.

The applicant had compiled a modified partial closure package to document the completion status of all actions required to close the CATD. This package and its associated Lookback Data Sheet, dated April 13, 1995, document the closure status, as of March 29, 1995, as follows:

Walkdowns for the affected supports were completed, the data was reviewed by engineering, and the supports were accepted for use as is. This acceptance is documented in calculation 50098.01-C-003, Revision 0, dated December 7, 1992.

SCAR 870316SCA remains open pending completion of other HVAC CAP related actions unrelated to this CATD. Prior to final closure of the CATD, the package will be supplemented with evidence of final SCAR closure.

The inspector reviewed the modified closure package and Lookback Data Sheet and found that the completed actions adequately disposition the originally identified deficiencies. The inspector therefore determined that, as all hardware related actions are complete and updating of the CATD package with the closed SCAR is a routine administrative task, the original concern has been resolved.

- Commitments to the NRC (NCOs)

NC0860237003 - In the final report for CDR WBRD-50-390/86-54, dated October 17, 1986, TVA committed to train cognizant personnel on revised criteria in Design Criteria WB-DC-40-31.8. The inspectors reviewed the commitment package which contained evidence of the training on the revised criteria. This commitment has been satisfied. The CDR is closed in paragraph 5.1 of this report. This commitment has been satisfied.

NC0880257003 - In paragraph 4.1 of the HVAC CAP, TVA committed to revise HVAC construction procedures and train affected personnel in the use of the revised procedures. The inspectors reviewed the commitment package which referenced revised procedure requirements, MAI-4.3, Revision 7, and evidence of training for the procedure. This commitment has been satisfied.

NC0880257007 - In a letter to the NRC dated September 12, 1990, TVA committed to revise the FSAR to provide updated design damping values for HVAC systems. The inspectors reviewed the commitment package and Amendment 64 to the FSAR, which included the updated damping values. This commitment has been satisfied.

NC0920005003 - In the final report for CDR WBRD-50-390,391/91-22, dated December 20, 1991, TVA commitment to upgrade engineering specifications for construction to provide improved clarity and guidance for the construction of HVAC duct supports. The inspectors reviewed the commitment package and

Specification Revision Notice SRN-N3C-942-1 to Engineering Specification N3C-942, Revision 3, Structural Requirements for HVAC Ducts and Duct Supports, which provided the improved clarity and guidance. This commitment has been satisfied. The CDR is closed in paragraph 5.2 of this report. This commitment has been satisfied.

- Condition Adverse to Quality Reports (CAQRs)

SCR W-580-P-S - This SCR was originally identified as a Nonconformance Report written in 1987 when discrepancies between drawings and field installations were found for HVAC Supports 1030-DW920-02H-0110, 1030-DW920-02H-0109, 0030-DW920-01H-1804, and 0030-DW920-1805. In 1990, the SCR was closed and incorporated into SCAR WBN870316, which encompassed the overall problem with HVAC Supports as covered by the HVAC CAP. (See related CATD 11103-WBN-06, discussed above).

In addition to the review of the CATD corrective actions, the inspectors reviewed the following documents specific to the above supports to verify the supports were included in the HVAC CAP and adequate corrective actions were taken:

TI-2012 Critical Case Walkdown Package for Support 0030-DW920-01H-1804

TI-2010 Walkthrough Package for Support 0030-DW920-1805

WD-026 Walkthrough Checklist and Calculation 50098.01.C.003 for all 4 Supports

The inspectors concluded that corrective actions were adequate for this SCR, and it was properly closed.

CAQR WBP880104 - The strap loop or ring, as required by design criteria, was missing from Support 2030-DW920-01H-1216. This CAQR was rolled into CAQR WBP880544 R1 on 6/26/1989 and closed. All Category I and I(L) HVAC supports were included in the Inspection/modification program under the HVAC CAP. To verify that Support 2030-DW920-01H-1216 was properly dispositioned, the inspectors reviewed the WD-026 walkthrough checklist and calculation 50098.01.C.003 for this support. The inspectors concluded that corrective actions were adequate for this CAQR and it was properly closed.

CAQR WBP880001 - This CAQR documented a number of cases of damage to duct near Support 0031-DW930-01H-0627. The inspectors reviewed the corrective actions documented in the CAQR package. Although the specific problems identified were justified without repair, guidance for the disposition to various types of damage was issued in Appendix A of Specification N3C-942, Revision 3. Also, clarifications for repair of damage to duct was issued in DCNs P-01662-A and P-02140-A. In the course of HVAC CAP inspections and modifications, damage was identified and repaired in accordance with these DCNs. The inspectors concluded that corrective actions were adequate for this CAQR and it was properly closed.

FIR WBFIR930165 - During the TVA 75% CAP assessment walkdowns, a number of discrepancies were identified between as-built and design configurations. The inspectors reviewed the corrective actions as documented in the Finding Investigation Report (FIR) package. In addition, the following documents, issued to correct a problem with support member rotation not being in accordance with drawing requirements, were reviewed:

Design Calculation WCG-1-1646, Evaluation of Member Rotation on HVAC Supports

SRN-N3C-942-4 to Specification N3C-942, Structural Requirements for HVAC Ducts and Duct Supports

The inspectors concluded that corrective actions were adequate for this FIR and it was properly closed.

PER WBPPER940082 - This PER was written to document corrective actions for rivet spacing and angle stiffener spacing problems identified on duct segments 47W930-2-803, 812 and 818. The inspectors reviewed the corrective actions documented in the PER package, including evidence of personnel training. TVA determined the problem to be isolated to one Workplan and personnel who worked and inspected that Workplan. Personnel involved had not received recurrence training for a similar problem identified in WBPPER930336. At the time of the work resulting in PER WBPPER940082 problem, the craft personnel had not yet had the recurrence training for PER WBPPER930336. QC personnel involved were not assigned to the HVAC work at the time of the recurrence training for PER WBPPER930336. Additional supports were inspected to verify that the case was isolated. The inspectors concluded that corrective actions were adequate for this PER and it was properly closed.

PER WBP89011 - A large crack was identified in a section of duct on elevation 692' in the Control Building. The crack was downstream of the EBR Air Handling Units. The inspectors reviewed the corrective actions as documented in the PER package. TVA determined the crack to be caused by excessive vibration due to poor design and an isolated condition. After repair of the damaged duct and monitoring to determine vibration effect, a DCN and Workplans were issued to modify the duct to eliminate the excessive turbulence. The inspectors concluded that corrective actions were adequate for this PER, and it was properly closed.

