



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

APR 8 1986

Report Nos.: 50-390/86-05 and 50-391/86-05

Licensee: Tennessee Valley Authority
 6N11 B Missionary Place
 1101 Market Street
 Chattanooga, TN 37402-2801

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

Facility Name: Watts Bar 1 and 2

Inspection Conducted: February 22 - March 21, 1986

Inspectors: W. E. Holland 4/4/86
 W. E. Holland Date Signed

C. W. Caldwell 4/4/86
 C. W. Caldwell Date Signed

Approved by: M. B. Shymlock 4-4-86
 M. B. Shymlock, Acting Section Chief Date Signed
 Division of Reactor Projects

SUMMARY

Scope: This routine inspection entailed 269 resident inspector-hours on site in the areas of licensee action on previous enforcement items, fire prevention and fire protection, preoperational test program implementation verification, testing of pipe support and restraint systems, TMI action item status and status of plant issues.

Results: No violations or deviations were identified in this inspection report.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- W. T. Cottle, Site Director
- *E. R. Ennis, Plant Manager
- G. Wadewitz, Construction Project Manager
- B. S. Willis, Operations and Engineering Superintendent
- *H. B. Bounds, Maintenance Superintendent
- D. W. Wilson, Design Services Manager
- J. E. Gibbs, Site Services Manager
- R. Norman, Jr., Operations Supervisor
- *R. C. Miles, Modifications Manager
- R. D. Tolley, Project Manager, Design Services
- *R. D. Greer, Electrical Maintenance Supervisor
- R. T. McCollom, Acting Instrument Maintenance Supervisor
- C. D. Nelson, Special Projects Manager
- M. K. Jones, Engineering Group Supervisor
- R. A. Beck, Health Physics Supervisor
- M. J. Burzynski, Regulatory Engineering Supervisor
- J. A. McDonald, Plant Compliance Supervisor
- *R. R. Garu, Preoperational Test Section Supervisor
- *R. B. Rieger, Preoperational Test Unit Supervisor
- R. E. Yarbrough, Jr., Assistant Operations Supervisor
- R. E. Bradley, Assistant Operations Supervisor
- T. W. Hayes, Nuclear Licensing Unit Supervisor OC
- *L. E. Ottinger, Plant Compliance Staff, Nuclear Engineer
- C. A. Borelli, Plant Compliance Staff, Nuclear Engineer
- G. R. Owens, Nuclear Engineer, Nuclear Licensing Section, OE
- *J. E. Engelhardt, Nuclear Engineer, Plant Quality Assurance

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

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 21, 1986, with those persons indicated by an asterisk in paragraph one above. One inspector followup item (paragraph 7) was identified with regards to NUREG 0737 requirements relating to the Independent Safety Engineering Group. In addition, one inspector followup item was identified (paragraph 5) with regards to review of steam generator sludge analysis.

The licensee acknowledged the inspection findings with no dissenting comments. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. At no

time during the inspection period did the inspectors provide written material to the licensee.

3. Licensee Action on Previous Enforcement Matters (92702)

(Closed) Unresolved Item 390,391/86-02-06, Inspector review of documentation relating to stop work order for ECN S1s. This issue was identified in inspection report 390,391/86-02. In this report it was stated that the inspector obtained a listing of documents relating to issuance of the stop work order, corrective actions taken during the stop work, and lifting of the stop work for Watts Bar. During this inspection period the inspector obtained copies of the documents from the TVA document control system. The documents were:

- OQA 830527 002, "Stopwork Action - Processing Design Changes by ECN S1" dated May 27, 1983.
- ESB 830609 001, "Stopwork Action - Processing Design Changes by ECN S1 - Response" dated June 9, 1983.
- ESB 830621 001, "Stopwork Action - Processing Design Changes by ECN S1 - Response Supplement" dated June 21, 1983.
- ESB 830628 003, "Stopwork Action - Processing Design Changes by ECN S1 - Response Supplement No. 2 - Watts Bar Project Release" dated June 28, 1983.
- DES 830706 016, "Stopwork Action - Processing Design Changes by ECN S1 - Watts Bar Response Supplement" dated July 7, 1983.
- OQA 830708 500, "Watts Bar Nuclear Plant - Stopwork Action - Processing Design Changes by ECN S1" dated July 8, 1983.
- OQA 830712 001, "Watts Bar Nuclear Plant - Processing Design Changes by ECN S1" dated July 12, 1983.
- WBP 830810 001, "Stopwork Action - Processing Design Changes by ECN S1 - Watts Bar Review of 100 Safety-Related Drawings Issued Prior to 1980" dated August 10, 1983.
- OQA 830818 002, "Stopwork Action - Processing Design Changes by ECN S1 - Watts Bar Review of 101 Safety-Related Drawings Issued Prior to 1980" dated August 18, 1983.

