



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

Report Nos.: 50-390/95-53 and 50-391/95-53

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

Docket Nos.: 50-390 and 50-391

Construction Permit
Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: July 10 - August 12, 1995

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

9/6/95
Date Signed

R. C. Chou, Reactor Inspector
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R. W. Wright, Project Engineer

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TVA Construction Branch
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9/6/95
Date Signed

SUMMARY

Scope:

This routine announced inspection was conducted in the areas of Employee Concerns Special Program corrective actions, a site review of safety-related structures and civil engineering features, construction inspection program review, Hanger Analysis and Update (HAAUP) CAP, Moderate Energy Line Break Special Program (SP), NRC Bulletins, Construction Deficiency (50.55(e)) Reports, and Actions on Previous Inspection Findings.

Results:

No violations or deviations were identified. The overall quality of the Employee Concerns Special Program corrective actions inspected was acceptable. Overall, the CAPs and SP inspected were determined to be adequately implemented and the inspected corrective actions associated with the CAPs and SP were found to be acceptable.

Enclosure

The Moderate Energy Line Break Special Program was nearing completion. All portions except the external conduit seals were considered adequate. A problem had been identified by the Quality Assurance organization related to the installation of external conduit seals. The Quality organization was aggressive and was actively pursuing resolution of the problem.

The HAAUP 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 390/95-53-01 was opened to review QA Assessment Findings and the completed IVP for HAAUP, is opened to review the corrective actions for the two PERs and the completed IVP for the HAAUP CAP. IFI 390/95-53-02 was opened to perform further inspection of VSRs after closure by TVA.

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

- Geotechnical/Foundation Activities Procedure Review (45051)
- Geotechnical/Foundation Activities - Work Observation (45053)
- Geotechnical/Foundation Activities - Record Review (45055)
- Structural Concrete Procedure Review (46051)
- Structural Concrete - Work Observation (46053)
- Structural Concrete - Record Review (46055)
- Structural Masonry Construction (46061)
- Concrete Expansion Anchors (46071)

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

REPORT DETAILS

1.0 Persons contacted

1.1 TVA Personnel

- *A. Capozzi, Concerns Resolution Staff Site Representative
- *R. Baron, Nuclear Assurance and Licensing Manager
- *W. Elliott, Engineering Manager
- M. Harding, Manager Concerns Resolution
- *T. Harrison, Project Manager
- *D. Kehoe, Site Quality Manager
- *P. Pace, Compliance Licensing Manager
- *J. Scalice, Site Vice President
- B. Schofield, Site Licensing Manager
- 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
- *P. Fredrickson, Branch Chief, TVA Construction

*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 percent of the engineering must be complete and over 50 percent 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 Instrument Line 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 Instrument and Instrument Line CAP originally encompassed the following 11 CATDs:

- | | |
|---------------|---|
| 10400-WBN-06, | Attachments of Instrument Supports to Embedded Features Do Not Have Proper Documentation. |
| 11103-WBN-03, | Instrumentation Support Documentation Deficiencies Identified in NCR W-334-P. |
| 15100-WBN-03, | Reactor Building Auxiliary Floor and Equipment Drain Sump Level Transmitters To Be Replaced With Ultrasonic Transmitters. |
| 17300-WBN-01, | Instrument Sensing Lines Were Installed With Inadequate Slope. |
| 17300-WBN-02, | Instrument Sensing Lines Were Installed With Inadequate Slope. |
| 17300-WBN-03, | Instrument Sensing Lines Were Installed With Inadequate Slope. |

17300-WBN-08,	Inspect Compression Fittings for Leak Tightness During First Heat-Up and Pressurization of Each Unit.
17300-WBN-12,	Qualification of Instrument Tubing Benders for Production Bends.
17300-WBN-14,	Documentation and Hardware Deficiencies on Instrument Lines and Their Supports.
17300-WBN-15,	Instrument Tubing In Sampling and Radiation Monitoring Systems Was Installed To Meet Seismic Qualification Without Adequately Considering Thermal Movements.
22301-WBN-01,	Discrepancies in Documentation and the As-Built Configuration of Instrument Lines and Supports.

As discussed in IRs 50-390, 391/92-43 and 93-65, NRC has previously reviewed the completed closure packages for CATDs 10400-WBN-06 and 17300-WBN-12 and found that all required corrective actions had been completed, the closure packages contained the appropriate documentation, and the original concerns had been resolved.

Currently, the applicant considers CATDs 17300-WBN-14 and 22301-WBN-01 closed and CATD 15100-WBN-03, partially closed, indicating that all actions affecting Unit 1 are complete. The inspector reviewed the closure packages for these CATDs, including their associated Lookback Data Sheets, and determined that, for Unit 1, 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.

Modified partial closure packages have been compiled for the other six 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 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. At the time of this inspection, essentially all of the hardware modifications and corrections associated with the Instrument and Instrument Line CAP had been completed. In addition to completion of the remaining 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.
- Adding/clarifying information in Subcategory Reports to document actual corrective actions performed.

The inspector therefore determined that, when updating of the documentation within the CATD packages has been accomplished, and the other routine administrative tasks listed on the Lookback Data Sheets have been completed, the original concerns will have been resolved. Because these issues are encompassed by the Instrument Line CAP, when this CAP is determined to be adequately implemented by the NRC, these CATDs will be considered to have been adequately addressed. Consequently, no further review of these CATDs is necessary.

3.0 Review of Corrective Action Program Plans and Special Programs

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.

The inspector reviewed the MELB SP Effective Implementation Milestone Report (completion book). The NRC accepted TVA's approach to resolving the MELB issue in NUREG 0847, Supplement 11, Section 3.6. A 75 percent milestone inspection of the MELB SP was documented in IR 390/93-85. The conclusion of that inspection was that the MELB SP was being successfully implemented and should resolve the MELB issue. The completion book identified CDR 390/85-59 and SCAR SCRWBNEB8523SCA which were the basis for the special program. The CDR was open and not ready for inspection at that time. The CDR and SCAR also included High Energy Line Break (HELB) which is addressed through the 10 CFR 50.49 Environmental Qualification program.

The aspects of MELB included performing calculations to determine the flood levels, evaluating the flood levels from MELB against the equipment affected, and making modifications to protect any affected equipment required for safe shutdown. TVA discussed the calculations performed for MELB and showed the inspector specific portions of the calculations listed below. A flow chart in Calculation WBN OSG4-224 (Exhibit 4-1) titled Workflow and Documentation Used to Support the MELB Flooding Evaluation, listed the calculations that MELB relied upon and showed how they were related. Several of the calculations were not issued at the beginning of the inspection. The inspector reviewed the below listed calculations to determine if the methodology was consistent

with the MELB descriptions in the Nuclear Performance Plan, CDR 390/85-59, NUREG 1232 Volume IV, and NUREG 0847 and its supplements:

WBN-OSG4-99, R3 MELB Flood Level Calculations
WBN-OSG4-103, R4 MELB Safe Shutdown Analysis
WBN-OSG4-101, R4 MELB Safe Shutdown Logic Diagram and Equipment List
WCG-1-277, R2 Moderate Energy Line Break Flooding Study - Structural
WCG-1-278, R1 Moderate Energy Line Break Flooding Study Refined Structural
WBN OSG4-224, R0 MELB Flooding Summary Report

The above list is not a complete list of calculations performed for MELB, but a list of those that address and summarize the key elements of MELB. The inspector determined that the calculations were adequate to resolve the MELB SP issues.

The modifications performed to satisfy analysis assumptions included adding curbs to rooms in the diesel generator building, upgrading several raw water piping supports to seismic 1(L), removal of weather stripping and door thresholds, and installation of internal and external seals on conduit to prevent water transport between rooms through conduits. TVA took the approach that internal seals were preferable and that when they could not be used, external seals would be installed. TVA's contractor identified that 3074 internal conduit seals and 651 external seals were necessary for MELB. A majority of the internal seals were already existing for other reasons. In addition, the installation of an internal seal can eliminate the need for several external seals.

The placing of curbs in the 2nd level of the diesel generator building in the 480V board room entrance from the ventilation room was inspected during the MELB 75% milestone inspection (IR 390/93-85). The inspector confirmed that these curbs were still there during a plant tour. The inspector assessed the installation of support #1024-447-23-03.04 installed in the chemistry lab ventilation room on elevation 713 under DCN-24500-A and determined it was adequate. A support for the fan cooling unit in the elevation 713 counting room was inaccessible behind a false ceiling. The inspector reviewed work order 94-21991-01 which covered that installation and verified that it was complete.

Calculation WBN-OSG4-099 assumed particular door gaps when calculating the flood levels for each room and elevation. Modifications had to be made to several door gaps in the Auxiliary Building on elevation 737. The inspector measured the bottom gap on door openings A124, A126, and A127 on elevation 737 in the auxiliary building where thresholds or weather stripping were removed to provide sufficient drainage to limit the flood levels. The inspector found that the gap met the requirements specified on DCN S-37423-A and drawing 46W454; the minimum average bottom gap was greater than 1/2" for door A124, 5/16" for door A126, and 1/4" for door A127. The drawing was also changed to

specify minimum gaps from the calculation for other doors which did not need modification. The inspector picked a sample and checked gaps on door A131 on elevation 737 in the auxiliary building, and vital battery room I and II doors A142 and A141 respectively and found that they met the minimum average gaps specified on drawing 46W454 and assumed in calculation WBN-OSG4-099. The inspector discussed the walkdown results obtained in the mid-1980s and those done recently related to door gaps for the calculation. Only one door had shown any significant change in the last approximate 9 years and the gap on that door (A131) was reduced based on the results of an Appendix R walkdown on work order 94-11715-00. The fact that door gaps had not significantly changed over the last 9 years of construction activity indicates that future changes are not expected due to normal use during operation.