CAQR WBP880543 - This CAQ was written when TVA found that there was no documentation to demonstrate seismic qualification of internal ductwork accessories such as turning vanes and splitters. The inspectors reviewed the corrective actions as documented in the CAQR package including the following documents:

- ° Design Criteria WB-DC-40-31.8, Revision 7, Seismically Qualifying Round and Rectangular Duct
- ° Calculation WCG-1-520

Design Criteria WB-DC-40-31.8, Revision 7, now provides design requirements for accessories and calculation WCG-1-520 evaluates all possible accessory locations in accordance with the revised criteria and concluded that all such accessories were acceptable without modification. The inspectors concluded that corrective actions were adequate for this CAQR, and it was properly closed.

PERs WBP910430 and WBP900501PER - These PERs were written to document corrective actions for various design issues identified during implementation of the HVAC CAP. The inspectors reviewed these PERs to verify that the issues identified were addressed in the corrective actions and appeared to be appropriate. The inspectors concluded that the issues were adequately addressed and the PERs properly closed.

SCAR WBP870818SCA - This SCAR addressed the question about differential seismic movement between buildings and the effect on various commodities spanning from one building to the next. Although the SCAR is still open, since it involves all commodities, corrective actions for HVAC systems have been completed. The inspectors reviewed the SCAR and Calculation 50050-C4-108. The calculation documented field walkdowns of all commodities and resolution of any problems identified with lack of adequate flexibility of commodities spanning from one building to another. No problems were expected in HVAC systems since flexible connections between buildings were a part of the original design and construction. No problems were identified. The inspectors concluded that corrective actions were adequate for the HVAC portion of this SCAR.

Six of the above sampled CAQ documents were source documents for the HVAC CAP. The other 4 addressed problems identified during implementation of the CAP. For the older CAQ packages, it was difficult to review the specific corrective actions for the specific problem identified in the CAQ document since most of the source problems were rolled into the overall Critical Case Evaluation and modify corrective actions of the HVAC CAP for all Category I and I(L) duct and supports. However, in all cases, the inspectors were able to verify that corrective actions were appropriate and the CAQ document appropriately closed. Based on the above sample review of CAQ documents, the inspectors concluded that adequate corrective actions were taken and the closure process was working well. Since 8 CAQ documents, including SCAR WBN870316 - the major source CAQ for the CAP, are still open, Inspector Followup Item (IFI) 390/95-46-01, Review of HVAC CAP Open Items, is identified to perform additional review after TVA has completed closure of the documents. The review of additional VSR items is included in the IFI as detailed below.

- VSR Items

VSR-068 - This VSR item identified the fact that safety related spiral welded HVAC duct was procured without adequate documentation. To justify the installed ductwork, TVA took samples of the installed material and performed mechanical tests to establish mechanical properties. Engineering established the sampling plan for the testing and performed a statistical analysis (Calculation WCG-1-332) on the test results to determine the mechanical properties to use in design calculations. These statistically developed

mechanical properties were used for qualifying the installed ducts. The inspectors reviewed the VSR package and Calculation WCG-1-332. The inspectors concluded that the corrective actions for this VSR item were adequate and the VSR properly closed.

VSR-151 - This VSR identified a problem relative to pipe support concrete expansion anchor bolts not meeting minimum concrete edge distance requirements of Engineering Specification G-32. It was determined that other commodities, including HVAC supports, had the same problem. The inspectors found that, although TVA had determined that this problem existed for HVAC supports, the VSR package did not clearly address resolution of this problem for HVAC supports. TVA indicated that, although resolution of the concrete edge distance problem for HVAC supports is not clearly addressed in the VSR, the problem was covered for HVAC supports in the HVAC CAP. Further, TVA agreed to revise the VSR documentation to reference resolution of the anchor bolt concrete edge distance problem for HVAC supports. Subsequent to completion to the inspection, TVA provided the inspectors a change to VSR-151 record referencing SCAR WBN870316SCA for resolution of the anchor bolt concrete edge distance problem for HVAC supports. This SCAR is the major CAQ source document for the HVAC CAP and is still open. The SCAR will be reviewed as part of IFI 390/95-46-01.

VSR-180 - This VSR item identified Support 0031-DW930-01H-0691 with connection details that did not meet the typical drawing. The support was determined to be a critical hanger and was evaluated as a Critical Case under the HVAC CAP. The VSR was considered a source document under the HVAC CAP and corrective actions accomplished within the CAP. The inspectors reviewed the VSR package including Critical Case Calculation WCG-1-651 and the Engineering Closure Package. The calculation justified the support without modification. The inspectors concluded that the corrective actions for this VSR item were adequate and the VSR properly closed.

Based on the above sample review of VSR documents, the inspectors concluded that adequate corrective actions were taken and the closure process was adequate. Since only 3 of 16 HVAC CAP related VSRs have been closed, additional VSRs will be reviewed after TVA has completed their closure process. This additional review will be accomplished under IFI 390/95-46-01, identified above.

- NRC Identified Items

The inspectors verified that all HVAC CAP related NRC identified items have been inspected and closed. See paragraph 6.3 below for items reviewed during the current inspection period.

- CDRs

The inspectors verified that all HVAC CAP related CDRs have been inspected and closed. See paragraph 5.0 below for the CDRs reviewed during the current inspection period.

- Design Change Notices (DCNs)

A number of DCN packages and work documents have been reviewed in the previous inspections documented in NRC Inspection Reports referenced in paragraph 3.2.3 above. During the current inspection, the inspectors reviewed the closure packages, including the Design Change Notice Closure, the DCN Closure/Return-To-Service Verification Checklist, and the Modification Work Completion Statement for DCNs M-17525-A, M-16933-A, M20791-A, and M-16902-A. In addition, a detailed review was performed for DCN M-17525-A, including the following related documents:

- ° Supporting Calculation WCG-1-703
- ° Closure Package for PER 900558PER
- ° Implementing WP D-17525-01
- ° Implementing WP D-17525-02

Based on the above review and the reviews documented in previous inspections, the inspectors concluded that DCN and associated work documents have been adequately implemented and are being properly closed out.

### 3.2.6 Conclusions

Based on the inspections documented above, including the previous inspections noted in paragraph 3.2.4 above, the inspectors concluded that the HVAC CAP has been adequately implemented.

As noted above, TVA still has 30 TROI items (8 CAQs, 2 Commitments, 16 VSRs, 2 CDRs, 1 CATD, and 1 NRC item) and 2 DCNs related to the HVAC CAP open. All hardware modifications have been completed for these items; only the verification and closure processes have to be completed. During this inspection, NRC inspections were completed for the NRC item, the CDRs and the CATD. As noted above, IFI 390/95-46-01 was opened to further sample CAQs and VSRs after closure by TVA.

Within the areas inspected, no violations or deviations were identified.