The inspector reviewed the preceding documentation and also discussed the issue with several engineering supervisors and quality assurance personnel. The inspector determined that ECN S1 was not being used during his OE review in JAN/FEB, 1986. Based on these reviews, the inspector considers that this issue has been properly dispositioned by the licensee and is closed.

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

4. Fire Prevention and Fire Protection - Unit 2 (42051)

During plant tours, the inspectors conducted observations of fire prevention and protection activities in areas containing combustible materials where ignition of these materials could damage safety-related structures, systems, or components. The observations included verification that applicable requirements of Administrative Instruction (AI) 9.9 (Torch Cutting, Welding, and Open Flame Work Permit), Standard Practice WB 12.6 (Fire Brigade Instructor's Guide and Fire Brigade Handbook), AI 1.8 (Plant Housekeeping) and WBNP Quality Control Instruction (QCI) 1.36 (Storage and Housekeeping) were being implemented with regards to fire prevention and protection.

Within this area inspected, no violations or deviations were identified.

5. Preoperational Test Program Implementation Verification - Unit 1 (71302)

The inspectors conducted routine tours of the facility to make an independent assessment of equipment conditions, plant conditions, security, and adherence to regulatory requirements. The tours included a general observation of plant areas to determine if fire hazards existed, observation of other activities in progress (e.g., maintenance, preoperational testing, etc.) to determine if they were being conducted in accordance with approved procedures. Also, observation of other activities which could damage installed equipment or instrumentation. The tours also included evaluation of system cleanliness controls and a review of logs maintained by test groups to identify problems that may be appropriate for additional followup.

During this period, the inspector witnessed a portion of a secondary side Steam Generator (S/G) inspection performed by the licensee. The purpose of this inspection was to determine the extent of sludge buildup in the secondary portion of all the S/Gs based upon a visual inspection of the Unit 1 loop 3 S/G. It was performed by use of a borescope that was inserted through the secondary handholes on the S/G. The procedures used to perform this inspection were Maintenance Instruction (MI)-68.9, Rev. 5, "Steam Generator Secondary Side Inspection" and Maintenance Request (MR)-A-571035. During this inspection, the licensee identified sludge varying in depths between approximately 1/2 inch to 2 inches depending upon axial location in the S/G. In addition, a sample was drawn to determine the chemical content of the sludge. The inspector observed this work and determined that the licensee performed the inspection in accordance with the procedures. The inspector will review the chemistry analysis report and follow the licensee's evaluation of the need for sludge removal. This item is identified as inspector followup item (390,391/86-05-01).

Within this area inspected, no violations or deviations were identified.

6. Testing of Pipe Supports and Restraint Systems - Unit 1 (70370C)

The inspector toured areas of the Unit 1 auxiliary building and reactor building. Numerous snubbers and restraints were observed. Visual examinations were conducted to check for deterioration and physical damage of mechanical snubbers. Visual examinations were also conducted to check for proper installation of base support plates, fasteners, locknuts, brackets, and clamps of fixed pipe supports.

Within this area inspected, no violations or deviations were identified.

7. TMI Action Items Status (25401)

NUREG-0737 Item I.B.1.2, "Evaluation of Organization and Management" was closed out in inspection report 390/85-40 for Unit 1. This item addresses the Independent Safety Engineering Group (ISEG) organization and reporting chain. Since that report, the inspector has been informed that this function may not be as described earlier due to TVAs reorganization of its nuclear program. Therefore, this item is being reopened pending the NRC review of how this issue will be addressed and staffed in the new organization. This item will be identified as an inspector followup item (390,391/86-05-02) for both Units.

Within this area inspected, no violations or deviations were identified.