Field work remaining involves sealing all conduits that are below the flood levels identified in the environmental series drawings 47E235. The conduit sealing process utilizes a combination of internal and external conduit seals per DCN 20217-A. The inspector observed the preparation and analysis of a batch sample (X-049) and the internal sealing of conduit floor penetrations T215, T217, T218, T219, T220, T221, T222, T224, T225, and T226 in the turbine building (elevation 755). The turbine building conduits were relevant to MELB because certain flood levels are calculated based on leakage between the turbine and auxiliary building. The sealing was made using 1" of ceramic fiber on the bottom and top with 6" of RTV silicone foam in the middle as the sealant per drawing 45W883-1. Quality Control inspection was performed as required prior to and after the installation of the RTV silicone sealant. The inspector analyzed the RTV for adequate cell structure from both the batch sample and a portion of the top of each seal installed. The cell structure was closed and was adequate. The inspector observed PCI/ICMS QC inspection of the seals and determined it was adequate. The installation matched the drawing requirements.

The inspector picked the below listed sample of installed internal seals by penetration ID number from the Auxiliary Building including pump rooms and Control Building including shutdown board rooms and vital battery board rooms.

PS777	A3553AB	A3553AE	A3553AJ	A837G	A837J
A901F	A903G	A934G	A938F	A2405	A1195A
A1195B	A2471A	A9270	A9273	A9277N	A9155G
A9178K	A9163	A9170	A8028E	A8085	A8149
A8081A	A13269X	A13241D	A13301P	A12804F	A12765J

The inspector reviewed the installation documentation to verify that the seals had been installed and were what was described by the DCN. The documentation showed that the seals (depth of seal, type, and material) had been installed and matched the appropriate design detail from DCN 20217-A. The documentation was properly initialed and dated by the craft person that installed the seal, by the second checker, and by the PCI/ICMS QC inspector that witnessed the installation. Approximately half of the forms had not completed the entire review cycle and did not contain the final QA and management review signatures at the time of this NRC inspection.

TVA had issued corrective action document PER 950371 for external seals due to TVA QA findings during the MELB QA assessment (NA-WB-95-0125). These QA findings were discussed in IR 390/95-46. TVA QA had determined that some unacceptable seals existed. Corrective action was taken by the contractor in response to the QA findings. QA made a follow-up inspection of external seals during this inspection period and again found some problems. TVA and the contractor were in the process of resolving this issue. The inspector discussed with TVA and their contractor the problems that had been found and was shown several examples by QA of the most recent problems found in the intake pumping station. The inspector determined that the Quality organization was aggressive and was actively pursuing resolution of the problem.

No violations or deviations were identified.

3.2 Hanger Analysis and Update Program Corrective Action Program (HAAUP CAP)(TI 2512/023)

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

TVA has implemented the HAAUP CAP in accordance with the Nuclear performance Plan and has completed hardware modifications except for verification of shim clearances on reactor coolant piping during hot functional testing. The applicable site procedures for HAAUP work are MAI-4.2A, Revision 11, Piping/Tubing Supports, and MAI-4.2B, Revision 5, Pipe Installation.

3.2.1 Background

The HAAUP CAP was established in June 1986 to evaluate a number of identified issues for Category I and I(L) piping and pipe supports, and to develop a comprehensive completion plan to resolve these issues. Revision 1 of the CAP, dated June 29, 1989, was approved by NRR in SSER 9, dated October 6, 1989.

The issues identified in the HAAUP CAP originated from employee concerns, lessons learned from Sequoyah and Browns Ferry restart programs, Duke Power Engineering Services, R. L. Cloud and Associates, and the four major WBN contractors (Bechtel, Sargent & Lundy, Ebasco, and Stone and Webster). A total of 34 source issues were identified by the applicant. Source documents for these issues included Condition Adverse to Quality Reports (CAQR), Corrective Action Tracking Documents (CATD) from the employee concerns program, Vertical Slice Review (VSR) Discrepancy Reports (DR), applicant walkdown items, Problem Identification Reports (PIR) and NRC open items.

The issues identified, and root causes, were grouped into three categories, as follows:

- Issue - Interface control of Design Input/Output
- Root Causes - Design put was not consistently defined and controlled.

- Design output was not clearly defined and, thus, was not consistently implemented by Construction.
- Issue - Design/Analysis Methodology
- Root Cause - Design criteria for piping analysis and pipe support design did not specify a consistent and comprehensive set of design/analysis methods. In some cases, relevant industry issues were not considered.
- Issue - Level of Design Methodology
- Root Cause - Requirements for closure of unverified assumptions and documentation of engineering judgments were neither fully defined nor procedurally controlled.

3.2.2 CAP Corrective Actions

The objectives of this CAP were to assure that pipe and pipe supports 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:

- Design criteria and the Final Safety Analysis Report (FSAR) will be revised to ensure consistency and to comply with licensing requirements.
- Procedures will be revised or established to ensure design input/output are controlled and implemented.
- Safety-related piping systems and the associated piping supports will be re-evaluated against the revised piping analysis and support design criteria.
- Documentation will comply with design criteria and procedures.

3.2.3 NRC CAP Inspection Activities

Significant NRC inspection activities have addressed the adequacy of applicant work associated with implementation of the HAAUP CAP. Included were detailed inspections of: walkdown 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 Inspection Reports (IRs) 390/:

89-200	89-14	90-14
90-18	90-20	90-28
90-200	91-03	92-26
92-30	92-35	92-201

93-07	93-35	93-45
93-56	93-70	94-11
94-32	94-55	95-06
95-23	95-27	95-35

NRC IR No. 50-390,391/93-45 documents a detailed team inspection of CAP implementation at 75 percent completion. This inspection was performed in June of 1993 and covered all aspects of CAP implementation, including: pipe support calculations; field walkdown inspections of portions of systems to verify piping and supports was in accordance with applicable as-built drawings; Independent Verification Plan, including 75% QA Assessment and QA Audits; Integrated Interaction Program, including field walkdown inspections to verify hardware conditions; CATDs; and VSRs. IRs 50-390,391/93-56, 93-70, 94-11, 94-32, 94-55,, 95-06,, 95-23, 95-27, and 95-35 documented additional verification of hardware modifications since the 75% inspection.

3.2.4 Current HAAUP CAP Status

Approximately 15,000 supports were included in the HAAUP program with approximately 8300 modifications issued and implemented. Approximately 740 field work DCNS were issued. Engineering is 100% complete and hardware modifications and verifications are essentially complete. On July 28, 1995, all but 2 DCNs had been closed. One of the 2 DCNs (W-31945) covered modification to the reactor coolant system restraint shim pads to obtain necessary clearances. The only remaining work was to verify shim clearances between reactor coolant piping and restraints during hot functional testing. The other DCN (W-36335) involved pipe rupture evaluations. Field work WOs were closed and the DCN was waiting Engineering closure.

On July 13, 1995, TVA issued, and included in the HVAC CAP Books, a report titled, Watts Bar Nuclear (WBN) - Hanger Analysis Update Program (HAAUP) Corrective Action Program (CAP) - Status Report (RIMS T21 950713 950). The Report identified 414 CAP related items in the 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 the TVA report, 353 of these items had been closed, 7 were completed, but not closed, and 54 were open. 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 have verified the walkdown and inspection process, the programmatic changes, the design process, the modifications to hardware (walkdown of as-built supports), and the intermediate QA assessments, this final inspection concentrated on verifying overall adequacy of CAP implementation by reviewing QA Assessments and completed TVA CAP associated documents as detailed below.

3.2.5.1 Independent Verification Plan (IVP) for Hanger Analysis and Update Program Corrective Action Program Plan

The purpose of the IVP for the HAAUP 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 Revision 1, dated February 4, 1993, of the IVP for the HAAUP CAP, including audits and assessments detailed below, to assess the effectiveness of QA and the adequacy of the verification assessments and audits for the HAAUP CAP. At the time of the current inspection, the IVP had not been updated to show the latest QA verification activities.

- NA-WB-95-0014, Assessment of Hanger Analysis and Update Program Watts Bar Nuclear Plant

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 July, 1995, and included: evaluation of 35 pipe supports to verify DCNs and Work Implementing Documents initiated as a result of the HAAUP CAP had been field implemented; verification of completion of NRC open items from previous inspections and 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 pipe supports.

A number of discrepancies were identified by the assessment. One PER (WBPER950108) was issued to document various pipe support installations which did not agree with design output documents. Three Drawing Deviations (DDs) were issued to correct minor dimensional errors. Five Work Requests (WRs) were issued to correct minor hardware discrepancies. Nuclear Engineering (NE) evaluated the findings and determined that the only items with a potential for safety significance were the pipe support configuration discrepancies. Each discrepancy was evaluated and found to be acceptable "as-is". The discrepancies were documented on PER WBPER950108 and 52 additional supports reviewed for "Extent of Condition" evaluation and no similar discrepancies were identified. The assessment concluded that the HAAUP CAP was being adequately implemented.