### 4.0 Construction Inspection Program Review (MC 2512)

The NRC Inspection Manual Chapter 2512, Construction Phase Inspection program was initially completed in 1985 for Watts Bar Unit 1, and since then construction-related activities have been documented primarily against construction inspection temporary instructions. As such, post-1985 inspections have not been correlated to MC 2512 inspection procedures. Therefore, the current MC 2512 inspection procedures are being re-evaluated with the objective of assuring that the procedures have been satisfied based primarily on post-1985 inspection activities. Where the program review procedures or field verification procedures of commodities can not be verified complete based on post-1985 inspections, the records inspection procedures are being re-performed and/or pre-1986 inspection effort used as appropriate. The below listed MC 2512 inspection procedures were reviewed during this reporting period.

#### 4.1 Concrete Expansion Anchors (46071)

On June 8-9, 1995, the inspector observed various phases of work implementing document 95-08995-00 written for the removal and replacement of four each unsatisfactory 3/4-inch (dia.) X 3 1/4-inch (length) SSD type anchor bolts, with four, 3/4-inch X 9 1/2-inch undercut (UC) concrete anchors for Unit 1 fuel pool cooling pipe support 1078-78-1FPC-R050. Prior to the commencement of work the inspector reviewed the following controlling procedures: Modification/Addition Instruction (MAI)-5.1C, Undercut (UC) Concrete Anchors, R9; MAI-4.2A, Piping/Tubing Supports, R11; and Site Standard Practice (SSP)-7.04, Work Permits, R6.

The replacement UC anchors were procured from the Nuclear Storeroom by requisition No. 954893. The craftsmen and responsible engineer (RE) examined the procured UC anchor assemblies to assure they were the correct type/grade, diameter, length, bolt marking, and complete with each assembly consisting of a bolt with two-part sleeve, a conical nut, a washer, and a hex nut.

Prior to redrilling the existing 3/4-inch SSD anchor holes deeper to accommodate the longer 9 1/2-inch long UC anchors, the masonry drill bit was checked by the craft foreman/RE with a micrometer to verify that the maximum procedural allowable hole diameter was not exceeded. To preclude rebar or embed cutting, a masonry type drill (carbide percussion drill) along with a very sensitive drill stop (ground fault interrupter {GFI}) was utilized by the craftsmen per procedure. All drilling was conducted perpendicular to the concrete wall surface and the drill bit was marked for proper depth of hole. During the redrilling of the upper two existing holes the ground fault interrupter activated stopping the masonry drill on both occasions. After cleaning the holes, observation revealed the exposed bottom of rebar in one hole, and the bit appeared to have barely made contact with the outer portion of an embed in the other. A satisfactory hole replacement was found by moving and drilling the upper right hole approximately 2-inches from its original location, but several small pilot holes were required to be drilled around the upper left existing SSD anchor hole before one of proper depth (8-inches min.) was successfully drilled without activating the drill stop. However upon enlarging this pilot hole the GFI stopped the drill bit approximately 5 1/4-inches into the wall. Due to the dense concentration of rebar in this area, the drill bit touched the rebar, causing no rebar damage, but activated the GFI and prevented further drilling. The RE submitted a Work Permit to Design Engineering seeking approval to advance the hole with the drill stop removed. Also, since the existing base plate configuration had changed and was no longer usable, FDCN No. F36822-A was initiated for Engineering to evaluate the revised plate detail due to the relocation of the top two anchors. Engineering subsequently approved both documents and the drill hole was successfully advanced with no further complications.

Prior to and after undercutting the anchorage holes the craft foreman checked the undercutting tool cutting diameter with a micrometer to ensure the cutter blades were within procedural specified tolerances. The inspector observed the snug tight installation of the first UC anchor performed per procedure which was subsequently rejected because the top of the upper sleeve after setting protruded beyond the concrete surface. Discussions with the RE

disclosed that he intended to submit another FDCN to Engineering seeking approval to deepen this existing anchor hole for use of a 3/4-inch X 10 1/2-inch UC anchor. Conversation with the craftsmen/RE disclosed they were very knowledgeable with the applicable controlling concrete anchorage procedural requirements and tolerances concerning allowable baseplate thickness, hole sizes, use of welded washers; minimum spacing between bolts, edge distance, distance from embedded steel; and initial torque to properly set the bolts.

The inspector observed the cement finisher skillfully perform satisfactory cosmetic repairs to the above abandoned drill holes utilizing Master Flow Grout 928 obtained by Nuclear Storeroom Requisition No. 954793. This work was properly accomplished per MAI-5.4, Concrete Removal, Repair, Grouting and Dry Packing.

No violations or deviations were identified concerning the above observed concrete anchorage/masonry work activities.

#### 4.2 Geotechnical/Foundation Activities Record Review (45055)

##### QA Audits

The inspector examined the following QA audits to ascertain that required audits were performed, deficiencies identified during the audits were corrected, and that the corrective action taken was sufficient to preclude recurrence of the deficiencies identified.

DEC-QC-CP-2.1-74-1,	Earthfill Placement, Inspection, & Documentation
WB-C-75-10,	Backfill Placement, Inspection, & Documentation Using Soil Material & Crushed Stone
WB-L-80-01,	Earthfill Operations
WB-C-81-01,	Pile Driving
WB-C-82-01,	Earthfill Placement, Inspection, & Documentation
WB-G-82-14,	Craft Qualification/Certification Program
WB-A-85-09,	Personnel Training, Indoctrination, Orientation, and Certification

No violations or deviations were identified in the above (Audit Review) area of inspection.

#### 4.3 Inspection for Review of QA Manual (IP 35100)

The purpose of this inspection procedure is to determine whether quality assurance plans, instructions, and procedures for specific safety-related activities have been established in the facility's quality assurance (QA) manual and implementing procedures and whether these documents conform to the

QA program as described in Amendment 23 of Chapter 17 of the final safety analysis report (FSAR) for Watts Bar Unit 1, dated September 27, 1976.

#### 4.3.1 Site Inspection of Construction (DEC) QA Manual

Table 17.1A-1 and Table 17.1A-2 of the FSAR list the QA Program Procedures (QAPs) addressing 10CFR50 Appendix B - Quality Assurance Criteria and for implementation at Watts Bar Unit 1. Section D of Table 17.1A-2 lists the Division of Engineering Design (DED) QA procedures, Section E of the table lists the Division of Construction's (DEC) QA procedures, and Section F lists the QC procedures. DEC-QAP-2.01, listed in Table 17.1A-2, provides for a correlation of DEC QAPs with 10CFR50 Appendix B 18 QA criteria and OEDC-QAP-2.0, Quality Assurance Program, the authority/policy program document. DEC-QAP-2.01 lists additional DEC-QAPs not listed in the Table 17.1A-2 of the FSAR.

The following table shows the DEC-QAP and interactive DED-QAP documents corresponding to IP 35100 inspection attributes. Documents in parentheses are the additional documents listed in QAP-2.02.