8. Status of Plant Issues (92705)

The inspectors are following the status of plant issues that have been identified through various sources. These sources are the employee concern program, nonconformance programs, audit findings, etc. The status of these issues are detailed in the following paragraphs.

a. Instrumentation Issues

- (1) Instrument Line Slope: Nonconformance Report (NCR)-6172, Rev. 1 for Unit 1 and NCR-6359 Rev. 0 for Unit 2; Construction Deficiency Reports (CDR) 390/85-50 and 391/85-49 - These NCRs were issued to consolidate approximately 21 NCRs that dealt with instrument line slope problems on various systems. In these NCRs, it was identified that the sense lines did not conform to the requirements specified on drawing 47W600-0-4 notes.

As a result of this discrepancy, the licensee has prepared approximately 100 work packages for OE evaluation and subsequent Craft action as required. A decision was made to correct Unit 1 slope problems by relocating instruments to avoid possible ALARA problems and enhance instrument operability and maintainability. Relocation of Unit 2 instrumentation was begun prior to issue of NCR-6359 to avoid ALARA, operational, maintenance, and potential

slope problems. As of this report, approximately 36 packages have been evaluated that require maintenance or backfill operations to take place. Another 76 packages are yet to be evaluated by the Office of Engineering. Rework in progress has been the movement of the Reactor Coolant System flow instruments (ECNs 5846 and 5237). The major scope of work yet to be accomplished is on the Main Steam System differential pressure transmitters (ECNs 5974 and 5568). In addition, two new ECNs are going to be prepared to change the orifice taps etc., and move flow transmitters on the Containment Spray and Residual Heat Removal Systems. Rework will also be done on tubing in the Auxiliary Feedwater System flow and suction pressure transmitters, Component Cooling Water flow transmitters (in certain areas), and the Chemical and Volume Control System charging line flow transmitters.

(2) Seismic Supports

- Sampling and Radiation Monitoring Systems support design/installation neglected to consider thermal effects: NCR WBNEEB-8572, Rev. 0 for both units; CDR 390/86-13 and 391/86-11. This NCR identified existing piping in the radiation sampling and radiation monitoring systems that was installed to meet seismic qualifications without adequately considering thermal requirements. The clamps in place were used to restrict pipe movement in all 3 axes. This condition could result in the piping being overstressed and eventually experiencing fatigue failure due to thermal expansion upon system heatup.

Since initial identification of this discrepancy, the licensee attempted to have Singleton Laboratories qualify the existing supports. However, it was determined that this method was not effective in qualifying the in-place supports. As a result, OE has determined that the acceptable method to be used in qualifications of these supports is to sketch and analyze all tubing affected. An analysis will then be done to evaluate the need for moving clamps, supports etc., to restore movement. The Impell Corp. has been contracted by the licensee as an aid in the sketching process. As of this inspection period, no ECNs have been prepared.

- Replacement of damaged Foxboro instrument mounting brackets: NCR-6296, Rev. 0 for Unit 1 and NCR-6287, Rev. 0 for Unit 2. These NCRs identified that Foxboro models E11DM and E11GM have been observed with damaged mounting brackets.

An evaluation was performed which determined that the mounting bracket was adequate and properly qualified. However, due to the construction environment many supports were damaged by personnel using them as step ladders or by

hard contact with other equipment. It was then determined that the Instrument Engineering Unit will write a field change request as an enhancement and OE will revise the drawing to show an optional detail of the mounting bracket. The 1/8 inch clamps previously used are acceptable and the NCR was dispositioned "use-as-is." However, the licensee may replace approximately 50 of the 1/8 inch clamps with 1/4 inch clamps in Unit 1 applications. In addition, 1/4 inch clamps will be used exclusively in Unit 2 as indicated in ECN 5916 and CEB is in the process of analyzing the qualification of these clamps. No ECN for the transmitters will be issued for either unit.

- Solenoid seismic mounting not qualified: NCR 6298, Rev. 2 for Unit 1 and NCR 6566 Rev. 0 for Unit 2; CDR 390/85-52 and 391/86-14. This NCR was issued after the inspector identified this discrepancy to the licensee. The details of this mounting deficiency are given in inspection report 390; 391/86-02. In addition, they have completed a generic review of mounting methods of all instruments. During this review, the licensee found that some locally mounted instruments were mounted in category I structures without OE approved seismic mounting details.

Since initial identification of this discrepancy, the licensee has identified 470 ASCO solenoids with mounting deficiencies that need to be evaluated. No ECNs have been issued for either unit.

