UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-390/84-35 and 50-391/84-33

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 Date: April 21 - May 25, 1984

Inspection at Watts Bar site near Spring City, Tennessee

Inspectors: P. K. Andrews Jr 6/20/84
M. B. Shymlock Date Signed

P. K. Andrews Jr 6/20/84
W. B. Swan Date Signed

P. K. Andrews Jr 6/20/84
W. E. Holland Date Signed

Accompanying Personnel: George Maxwell and Morris Branch

Approved by: P. K. Andrews Jr 6/20/84
C. A. Julian, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine inspection involved 367 resident inspector-hours on site in the areas of licensee action on previous enforcement matters, TMI task items, followup on licensee identified items, IE Bulletin close out, engineered safety features test witnessing, loss of offsite power test witnessing, comparison of as-built plant to FSAR description, control room design review, independent inspection effort and plant tours.

Results: No violations or deviations were identified in the ten areas inspected.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. T. Cottle, Plant Manager
*G. Wadewitz, Construction Project Manager
H. B. Bounds, Superintendent (Maintenance)
S. Johnson, Jr., Quality Manager, Construction
*E. R. Ennis, Assistant Plant Manager
D. C. Williams, Nuclear Licensing Unit Supervisor
W. L. Byrd, III, Preoperational Test Supervisor
*R. H. Smith, Preoperational Test Assistant Supervisor
R. Norman, Operations Supervisor
B. S. Willis, Engineering Supervisor
*T. W. Hayes, Nuclear Licensing Unit Supervisor
*J. W. Coan, Office Engineering Design and Construction, (PMO)
*R. C. Sauer, Plant Compliance Supervisor
R. T. McCollom, Nuclear Power Compliance Staff
*J. E. Englehart, Nuclear Power Compliance Staff, Engineer
K. K. Napier, ENDES Licensing Staff
J. Baumgarter, ENDES (EEB-OIS)
D. P. Ormsby, Nuclear Licensing Staff
D. J. Record, Watts Bar Special Projects
C. R. Cook, Operations
J. A. Martin, ENDES (EEB)
J. L. Dorris, ENDES (EESB, WB Project)
D. E. Fincher, ENDES (EESB)

2. Exit Interview

The inspection scope and findings were summarized on May 29, 1984, with those persons indicated in Paragraph 1 above.

3. Licensee Action on Previous Enforcement Matters (92702)

(Closed) Violation 390/84-20-04, Failure to include provisions for assuring that all prerequisites for the given test have been met.

The inspector verified that proper immediate action was taken to correct the breaker lineup deficiency. Additionally, tags identifying equipment associated with the test were conspicuously placed to inform responsible personnel to clear repositioning of equipment through the test director.

The licensee also took additional corrective steps including counseling of responsible test personnel in the necessity to either personally verify that all conditions stated in the prerequisites have been met or to have the person or persons performing the verification sign the prerequisite step. The inspector considers this action to be adequate.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. TMI Task Action Items

a. (Closed) TMI 390/80-RD-01, Shift Technical Advisor to Provide On-shift Advice (Item I.A.1.1).

An evaluation of the subject item (NUREG 0737, Item I.A.1.1) was conducted by the inspector as it applies to Watts Bar. As a result, the inspector observed that TVA has adequately addressed the concerns identified in the NUREG. TVA has an administrative instruction (AI 2.16, Shift Technical Advisor) supplemented by a draft copy of the Technical Specifications (TS) Section, 6.2.4, which clearly specifies the qualifications and requirements for the Shift Technical Advisor (STA). The inspector interviewed the responsible TVA supervisory personnel and noted that TVA currently has nine qualified STAs which will be assigned to man the plan whenever the plant is in Modes 1-4.

b. (Closed) TMI 390/80-RD-06, Shift and Relief Turnover Procedures to Ensure that Critical Plant Status is Transferred (Item I.C.2).

The inspector evaluated action taken by the licensee relative to NUREG 0737 and NUREG 0660, Item I.C.2. The inspector found that TVA's Administrative Instruction, AI 2.10 (Shift and Relief Turnover) adequately addresses the concerns identified in the NUREG. The subject NUREG item was also evaluated and documented in IE Inspection Report 83-27. The concerns identified in report 83-27 were evaluated and found to have been satisfactory addressed by TVA.

c. (Closed) TMI 390/80-RD-07, Shift Supervisor Responsibility (Item I.C.3).