IP 35100 Sections	DEC & DED Procedures
<u>021 Organizational Structure and QA Personnel</u>	
021a Organization structure and functional relationships	(QAP-1.01)
021b Qualifications, responsibilities and duties of QA/QC personnel	QAPs-2.05 series, 2.07, 2.08, 2.09, 2.10
021c Indoctrination/training and retraining for QA/QC personnel	Same as above,
021d Assignment of stop-process and stop-work authority to an onsite individual.	None
<u>022 Audits</u>	QAP-18.01 (addresses 022a - 022e)
022a Audit procedures and/or checklists.	See 022
022b Scope and purpose of audits to be performed, including audits of status and adequacy of the site QA program	See 022
022c Frequency (or schedule) of audits, audit criteria, basis for reaudit, management review and assessment, corrective action (and followup), documentation of results of audits, management review and followup of corrective action.	See 022

022d Qualifications and responsibilities of auditors, including those of contractors	See 022
022e An overall plan by which management assures that the audit program addresses all aspects of quality-affecting activities	See 022
023 <u>Quality Requirements</u>	(WBN-QCP-2.2)
023a Quality requirements, including appropriate material specifications, test reports, acceptance criteria, and required documentation are specified in design and procurement documents	(WBN-QCP-2.2), QCPs-5.2, 5.3, 5.4
023b QA review procurement documents to assure that quality requirements are adequately specified	QAP-4.01
023c Deviations from previously established requirements, including design changes, are adequately controlled and reviewed by QA personnel	QAP-3.01
023d Quality documentation, including material certification, test reports, receiving inspections, evaluations, and auditing results are generated and maintained to indicate that quality requirements have been met	(QAP-6.01)
023e Identification and control of components, structures, and systems covered by the facility's QA program; i.e., all safety-related, fire protection, environmental, and other important-to-safety items subject to the QA program	QAP-8.01 QAP-8.02
024 <u>Work and quality Inspection Procedures</u>	
024a Work and inspection procedures important to safety, including those of vendors and suppliers, have been established. These procedures shall cover significant related activities such as process monitoring, QC surveillance, inspection hold points, test programs, and the control of special equipment	QAP-(10.02 civil), 14.01

024b Procedures are complete, reviewed, approved and controlled; and that those performing QA and inspection (QC) activities have available to them the most recent and approved specifications, procedures, and instructions pertinent to activities audited, monitored, or inspected by them	(QAP-6.01)
025 <u>Control of Material</u>	
025a Documented evidence that quality requirements are met prior to use or installation of material or equipment	QAP-8.01,8.02
025b Identification and traceability of material and equipment, including status of inspection or tests performed, as required	QAP-8.01,
025c Handling, shipping, and storage procedures are established	QAP-13.01, 13.02,
025d Identification and control of nonconforming material and components to preclude inadvertent use, including periodic (QC) inspection/surveillance to verify adequate control	(QAP-15.01)
026 <u>Control of Process</u>	
026a Procedures are provided to assure quality controlled work and inspection/surveillance conditions	QAP-7.02, 14.01
026b Procedures are provided for the control of special process	(QAP-9.01)
026c Special processes are performed by qualified personnel using qualified procedures in accordance with applicable requirements	QAP-9.03, 9.04, (QAP-9.10, 9.11, 9.12, 9.13, 9.14, 9.15, 9.16, 9.17, 9.18)
026d Procedures are provided for control and approval of supplier's special processes such as welding, non-destructive examinations (NDE), heat treatment, electroplating, and postplating processes to preclude hydrogen embrittlement and galvanizing	Same as above

027 <u>Corrective Action</u>	(QAP-16.01, Reserved), QAP-16.02
027a Procedures are established for identification and correction of conditions adverse to quality	QAP-15.01
027b Procedures are established to preclude repetition of activities adverse to quality	QAP-15.01
027c Provisions are established for escalating to higher management those corrective actions that are not adequate/timely	See IR para. 4.3.2
027d A management system is established for overview of trends in conditions adverse to quality	See IR para. 4.3.2
028 <u>Document Control</u>	
028a Documents relating to quality are adequately controlled	(QAP-6.01),
028b Quality related documents are reviewed by QA personnel for adequacy	QAP-5.01, (QAP-5.02)
028c Provisions to assure appropriate identification/listing and control of aggregate collection of quality assurance (including quality control) instructions and procedures known as the QA manual, including future revisions	(QAP-2.02)
028d Provisions exist to assure periodic review of the adequacy of the document control procedures	QAP-5.01, (QAP-5.02)
028e Provisions exist to assure that plant configurations are accurately reflected in as-built drawings	(QAP-3.03)
029 <u>Test Control and Control of Test Equipment</u>	
029a Procedures are established to assure that acceptance criteria are specified, test requirements (including prerequisite) have been met, evaluation of results are documented, and deficiencies have been detected and reported to the appropriate level of management	(QAP-11.01), QAP-12.01

029b Provisions are established to assure adequate control, calibration and adjustment of measuring and test equipment	QAP-12.01, QCP-5.1
029c An adequate method exists for establishing traceability of an inspection/tested work activity to the instrument used for acceptance purpose	QAP-14.01
0210 <u>Quality Record</u>	(QAP-17.01)
0210a Procedures are established to assure that evidence of activities affecting quality are documented by qualified personnel	(QAP-10.01, Reserved)
0210b Procedures are established to assure that specified documentation for procured items has been received at the site and has been reviewed	QAP-7.01
0210c Provisions are made to assure that quality records are legible, adequate, retrievable, adequately protected and refer to markings, identification tags, or other means of identifying materials and documents important to safety within a reasonable time after conclusion of the applicable quality-affecting activities	QAP-17.01
0210d Review of quality records by qualified personnel, including records of appropriate subsequent corrective action if needed	See IR para. 4.3.2
0211 <u>Onsite Design Control</u>	
0211a Procedures are in effect to assure that design activities are carried out in a planned, controlled, and orderly manner, and to assure that design changes are subject to design control measures commensurate with those applied to the original design	QAP-3.01, (QAP-3.02)
0211b Applicable design inputs are identified and their selection reviewed and approved	(QAP-3.02)
0211c Design activities are prescribed and accomplished in accordance with procedures of a type sufficient to assure that applicable design inputs are correctly translated into specifications, drawings, procedures, or instructions	(QAP-3.02)

0211d Procedures requiring design analysis, such as physics, stress, thermal, hydraulic, and accident, shall be performed in a planned, controlled, and correct manner	(QAP-3.02)
0211e Procedures in existence that identify the external interfaces between the onsite design organizations, including criteria designs, specifications, changes, technical direction, and approvals	QAP-3.01
0211e Procedures are in existence to assure that design changes have the adequacy of design verification or checking by applicable methods	QAP-3.01