- Instruments not properly mounted: NCR-6397, Rev. 0 for Unit 1 and NCR-6449, Rev. 0 for Unit 2; CDR 390/85-61 and 391/85-57 - In these NCRs, it was identified that several instruments had loose bolts attaching the mounting bracket to the mounting plate. In addition, some of these instruments were attached to the mounting plates using round head machine screws instead of bolts.

Since identification of this discrepancy, the licensee has submitted a sampling of round head machine screws to Singleton Labs for testing. These screws have been tested and approved for use in existing mountings by Singleton. It was determined that there was not a material problem but there was a lack of OE specified tightness criteria. Since initial identification of this problem, the licensee has established tightness criteria for these fasteners and the civil engineering branch (CEB) is in the process of determining an inspection method for mountings that have not been inspected already. ECN 5957 was issued to describe the scope of work to be performed on both units.

- Unistrut assembly installed with slotted head screws: NCR-6422, Rev. 1; CDR 390/85-62. This NCR identified several subassemblies that have slotted head machine head screws installed in place of hex head cap screws as furnished by Unistrut. General Construction Specification G-53 applies to bolting materials used at TVA projects. However, section 1.2 of this G-spec states that slotted head machine screws are not covered and are outside the scope of this procedure. In addition, QCP-3.11 does not address machine screws in section 7.0, Acceptance Criteria.

This discrepancy is currently being evaluated for applicability to Unit 2. Use of these screws has been approved as described in the preceding paragraph for NCR-6397. In addition, inspection for use of these screws will be performed in accordance with the disposition of NCR-6397. No ECNs have been issued.

- Incorrect subassembly typical supports for control air: NCR-6467, Rev. 0 for Unit 1 and NCR-6405, Rev. 1 for Unit 2; CDR 390/86-15. The NCRs identified a discrepancy for various supports on the Control Air System. These supports were installed in a manner that was contrary to OE intent. The supports were incorrectly interchanged beyond the scope of the notes on the 47A050 series drawings.

Since identification of this discrepancy, it was determined that it was a construction error only and that adequate criteria existed at the time of installation. As of this report, 180 variances have been submitted to OE for review and approval of the existing support. In addition, OE has issued a revised drawing disallowing future substitutions per FCR I-2499.

- Pipe and tubing supports with loose or missing bolts, screws, and/or clamps: NCR 6356, Rev. 1, for Unit 1. This NCR identified that various instrumentation sense lines were found to have missing or loose bolts, screws, and/or clamps as described in the previous paragraph.

Since original disposition of this NCR, hanger inspections have been performed in conjunction with the slope reinspection. This walkdown has indicated the existence of numerous problems and has lead to the issue of NCR W-334P (listed below) which covers the generic concern with instrument hangers including clamps. The licensee has determined that loose clamps will be tightened to the required values, missing or damaged clamps will be replaced using OE coordination as required, and overspans identified

will be submitted to OE by variance for approval or fixed by the addition of a new support. Rework is to be performed by workplan N-W334P-2 by Modifications.

- Generic items identified from walkdown inspection of instrument lines in Unit 1; NCR W-334-P, Rev. 0; CDR 390/86-29. This NCR was issued as a generic NCR for discrepancies identified from the walkdown inspection of instrument lines in Unit 1. It identified that the Fabrication Operation Sheet (FOS)/Installation Operation Sheet (IOS) program was not adequately implemented for Unit 1. An inspection by the licensee identified problems with lost documentation and discrepancies in as-constructed configurations when compared with the Installation Operation Sheets (IOS). This item is applicable to Unit 1 only, since the FOS/IOS program did not apply to Unit 2.

Since identification of these discrepancies, the licensee has inspected a sampling of 60 supports and found that they were acceptable with the exception of loose, damaged, and missing Unistrut clamps, as described in NCR 6356, Rev. 1. These problems were in addition to the missing documentation problem. OE has concluded that there is a need to perform a 100% walkdown of clamps for tightness and proper installation.

- Lack of information to qualify instrument interface points: NCR 6218 for Unit 1 and NCR 6219 for Unit 2; CDR 390/85-35 and 391/85-34. These NCRs were issued to specify that design information was not provided, in certain cases, to permit OC to adequately qualify the interface between a process root valve connection and its associated field routed instrument line and/or flex hose assembly.

Since initial identification of this discrepancy, the licensee has qualified all of the interface points for Unit 1. This included rework of 26 supports and revisions to all interface drawings. The Unit 2 item is still being evaluated by the licensee so that a new program to control the interfaces may be utilized.

