



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-390/83-46 and 50-391/83-35

Licensee: Tennessee Valley Authority
500A Chestnut Street
Chattanooga, TN 37401

Docket Nos.: 50-390 and 50-391

License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection at Watts Bar site near Spring City, Tennessee

Inspectors:	<u>P. R. Anderson</u>	<u>11/22/83</u>
	Jr T. L. Heatherly	Date Signed
	<u>P. R. Anderson</u>	<u>11/22/83</u>
	Jr W. B. Swan	Date Signed
Approved by:	<u>C. A. Julian</u>	<u>11/22/83</u>
	for C. A. Julian, Section Chief	Date Signed
	Division of Project and Resident Programs	

SUMMARY

Inspection on September 22 - October 22, 1983

Areas Inspected

This routine, inspection involved 367 resident inspector-hours on site in the areas of Licensee Action on Previous Enforcement Matters; Licensee Control of System Cleanliness; Inspector Followup Items; Independent Inspection Effort; Review of Licensee Identified Items; and Soil Liquefaction Barriers Installation.

Results

Of the six areas inspected, no violations or deviations were identified in five areas; one apparent violation was found in one area (Failure to protect against foreign matter contamination of systems and components, paragraph 5).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *H. Fischer, Construction Engineer
- *T. Hayes, Nuclear Licensing Unit Supervisor
- *H. Wilhite, Licensing Engineer, OEDC Licensing
- *J. Prah1, Licensing Engineer, OEDC Licensing
- *A. W. Rogers, OQA, Unit Supervisor
- *C. O. Christopher, Assistant Quality Manager, Construction
- *L. J. Johnson, Assistant Construction Engineer
- G. Wadewitz, Construction Project Manager

Other licensee employees contacted included 16 engineers, technicians, and construction supervisors.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 21, 1983, with those persons indicated in Paragraph 1 above.

3. Licensee Action on Previous Enforcement Matters

- a. (Closed) Violation (390/83-18-01) Foreign Material in Steam Generators. In April 1983, the violation was issued citing the licensee with failure to take into account the need for special controls and processes to attain required quality in that the secondary side of all steam generators contained foreign material which could be detrimental to steam generator integrity during plant operation. By letter dated May 13, 1983, the licensee outlined corrective actions including measures controlling all future entries into the secondary side of both Units 1 and 2 steam generators and cleanliness inspections.

Previous corrective actions did not include inspection for foreign materials in the upper sections of the steam generators. On September 30, 1983, the resident inspectors were notified that debris had been found in the upper section of two steam generators. A piece of eight-inch I-beam was found in Unit 1's #2 generator and two pieces of bar stock (3/4" x 3') were found in Unit 1's #3 generator. Other smaller items were found in both generators (weld rod stubs, weld cloth, and small pieces of angle iron). The material was found on an upper level platform above the tube bundle and swirl vanes. No other debris was found in the other six generators.

The resident inspector concluded that the licensee's increased diligence in assuring cleanliness of the secondary side of the steam generators demonstrates positive response to the violation.

- b. (Closed) Violation (390/82-18-01; 391/82-15-01) Failure to Satisfy Environmental Design for Containment Purge Air Supply Valves. The violation stated that the containment purge air isolation valves were designed by TVA with a minimum operating temperature of 60°F and installed in a system with a minimum normal operating temperature of 40°F.

The licensee admitted the violation and undertook to ascertain if the manufacturer could qualify the valves to meet leakage requirements at 40°F, versus the specified 60°F. The licensee was verbally notified of the violation on May 20, 1982, and by letter dated July 7, 1982. On August 19, 1982, TVA issued a 10 CFR 50.55(e) deficiency report, WBRD-50-390/82-86; WBRD-50-391/82-82, on the specification error on temperature, i.e., 40°F versus 60°F.

To avoid further violations of this type EN DES requires documentation of independent verification of adequacy of procurement specification by independent groups under EN DES - EP 1.28 and "squad checking" required by Topical Report - TVA - TR75-1A.

The manufacturer provided certification to TVA that the valves are qualified for use at 40°F. By letter of September 16, 1983, TVA stated that they no longer consider 10 CFR 50.55(e) to be applicable to this matter.

The inspector has found the licensee's corrective actions acceptable. This item is closed.