The inspector evaluated TVA's Administrative Instructions, AI-2.1 (Authorities and Responsibilities for Safe Operation and Shutdown) and AI-2.10 (Shift and Relief Turnover) in conjunction with the draft copy of the TS Section 6. The evaluation was conducted to determine whether or not the requirements of NUREG 0660, Item 1.C.3 have been addressed by the licensee. The evaluation revealed that the licensee has developed instructions which provide direction to the operations staff concerning the Shift Supervisor's responsibilities. The instructions clearly describe responsibilities and authority provided to the shift supervisory personnel.

d. (Closed) TMI 390/80-RD-09, Procedures for Feedback of Operating Experience to Plant Staff (Item I.C.5).

The inspector evaluated the licensee's procedure which has been developed (WB 6.3.13, Nuclear Operations Experience Review Program) to assure compliance with NUREG 0737, Item I.C.5. The procedure was found to adequately address the concerns identified in the NUREG. The implementation of WB 6.3.13 will be evaluated as a part of the routine inspections at the Watts Bar project.

e. (Closed) TMI 390/80-RD-16, Direct Indication of Relief and Safety Valve Position (Item II.D.3).

The safety evaluation report (SER) (NUREG 0847) states that the valve position indication, alarms, and environmental and seismic qualification of components for the subject valves conforms with NUREG 0737 requirements. The inspector verified that the power-operated relief valves have valve position indication provided by stem mounted indicators and downstream accoustic monitoring displayed in the control room for each valve. The inspector also verified that the pressurizer safety valves have temperature sensors and acoustic monitoring sensors installed downstream of each valve which provide indication and alarms in the control room.

f. (Closed) TMI 390/80-RD-21, Isolation Dependability of Containment Systems on Diverse Signals (Item II.E.4.2).

The inspectors evaluated the licensee's responses to NUREG 0737 (Item II.E.4.2) and observed the status of confirmatory tests which the licensee has conducted with respect to the containment vessel pressure and leak testing. The confirmatory tests which have been conducted include: TVA-2A, TVA-2B, TVA-2C and TVA-41. The results of these tests indicate that the design and installation of the containment valves do automatically isolate the containment upon receipt of the appropriate signals (Phase A and/or Phase B isolation signals). Testing revealed that resetting of the isolation signal does not cause the isolation valves to re-position. The inspector evaluated the draft copy of the licensee's TS Section 3.6.1.9. The TS contained the necessary provisions to ascertain that containment isolation purge valves, which do not satisfy the operability criteria of Branch Technical Position CSB 6-4, are verified to be closed at least every 31 days.

g. (Open) TMI 390/80-RD-52, Final Recommendations B and O Task Force (Item II.K.3).

The inspector reviewed the licensee's action on Item II.K.3.9 (PID Controller Modification). The action included elimination of the derivative action from the controller by setting the derivation time constant to off (zero). This action is considered adequate.

The inspector reviewed the licensee's action on Item II.K.3.12 (Anticipatory trip on turbine trip). Watts Bar has an anticipatory reactor trip on turbine trip when reactor power is above 50%. Amendment 49 to the FSAR addressed the above trip and the P-9 permissive above 50% power. The inspector considers this action as adequate.

The inspector reviewed the licensee's response on Item II.K.3.25 (Power on pump seals). The SER, paragraph 9.2.2 stated that water systems cooling RCP seals are automatically powered by the emergency diesel generators in the event of ss of offsite power which is acceptable. The inspector verified the above condition and found it acceptable.

h. (Closed) 390/84-80-01, Shift Manning Requirements.

The inspector evaluated the licensee Administrative Instruction, AI-2.1 (Authorities and Responsibilities for Safe Operation and Shutdown), and applicable sections (6.22) of the draft copy of the TS. TVA has made the required additions to assure that when required by NUREG 0737 (TMI Item I.A.1.3), the control room will be manned by at least one SRO and allows the necessary freedom to the shift supervisor to make routine inspections outside the control room. The shift supervisor is also required to be a licensed SRO.