- Category 1L tubing spans with concentrated weights: NCR-6599, Rev. 0, for Unit 1 and NCR-6581, Rev. 1 for Unit 2. These NCRs identified a discrepancy in which no requirements existed for reducing spans on category 1L lines due to concentrated weights.

To correct these discrepancies, the licensee is in the process of establishing OE design criteria and a sampling program to compare the tubing to the typical drawings. Supports will be added as necessary.

(3) Instrument Line Tube Bending

Inadequate practice and documentation for qualifying pipe tube benders: NCR 6276, Rev. 0 for both units; CDR 390/85-46 and 391/85-46. This NCR identified that instrument pipe and tube bending did not meet all the requirements of section 4.M.2.1 of TVA Construction Specification G-29.

A sampling program was initiated to determine the extent of the tube bending deficiencies. As of this inspection period, all 200 benders were qualified and a bender qualification program is to be established for nuclear power (NUC PR). No ECNs are expected since no drawing revisions are necessary.

(4) Compression Fittings Installed Improperly: NCR 6278, Rev. 0 for both units; CDR 390/85-43 and 391/85-42. This NCR identified problems with instrument tubing connections. The discrepancies identified are as follows: tube cuts were not deburred, tube were not bottomed out in the fitting, nuts were not completely covering the threads on the connection, ferrules were missing, ferrules were reversed, unidentifiable ferrules.

As a result of this identified discrepancy, the licensee sent samples of tube fitting assemblies to Singleton Laboratories for testing. As of this report, all testing was complete with results indicating that there was little potential for failure during operations. Mechanical Maintenance is currently in the process of inspecting fittings on instrument panels. No ECNs have been issued yet.

(5) Instrument Tube Wall Thickness: NCR 6371, Rev. 2 for Unit 1. This NCR identified that 4 subassemblies were not installed per the 47W600 series drawings. The tubing nominal wall thickness was found to be 0.049 inches while the applicable drawing required 0.065 inches.

Since issue late in January, 1986, OE has been working on a calculation package to disposition this NCR. ECN 5999 has been issued to describe the scope of work for Unit 1.

b. Electrical - Cables

(1) Nominal Cable Weights and Diameters: NCR WBNEEB-8589 for Unit 1 and NCR WBNEEB-8590 for Unit 2; CDR 390/86-25 and 391/86-21. These NCRs identified that cable weights and outside diameters are not available from a QA source. The origin of the present values is unknown. Non-QA values were used for the calculation of conduit and cable tray seismic loadings and are presently used for the calculation of conduit and cable tray cross sectional area fill, calculation of cable minimum bend and training radius, and sidewall pressure calculations.

Since initial identification of this discrepancy, the licensee has submitted samples of cable sections to Singleton Laboratories for analysis. The results have been applied to revise the QA documents that contain weight and diameter information. This information will be used to recalculate for conduit overfill conditions. If problems with overfill are found, then the licensee will evaluate the cables with regards to a possible reduction in electrical rating and will also evaluate the cable tray supports for possible overloading.

- (2) Cable Sidewall Pressure: NCR-6270 for Unit 2. This NCR identified that cable sidewall pressure calculations were not considered in the design process. This condition was identified in Nuclear Safety Review Staff (NSRS) Report I-85-06-WBN. In addition, Construction Specification (G-spec) G-38, Rev. 5, which is used for cable pulling operations, did not address cable sidewall pressure.

Upon initial identification of the cable sidewall pressure discrepancy, the licensee issued a stop work order on July 19, 1985, to evaluate the situation. The order required craft to stop pulling train, protection set, and associated cables, as defined in the G-spec, on conduit. The particular cables specified were denoted as "Q" or "P" in the QA field of the ECM&D accountability program. This stop work order was lifted on December 10, 1985, when the revision to the G-spec was issued. Since then, the licensee has undertaken a program to develop sidewall pressure limits for the various cable sizes and to develop procedures detailing the use of sidewall pressure calculations in the design process.

- (3) Violation of Minimum Bend Radius: NCR-6295, Rev. 0, for both units, CDR 390/85-44 and 391/85-43. This NCR is similar to NCR W-290-P which was also issued for both units. Both of these NCRs identified that some of the main control room panels and others throughout the plant have cases of terminated cables in which the minimum bend radius has been violated. These cases involve both safety related and non-safety related cables.