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

WBPER950108
WR C332610 and WO 95-02691-00
WR C332620 and WO 95-03793-00
DDs 95-0114, 95-0113, and 95-0112

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 Audit and Monitoring Reports related to the HAAUP CAP, as detailed below.

Ebasco Audit Report A-0033 - The scope of this audit was to verify through examination of DCNs and calculations that procedural and technical requirements were properly implemented. A total of 22 calculations and 14 DCNs were reviewed and examined by the Ebasco QA Team. There were no procedural violations identified or Quality Finding Reports issued. However, 16 concerns and one observation were identified. The scope of the audit included Civil, Mechanical, and Electrical Engineering. The Civil Engineering portion of the audit included piping systems and civil structures. The inspectors reviewed the audit report and its resolution to verify that the concerns related to Civil Engineering were properly resolved. Concern No. 1, 4, 6, 9, 10, and 11 related to Civil Engineering. Those concerns included using design calculations for design instructions, missing references, wrong weld lengths, unmatched foot point loads, using a load factor of 1.2 in conduit support design instead of 1.5 as required by the FSAR, missing span length, no signatures signed by preparer and checker in calculations, etc. The inspectors reviewed the concerns related to Civil Engineering and determined that the resolutions were acceptable.

Ebasco Audit Report A-0042 - This audit included the assessment of Project Work List (PWL) calculation deliverables. These calculations were generated or reviewed by the Ebasco, ABB Impell Corporation and EQE Engineering Consultants. The audit was performed to determine the adequacy of compliance for implementing the procedural requirements for calculations. Each calculation was randomly selected from twenty two PWLs based on the sampling plan. The minor discrepancies found were missing references. The audit concluded that the 23 calculations reviewed were adequate with minor discrepancies identified in two calculations.

TVA Site Quality Monitoring Report QWB-R-92-0417 - The purpose of the monitoring report was to assess the adequacy and verify the acceptability of Design Control Document Tracking System (DCDTS) updated for small bore piping under HAAUP CAP Qualification Verification Plan. DCDTS was changed to Design Control Change Management (DCCM). The audit team successfully retrieved 35 DCNs from the DCCM data base. They concluded that all 35 DCNs could be appropriately tracked and were updated by DCCM.

TVA Site Quality Monitoring Report QWB-R-92-0450 - This monitoring report was to assess the adequacy and verify the acceptability of small bore piping calculation updates. The small bore piping calculations originally performed to cookbook (alternate analysis) were re-analyzed with the TPIPR computer analysis method. Five stress calculations were reviewed. All of the analyses

had been updated to include the use of the updated seismic response spectra, thermal operation modes, as-built configuration based on walkdown inspections, etc. The audit team concluded that the subject calculations had been adequately updated to reflect current design criteria.

Conclusion

The above 4 QA audits adequately covered the subjects identified and indicated the areas covered were being accomplished satisfactorily. The audits were detailed evaluations of various HAAUP corrective actions that provided further assurance that the HAAUP CAP was being adequately implemented.

In addition to the above assessment and QA audits, TVA performed an assessment of WP-32 walkdowns. This assessment was not completed until August 9, 1995, and was forwarded to the RII offices for review at that time. The assessment concluded that, overall, corrective actions taken to resolve identified WP-32 walkdown issues have been adequately implemented. However, in addition to identification of minor damaged, loose and missing hardware (DLMH), the assessment identified a problem with a box anchor that had not been grouted (PER WBPER950446) and with an Engineering evaluation of "accept-as-is" without an engineering evaluation (PER WBPER950471). Inspector Follow-up Item (IFI) 390/95-53-01, Review of QA Assessment Findings and IVP for HAAUP, is opened to review the corrective actions for the two PERs and the completed IVP for the HAAUP CAP.

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

As noted in paragraph 3.2.4 above, 353 TROI items related to the HAAUP CAP have been closed. In addition, all but 2 DCNs have been closed. The inspectors reviewed a sample of each item type, including a review of a sample of implementing DCNs and work documents, to verify proper closure and the adequacy of corrective actions. These reviews are detailed in the following paragraphs:

- CATDs

There are 20 CATDs associated with the HAAUP CAP. All of the CATDs were reviewed in the inspection documented in NRC Inspection Report 50-390,391/95-46. This inspection determined that the CATD issues are encompassed by the HAAUP CAP and that, when the HAAUP hardware modifications are 100% complete, updating of the documentation within the CATD packages has been accomplished, and the other routine administrative tasks listed on the Lookback Data Sheets have been completed, the original concerns will have been resolved. As noted above, all HAAUP hardware modifications have been completed and documentation closure is in process. Based on the inspections documented in Report 95-46 and the verifications performed during the current inspection, the inspectors concluded that the CATD corrective actions have been adequately implemented and no further review of these CATDs is necessary.

- Commitments to the NRC (NCOs)

NC0860276027 and NC0860276022 - In a letter to the NRC dated November 3, 1986, relative to Sequoyah Report 50-327, 328/86-27, TVA committed to completion of the HAAUP CAP prior to fuel loading to resolve Base Plate Design Criteria (Sequoyah item 04.3-8) for Watts Bar. In addition, TVA committed to issue design criteria that will require consideration of friction loads due to temperature for the design of all new pipe supports and support modifications made due to load changes, changes in configuration, etc. The inspectors reviewed the commitment package, including the following documents:

WB-DC-40-31.9, Revisions 7 and 14, Criteria for Design of Piping Supports and Supplemental Steel in Category I Structures, which includes base plate flexibility criteria and consideration of friction loads

TVA Memo (RIMS B26910702751) documenting completion of the HAAUP CAP analysis for Large Bore Piping and Pipe Supports

TVA Memo (RIMS B18920630773) documenting completion of the HAAUP CAP analysis for Small Bore Piping and Pipe Supports

These commitments have been satisfied.

NC0860227007 - CDR WBRD 390/86-52 identified a problem relative to Category I/I(L) piping penetrating non-seismic walls. In the Revised Final Report, dated January 26, 1987, TVA committed to revise Drawings 47W200-100 through 47W200-108 to provide improved guidelines and clarification to designers to ensure seismic design requirements are met. The CDR was inspected and closed in NRC Inspection Report 50-390/91-15. During the current inspection, the inspector reviewed the commitment package including the revised drawings.

This commitment has been satisfied.

NC0900121001 - In response to NRC Bulletin 88-08, Thermal Stresses in Piping Connected to Reactor Coolant Systems, TVA's contractor reviewed Unit 1 systems connected to the Reactor Coolant Systems to determine which lines were susceptible to thermal stratification or cycling caused by valve leakage. The review showed no lines susceptible. The Bulletin was inspected and closed in NRC Inspection Report 50-390/94-55. The commitment package, including Calculation AES-C-1991-1 documenting the evaluation by TVA's contractor (APTECH), was reviewed by the inspectors.

This commitment has been satisfied.

NC0870198002 - CDR WBRD-50-390/87-01 identified a problem relative to deficient design of valve supports. In the Final Report, dated June 30, 1987, TVA committed to provide additional training to design personnel. This CDR was inspected and closed in NRC Inspection Report 50-390/94-55. During the current inspection, the inspectors reviewed the commitment package, including a training roster dated August 19, 1987.

This commitment has been satisfied.

NC0860245003 - CDR WBRD-390/86-55 identified a problem relative to supports installed by Modifications being installed in locations not analyzed by Engineering. In Interim Report, dated July 17, 1986, TVA committed to evaluate as-built locations of Engineered Supports installed or modified since system transfer from Construction, which do not have as-built locations documented by FCRs. This CDR was inspected and closed in NRC Inspection Report 50-390/91-14. During the current inspection, the inspectors reviewed the commitment package, including Calculation WMG-1040-47A40007015 which reviewed and approved the installed support locations.

This commitment has been satisfied.

NC0860157003 and NC0860157006 - The final report for CDR WBRD-50-390/86-41 identified a problem relative to failure to consider zero period acceleration (ZPA) for analysis of some pipe supports, resulting in use of unconservative loads. TVA committed to revise support load tables and isometric drawings, revise and reissue pipe support designs, and modify affected supports. This was accomplished within the HAAUP CAP. In addition, TVA committed to revise the analysis handbook to specify methods to account for higher frequency modes in response spectra and time history analysis. This CDR was inspected and closed in NRC Inspection Report 50-390/95-24. During the current inspection, the inspectors reviewed the commitment package including the following documents:

WB-DC-40-31.7, Analysis of Category I and I(L) piping Systems

TVA Memo (RIMS B26910702751) documenting completion of the HAAUP CAP analysis for Large Bore Piping and Pipe Supports

TVA Memo (RIMS B18920630773) documenting completion of the HAAUP CAP analysis for Small Bore Piping and Pipe Supports

These commitments have been satisfied.

NC0860137003 - CDR WBRD-50-390/86-35 identified a problem relative to the relief valves for the High Pressure Fire Pumps being too large. In the final CDR, dated June 20, 1986, TVA committed to replace the valves with smaller valves. The inspectors reviewed the commitment package, which included Calculation N3-26-4A, Revision 4, DCN P-05610-A, and ECN 6184. These documents were reviewed in sufficient detail to determine that the valves were re-sized and replaced. This CDR was inspected and closed in NRC Inspection Report 50-390/91-15.

This commitment has been met.