- c. (Closed) Unresolved Item (390/81-13-06) Questionable HVAC Damper Integrity. Previously, the inspector had identified an HVAC damper that was not qualified for its intended use. It was determined that the damper and several others had been removed and that TVA's Nuclear Safety Section (NSS) was investigating the matter for generic applicability and safety significance. As documented in IE Report 390/83-06, 391/83-05 further investigation revealed that the problem was previously identified at Sequoyah Nuclear Plant (SQN) and ECN 2444 had been initiated to change out 63 dampers at WBNP. The item remained open pending a review of ECN documentation.

The inspector reviewed ECN 2444 which required that dampers be replaced in order to meet ANSI-N509 integrity requirements. The ECN had been completed for Unit 1 only as of August 12, 1983.

This item is closed.

- d. (Closed) Open Item (390/82-05-06; 391/82-03-06) Compliance with Westinghouse Technical Bulletin NSD-TB-81-12. This item was opened after it appeared that TVA had not initiated action to resolve an issue discussed in Westinghouse Technical Bulletin NSD-TB-81-12. The bulletin stated that a power operated relief valve had inadvertently opened after a reactor trip. Previously, plant personnel had set the

derivative control to "off". Turning the controller to "off" did not remove the derivative function, but instead had the effect of accelerating the controller's response. The bulletin further identified Watts Bar as having received the Foxboro equipment.

TVA memo EEB '83 0927929 dated September 26, 1983, stated, with concurrence by Westinghouse, that no changes were necessary at Watts Bar as a result of the above technical bulletin (NSD-TB-81-12) because the pressurizer pressure master controller's output alone cannot open a PORV; it is interlocked with a separate RCS pressure channel such that the RCS pressure must be greater than 2335 psig. These functions were subsequently verified to perform correctly during preoperational testing. This item is closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Licensee System Cleanliness

On October 7, 1983, an inspection was made of Unit 2 containment and the following deficiencies were noted:

- a. Steam Generators (S/G) #2 and #3 primary side manway covers were unbolted and removed from the S/G(s) and no protective covers were installed over the openings.
- b. Various pieces of class 2 (safety-related) piping were observed lying on the reactor building floor between the containment wall and the polar crane wall without protective covers or caps installed over the pipe ends.
- c. Installed safety-related piping in safety injection pump room 2B-B had an open (unprotected) instrument penetration in the piping.
- d. An open cabinet in containment had various class 2 (safety-related) fittings, pieces of pipe, components laying on an upper shelf with no identification tags or protective covers over the component openings.

The Shift Engineer's Office was notified of the steam generator deficiency on October 7, 1983 at approximately 5:00 p.m.

A reinspection of the same area on October 11, 1983, indicated that the discrepancies had not been corrected. The Construction Engineer was then contacted by the inspector.

An additional reinspection on October 13, 1983, indicated that all noted deficiencies had been corrected. In that activities affecting quality were not accomplished in accordance with instruction, this item is an apparent Violation 391/83-35-01 applicable to unit 2 only.

6. Dams (Soil Liquefaction Barriers) Observation of Work

Four inspection tours were made by the resident inspector of compaction of backfill clay in the excavation to the east and west of the Intake Pumping Station (IPS) and of excavation, down to shale, west and northwesterly of the IPS for additional stabilization barriers. The licensee, during the report period, supported the exposed corrugated metal casing and its enclosed three-foot diameter fiberglass effluent line on driven steel pilings. Leaks in the effluent line were repaired, its vertical alignment was restored, and damage to the corrugated metal casing was repaired. Additional measures were taken to prevent muddy water from entering the pumping station intake canal. No violations or deviations were identified in the soil compaction work. The excavation is not quality assurance controlled.

7. Independent Inspection Effort

- a. The senior resident inspectors made periodic routine surveillance tours of the power blocks of Units 1 and 2. The resident inspector (operations) followed pre-operational testing in Unit 1. No violations, deviations or unresolved items were identified during these surveillance inspections.
- b. On Thursday, October 13, 1983, the senior resident inspector - construction, monitored the TVA Watts Bar biweekly startup progress overview conference. Eighteen categories of construction activities and concerns were discussed as to schedule status, current preoperational tests and restraints on completion. TVA reported 41 tests in progress, to which there were restraints to 11, both construction and design. During consideration of the Open Work Items List (OWIL), the inspector discussed coordination of NRC and TVA reviews to close Construction Deficiency Reports (CDRs), violations, unresolved items and inspector follow-up items. TVA has supplied information folders for NRC consideration for closure on some 45 items. On Friday, October 21, 1983, the senior resident inspector telefaxed to RII a listing of open items awaiting close out action by NRC. The listing was broken down, for convenience in expedited assignment of EOP specialists, into categories: welding and mechanical, quality assurance, and design.
- c. The major portion of discretionary effort by the senior resident inspectors during this report period was exerted on tracking, evaluation and close out of open items. The large number of open items which should be closed for Unit 1 before scheduled start of fuel loading on April 2, 1984, requires a substantial sustained effort by resident inspectors and Region II inspection specialists to meet the objective.