Since identification of the bend radius discrepancy, the licensee has contracted Wyle Laboratories to perform qualification testing on wiring of the size and type covered initially in this NCR that have been bent to 1/4 inch or less. This is for the purpose of demonstrating that bending the wires in this manner will not have a detrimental effect on their qualified life.

- (4) Conduit Contains More Than 360 Degree Bends, NCR-6347. This NCR identified numerous conduits that were found to have more than 360 degrees of accumulated pull points in violation of Electrical Design Guide DG-E13.1.1.

This discrepancy was revealed as a result of evaluation of the cable sidewall issue. The licensee is currently evaluating the possibility of raising the sidewall pressure limits for cables. If this can be done, then the licensee will reevaluate to determine if the pull tension limits were exceeded in areas where bends were greater than 360 degrees.

- (5) Conduit Filled Beyond 40% Allowable Fill, NCRs 6609, 5917, and WBN EEB-8546. These NCRs identified that various conduits contain multiple conductors with a total actual cross sectional area that exceeds the conduit allowable 40% fill.

The licensee is evaluating test results to determine if the allowable fill has been violated.

c. Electrical - Calculations

Design Documentation Without Supporting Calculations, NCR WBNEEB-8571. This NCR identified that 1) a minimum set of electrical calculations to support design documents does not exist, 2) OE failed to revise existing electrical calculations after design changes, and 3) design documents and drawings were issued without preparation or completion of calculations. These documents related to electrical loads, shifting or addition of loads, and loading during operational modes.

The licensee is currently in the process of preparing calculations (e.g., voltage drop calculations) to support their design documentation. In addition, Sargent and Lundy Engineering Company has been contracted to perform an independent review of this issue.

d. Environmental Qualification (EQ)

An EQ project team has been established at Watts Bar and is in the process of documenting EQ requirements and resolving discrepancies identified during the documentation process. This team is also using some lessons learned at Sequoyah to provide a better final product and to avoid some pitfalls in the process. The general process used in the EQ program listed in chronological order is as follows:

- Identification of harsh (EQ) areas in plant.
- Identification of Class 1E equipment in harsh areas in plant.
- Identification of Class 1E equipment in EQ program in harsh areas in plant.
- Field verification of location and status of equipment requiring EQ in plant.

- Using vendor input and/or TVA testing/qualification, put together binder packages providing complete documentation of environmental qualification of equipment.
- Conduct independent review of binder packages to assure package is complete.
- Conduct management review of binder packages to assure package is complete.
- Issue binder packages to plant/document control to be maintained as permanent QA records.
- Plant to implement EQ binder package requirements into site procedures (operation/maintenance programs).

As of this report the inspector determined that approximately 30% of the binder packages have been prepared (ready for review). The inspector projects that the EQ project will be complete in the Summer of 1986.

During preparation of the packages and the EQ effort for Sequoyah, conditions adverse to quality (CAQs) which effect Watts Bar have been identified and documented. Some of these CAQs are:

- SCRWBNEEB 85-73, Local panel wire unqualified for harsh environment.
- SCRWBNEEB 85-88, High coil temperature in Target Rock and Valcor valves.
- NCR-6716, Unqualified cable used in containment.
- SCRWBNEEB 85-51, Limitorque valves in harsh environments may not have qualified wiring.

All CAQs which involve EQ issues are being reviewed by the EQ project team and corrective actions (if necessary) are being implemented when possible in parallel with the binder preparation effort. The inspector will continue to maintain an overview of this project and provide status updates in future reports.

Mechanical/Civil Issues

The following is a list of outstanding mechanical and civil engineering discipline issues that are currently being addressed at Watts Bar in the Unit 1 composite schedule meetings:

- SCRWBNEEB 86-16, Improper response of relief valves on High Pressure Fire Pumps. This issue is discussed in paragraph 9 under intake pumping station status.