NC0870074005, NC0870074027, NC0870074010, and NC0870074009 - CDR WBRD-50-390/84-17 identified a problem relative to welds joining piping shear lugs to pipe were not full penetration welds as required by design. In addition to inspection of lug welds to verify sufficient weld size to meet design requirements, TVA committed in the Third Revised Final Report to show the as-built conditions on revised design drawings for ASME Code Class 2 and 3 piping and non-ASME Category lugs located on Category I structures. This was

accomplished as part of the HAAUP CAP. This CDR was inspected and closed in NRC Inspection Report 50-390/89-04. During the current inspection, the inspectors reviewed the Commitment packages including requirements for inspecting lug welds, Design Criteria WB-DC-40-31.9, and the following documentation for completion of HAAUP analysis work:

TVA Memo (RIMS B26910702751) documenting completion of the HAAUP CAP analysis for Large Bore Piping and Pipe Supports

TVA Memo (RIMS B18920630773) documenting completion of the HAAUP CAP analysis for Small Bore Piping and Pipe Supports

These commitments have been satisfied.

Although a number of commitments are still open, the above review of a sample of closed commitments, and the closure reviews performed for CDRs and NRC identified findings, provide adequate assurance that commitments have been satisfied.

- VSR Items - The following VSR items were reviewed in sufficient depth to verify that the item had been closed and to determine that the documented corrective actions were adequate to correct the identified problem, including determination of the extent of condition.

VSR-157 - Applied loads had not been evaluated against the allowable loads for the Component Cooling System (CCS) surge tank nozzles. The corrective actions were to identify and review all safety related flow diagrams for the interfaces between piping and valves for the nozzle loadings. Ebasco performed the review of all safety-related flow diagrams for equipment that required piping stress analysis to be performed on interfacing piping and valves. Rigorous analysis was used in the ASME Small Bore Program and the Large Bore Program. All non safety-related, interfacing piping and valves connected to safety-related equipment nozzles were reviewed under the HAAUP CAP. PER WBP880785PER was prepared to ensure that the analysis for the Seismic Category I Interfacing piping and Valves 1-FCV-70-66, 1RFV-70-538, and 1-RFV-70-539 connected to the CCS Surge Tank was performed and to verify that the nozzle loading and valve Seismic accelerations were accounted for. PER WB880785PER was incorporated into PER WBP880803PER, which was rolled into WBP900589SCA and closed. DCN S-20835-A was issued to add the Stress Analysis Problem Boundaries for the CCS and has been closed. Stress calculations N3-70-R21A, N3-77-04A and 70090 analyzed and documented qualification of applied loads for valve Nos. 1-FCV-70-66, 1-RFV-70-538, and 1-RFV-70-539, respectively. The inspectors verified that the three stress calculations had been updated. The inspectors concluded that the corrective actions for the VSR were adequate and the VSR properly closed.

VSR-248 - This VSR item identified a problem with Valve 1-FCV-70-26B being installed with the motor operator position different from that shown on the drawing. DCN P-02433-B was issued to change the design to agree with the installed condition. The inspectors reviewed the VSR package, including DCN P-02433-B and concluded that corrective actions for the VSR were adequate and the VSR properly closed.

VSR-441 - This VSR item identified that for Support FOS-112, one unistrut clamp half of the installed pipe clamp, was a type P1111, and the other half was type P1111B. The mixing of the two clamp types was not allowed by typical Drawing 47A050-1J3. In addition, spalled concrete was found at one of the anchor bolts for the support. TVA had previously identified the unistrut clamp problem as documented in NCRs W-334-P and WBN 6172. Extent of condition and corrective actions were included in these two NCRs. The extent of condition for the concrete spalling problem was documented in NCR 6578. MR A-604924 was issued to correct both the clamp problem and the concrete spalling problem for Support FOS-112. The inspectors reviewed the VSR package, including the MR and NCRs noted above. The inspectors concluded that the corrective actions for this VSR item were adequate and that the VSR properly closed.

VSR-488 - This VSR item identified a problem with unistrut spring nuts being rotated and grooves not properly engaged at the lips of the unistrut for unistrut type supports. The specific problem identified was fixed by MR A-606083. For extent of condition, the problem was considered bounded by PER WBP880734PER. The PER corrective actions included 100% inspection of applicable pipe supports. The inspectors reviewed the VSR package including MR A-606083 and PER WBP880734PER. In addition, the following sample of WOs, documenting inspection and correction of spring nut discrepancies, were reviewed:

92-12411-01
92-12836-02
92-13001-05

The inspectors concluded that the corrective actions for this VSR item were adequate and the VSR properly closed.

VSR-635 - Supports on EDS Nuclear Inc. Drawings 1-70-199, Revision 2, and 1-70-337, Revision 902, had gaps between the pipe and the supporting steel or guide exceeding that specified on the drawings or General Construction Specifications No. G-43. Both supports were re-inspected by TVA Quality Control (QC) inspectors and determined to be acceptable per the specification. However, the support drawing for support 1070-1-70-199 needed to be revised to show the as-built configuration. This was accomplished per DCN C-02623A. Therefore, this item was considered closed without hardware modifications. The inspectors concluded that the resolution of this VSR was adequate and that it was properly closed.

VSR-636 - The installed configuration of small bore pipe support No. 1070-464-2-29-2665 did not agree with support typical Drawings 47A053-10, Revision 6 and 47A053-22, Revision 1. In addition, the VSR found that the actual thickness of the guide plate was 5/16" versus a drawing requirement of 3/8", and a hole in the support steel was plugged with a screw. The corrective actions were to evaluate the problems under the HAAUP CAP. DCN C-02456-A was issued to address the discrepancies and accepted all conditions "as is". Calculation H464020292665 was generated to evaluate and accept the discrepancies for support H-464-2-29-2665.

Later, this support was removed and replaced with Support 1070-A060-70-81 under calculation 47A060070081 per DCN P-02791-D and WP K-P02698A-1. However, calculation H464020292665 was not deleted or voided from the calculation control system for the superseded support H-464-2-29-2665. The calculation is still active for the support per the general practice of the Watts Bar support calculation control system.

On May 8, 1995, during the package closure, a supervisor needed to verify which support was in the field and issued Action No. 322 which stated in the description, "configuration does not agree with design H-464-2-29-2665". Based on DCN. No. C-02456-A and support calculation H464020292665, Revision 0, for disposition of the discrepancies, the Field Engineer replied that all discrepancies identified in DR No. 636 are acceptable and no field verification is required. This reply indicated that support H-464-2-29-2665 was still in the field, based on the active calculation H464020292665, Revision 0. Later, another engineer field verified that support H-464-2-29-2665 had been replaced by support 1070-A060-70-81.

The inspectors questioned TVA relative to why the calculation was not deleted for the superseded support. Engineering personnel replied that it was a management decision not to delete the original calculation for the deleted support in order to retain evidence of the calculation having been generated to resolve and satisfy the VSR or Deviation Report (DR). They considered that if the original calculation were deleted, there was no evidence to show resolution of the VSR or DR.

The management decision to not delete the original calculation for the superseded support was not consistent with the general practice of the Watts Bar support calculation control system. The general practice for superseded supports at Watts Bar is to delete or void the original calculation through a new revision to the calculation. To verify the applicant general practices relative to support calculations for deleted or superseded supports, the inspectors randomly selected from the calculation library two pipe stress calculations for deleted supports, reviewed the revision of stress calculations, and verified the existence of the support calculations for these deleted supports. The support calculation numbers and status for the calculations reviewed are as follows:

Superseded Support No.	Stress Calculation No.	Support Calculation No.	Rev. No.	Status
47A560-6-42	N3-62-03R	47A56006042	2	Calculation was deleted
47A406-8-14	N3-62-03R	47A40608014	3	Calculation was deleted
47A406-8-19	N3-62-03R	47A40608019	3	Calculation was deleted

47A406-8-20	N3-62-03R	47A40608020	5	Calculation was deleted
47A406-8-30	N3-62-03R	47A40608030	2	Calculation was deleted The cover sheet of this calculation had a "voided" sticker.
62-1LCV-R97	N3-62-05A	621LCVR097	2	Calculation was deleted

All of the above support calculations were deleted in the original calculations with the new revision numbers shown. The inspectors also found that stress calculations for Equipment Seismic Qualification were also deleted in the original calculations the same way as shown above for the superseded support calculations. Stress Calculation N3-3-8A and Fans and Dampers Calculation WCG-E-160 are examples. For some of the calculations reviewed, the description in the revision log stated that retrieval of that revision (previous revision) can be obtained through RIMS. Some of the deleted calculations retained the deleted pages in the calculations. In this case, the deleted pages contained a line drawn from the bottom left corner to the upper right corner with the Engineer's signature and date near the line. Based on this review, the inspectors concluded that it is not necessary to retain the original undeleted calculation for a superseded support to show evidence of qualification for the support. To keep the original calculation active for a superseded support (as was done for support H-464-2-29-2665), adds confusion and might give engineers or reviewers the impression that the superseded support was still active. The inspectors also concluded that TVA was inconsistent in their practices for voiding calculations for deleted supports. The inspectors considered the resolution of the VSR was adequate, and the item properly closed. However, not voiding original support calculations for superseded or deleted supports is a weakness in the control of support calculations.

Based on the above sample review of VSR documents, the inspectors concluded that adequate corrective actions were taken and the closure process was adequate. However, since 24 of 42 HAAUP CAP related VSRs are open, including a number of design significant VSRs, additional VSRs, including design significant VSRs, will be reviewed after TVA has completed their closure process. IFI 390/95-53-02, Review of HAAUP CAP VSRs, is identified to track completion of this additional review.