8. Followup on Licensee Identified Items

- a. (Closed) LII (CDR 390/79-17; 391/79-17) Power Operated Relief Valves (PORV) do not Meet Requirements. During valve operability testing the licensee identified via NCR MEB 79-17 that two PORVs and two Flow

Control Valves (FCV) did not meet the 33 Hz minimum natural frequency requirements. The Fisher Control PORVs have subsequently been replaced with Target Rock models and the noted deficiency no longer exists. Stiffer and heavier bonnets have been placed on the FCVS to ensure that the 33 Hz criteria could be met. The inspector reviewed documentation used for rework and procurement documentation (Certification of Compliance and manufacturer data sheets) and found them to be adequate. This item is closed.

- b. (Closed) LII (CDR 391/80-02) Full Penetration Welds for Pipe Supports - NCR WBN SWP 8007. A potential problem involving welding of attachments to pressure boundary piping was reported to NRC on October 10, 1980.

For Unit 2 the problem was resolved by redesign of supports to eliminate welding of support attachments to the pipe. ECN 3319 for the redesign was signed off on August 15, 1983.

The resident inspector inspected drawings 63-25IS-V139; 63-25IS-140, and 63-25IS-V163 and verified that weld attachments to the pressure boundary piping are not involved.

This item is closed.

- c. (Closed) LII (CDR 390/82-28) Containment Spray Miniflow Design Error - WBRD-50-390/82-28. On March 5, 1982, the licensee gave notice of a control circuit wiring design error on the containment spray miniflow valves.

The containment spray (CS) miniflow is supposed to be terminated when the total CS pump flow is greater than 2000 gpm. This logic is called for in the Westinghouse Electric Corporation (Pittsburgh, Pennsylvania) system description WAT/WBT-906/4, section 7.3.1. Contrary to this, the Watts Bar Nuclear Plant (WBN) CS electrical logic diagram (47W611-72-1) did not provide for closure of the miniflow control valves (FCV 72-13 and -34) under the specified flow condition.

Westinghouse revised the elementary wiring diagram to conform to the system description. All affected TVA design drawings have been revised and issued consistent with the Westinghouse elementary wiring diagram. These revisions provide for closure of the miniflow valves under the appropriate conditions. Field changes were required as a result of the design modifications. Unit 1 field modifications are complete.

On October 20, 1983, the TVA-Nuclear Power Compliance Supervisor verified that during preoperational test, IAW, the modified valve operated correctly.

The senior operations resident inspected the field modifications and found the installation acceptable. This item is closed for Unit 1.

- d. (Closed) LII (CDR 390/82-42; CDR 391/82-39) Qualification of RHR/DHR Sump Valve Room. TVA identified that FSAR commitments had not been met for the RHR valve sump room electrical penetrations. In subsequent reports justification was provided to show that the electrical penetrations were not required to be leak tight.

The inspector held discussions with NRR reviewers and regional management to ascertain the correctness of TVA justification. NRC's Standard Review Plan (SRP) requires only that the sump room be enclosed in a controlled leakage housing. Since the sump room is within the auxiliary building which is serviced by the auxiliary gas treatment system, the criteria for controlled leakage is met. Therefore, the technical aspects of this deficiency are resolved. It is expected that the breakdown in management controls that caused the structure to be built in a manner that did not meet NRC commitments will be addressed in response to NRC violation 390/83-40-01. This item is closed.

- e. (Closed) LII (CDR 390/82-47; CDR 391/82-44) Questionable Patches of Plastic Cement Mortar - WBRD-50-390/82-47; WBRD-50-391/82-44. On April 29, 1982, the licensee reported a 10 CFR 50.55(e) concern, NCR 3791R1, concerning several patches of plastic cement mortar (a bonding material used in the embedment of expansion anchors and grouted anchors) in the auxiliary building and reactor building which had developed cracks and were hollow sounding. The mortar had been used to repair areas of concrete that had been chipped during the drilling of anchor bolt holes.