#### 4.3.2 Program Selective Examinations

During the above described programmatic review of the QA procedures applicable to the area of concrete construction, the inspector selected a sample of Division of Construction's (DEC) QA document for further review. These included QAP-4.01 "Procurement Document Control," Revision 2, 9/8/76; QCP-5.2 "Quality Assurance Requirements for Concrete Mixture Proportions," Revision 2, 9/23/77; WBNP-QCP-2.2 "Concrete Placement and Documentation," Revision 0, 6/10/75; QAP-18.01 "Auditing Construction Activities," Revision 0, 11/25/75; QAP-2.01 "DEC QA Program Description," Revision 1, 4/8/76; QAP-3.01 "Field Change Requests," Revision 0, 8/28/75; QAP-14.01 "Inspection and Testing Status," Revision 0, 2/20/76; QAP-8.01 "Identification and Marking of Materials, Parts, and Components," Revision 0, 3/8/76. This review found the DEC procedures to be generally responsive to Appendix B to 10CFR50 and OEDC-QAP 16.0, Corrective Action, except for corrective action.

The DEC QA program procedures listed in Table 17.1A-2 or in DEC-QAP-2.01, DEC Quality Program description is absent of a general procedure to address the corrective action requirements of 10CFR50 Appendix B. DEC-QAP-2.01 only lists DEC-QAP-16.01 as "(Reserved)". The one procedure listed for the program area of corrective action is QAP-16.02, "NRC-OIE Replies", which addresses only NRC-OIE Bulletins and Enforcement Items from NRC-OIE Inspection Reports.

FSAR, Section 17.1A.16, Corrective Action, states that "corrective action measures at the site are prescribed in Construction Quality Control Procedures, 'Control of Nonconforming Material,' 'Reporting Conditions Adverse to Quality,' and Construction Quality Assurance Procedure 'Auditing Construction Activities'." A review of these procedures found that provisions did exist to initiate corrective action. For example, Section 6.6.5 of QAP-18.01 states that "Deficiency findings requiring corrective action by the Division of Engineering Design (DED) are included in the audit report. Resolution of these findings is coordinated with DED by the Chief, QA Staff, DED." DEC-QAP-15.01 also included instructions which provide for the identification of a "suspected nonconformance" (Section 5.1) and disposition of corrective action (Section 5.2).

#### 4.3.3 Summary

Although DEC had not prepared procedure DEC-QAP-16.01 (listed as Reserved ) to address the 10CFR50 Appendix B, Corrective Action requirements within the DEC Quality Assurance Program, the program did include means, generally consistent with the FSAR, to initiate required corrective action, internally or by referral of audit deficiencies or nonconforming items to DED to address under OEDC-QAP-16.0.

#### 4.3.4 Conclusion

Inspection Procedure 35100 is performed initially at the start of construction and also when referenced by 12 other procedure-related inspection procedures. These are IPs 45051, 46051, 47051, 48051, 49051, 49061, 50051, 50071, 51051, 51061, 52051 and 53051. To accomplish the review of IP 35100 and its reference use, the IP has been reviewed in this inspection report and in two previous post-1985 NRC inspection reports, 50-390/94-89 and 95-29. IR 390/94-89 discussed the initial inspection and also concluded that adequate inspections of the QA Manual and QA procedures had been conducted and that, based on a sampling basis, procedures implementing QA manual instructions had been developed and utilized during the various activities of construction of the facility. Based on the results of IR 390/89, subsequent inspections to further address the reconstitution of the use of IP 35100 as a reference were planned. Two IPs referencing IP 35100 were selected for review. IR 390/95-29 documents the reference in IP 52061, Electric Cable - Procedure Review and paragraph 4.3 of the current report documents the reference in IP 46051, Structural Concrete - Procedure Review. These IP reviews were performed as the means, in conjunction with the results of IR 390/94-89, to confirm on a sampling basis that the applicant had established appropriate QA Program instructions for the 12 IPs listed above that reference IP 35100.

On this basis, the reconstitution for IP 35100, including when referenced by the 12 IPs listed above, is considered complete.

#### 4.4 Safety Related Piping - QA Review (49061)

The purpose of this inspection procedure is to determine whether the technical requirements from sections of the FSAR, associated with safety-related piping (outside the reactor coolant pressure boundary) have been adequately addressed in the construction specification, drawings and work procedures; to determine whether quality assurance plans, instructions and procedures for safety-related piping have been established in the QA Manual and implementing procedures and whether these documents conform to the QA Program; and to determine whether specification or procedural controls associated with safety-related piping are adequate.

##### 4.4.1 Review of Post-1985 Inspection Reports

Review of post-1985 inspection reports revealed that the attributes in this inspection procedure were inspected since 1985. The following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/86-02, 87-14, 88-02, 88-06, 89-04, 89-13, 89-18, 90-09, 91-21, 92-21, 91-29, 91-31, 92-13, 92-24, 92-25, 92-26, 92-201, 93-03, 93-20, 93-22, 93-35, 93-45, 93-67, 93-85, 94-03, 94-35, 94-08, 94-21, and paragraph 4.3 of this inspection report

The reconstitution of Inspection Procedure 49061 is considered complete.

#### 4.5 Safety Related Piping - Work Observation (49063)

The purpose of this inspection procedure is to determine by direct observation whether activities relative to safety-related piping outside the reactor pressure coolant boundary are being accomplished in accordance with NRC requirements, FSAR commitments, and applicant procedures; and to determine whether inadequacies in completed work, partially completed work, or work activities in progress may indicate management control problems or generic weaknesses.

##### 4.5.1 Review of Post-1985 Inspection Reports

Review of post-1985 inspection reports revealed that the attributes in this inspection procedure were inspected since 1985. The following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/87-01, 88-01, 89-18, 89-200, 90-40, 92-01, 92-21, 92-26, 92-30, 92-40, 92-45, 93-03, 93-10, 93-20, 93-45, 93-56, 93-66, 93-91, 93-202, 94-24, 94-32, 94-47, 94-55, and 94-61

The reconstitution of Inspection Procedure 49063 is considered complete.

#### 4.6 Safety Related Piping - Record Review (49065)

The purpose of this inspection procedure is to review a sample of safety-related piping records to determine whether the applicant's system for preparing, reviewing and maintaining records is functioning properly; the selected records reflect work accomplishment consistent with NRC requirements and FSAR commitments; and the records indicate any potentially generic problems, management control inadequacies or other weaknesses of safety significance.