- CAQs

The following CAQ documents were reviewed in sufficient depth to verify that the item had been closed and to determine that the documented corrective

actions were adequate to correct the identified problem, including determination of the extent of condition.

PER WBP880044PER - This PER identified various welding problems on pipe supports 47A491-51-33 and 47A491-51-34. The extent of condition for these problems were considered encompassed in the HAAUP CAP since the problems were identified prior to the HAAUP CAP WP-32 walkdown inspections. The inspectors reviewed the PER closeout package including the following documents covering repair and acceptance of the supports 47A491-51-33 and 47A491-51-34.

DCN S-15709-A

DCN S-27767-A

MR C123511

WO 94-15778-00 including Weld Data Sheets and QC Inspection Reports

WO 94-15778-01 including Weld Data Sheets and QC Inspection Reports

Calculations 47A49151034 and 47A49151033

The inspectors concluded that the corrective actions for this CAQ document were adequate and the item was properly closed.

CAQR WBP880173 - This CAQR identified that pipe support 1063-1-63-349 configuration did not match the latest revision of the support drawing. The support was removed by MR A-615981. A new support in accordance with FDCN F-11902 and DCA P0347702 was installed by WP C-WBP880173-1. The inspectors reviewed the CAQR package and noted that no "Extent of Condition" was documented. Through further discussions, TVA stated that they consider "Extent of Condition" was evaluated since this CAQR was used as input for the HAAUP CAP, and under the HAAUP CAP, as-built information for installed piping and associated pipe supports was collected with WP-32 walkdowns and reconciled with design output. TVA further pointed out that the problem of not having "Extent of Condition" evaluations for CAQ documents was identified in SCAR WBSCA910212. The SCAR documented review of a large sample of CAQs and concluded that no safety significant condition exists. As documented in Inspection Report 50-390/94-37, the NRC continues to identify problems with CAQ documents. Additional inspection of the Corrective Action Program is planned prior to fuel loading.

For the specific problem identified, the inspectors concluded that the corrective actions were adequate and the CAQR properly closed. Although not documented in the CAQR package, the "Extent of Condition" was evaluated through implementation of the HAAUP CAP walkdown inspections.

PRD WBN 900409P - This CAQ document identified a problem with insufficient thread engagement of the threaded rod into the concrete SSD anchor shell for pipe supports 1003B-1AFW-R17 and 1003B-1AFW-R31. This CAQ resulted from an NRC inspection (Report 50-390/90-15) wherein 160 randomly selected concrete anchor bolts were UT inspected, and two bolts were found to have questionable thread engagement. Further inspections by TVA QC verified that the two bolts did have insufficient thread engagement. The supports were re-worked by WP K-P04508A-1 per DCN P-04508-A. No "Extent of Condition" evaluation was documented in the PRD package. When questioned, TVA provided the Final Report for CDR WBRD-50-390/81-14, dated March 14, 1983, which documented problems

with anchor bolt engagement into the anchor shell and an extensive testing program in accordance with NRC Bulletin 79-02 to verify the adequacy of anchor bolt installations. In addition, the revised response to NRC Bulletin 79-02 was provided, which documented further evidence that the anchor bolt engagement problem had been fully evaluated. Again SCAR WBSA910212 was provided to justify not having "Extent of Condition" evaluations for old CAQ documents.

For the specific problem identified, the inspectors concluded that the corrective actions were adequate and the PDR properly closed. Although not documented in the PDR package, the "Extent of Condition" was evaluated through implementation of the Bulletin 79-02 type testing on anchor bolts.

CAQR WBA900152012 - This CAQR identified a problem with "Travel Stop" being left installed on the Spring Can for Support 67-1ERCW-V105. The "Travel Stops" were removed by WP K-P02649A-1. No "Extent of Condition" evaluation was documented in the CAQR package. When questioned by the inspectors, TVA provided completed Preop Test Instruction PTI-067-02, which verifies removal of pins (travel stops) for system 67.

For the specific problem identified, the inspectors concluded that the corrective actions were adequate and the CAQR properly closed. Although not documented in the CAQR package, the "Extent of Condition" was satisfied through performance of the Preop Test Instructions.

PER WBP940421 - During the overview review of DCN F-32143-A, WP D-19871-172, for support 0026-491-28-53-6, TVA found that two dimensions for the embedded attachment exceeded the 1/4" tolerance. A F-DCN was issued approving the as-installed condition. The cause of the problem was attributed to inattention to detail by the craft and QC. The inspector reviewed the PER closure package, including the Cause Analysis, Recurrence Controls, Extent of Condition Evaluation, and training rosters for personnel.

The inspectors concluded that the corrective actions for this CAQ document were adequate and the item was properly closed.

PER WBP940084 - During WP closure review, TVA found that the scope of work for WP D-00607-01 was modified by the Field Engineer without revising the WP resulting in not completing required modification work on pipe support 1062-1-62A-22. This problem resulted when a Field Engineer was under the impression that he was correcting erroneous information on the WP because it appeared the work in question had been previously completed. Therefore, he changed the scope of work without revising the WP. For corrective action, the WP was completed as originally issued. The inspectors reviewed the PER package including, the Recurrence Controls, the Extent of Condition Evaluation, data sheets for the completed work, and training rosters for personnel.

The inspectors concluded that the corrective actions for this CAQ document were adequate, and the item was properly closed.

SCAR WBP890216SCA R3 - This SCAR documents implementation of corrective actions for 21 existing CAQRs, PIRs, etc., which documented the design and

construction deficiencies identified in the piping and supports in the various systems. The deficiencies included piping stress analysis overlap, lack of pipe support design calculations, interface region (safety-related versus non safety-related) stress problems, incorrect design input, incorrect temperature analysis, wrong load sign combination, pipe movements not considered in pipe support design, etc. The root causes included lack of procedures, procedures unclear, use of wrong procedures, design not to requirements, and carelessness of personnel. The corrective actions were to revise the procedure and the design criteria, walk down the systems, re-analyze the piping, and review or re-generate all the pipe support calculations. The inspectors reviewed the closure package and randomly selected five CAQRs for detail review to verify the implementation of corrective actions. The five CAQRs were PIR WBNCEB8552, SCAR SCRWBNCB8553, CAOR WBP870455, CAQR WBP870620, and CAQR WBP870621. Most of the corrective actions were completed as part of completion of the HAAUP CAP through changes to procedures, changes to the design criteria, walkdown inspections, re-analysis, and modifications.

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

SCAR SCRWBNCB86102 - This SCAR identified a problem with pipe support designs being inconsistent with the piping stress analysis. Some supports were not designed (no calculations or drawings) and some were not voided as required by the stress analyses. The seven supports affected were redesigned or voided through the re-analyses of the HAAUP CAP. The inspectors reviewed the closure package for the corrective actions. DCN M-16474-A for modification of support 47A915-8-1 was verified to be complete. Support calculations 47A93007008, Revision 3, and 479300007114, Revision 0, were verified to be complete for supports 47A930-7-8A and 47A930-7-8B, which replaced supports 47A930-7-8 and 47A930-7-114 respectively.

The inspectors considered that the corrective actions for this SCAR was adequate, and it was properly closed.

PER WBPER940213 - This PER was issued to provide the resolution of an NRC identified finding relative to excessive gap problem between a base plate and the concrete surface. Support H-464-001-003-2781 had approximately $\frac{1}{2}$ " gap between the base plate and surface of concrete. The corrective actions were to revise calculation F174032 and grout the gap. The gap was grouted per Work Request (WR) C138238 and Work Order (WO) 941594800. The grouting was completed on July 21, 1994. Revision 1 to Calculation F174032 was issued July 22, 1994. The problem was determined to be isolated.

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

PER WBPER930167 - Pipe stress analysis calculation N3-77-04A, Revision 0, was incorrect to determine the thermal movements of the relief valve nozzle for Component Cooling Water Surge Tanks A&B. The units used for the length and coefficient of thermal expansion valves were not consistent. This problem was identified by an NRC inspection. The corrective actions were to re-analyze the stress calculation based on the correct information and re-evaluate the

pipe support calculations based on the new support loads. The extent of condition was to review the other stress calculations performed by either the preparer or checker for similar type errors. Revision 1 to stress calculation N3-77-04A was issued and the support calculations for this system were evaluated. Two support calculations were revised based on the new support loads. The tank nozzles were re-evaluated in Calculation WCG-ACO-0334, Revision 3, based on the new loads. A support was removed based on the new analysis. During the review of calculations performed by the preparer or checker, four calculations were identified that needed revision. None of these additional errors resulted in impact to the asbuilt field configuration.

The inspectors concluded that the corrective actions were adequate, and the PER was properly closed.

PER WBN900552PPER - Supports 70-1CC-R146, -R15, and - R269 were found to have under-size welds. The drawing for support 67-1ERCW-R156 omitted a weld size. The corrective actions were to evaluate the under-size welds, revise drawings to add the missing weld size, and provide training to engineers and QC inspectors. Three supports with under-size welds were reinspected by QC inspectors based on Construction Specification N3C-912 and were determined to be acceptable. The missing weld size was added to the drawing by FDCN-12384-C. Weld connection improvement training was provided to 67 engineers and QC inspectors. Three QC inspectors also received special training for NCIG requirements.