The licensee's Final Report on this matter, dated October 4, 1983, stated: "TVA no longer considers the subject condition to be adverse to the safe operations of the plant. Therefore, we will amend our records to delete this nonconformance as a 10 CFR 50.55(e) item."

This conclusion was based on a sampling program involving the inspection of approximately 300 supports, the testing of 50 self-drilling expansion anchors, eighteen of which were installed in patches. The licensee's analysis of the test results indicated the adequacy of the supports. The senior resident inspector (construction), reviewed the analysis and concurs in the conclusions.

This item is closed.

- f. (Closed) LII (CDR 390/82-49) Failure to Evaluate Operator Actions to Realign ERCW Train A - WBRD-50-390/82-49; WBRD-50-391/82-46. The licensee reported the subject 10 CFR 50.55(e) deficiency on May 10, 1982, as NCR WBN QAB 8203. The concern was that before the CCS valves are repositioned, excess flow to the CCS heat exchangers might divert water from other system users.

In the final report dated September 22, 1983, the licensee stated: "An analysis has been performed to evaluate ERCW system performance during the initial 10 minutes following a design basis accident. It was found

that the system is able to deliver design flow to all loads during the period. TVA has, therefore, determined this condition is not adverse to the safe operation of the plant and is no longer reportable under 10 CFR 50.55(e).

There is still no regulatory requirement or industry standard requiring hands-off operation for a definite period after an accident. However, ANSI N660/ANS 51.4, "Proposed American National Standard Criteria for Safety-Related Operator Actions", was issued for trial use in January 1977. In future plants, this document, or revisions of it, will be used as a guide in evaluating problems of this nature."

The senior resident inspector found the licensee's conclusions acceptable. This item is closed.

- g. (Closed) LII (CDR 390/82-85; CDR 391/82-81) Voiding of Engineering Change Notices (ECNs) without Proper Review - WBRD-50-390/82-85, WBRD-50-391/82-81. The licensee reported a design control deficiency, under 10 CFR 50.55(e) as NCR GEN NEB 8208 which disclosed that Procedure EP 4.02, the process for voiding ECNs, allowed the voidance of a Thermal Power Engineering (TPE) reviewed and approved ECN without its being reviewed and approved by the same organizations that performed the original review and approval as required by 10 CFR 50, Appendix B, Criteria VI.

For corrective action the licensee issued Revision 12 to EN DES - EP 4.02 on February 3, 1983, to require that any EN DES Engineering Support Branch which initially reviewed the ECN must review the voidance of the ECN. Also, an unresolved safety question determination (USQD) under EN DES - EP 2.03 is required to determine if there are any safety impacts on other ECNs.

An investigation into the ECNs which might have previously been voided without proper review has been completed by TVA. Surveys of voided ECNs for the Watts Bar plant revealed that no problem exists.

The resident inspector concluded that these corrective actions would preclude improper voidance of an ECN with possible adverse safety effects. This item is closed.

- h. (Closed) LII (CDR 390/82-86; CDR 391/82-82) Temperature Specification for Containment Purge Isolation Valves - WBRD-50-390/82-86, WBRD-50-391/82-82. The licensee reported this matter as a 10 CFR 50.55(e) deficiency on August 19, 1982. In TVA Final Report dated September 16, 1983, the licensee stated the determination that 10 CFR 50.55(e) does not apply. The valve manufacturer issued a revised certified design specification showing the valves qualified for the minimum operating temperature; so there is no adverse implication to safety.

This item is closed.

- i. (Closed) LII (CDR 390/83-10) Summation of Loads in STRUDL Code - WBRD-50-390/83-10; WBRD-50-391/83-09. On February 15, 1983, the licensee reported that misinterpretation of computer results from dynamic analysis incorrectly combined static and dynamic loads with unconservative results. NCR WBN SWP 8310 was issued.

Review of calculations for Watts Bar platforms under ECN 3850 determined that only one reactor building access platform in Unit 1 required modification to strengthen it. Drawings 48N905 R 33 and 48W905-3 R 3 were issued under the ECN for Unit 1.

The senior resident inspector inspected modifications to the platform, consisting of the addition of three 4" x 4" tubular braces, and found the installation acceptable.