##### 4.6.1 Review of Post-1985 Inspection Reports

Review of post-1985 inspection reports revealed that the attributes in this inspection procedure were inspected since 1985. The following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/86-02, 87-11, 87-14, 88-02, 88-06, 90-19, 90-31, 91-29, 92-24, 92-45, 93-36, 93-42, 93-45, 93-50, 93-63, 93-85, 93-67, 94-40, 94-47, and 94-54

The reconstitution of Inspection Procedure 49065 is considered complete.

#### 4.7 Instrument Components and Systems - Procedure Review (52051)

The purpose of this inspection procedure is to determine whether technical requirements contained in the facility FSAR for safety-related instrumentation have been adequately translated into applicable construction specifications, drawings, work procedures, and instructions; and to determine whether applicable quality assurance plans, instructions, and procedures for the control and installation of safety-related instrumentation have been established in applicant and contractor QA manuals.

##### 4.7.1 Review of Post-1985 Inspection Reports

Review of post-1985 inspection reports revealed that the attributes in this inspection procedure were inspected since 1985. The following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/86-02, 86-04, 86-05, 86-12, 86-14, 86-19, 86-25, 87-10, 87-14, 89-07, 90-04, 90-20, 90-23, 90-29, 91-02, 91-14, 91-26, 91-29, 91-31, 92-03, 92-11, 92-17, 92-21, 92-24, 92-25, 92-45, 92-201, 93-42, 93-48, 93-50, 93-58, 94-02, 94-03, 94-18, 94-20, 94-21, 94-24, 94-32, 94-33, 94-40, 94-43, 94-55, and paragraph 4.3 of this inspection report

The reconstitution of Inspection Procedure 52051 is considered complete.

#### 4.8 Instrument Components and Systems - Work Observation (52053)

The purpose of this inspection procedure is to determine by direct observation whether activities relative to safety-related instrument components and systems are being accomplished in accordance with NRC requirements, FSAR commitments, and applicant procedures; and to determine whether inadequacies in completed work, partially completed work, or work activities in progress associated with instrument components indicate a management control problem or generic weaknesses.

##### 4.8.1 Review of Inspection Reports

Review of post-1985 inspection reports revealed that all the attributes in this inspection procedure were inspected since 1985 except two, attribute 2.02.c, In-Process Installation, for both reactor trip system and engineered safety features actuation system process variables. These two were reviewed and documented in several pre-1986 inspection reports. The following NRC inspection reports document reconstitution completion of this inspection procedure:

###### Post-1985

50-390/86-04, 87-01, 87-03, 87-14, 89-24, 89-20, 89-200, 91-26, 92-22, 92-30, 93-53, 93-56, 93-59, 93-72, 93-86, 94-18, 94-22, 94-24, 94-25, 94-33, 94-38, 94-51, 94-52, 94-55, 94-65, and 94-80

###### Pre-1986

50-390/78-31, 79-21, 79-24, and 79-42

The reconstitution of Inspection Procedure 52053 is considered complete.

#### 4.9 Instrument Components and Systems - Record Observation (52055)

The purpose of this inspection procedure is to review a sample of safety-related instrumentation records to determine whether the applicant /contractor system for preparing, reviewing, and maintaining records is functioning properly; the records reflect work accomplishment consistent with NRC requirements and FSAR commitments; and the records indicate any potentially generic problems, management control inadequacies, or other weaknesses of safety significance.

##### 4.9.1 Review of Post-1985 Inspection Reports

Review of post-1985 inspection reports revealed that the attributes in this inspection procedure were inspected since 1985. The following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/86-02, 86-05, 86-19, 86-20, 86-21, 86-22, 86-25, 87-14, 88-03, 88-09, 89-02, 89-17, 89-200, 90-05, 90-06, 90-29, 90-30, 90-31, 91-02, 91-13, 91-21, 91-26, 91-29, 92-11, 92-16, 92-21, 92-25, 92-45, 92-46, 93-42, 93-48, 93-50, 93-56, 93-59, 93-72, 93-77, 93-79, 93-86, 93-89, 93-202, 94-13, 94-20, 94-21, 94-24, 94-33, 94-37, 94-40, 94-54, 94-58, 94-61, and 94-72

The reconstitution of Inspection Procedure 52055 is considered complete.

#### 4.10 Environmental Protection (80210)

The purpose of this inspection procedure is to assure the applicant has adequate plans and procedures to implement environmental programs required by the construction permit; and to verify the applicant has implemented environmental programs required for construction work in progress and is complying with the environmental requirements of his construction permit.

##### 4.10.1 Review of Inspection Reports

Review of post-1985 inspection reports revealed that minimal construction activities affecting the environment and associated NRC inspection activity were conducted at Watts Bar. A subsequent review of pre-1986 inspection reports identified that the attributes in this inspection procedure had been inspected prior to 1986. In addition to the pre-1986 inspection reports, the inspector also reviewed NUREG 0498, Supplement 1, April 1995, Final Environment Statement Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2. Along with NUREG 0498, Supplement 1, the following NRC inspection reports document reconstitution completion of this inspection procedure:

50-390/75-02, 76-03, 76-03, 77-10, 78-20, 79-44, and 80-17

The reconstitution of Inspection Procedure 80210 is considered complete.

## 5.0 Construction Deficiency (50.55(e)) Reports (CDRs) (92700)

### 5.1 (Closed) CDR 50-390/86-54, Deficiencies with HVAC Duct Seismic Design Criteria.

This 10CFR50.55(e) report involved the discovery that the theoretical frequencies determined by the HVAC duct seismic design criteria equations were inconsistent with test results obtained subsequent to the criteria's original issuance. In addition, some ducts were found to have free-end overhangs past the last supports on the runs which were outside the scope of the criteria's design assumptions.

As discussed in IR 50-390, 391/91-26, programmatic corrective actions and recurrence controls were previously reviewed and found acceptable, leaving completion of the required hardware modifications as the only corrective actions remaining to be accomplished.

A total of 32 base DCNs were issued to identify hardware modifications required to be performed under the HVAC CAP and implemented through the issuance of one Work Order and 267 workplans. The completion status of these DCNs and WIDs is discussed in the closure report for VIO 50-390/87-07-01, which is in paragraph 6.3 of this report.

As discussed in paragraph 4 of IR 50-390, 391/94-08, NRC reviewed a sample of the calculations generated by the HVAC CAP and found them acceptable. Paragraph 5 of the same report documents NRC walkdown inspections of completed hardware modifications, with no significant adverse findings. NRC verifications of additional modified duct sections and supports are documented in IRs 50-390, 391/95-17, 95-23, and 95-35. TVA verification activities conducted by QA for this open item, which consisted of document reviews and field inspections, were reviewed and considered adequate by the NRC inspector. This item is closed.

### 5.2 (Closed) CDR 50-390/91-22, Deficiencies with Heating, Ventilating, and Air Conditioning (HVAC) Duct Supports.

See NRC IR 50-390,391/95-35 for documentation of a previous inspection of this item.