Support 67-1ERCW-R186 was found to have missing locking devices and a loose kicker connection. This support was listed with the 4 supports noted above as a problem support, and no tracking record assigned. The inspector requested to see the evidence of corrective actions for this support. Workplan (WP) K-P02773A-1, Revision 4, which covered installation of two SA193 GR.B7 jam nuts for 1" bolts for locking devices and tightening the loose connection, was reviewed by the inspectors.

The inspectors concluded that the corrective actions were adequate, and it was properly closed.

The following CAQ documents were reviewed only to verify closure and to determine if the corrective action documented for the specific condition appeared to be adequate:

SCAR WBNCEB8223SCA R1
PIRWBNCEB8659 R1
PIRWBNCEB8697
PIRWBNCEB8536
PIRWBNCEB8758PER
WBNCEB8663
WBPER940509
WBPER940719
WBPER940463

No problems were identified for these CAQ documents.

There are 11 CAQ documents related to the HAAUP CAP open out of 212 listed in TROI. Hardware work is complete for these 11 documents, and paperwork closures are in process. The above detailed inspection of closed CAQ documents provides adequate assurance that the 11 open CAQ documents will be properly closed.

- NRC Identified Items

The inspectors verified that all NRC identified inspection items have been inspected and closed. Only one item was identified that had not been closed. See paragraph 7.1 below for inspection and closure of this item.

- CDRs

The inspectors verified that all CDRs have been inspected and closed. No open CDRs were identified.

- Design Change Notices (DCNs)

A number of DCN packages and work documents have been reviewed in the previous NRC inspections 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 the DCNs listed below. In addition a sample of the completed implementing work documents, as listed, were reviewed to verify that the DCNs were implemented.

DCN Number	Work Implementing Document
P-0610-B	D-06120-01
M-20592-A	D-20592-01 and D-20592-02
P-05641-A	D-05641-01
M-15641-A	D-15541-01
P-04635-A	D-04635-01
P-02903-G	D-02903-01 and D-02903-02
W-30066-A	94-07073-00

In addition, the following supporting calculations were reviewed:

- Calculations 47A400-7-20(RB) and 47A400-7-96(RB) for DCN P-05641-A
- Calculation 47A400-11-41 for DCN M-15641-A

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 3.2.3 above, the inspectors concluded that the HAAUP CAP has been adequately implemented.

As noted above, TVA still has 54 TROI items (11 CAQs, 1 Commitment, 24 VSRs, and 18 CATDs) and 2 DCNs related to the HAAUP CAP open. All hardware modifications, except for verification of shim clearances for reactor coolant system restraints during hot functional testing, have been completed for these items; only the verification and closure processes have to be completed for all other open items. For all items except VSRs, the inspectors concluded there is adequate assurance, based on inspections performed, that the remaining items will be properly closed out. IFI 390/95-53-01 was opened to review the corrective actions for the two PERs and the completed IVP for the HAAUP CAP. IFI 390/95-53-02 was opened to perform further inspection of VSRs after closure by TVA.

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

4.0 Watts Bar Unit 1 - Condition Of Structure And Civil Engineering Features, Trip Report (TAC M92765)

The NRC conducted a site review of the condition of safety-related structures and civil engineering features at Watts Bar Unit 1 on July 18-19, 1995. The objective of the review was to conduct a visual inspection to gain additional confidence that there was no age-related degradation evident in these features. To achieve this objective, the inspection consisted of an assessment of the existing condition and past performance of structures and civil engineering features, including buildings, tanks, cable tray and conduit supports, anchorages, buried piping, and the water intake structure.

The NRC reviewers concluded that the structures and civil engineering features are in very good condition and that no age-related degradation was evident. There was no evidence of any soil settlement or local areas of unusual soil condition of subsidence or heaving.

Details are set forth in the subject trip report, which has been placed in the NRC Public Document Room, and can be retrieved by the following information: Letter, P.S. Tam (NRC) to O.D. Kingsley (TVA), August 9, 1995, Docket No. 50-390, Enclosure, Trip Report.

5.0 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.

5.1 Geotechnical/Foundation Activities Procedure Review (45051)

The purpose of this IP is to verify that technical requirements, quality assurance plans, instructions, and procedures for geotechnical/foundation (G/F) activities meet applicable NRC requirements. The IP includes the areas of: quality assurance requirements, qualification of personnel, audit program, and procedures to control and perform specific activities.

5.1.1 Review of post-1985 Inspection Reports

G/F construction activities were essentially complete by the end of 1985. Therefore, there was no IP data identified in post-1985 reports other than that taken from the RII QA Records Cap inspection (2%) and the subsequent on-site generic reviews of IP 35100 and the NRC, ECGB audit of structures and civil engineering features (33%) which was performed to assist in closure of this IP and others (see paragraph 4). The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet approximately 35% of the inspection requirements:

50-390/93-86

50-390/95-46

5.1.2 Review of pre-1986 Inspection Reports

Since the G/F activities were essentially complete by the end of 1985, the inspector determined it to be appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document activities for approximately 65% of IP requirements:

50-390/73-3

50-390/81-20

50-390/74-2

50-390/81-27

50-390/76-10

50-390/82-16

50-390/76-11

50-390/83-12

50-390/77-12

50-390/83-41

50-390/81-07

50-390/84-51

Based on review of post-1985 and pre-1986 IRs, to include the 1995 NRR audit, the inspector concluded that IP 45051 has been adequately inspected. This inspection completes reconstitution of IP 45051.

5.2 Geotechnical/Foundation Activities - Work Observation (45053)

The purpose of this IP is to verify by observation of work activities that G/F activities were accomplished in accordance with NRC requirements, SAR commitments, and applicant procedures. The IP includes the areas of: observation of various G/F activities such as subgrade preparation, fill material and compaction control, dewatering, piling, concrete foundations, laboratory and field testing, calibration of equipment, instrument and monitoring systems, record keeping, and use of qualified inspection and test personnel.

5.2.1 Review of post-1985 Inspection Reports

Essentially all WBNP G/F work activities had been completed by 1986. Therefore, there was little IP data identified in post-1985 IRs. An NRR on-site audit was conducted July 18-19, 1995, to analyze the adequacy of the plant's settlement monitoring program, engineered backfilled areas, and structural foundations. This post-1985 audit which is discussed in an NRR Trip Report and referenced in paragraph 4 was determined to contain inspection documentation that could be applied to the IP to meet approximately 5% of the inspection requirements.

5.2.2 Review of pre-1986 Inspection Reports

Since G/F work activities were completed by 1986, it was necessary and appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document inspection activities for approximately 95% of IP requirements:

50-390/73-03	50-390/81-20
50-390/74-02	50-390/81-27
50-390/75-06	50-390/82-16
50-390/76-08	50-390/83-03
50-390/76-10	50-390/83-12
50-390/76-11	50-390/83-41
50-390/77-12	50-390/84-51

Based on review of the 1995 NRR audit and pre-1986 IRs, the inspector concluded that IP 45053 has been adequately inspected. This inspection completes reconstitution of IP 45053.

5.3 Geotechnical/Foundation Activities - Record Review (45055)

The purpose of this IP is to review a sample of G/F activity records to determine whether: (1) the applicant system for preparing, reviewing, and maintaining records is functioning properly, (2) the selected records reflect work accomplishment consistent with requirements, and (3) the records indicate any potentially generic problems or weaknesses that could have safety significance. The IP includes the areas of: receipt inspection and material certification records, installation records, nonconformance records, craft and inspection personnel qualification records, and audit reports.

5.3.1 Review of post-1985 Inspection Reports

A total of 30% of the IP requirements were determined to be satisfactorily met by post-1985 IR reviews. Twenty-five percent of the IP requirements were met by review of the NRC QA Records CAP inspection, and the remaining 5% by on-site inspection of audit reports. The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet approximately 30% of the inspection requirements:

50-390/93-86

50-390/95-46

5.3.2 Review of pre-1986 Inspection Reports

Since all WBNP G/F work activities had been essentially completed by 1986, the inspector determined it appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document inspection activities for approximately 70% of IP requirements:

50-390/74-05	50-390/83-12
50-390/77-12	50-390/83-41
50-390/82-16	50-390/84-51

Based on the post-1985 and pre-1985 IRs, the inspector concluded that IP 45055 has been adequately inspected. This inspection completes reconstitution of IP 45055.

5.4 Structural Concrete Procedure Review (46051)

The purpose of this IP is to verify that technical requirements, quality assurance plans, instructions, and procedures for structural concrete activities meet applicable NRC requirements. The IP includes the areas of: quality insurance requirements, qualification of personnel, audit program, concrete mix designs, and procedures to control and perform specific activities.

5.4.1 Review of post-1985 Inspection Reports

Structural concrete placement was essentially complete by 1983. Therefore, there was little IP data identified in post-1985 IRs other than that taken to followup on NRC Information Notice 92-66 concerning vendor supplied grout/concrete products (3%), and the subsequent on-site generic review of IP 35100 (17%) which was performed to assist in closure of this IP and others. The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet approximately 20% of the inspection requirements.

50-390/93-48	50-390/95-46
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5.4.2 Review of pre-1986 Inspection Reports

Since structural concrete placement activities were essentially complete by 1983, the inspector determined it to be appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document activities for approximately 80% of IP requirements.

50-390/73-03	50-390/75-10
50-390/74-01	50-390/76-05
50-390/74-02	50-390/76-08
50-390/74-04	50-390/77-07
50-390/74-05	50-390/77-12
50-390/75-03	50-390/83-12

Based on review of post-1985 and pre-1986 IRs, the inspector concluded that IP 46051 has been adequately inspected. This inspection completes reconstitution of IP 46051.