This item is closed for Unit 1.

- j. (Closed) LII (CDR 390/83-29; CDR 391/83-29) Incorrect Maximum Pipe Movements - TPIPE Program - WBRD-50-390/83-29; WBRD-50-391/83-29. The licensee on May 4, 1983, reported a 10 CFR 50.55(e) deficiency disclosed by NCR GEN CEB 8303. The concern was that unscaled seismic anchor movements could result in unconservative displacement data being placed on support load tables.

In a final report dated September 22, 1983, TVA described resolution of this design concern by review of previous TPIPE cases using more conservative stress data. Earthquake induced displacements were combined with deadweight and thermal movements to yield the maximum pipe movement. The reanalysis required no revision of previously calculated displacements; so it was concluded no conditions adverse to the safety of the plant existed and 10 CFR 50.55(e) was not applicable.

The resident inspector reviewed the reports and judged the licensee's corrective actions to be conservative and acceptable.

This item is closed.

- k. (Closed) LII (CDR 390/83-33; CDR 391/83-33) Meriam Instruments' QA Program - WBRD-50-390, 391/83-33. On May 10, 1983, the licensee reported that NCR WBN Audit 83V-37, Deficiency 1, had disclosed that orifice plates obtained from Meriam Instruments Company on Contract 73C38-83520-1 had not been subjected to the required quality assurance program.

To assure that the orifice plates could be utilized as designed and fabricated, TVA required Meriam to certify the following information: (1) the ASTM grade of materials used in the manufacture of the subject orifice plates; (2) the identification of instruments used to measure bore diameters and the tolerance of noted equipment; and (3) a sample

verification of bore design hand calculations previously submitted versus current calculations to determine the adequacy of the design procedure.

The vendor provided the certification required for (1) and (2) in a response letter to TVA dated July 15, 1983. A comparison of design calculations for (3) was submitted in Meriam's letter to TVA dated July 20, 1983. As a result of these submittals and TVA's technical review, TVA determined that the subject orifice plates satisfy the technical requirements of the contract and that bore calculations were within the range necessary to meet the desired accuracy of orifice plates required by TVA's system designs.

Corrective action for this deficiency is complete and TVA has committed to verify implementation of quality assurance requirements in future procurements of safety-related orifice plates. This item is closed.

1. (Closed) LII (390/79-22-01) Defective Red Head Concrete Anchors. The license reported on March 19, 1979, that defective anchors might have been used on supports for safety-related items. This notice was initiated by a letter from the manufacturer on March 12, 1979, stating that certain anchors supplied to TVA did not meet specifications. On March 21, 1979, NCR 1433 R was issued to isolate unused anchors, and to locate and test those already installed. Testing indicated the probability of a high failure rate on the installed anchors, as stated in TVA's Final Report, dated June 26, 1979. Memorandum WBN '80 0417 013 sets forth the provisions for inspection of 4,042 identified suspect anchors. Eleven anchors were inaccessible for testing.

Due to a total rework/reinspection program which was instituted for pipe supports during 1980 and an intensive training/indoctrination program of craft personnel concerning the defective anchors, the craft personnel identified and performed corrective action for the defective anchors as part of the rework program.

NCR 1433R was closed out on September 29, 1983, on completion of the certification that accessible anchors had been identified, tested and replaced as required for Unit 1. A programmatic system is being implemented for closure of the NCR for Unit 2.

A massive reevaluation of anchors at Watts Bar under IE Bulletins 79-02 and 79-14 has been carried out.

The resident inspector has reviewed the documentation for the subject LII and found it acceptable.

This item is closed for Unit 1.

9. Followup on IE Bulletin

(Closed) IE Bulletin 80-20 (80-BU-20) Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches

The subject bulletin was transmitted to TVA by letter dated July 31, 1980. The bulletin required the licensee to identify the safety-related system using the switches and the total number of switches so used.

In letter of December 12, 1980, the licensee stated that 135 switches were being used in safety-related systems at Watts Bar. By letter of June 2, 1982, the circuits and systems in which 67 safety-related switches per unit were located. Some of the switches did not have indicating lights. Replacements were obtained through Westinghouse. By TVA memorandum dated October 3, 1983, the construction project manager notified the design project manager that all construction work identified by IE Bulletin 80-20 had been completed under ECN 3306.

The bulletin is closed for Watts Bar.