This 10CFR50.55(e) report, along with CDR 50-390/86-54 and VIO 50-390/87-07-01, essentially encompass the scope of the HVAC CAP. As discussed in IRs 50-390, 391/91-26 and 95-35, programmatic corrective actions and recurrence controls were previously reviewed and found acceptable, leaving completion of the required hardware modifications as the only corrective actions remaining to be accomplished.

A total of 32 base DCNs were issued to identify hardware modifications required to be performed under the HVAC CAP. The modifications were implemented through 267 workplans and Work Order 95-08446-00. The completion status of these DCNs and WIDs is discussed in the closure report for VIO 390/87-07-01, which is in paragraph 6.3 of this report.

As discussed in paragraph 4 of IR 50-390, 391/94-08, NRC has reviewed a sample of the calculations generated by the HVAC CAP and found them acceptable. Paragraph 5 of the same report documents NRC walkdown inspections of completed hardware modifications, with no significant adverse findings. NRC verifications of additional modified duct sections and supports are documented in NRC IRs 50-390, 391/95-17, 95-23, and 95-35. TVA verification activities conducted by QA for this open item, which consisted of document reviews and field inspections, were reviewed and considered adequate by the NRC inspector. This item is closed.

Within the areas inspected, no violations or deviations were identified.

## 6.0 Actions On Previous Inspection Findings (92701)

### 6.1 (Closed) IEB 80-11, Masonry Wall Design (Unit 1 only)

NRC Inspection Report 50-390, 391/93-01 provides a chronology of TVA/NRC methodology, corrective actions taken and inspections conducted to date to address and resolve this IEB. This inspection report left the subject IEB open pending TVA's completion of the corrective action details on DCNs M-15585-A (painting of caution signs) and M-16188-A (replacement of toggle bolt installations) and further NRC inspection of these activities.

During the week of March 6, 1995, the NRC inspector reviewed the corrective actions and recurrence controls implemented to resolve the issue concerning the structural integrity of concrete masonry block walls at Watts Bar. On March 8, 1995, the inspector accompanied by TVA QA/QC/Engineering personnel began a walkdown inspection of the subject masonry block walls with the intent to verify that no unauthorized attachments existed on the walls and to ascertain that the corrective actions specified for the above mentioned DCNs had been properly implemented.

Forty-one walls out of a total of 85 masonry walls involved (13 Auxiliary Building, 13 DG Building, 15 Control Building) were inspected to the above mentioned inspection criteria. This inspection identified two unauthorized attachments (not identified by DCN M-16188-A), a toggle bolt and a SSD anchor on a control building masonry wall at elevation 692, next to door C1 (Reference drawing 46W405-1). All permanently painted signs per DCN M-15585-A were found complete for the 41 walls examined.

Problem Evaluation Report WBP950159 was written to document this discrepant condition. DCN F-35353-A was issued to remove these unauthorized attachments. All 85 walls were subsequently walked-down again by TVA to identify any other unauthorized attachments, missing permanent signs, to assure restraints had been added where necessary, to verify fall zone signs were in place and fall zones were clear of safety related equipment. This subsequent walk-down inspection identified and documented on DCN 35628-A, nine additional supports that were anchored to walls with toggle bolts or SSDs which needed to be replaced with through-bolts. It also identified one fall zone with no sign to indicate "no safety related equipment is to be located within \_\_\_ feet of this fall zone (Reference drawings 41N369 & 41N371)." This work was accomplished per DCN W-35628.

On April 5, 1995, the NRC inspector accompanied by a TVA engineering representative completed a 100 percent walkdown inspection of the Unit 1 IEB 80-11 affected concrete masonry walls and verified the remaining work specified by DCNs M-15585-A, 16188-A, F-35353-A, and W-35628 had been completed. Since this inspection a subsequent TVA QA review/inspection identified (DCN W-36512-A) several more attachments having SSD/toggle bolt anchorages requiring replacement with through-bolts.

Field verification inspections performed disclosed that approximately 90 percent of the work implementing documents are complete. With only the closure of DCN W-36512-A remaining, TVA concluded the structural integrity concerns of concrete masonry walls at Watts Bar were resolved. The NRC inspector concurred with the applicant's position for Unit 1 only, based on the numerous confirmatory inspections performed on that Unit. Further verification inspection of these activities will be necessary to close this IEB for Unit 2.

#### 6.2 (Closed) Inspector Followup Item 390/94-79-01, Review of N-5 Code Data Report Supplements

This item was inspected and documented in NRC IR 50-390/95-27. The original ASME Code Data Reports were assembled in the mid 1980s. In accordance with ASME Code Interpretation III-1-83-175 and correspondence with the NRC, TVA is issuing N-5 Supplements to document any work that occurred on ASME welds since issue of the original N-5 Reports. The review of records and issue of Supplements is being accomplished in accordance with site procedure SSP-2.53, Revision 4, ASME Section III N-5 Code Data Reports and Supplements. At the time of the current inspection, Supplements had been completed for 15 of the 22 ASME Section III systems requiring Supplements. These 15 systems have 10111 weld identifiers, or approximately 95% of the total number of weld identifiers in the N-5 Supplement process. During the inspection documented in NRC Inspection Report 50-390/95-27, Supplements for 6 of the 15 completed systems were sampled. No significant problems were identified. During the current inspection, the inspectors reviewed the following sample of Supplements from the other 9 completed systems to verify that the process is being accomplished in accordance with procedures and that the Supplements accurately reflect work accomplished since issue of the original N-5 Reports.

<u>Supplement Number</u>	<u>Work Document</u>
TVA-1-03-2-P5-S1	WP D-21464-01
TVA-1-32-2/3-P4R1-S2	WP D-20307-01
TVA-1-33-2-F1-S1	WP NR-033BB
TVA-1-62-3-P7-S1	WO 94-05417-05
TVA-1-65-3-F1-S1	WP 4376
TVA-1-67-3-F2-S1	WO 94-13923-00

	WP E-6591-7
TVA-1-70-3-P2R1-S1	WP E-6591-2
TVA-1-78-2/3-F1-S1	WP D-16507-115
TVA-1-84-2/3-P1-S1	WP 4397

For the listed work documents, the inspectors reviewed the work documents, including Weld Data Sheets and Weld Maps, and verified that the work was appropriately included in the Supplements. The inspectors also verified that the latest revisions of the Weld Maps were referenced in the Supplements. For these reviews, only one minor discrepancy was identified. In the Weld Monitoring Information System (WMIS) list of welds and work documents attached to Supplement 1-67-3-F2-S1, Weld 2-067B-T253-02E was identified as being worked under WO 92-13923-00. It should have been listed under WP E6591-7. This discrepancy was corrected immediately. In general, the inspectors concluded that detailed and comprehensive reviews were being performed in preparation of the Supplements and that the Supplements were being well documented. Based on review of this sample of completed N-5 Supplements and that documented in NRC IR 50-390/95-27, there is reasonable assurance that the N-5 Supplement process will be satisfactorily completed. This item is closed.