- ECN 5798, Replace 2 pressure control valves at discharge of motor driven auxiliary feedwater pumps.
- SCRWBNCB 85-36, Internal thermal load not considered for supports.
- SCRWBNCB 85-37, Lateral seismic load not considered in design of 47A058 and 47A059 series of pipe supports.
- SCRWBNCB 85-53, Failure to include ZPA in seismic and DBA analysis of piping.
- SCRWBNCB 85-76, Containment vessel tubing not supported for thermal expansion.

f. Welding Project Status

The inspector held discussions with the licensee's personnel onsite and determined that TVA had contracted with EG&G 1) to provide for an overall evaluation of the TVA welding program at Watts Bar from the start of construction to present, and 2) to resolve the employee concerns relating to welding issues that have been identified by the QTC program. The status of this effort to date is as follows:

EG&G is in the process of establishing populations of weld components which will be inspected to determine adequacy of welding based on statistical data to insure a 95% confidence level that 95% of the welds are acceptable. This effort involves field verifications of a sampling of each population to provide proper justification that classes of structures are acceptable based on applicable codes. If structures are found to be unacceptable, then EG&G will also provide for corrective actions to resolve the deficiencies. After preliminary field verifications and procedures are in place, inspections will begin using initially only EG&G inspectors. TVA personnel will provide necessary support to gain access to the welds being inspected and also will prepare the weld area for inspection using EG&G procedures. The program details will be formally presented to the NRC in the near future.

The resident inspectors will continue to monitor the welding program and provide future overview reports on its progress.

g. Intake Pumping Station Status

The inspector continued with his inspection of corrective actions being implemented by the licensee in the Intake Pumping Station (IPS). This issue was identified as an inspector followup item (390/85-50-02) in inspection report 390/85-50. The IFI is still open. Followup inspection was addressed in inspection report 390/85-60. Although much work has been accomplished, corrective actions are still incomplete. The following is a current status of work for the IPS:

- Screen Wash Pumps (NCR W-243-P) - The discrepancy related to improper assembly of column sections for the four screen wash pumps which provide for shaft support. These support bolts were coming loose and causing excessive bearing wear. The licensee has installed lock washers on the bolts which hold the column sections together to resolve this problem. All work has been completed for this item and all screen wash pumps are operable.
- Raw Cooling Water Pumps - The seven raw cooling water (RCW) pumps had the same column assembly discrepancy as described above for the screen wash pumps. Also, the shaft sections for the RCW pumps were not correctly oriented in all cases with regards to bearing surfaces. The licensee has corrected all discrepancies associated with these pumps and all RCW pumps are operable.
- Essential Raw Cooling Water (ERCW) Pumps - The eight ERCW pumps had numerous discrepancies associated with the motors and the pumps. The motors experienced anti-reverse assembly problems and required repeated corrective actions before the problem was properly resolved. In addition, the final correction method required additional action to properly attach the new anti-reverse devices to the motor assemblies. All corrective actions with regards to the anti-reverse assembly problems have been installed on the eight ERCW pump motors. The ERCW pumps experienced problems with shaft failure attributed to improper maintenance; however, all shafts have been replaced with new shafts which are designed to further reduce the chance of shaft failures due to stress or fatigue. During reassembly of four of the eight pump's shaft sections, improper torques were used to fasten the sections together. The licensee is in the process of pulling these pump shafts in order to retorque the sections properly. Also, all shaft bearings have been renewed during this maintenance period.
- High Pressure Fire Pumps (HPFP) - The four HPFPs also experienced problems with excessive pump bearing wear. This condition led to failure of one of the pumps shafts. In order to evaluate this failure, the licensee rebuilt the pump bearings and also instrumented one of the pumps support structures with proximity probes and accelerometers. Testing was conducted and data was obtained indicating excessive shaft movement at certain sensing points during operation. The testing identified abnormal pump operation due to pump discharge relief valve lifting. Discussions with the pump vendor have concluded that incorrect bearings have been used in the pump application. The vendor is furnishing new correct bearings to the licensee. The licensee is in the process of redesigning the relief portion of the HPFP discharge piping to correct the relief valve problem. The solution should include procurement of new relief valves which will resolve this deficiency. After receipt, the licensee will install the new

bearings and relief valves in the instrumented HPFP and reconduct the operational tests to determine if the deficiency has been corrected. The licensee plans to install the replacement bearings and new relief valves in all HPFPs and to provide for new preventative maintenance procedure based on testing and experience gained with regards to pump wear using the new components.

- After completion of all corrective actions on the deep draft pumps, the licensee intends to provide a revised response to IE Bulletin 79-02 (Deep Draft Pump). This issue was also identified as an open IFI in inspection report 390/85-60 (79-BU-15).

In summary, the inspector is continuing to follow all outstanding items associated with the IPS. After completion of all work, the licensee intends to provide a complete report on the IPS addressing all past discrepancies and actions taken to correct them. At that time the inspector will review the report and will conduct a detailed review of the operability of the IPS in order to resolve the open Issues.