6. Followup on Licensee Identified Items (92700)

a. (Closed) CDR 390/81-23; CDR 391/81-22, Discrepancy In As-Built Versus As-Analyzed Piping Systems - WBRD 50-390/81-23; WBRD 50-391/81-22.

Initial notice on this problem was given by the licensee on February 26, 1981, under NCR WBN SWP-8108. Later notice was given that NRC WBN SWP-8148 would also be used and that actions on both would be tracked under NCR 3730 R1. In all, 23 engineering change notices (ECNs) were utilized by EN DES in identifying and resolving discrepancies. The specific class of problem was inadvertent incorrect positioning of hangers. Isometric drawings of systems designated support locations based on computer analysis. Because of interferences and other considerations, construction drawing locations sometimes varied. Construction Specification G-43 allows an acceptable relocation tolerance from the analyzed point; however, some support drawings specified locations outside this tolerance. The isometrics had been updated only if the system piping analyses were changed. On May 22, 1984, the on-site Hanger Engineering Unit verified that all hanger relocation problems under the ECNs had been resolved and physical changes made. As an example, two supports for the safety injection system, 63-1515-R104 and -R212, were identified as improperly located. Corrections were completed and accepted on August 4, 1983.

b. (Closed) CDR 390/82-88; CDR 391/82-84, Control of Engineering Support Branch Analysis Calculations - WBRD 50-390/82-88; WBRD 50-391/82-84.

On August 23, 1982, the licensee reported that 30 piping analysis calculations, based on preliminary criteria, had not been documented in accordance with procedure EN DES - EP-3.03 and were therefore unavailable for the required review. Additionally, flange calculations were omitted from some piping analysis calculation packages. For corrective action, TVA reanalyzed the piping calculations, with finalized criteria including those for flange analysis; the calculations were reviewed and sent to document storage. EN DES designers were provided training on EP-3.03 requirements.

The senior construction resident inspector found that adequate controls had been established to assure review of calculations and retrievability of records. No rework of field hardware was found necessary during the verification reanalyses.

c. (Closed) CDR 390/83-38; CDR 391/83-38, HPFP Piping Water Danger to Shutdown Board Transformers After Earthquake - WBRD 50-390/83-38; WBRD 50-391/83-38.

The subject deficiency was reported to the NRC on June 16, 1983, under NCR WBN 8309. Corrective design was completed under Engineering Change Notice 4038, closed on March 3, 1984.

On May 19, 1984, the senior resident construction inspector inspected all HPFP piping adjacent to and over the shutdown boards and transformers on elevation 772 of the Auxiliary Building. The supports and restraints were properly spaced, conservatively designed and correctly installed.

d. (Closed) CDR 391/83-42, HPFP Pipe Not Seismically Supported Over SIS Pump - WBRD 50-391/83-42.

The subject deficiency was initially reported on July 11, 1982, as NCR WBN WBP-8308. The availability of the SIS pump could not be guaranteed in a seismic event which could release a spray of water onto the pump.

The licensee determined to assure pressure boundary integrity and position retention by seismically supporting piping in the SIS pump rooms in accordance with TVA drawing 47W491-18, R4.

On April 10, 1984, on-site Hanger Engineering Unit B certified that: "All work required to seismically support the HPFP piping on the SIS pump rooms has been completed and that corrective actions for this item were completed for both Units 1 and 2."

On May 19, 1984, the senior resident inspector-construction examined the supports and restraints for HPFP piping in SIS pump rooms 1A, 1B, 2A, and 2B. The inspector found that the supports and restraints were conservatively designed and correctly installed for both Units 1 and 2.

e. (Closed) LII CDR 390/81-101; CDR 391/81-95, Control Room Habitability - WBRD 50-390/81-101; WBRD 50-391/81-95.

The operations inspector reviewed NCR WBN SWP 8101 along with its supporting documentation. Additionally, the inspector verified that concerns expressed in paragraph 13.W of Inspection Report 50-390/83-27 and 50-391/83-19, regarding differences between the as-built system and the system described in the licensee's Second Revised Final Report to the NRC were corrected. Specifically, Revision 3 of the Final Report dated September 6, 1983, corrected items 1 and 3 of the inspection report concerns and items 2 and 4 were inspected to verify adequate correction of a gasket and chlorine detector problem.