5.5 Structural Concrete - Work Observation (46053)

The purpose of this IP is to verify by observation of work activities that structural concrete activities were accomplished in accordance with NRC requirements, SAR commitments, and applicant procedures. The IP includes the areas of: observation of various structural concrete activities such as reinforcing steel, splices, and embedment placement; liner plate erection and fabrication; concrete batching, delivery and placement; in-process testing, curing and calibration of equipment; special considerations; and use of qualified craft and inspection/test personnel.

5.5.1 Review of post-1985 Inspection Reports

Structural concrete was essentially all placed by 1983. Therefore, there was little IP data identified in post-1985 IRs. The acceptance of the civil/structural area has been documented in several IRs which discuss: testing programs, an NRC broad based assessment, an integrated design inspection, and a special walkdown of Category I structures all of which assessed the quality of concrete construction. These IRs were determined to account for 2% of this IP's requirements. Another 1% was met by a current NRR on-site audit of the condition of WBs safety related concrete structures conducted 7/18-19/95. This post-1985 audit is discussed in an NRR Trip Report which is referenced in paragraph 4. The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet approximately 3% of the inspection requirements:

50-390/87-03	50-390/90-26
50-390/87-04	50-390/92-201
50-390/89-200	

5.5.2 Review of pre-1986 Inspection Reports

Since virtually all structural concrete activities were completed by 1983, the inspector determined it to be appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document inspection activities for approximately 97% of IP requirements:

50-390/73-03	50-390/76-11
50-390/74-01	50-390/77-02
50-390/74-02	50-390/77-04
50-390/74-04	50-390/77-07
50-390/74-05	50-390/77-09
50-390/75-04	50-390/77-12
50-390/75-06	50-390/78-01
50-390/76-02	50-390/83-12
50-390/76-05	50-390/83-22
50-390/76-08	50-380/83-41

Based on review of post-1985 and pre-1986 IRs the inspector concluded that IP 46053 has been adequately inspected. This inspection completes reconstitution of IP 46053.

5.6 Structural Concrete - Record Review (46055)

The purpose of this IP is to review a sample of structural concrete activity records to determine whether: (1) the system for preparing, reviewing, and maintaining records is functioning properly, (2) the selected records reflect work accomplishment consistent with requirements, and (3) the records indicate any potentially generic problems or weaknesses that could have safety significance. The IP includes the areas of: receipt inspection and materials certification records, installation records, nonconformance records, craft and inspection personnel qualification records, and audit reports.

5.6.1 Review of post-1985 Inspection Reports

The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet approximately 60% of the inspection requirements:

50-390/87-11	50-390/90-26
50-390/87-13	50-390/90-31
50-390/89-200	50-390/91-21
50-390/90-24	50-390/93-86

5.6.2 Review of pre-1986 Inspection Reports

Since all WBNP structural concrete activities had been essentially complete by 1983, the inspector determined it appropriate to use pre-1986 IRs to satisfy IP requirements. The following pre-1986 IRs document inspection activities for approximately 40% of IP requirements:

50-390/73-03	50-390/74-06
50-390/74-01	50-390/75-04
50-390/74-02	50-390/75-06
50-390/74-04	50-390/77-12
50-390/74-05	

Based on review of post-1985 and pre-1986 IRs, the inspector concluded that IP 46055 has been adequately inspected. This inspection completes reconstitution of IP 46055.

5.7 Structural Masonry Construction (46061)

The purpose of this IP is to verify by review that technical requirements, quality assurance plans, instructions and procedures for masonry wall construction meet applicable NRC requirements; and by observation of ongoing and completed work to verify that the as-built masonry wall construction meets NRC requirements and applicant commitments.

5.7.1 Review of post-1985 Inspection Reports

Review of post-1985 IRs revealed that 90% of the requirements in this IP were inspected since 1985. The remaining 10% although believed to have been performed involved non-specific documentation of FSAR reviews and observation of masonry wall workmanship. These requirements were evaluated and the inspector determined that recent extensive masonry wall walkdowns and review of applicant commitments conducted by the NRC as discussed in IR 50-390/95-46, could be credited toward closure of this IP. The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet 100% of the inspection requirements.

50-390/87-07	50-390/93-01
50-390/89-02	50-390/93-29
50-390/89/200	50-390/93-48
50-390/90-20	50-390/93-69
50-390/90-26	50-390/95-46
50-390/91-03	

Based on review of post-1985 IRs and the conduct of one post-1985 inspection, the inspector concluded that IP 46061 has been adequately inspected. This inspection completes reconstitution of IP 46061.

5.8 Concrete Expansion Anchors (46071)

The purpose of this IP is to verify by review that technical requirements, quality assurance plans, instructions and procedures for concrete expansion anchor construction meet applicable NRC requirements; and by observation of ongoing and completed work to verify that the as-built concrete expansion anchor construction meets NRC requirements and applicant commitments.

5.8.1 Review of post-1985 Inspection Reports

Review of post-1985 IRs revealed that 85% of the requirements in this IP were inspected since 1985. The remaining 15% of the IP requirements were determined to be adequately covered by a recent inspection 50-390/95-46. The following post-1985 IRs were determined to contain inspection documentation that could be applied to the IP to meet 100% of the inspection requirements.

50-390/86-07	50-390/91-29	50-390/93-45
50-390/87-03	50-390/91-31	50-390/93-70
50-390/88-06	50-390/91-33	50-390/93-78
50-390/89-18	50-390/92-09	50 390/94-17
50-390/89-200	50-390/93-01	50-390/94-22
50-390/90-15	50-390/93-20	50-390/94-28
50-390/90-20	50-390/93-29	50-390/94-32
50-390/90-24	50-390/93-34	50-390/94-88
50-390/91-09	50-390/93-35	50-390/95-27
50-390/91-23	50-390/93-38	50-390/95-46
50-390/91-26		

Based on review of post-1985 IRs and the conduct of a post-1985 inspection, the inspector concluded that IP 46071 has been adequately inspected. This inspection completes reconstitution of IP 46071.

6.0 NRC Bulletins (92700)

6.1 (Closed) IE Bulletin 79-14, Seismic Analysis for As-Built Safety-Related Piping Systems

This Bulletin was issued by the NRC on July 2, 1979 to require the construction permit holder to compare the design input with the as-built field conditions for safety-related piping systems. The Bulletin was subsequently revised to Revision 1 and supplements 1 and 2. During NRC audits and other licensee or construction permit holders own inspections, piping systems as-built conditions had been found to be different from design drawings and design input. This rendered systems inoperable because applied loads exceeded the allowable loads or in some cases, because of actual damaged hardware. The bulletin required that each licensee or construction permit holder review their design input based on the completed QC record or perform walkdown inspections to check as-built configurations against the design input. If nonconformances were found, the nonconformances were to be evaluated and the design input revised or the hardware modified. A response was to be submitted, including a schedule for required modifications.

TVA submitted their preliminary response in 1979. On June 29, 1989, TVA issued Revision 1 to the HAAUP CAP committing to the re-analysis of all safety-related piping systems in accordance with the requirements of IE Bulletin 79-14 and submitted it to NRC for review. In December 1989, the NRC documented their review of the HAAUP CAP in the "Safety Evaluation Report on the Watts Bar Nuclear Performance Plan - NUREG-1232, Volume 4 and accepted the plan. The NRC review concluded that the WBN Unit 1 HAAUP CAP was an acceptable plan to ensure that the structural design of piping systems was in compliance with the design criteria and licensing commitments. The corrective actions identified in the CAP were to: revise design criteria, FSAR, and procedures; walk down the piping systems to obtain the as-built configuration; re-analyze the piping systems; review the pipe support calculations; and re-work or modify the hardware. NRR reviewed the revised design criteria, FSAR, procedures, design methodology, scope of safety-related piping systems, etc.

The inspections listed in the table below were conducted by the NRC (Region II or NRR). Modifications were included in the hardware inspected.

Inspection Report No.	No. Of Piping Systems Inspected	No. Of Pipe Supports Inspected	No. Of Support Calculations Reviewed	No. Of Stress Calculations Reviewed
89-200	2	82		
90-18		37		

90-28		28		
92-201		53	30	3
93-07		17		
93-45	2	36	7	

Inspection Report 92-201 was an Integrated Design Inspection (IDI) report which also documented review of the design criteria, FSAR, procedures, design methodology, programs, and documentation. Inspection Report 93-45 was a 75% completion milestone inspection for the HAAUP CAP, which identified two violations and concluded HAAUP engineering and construction activities were being satisfactorily implemented.

Through July 1995, TVA informed the NRC about its completion of WBN Unit 1 HAAUP CAP and was ready for the closure of IE Bulletin 79-14. The Final Closure Report for IE Bulletin 79-14 also was submitted to NRC on August 21, 1995. The inspectors reviewed the Final Closure Report and determined it to be adequate. Based on the TVA HAAUP CAP, the Bulletin Final Closure Report, and the NRC inspections of Watts Bar, IE Bulletin 79-14 is considered closed for Watts Bar Unit 1.