### 6.3 (Closed) VIO 50-390/87-07-01, Failure to Identify, Evaluate, and Disposition Nonconforming Conditions.

This item involved the discovery of installed configurations not in compliance with as-constructed drawings on HVAC duct supports 0031-DW930-04H-1092 and -1093. As a result of this violation, as well as other applicant identified deficiencies, VSR DRs, and a 1985 INPO construction project evaluation, the HVAC CAP was instituted.

As reported in IR 50-390,391/94-08, the deficiencies on the two originally identified supports have been corrected by the applicant and verified as acceptable by NRC inspectors. In addition, as reported in IR 50-390/91-26, the applicant's programmatic corrective actions and recurrence controls have been reviewed and accepted by the NRC, leaving completion of HVAC CAP related hardware modifications as the only action remaining to be completed.

A total of 32 DCNs were issued to specify the hardware modifications required by the HVAC CAP. The modifications were implemented by Work Order 95-08446-00 and 267 Workplans, as follows:

<u>DCN Number</u>	<u>Qty of WPs</u>	<u>DCN Number</u>	<u>Qty of WPs</u>
M-08968-B	7	M-16977-A	15
M-10009-B	0	M-16978-A	2
M-11824-A	13	M-16979-A	1
M-11867-B	0	M-17012-A	2
M-14859-A	5	M-17022-A	3
M-16766-A	8	M-17049-A	8
M-16767-A	3	M-17367-A	15

M-16901-A	16	M-17399-A	9
M-16902-A	20	M-17525-A	2
M-16903-A*	10	M-17764-A	1
M-16904-A	17	M-17876-A	9
M-16933-A	6	M-20791-A	3
M-16954-A	8	M-20992-A*	37
M-16964-A	15	W-36213-A*	0
M-16975-A	18	M-08972-A	0
M-16976-A	14	M-09010-A	0

At the time of this inspection, field work associated with all of the above WIDs had been completed, and 29 of the 32 DCNs had been closed. Those not yet closed are annotated above with an asterisk.

As discussed in paragraph 4 of NRC IR 50-390, 391/94-08, NRC has reviewed a sample of the calculations generated by the HVAC CAP and found them acceptable. Paragraph 5 of the same report documents NRC walkdown inspections of completed hardware modifications, with no significant adverse findings. NRC verifications of additional modified duct sections and supports are documented in NRC IRs 50-390,391/95-17, 50-390,391/95-23, and 95-35. TVA verification activities conducted by QA for this open item, which consisted of document reviews and field inspections, were reviewed and considered adequate by the NRC inspectors. This item is closed.

#### 7.0 Exit Interview

The results were summarized on June 30, 1995 with those individuals identified by an asterisk in paragraph 1. Proprietary information is not contained in this report. No dissenting comments were received from the licensee.

#### Inspection Findings:

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description</u>
IFI	390/95-46-01	Open	Review of HVAC CAP Open Items (Paragraph 3.2.5.2)
IEB	390/80-11	Closed	Masonry Wall Design (Paragraph 6.1)
CDR	390/86-54	Closed	Deficiencies with HVAC Duct Seismic Design Criteria (Paragraph 5.1)
CDR	390/91-22	Closed	Deficiencies with Heating, Ventilating, and Air Conditioning (HVAC) Duct Supports (Paragraph 5.2)
IFI	390/94-79-01	Closed	Review of N-5 Code Data Report Supplements (Paragraph 6.2)
VIO	390/87-07-01	Closed	Failure to Identify, Evaluate, and Disposition Nonconforming Conditions (Paragraph 6.3)

## 8.0 List of Acronyms and Initialisms

ANSI	American National Standards Institute
ASME	American Society for Mechanical Engineers
CAQ	Condition Adverse to Quality
CAQR	Condition Adverse to Quality Report
CAP	Corrective Action Program plan
CATD	Corrective Action Tracking Document
CATD CAP	CATD corrective action plan
CCE	Critical Case Evaluation
CDR	Construction Deficiency Report
CFR	Code of Federal Regulations
CRS	Concerns Resolution Staff
DBVP	Design Baseline Verification Program
DCA	Drawing Change Authorization
DCN	Design Change Notice
DG	Diesel Generator
DR	Deficiency Report
EAI	Engineering Administrative Instruction
ECN	Engineering Change Notice
ECSP	Employee Concerns Special Program
ECTG	Employee Concerns Task Group
ERCW	Essential Raw Cooling Water
FDCN	Field Design Change Notice
FIR	Finding Investigation Report
FSAR	Final Safety Analysis Report
GFI	Ground Fault Indicator
HAAUP	Hanger Analysis and Update Program
HVAC	Heating, Ventilation, and Air Conditioning
IEB	Inspection And Enforcement Bulletin
IL	Instrument Line
IR	NRC Inspection Report
IVP	Independent Verification Plan
MAI	Modifications and Additions Instruction
NCR	Nonconformance report
NE	Nuclear Engineering
NOV	Notice of Violation
NQAP	Nuclear Quality Assurance Plan
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NSRS	Nuclear Safety Review Staff
PAC/AQ	Program for Assurance of Completion and Assurance of Quality
PCI/ICMS	Performance Contracting Inc./Insulation Consultants and Management Services
PER	Problem Evaluation Report
PIR	Problem Identification Report
QA	Quality Assurance
QAI	Quality Administrative Instruction
QC	Quality Control
QCP	Quality Control Procedure
QCI	Quality Control Instruction
QMP	Quality Maintenance Procedure

QTC	Quality Technology Company
RE	Responsible Engineer
RWST	Refueling Water Storage Tank
SAR	Safety Analysis Report
SCAR	Significant Corrective Action Report
SCR	Significant Condition Report
SER	Safety Evaluation Report
SOI	System Operating Instruction
SP	Special Program
SSD	Shell Self Drilling (anchor)
SSER	Supplemental Safety Evaluation Report
SSP	Site Standard Practice
STD	Nuclear Power Standard
Subcat	Employee Concerns Special Program Subcategory Report
SWEC	Stone and Webster Engineering Corporation
TI	Technical Instruction
TI	Temporary Instruction
TROI	Tracking and Reporting of Open Items
TVA	Tennessee Valley Authority
UC	Undercut (anchor)
URI	Unresolved Item
VIO	Violation
VSR	Verticle Slice Review
WBN or WB	Watts Bar
WID	Work Implementing Document
WO	Work Order
WP	Workplan
WR	Work Request