The inspector did question the logic of locating the chloride (CL) detector downstream of the valves that the detector automatically closes, in that after isolation, the CL monitor would be monitoring an area not representative of the CL source; but after reviewing system logic diagram 47W611-31-1, R10, the inspector verified that the isolation valves would not automatically open after downstream conditions improve. Additionally, the inspector reviewed Abnormal Operating Instruction, AOI 32 (Chlorine Release) and verified that the chloride concentration indicated by the isolated monitor would not be utilized as a reference for when to manually unisolate the system.

f. The following licensee identified items previously reported to the NRC have been determined by the licensee to be non-reportable under 10 CFR 50.55e:

- CDR 50-390/84-42, HFFP Pipe Not Seismically Supported Over SIS Pump

- CDR 50-390/83-65, CDR 50-391/83-60, Environmental Qualification of Mechanical Equipment

- CDR 50-390/84-17, CDR 50-391/84-17, Discontinuities on Shear Lug to Piping Welds.

7. IE Bulletin Closeout (92703)

a. (Closed) IE Bulletin 79-BU-03 (390/79-BU-03, 391/79-BU-03), Longitudinal Weld Defects in ASME SA-312 Type 304 Stainless Steel. 79-BU-03, was superseded by 79-BU-03A, which has been closed thus also closing the original bulletin.

b. (Closed) IE Bulletin 83-08 (390/83-BU-08, 391/83-BU-08), Electrical Circuit Breakers With An Undervoltage Trip Feature Used in Safety-Related Applications Other Than Reactor Trip System.

The licensee reported that the subject equipment is not used in safety-related circuits other than as reactor trip breakers. This was stated in their March 29, 1984 response.

8. Engineered Safety Features (ESF) Test Witnessing (70315)

The inspectors witnessed portions of the ESF Test (W3.1F, Integrated Engineered Safety Features Actuation Test) for Unit 1. The test was being conducted to demonstrate proper operation of plant systems and equipment in response to Unit 1 ESF Actuation Signals (Safety Injection, Phase A Containment Isolation, Phase B Containment Isolation and Containment Spray).

The test was divided into three sections with each section requiring ESF actuation. The first section simulated a loss of all Train "A" AC and DC power. The second section simulated a loss of all Train "B" AC and DC power. The third section simulated a loss of off-site power. The inspectors reviewed the official copy of the test procedure and verified that the test instructions were being accomplished as required by administrative instructions. The inspectors witnessed the second and third sections of the test with regards to the actual initiation of ESF activation (Safety Injection and Phase B Containment Isolation Switches placed in "Activate").

The inspectors observed that all ESF components appeared to operate properly. The inspectors also observed that test deficiencies were properly documented and dispositioned in accordance with administrative procedures.

No violations or deviations were identified during this inspection.

9. Loss of Offsite Power Test Witnessing (70316)

The inspectors witnessed portions of test number TVA-13BRT (Onsite AC Distribution System Test) for Unit 1. The test was being conducted to confirm that for an ESF (Safety Injection Initiation) in conjunction with a loss of offsite power (Blackout) that the emergency diesel generators will start and tie to the shutdown boards, that the required loads will be sequenced onto the diesels and that voltage and frequency will not vary beyond design limits.

The inspectors witnessed the section of the test in which power train 1B had to respond to a simultaneous blackout and safety injection initiation under full flow conditions. The inspector observed that all ESF components on power train 1B appeared to operate properly. Test control was being exercised in a good manner between unit operators and the test director.

No violations or deviations were identified during this inspection.

10. Comparison of As-Built Plant to FSAR Description (37301)

a. Auxiliary Feedwater System

On May 9-11, 1984, the inspector conducted a walkdown of the Auxiliary Feedwater (AFW) system for Unit 1. The AFW system was inspected for conformance with TVA drawing 47W803-2, Rev. 19 (Flow Diagram-Auxiliary Feedwater). During the inspection, the following discrepancies were

noted:

(1) The following valves did not have identification tags at the time of the inspection: 03-352A, 359A, 321A, 805, 814, 816, 832, 833, 859, 861, 862, 872, 873, 874, 891, 892, 896, 906, 921, 922, and FCV126B.