6.2 (Open) IE Bulletin 79-02, Pipe Support Base Plate Design Using Concrete Expansion Anchor Bolts

This Bulletin required the construction permit holder to review base plate flexibility, minimum factor for safety on expansion anchor bolts, etc., for Seismic category I piping systems. TVA combined the program for Bulletin 79-02 actions with Bulletin 79-14 actions and included the necessary inspection and modification activities in the HAAUP CAP. The HAAUP CAP has been completed and TVA has provided NRC a closure package for Bulletin 79-02. The inspectors initiated a review of the Bulletin during the current inspection to verify design and modification of piping systems in accordance with the Bulletin. Closure review of Bulletin 79-02 will be completed during a subsequent inspection.

7.0 Construction Deficiency (50.55(e)) Reports (CDRs) (92700)

7.1 (Closed) CDR 50-390/86-29, Discrepancies Identified From Walkdowns of Instrumentation.

This 10 CFR 50.55(e) notification was issued as a result of NCR334PSCA, which identified instances of improper use and installation of instrument line attachment clamps and bolting hardware. The applicant subsequently determined that similar deficiencies could exist on supports for all seismic category I and I(L) instrument lines. As discussed in IR 50-390, 391/91-31, the applicant performed walkdowns of instrument lines to determine as-installed configurations, initiated work documents to correct identified deficiencies, and provided adequate recurrence controls, leaving only implementation of the hardware corrective actions remaining to be completed.

Completion of the hardware corrective actions was accomplished by 123 Workplans and 21 Work Orders, which are listed under Tab 12 of the closure package for this item (RIMS T03950807837).

The inspector reviewed NCR334PSCA, which stated that all corrective actions required to support Unit 1 operation were complete as of July 1, 1995, and the work completion status of the above referenced Workplans and Work Orders, as shown in MTS, and verified that they all have been closed, indicating satisfactory completion of work. NRC field verification of completed instrumentation support modifications and corrective actions are documented in IRs 50-390, 391/93-50, 93-70, 94-17, 94-24, 94-37, and 94-55. 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.

8.0 Actions On Previous Inspection Findings (92701)

8.1 (Closed) IFI 390/90-27-09, Sample Connection Support

This item was a generic concern regarding Deficiency D3.2-4 identified in SQN design control IR 50-327, 328/86-27. This deficiency involved supports for sample lines branching off process piping, called tie-back supports by TVA. The support was depicted on a standard (typical) support detail, which was based on a TVA Civil Engineering Branch report which specified Bergen Patterson clamps with 7/8 inch bolts. The inspectors identified that the support detail had been revised to specify a Basic Engineers type clamp with 3/4 inch diameter bolts and an ECN referencing the typical support detail and the 100 ft-lbs torque originally specified in CEB Report 77-42. The concern was the potential over-torquing of the smaller bolts. During the generic review of this issue for WBN the applicant identified that design requirements on typical tieback restraint drawing 47B001 did not agree with the CEB reports which provided analysis and testing input to the design of this type of support. To document and investigate these issues the applicant issued PIR WBNCEB8693 (Unit 1) and PIR WBNCEB8698 (Unit 2).

Corrective actions included reevaluation of CEB Report 75-18 to determine the adequacy of the specified bolt torque and preload values. This resulted in the reissue of this report as CEB 89-01-C for WBN with revised bolt torques and preloads. Drawing series 47B001 was revised to meet these new requirements and to specify the use of A193 Grade B7 bolting. NRC Inspection Report 50-390, 391/93-45 documented a status inspection of this issue. This support type was walked down as part of the HAAUP CAP and evaluated to the latest design criteria through that CAP. Support modifications were made as required by the evaluation of the as-built conditions. The inspector reviewed the CEB reports, drawing changes, typical calculations 47A40603032 and 47A0603040 Revision 1, and discussed this issue with NE personnel. The inspector performed a field inspection of tieback supports for the following valves and identified no deficiencies:

1-RTV-72-215A	1-RTV-72-216A
1-DRV-63-652	1-TV-62-618
1-TV-62-619	1-RTV-63-329A

1-RTV-63-320A

The inspector concluded that the applicant's actions adequately addressed this issue.

WBN QA identified pipe clamp ear deformation on several tie-back supports during the closure verification of this VIO. These conditions were added to the extent of condition of PER WBP950007 which identified similar conditions during closure of a previous PER WBP900528PPER. The inspector reviewed the corrective actions and recurrence controls for WBP950007 and concluded that the applicant's actions were appropriate and that the results did not affect the closure of this VIO. The inspector did identify that no technical justification had been documented for not inspecting three installations which were noted to be inaccessible due to insulation, as is required by procedure SSP-9.A, Revision 4, Administration of Walkdown Documents. The applicant subsequently supplemented WBP950007 to document an appropriate justification. Verification activities conducted by WBN 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.

8.2 (Closed) VIO 390/86-25-01, Failure to Follow Drawings for Separation Requirements of Instrument Sense Lines.

This violation identified the installation of instrument sensing lines that failed to meet the minimum 18-inch separation criteria for redundant safety trains. The specific lines identified were connected to pressure switches for the turbine driven auxiliary feedwater pumps. The applicant determined that the cause of the deficiencies was a failure by construction and QC personnel to correctly interpret the drawing requirements. A contributing factor was determined to be lack of clarity in the applicable drawing notes.

As discussed in IR 390, 391/91-31, programmatic corrective actions and recurrence controls were previously reviewed by NRC and found acceptable. The actions remaining to be completed at that time were reinspection of all affected lines to the clarified criteria, and implementation of any resulting hardware corrections or modifications.

WBP880634PER was issued to address sense line separation violations found on design output drawings. A review of applicable design output drawings that depict instrument lines with the potential for similar deficiencies resulted in the issuance of DCNs P-01570-A, P-03101-B, P-03473-A, P-03474-B, P-04928-A, and F-04929-A to relocate lines that did not meet the required minimum separation distance. The extent of condition review for the identified separation violations was covered under this PER. However, the implementation of the hardware corrective actions was accomplished under SCAR NCR6172SCA, which encompassed an inspection of all applicable instrument line installation acceptance criteria. At the time of this inspection all of the above referenced documents had been closed, indicating completion of the required corrective actions.

During the 75% Instrument Line CAP inspection, NRC inspectors identified an additional separation violation between sense lines for 1-FT-67-61 (Train A) and 1-FT-67-62 (Train B). That deficiency, along with others, was identified as VIO 50-390/94-24-01, Failure to Take Adequate Corrective Actions To Previously Identified Instrument Line Deficiencies.

The inspector reviewed the extent of condition evaluations, required corrective actions and corrective action completion statements in the above referenced SCAR and PER and the applicant's revised response to the above referenced violation, dated April 14, 1995, and determined that the corrective actions necessary to resolve this item are included within those required to be performed to satisfy VIO 50-390/94-24-01. Therefore, this item is considered closed and the detailed review of the corrective actions accomplished by NCR6172SCA and WBP880643PER, as well as the review of NA verification activities associated with this item, will be performed during the closure review of VIO 50-390/94-24-01.

This violation is closed.

9.0 Exit Interview

The results were summarized on August 25, 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 applicant.

Inspection Findings:

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description</u>
IFI	390/95-53-01	Open	Review of QA Assessment Findings and IVP for HAAUP, Paragraph 3.2.5.1
IFI	390/95-53-02	Open	Review of HAAUP CAP VSRs, Paragraph 3.2.5.2
IFI	390/90-27-09	Closed	Sample Connection Support, Paragraph 8.1
VIO	390/86-25-01	Closed	Failure to Follow Drawings for Separation Requirements of Instrument Sense Lines, Paragraph 8.2
CDR	390/86-29	Closed	Discrepancies Identified From Walkdowns of Instrumentation, Paragraph 7.1
BU	390/79-02	Open	Pipe Support Base Plate Design Using Concrete Expansion Anchor Bolts, Paragraph 6.2
BU	390/79-14	Closed	Seismic Analysis for As-Built Safety-Related Piping Systems, Paragraph 6.1

10.0 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
CCS	Component Cooling System
CDR	Construction Deficiency Report
CFR	Code of Federal Regulations
CRS	Concerns Resolution Staff
DCA	Drawing Change Authorization
DCCM	Design Control Change Management
DCDT	Design Control Documentation Tracking System
DCN	Design Change Notice
DLMH	Damaged, Loose, and Missing Hardware
ECN	Engineering Change Notice
ECSP	Employee Concerns Special Program
ECTG	Employee Concerns Task Group
FDCN	Field Design Change Notice
FSAR	Final Safety Analysis Report
G/F	Geotechnical/Foundation
HAAUP	Hanger Analysis and Update Program
IEB	Inspection And Enforcement Bulletin
IL	Instrument Line
IP	Inspection Procedure
IR	NRC Inspection Report
MAI	Modifications and Additions Instruction
MELB	Moderate Energy Line Break
MR	Maintenance Request
NCR	Nonconformance report
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NSRS	Nuclear Safety Review Staff
PCI/ICMS	Performance Contracting Inc./Insulation Consultants and Management Services
PER	Problem Evaluation Report
PIR	Problem Identification Report
PWL	Project Work List
QA	Quality Assurance
QC	Quality Control
QTC	Quality Technology Company
SCAR	Significant Corrective Action Report
SCR	Significant Condition Report
SP	Special Program
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	Temporary Instruction
TROI	Tracking and Reporting of Open Items
TVA	Tennessee Valley Authority
URI	Unresolved Item
VIO	Violation
WBN or WB	Watts Bar
WO	Work Order
WP	Workplan
WR	Work Request
ZPA	Zero Period Acceleration