(2) Flow Element 3-131 and associated valves 3-930 and 3-931 were not installed in the system.

(3) Instrument Root Valves 932, 933, and 934 are tagged as valves 370, 371, and 372, respectively in the system.

(4) A power cable for FCV1-15 was not properly installed to its stuffing tube fitting.

The preceeding deficiencies were discussed with the licensee and are identified as inspector followup item 390/84-35-01.

No violations or deviations were identified in this area.

b. Essential Raw Cooling Water System (ERCW)

The inspector conducted a walkdown of the accessible portions of the ERCW system located in the ERCW pump house and the Emergency Diesel Generator Building. The ERCW system was inspected for conformance with TVA drawing 47W845-1, Rev. 22 (Mechanical Flow Diagram-Essential Raw Cooling Water System). During the inspection, the following discrepancies were noted:

(1) The outer edge of gasket for valve 2-67-505A is torn and gasket appears brittle.

(2) The ERCW discharge thermometers for all eight diesel generator coolers are oriented so that they are not visible to the operator.

(3) Valve 2-67-510A which is the discharge isolation for DG cooler 2A-1 has a label plate that states it is the discharge isolation for DG cooler 2A-2.

(4) During an internal inspection of check valve 0-67-503B, the inspector noted a 4-inch long piece of white rubber-like material stuck in the check valve spring. The material was pre-formed and appeared to be a piece of valve seat gasket material. The maintenance system engineer at the job site was questioned as to the possible source of the material. His reply indicated that he could not determine the source.

(5) ERCW pumps E-B and F-B were noted as having squeaking bearings.

(6) ERCW pumps B-A, D-A, G-B and H-B were disassembled for anti-rotation work.

(7) ERCW pump C-A was noted as having condensate dripping from the motor cooler.

The above items were discussed with the licensee and are identified as inspector followup item 390/84-35-03.

No violations or deviations were identified during this inspection.

11. Independent Inspection Effort (92706)

a. The inspector conducted a review of the preoperational test program with respect to test requirements as outlined in Chapter 14 of the FSAR. The review was conducted to determine if all of the testing and acceptance criteria listed for selected tests from Table 14.2-1 in Chapter 14 of the FSAR was addressed. The inspector concluded that all safety related structures, systems, and components are tested as outlined in Regulatory Guide 1.68 (11/73); however, the licensee was asked to conduct a review of each test listed in FSAR Chapter 14, Table 14.2-1 and verify that all test prerequisites and all test objectives, summary of testing and acceptance criteria listed for each test are included in the respective test. This item is identified as inspector followup item 390/84-35-02.

No violations or deviations were identified during this inspection.

b. Control Room Ventilation Chlorine Monitor

During a review of licensee corrective action for CDR 390/81-101 and 391/81-95, the inspector noted a discrepancy between the installed system and the FSAR description contained in Section 9.4.1.1. Section 9.4.1.1 of FSAR states, in part, "Indicators are provided with the chlorine detectors... Main Control Room annunciation is provided for each... detector." The actual installation does not provide for quantitative indication; however, there is an alarm light on the instrument as well as an annunciator in the control room.

This item is identified as IFI 390/84-35-04 and will require licensee resolution of the discrepancy.

No violations or deviations were identified.

c. The senior resident inspector-construction, by review of construction project management reports, and discussions with QA-QC and construction supervisors kept abreast of the licensee's construction progress and work schedule changes. During this period, the licensee realigned his trades and labor force between Units 1 and 2 from the previous 10% assigned to Unit 2 and 90% to Unit 1 and common, to 33% on Unit 2 and 67% on Unit 1 and common. Unit 1 work was concentrated on completing

remaining items required for fuel loading. Unit 2 work was largely on nonsafety-related structures and systems.

12. Review of Control Room Design

On May 22, licensee personnel met with the resident inspector and reviewed Appendix D of the Watts Bar SER NUREG 0847. Several problems were encountered while conducting this review.

(1) Relating the Appendix D item number to sperific work conducted per an Engineering Change Notice (ECN) and Commitment Tracking Record (CTR).

(2) Determination of actual work conducted per an ECN or CTR.

(3) Instrumentation placement error (i.e., Steam and Feedwater flow recorder, wide and narrow range reversed order) and the ability for tracking back to a specific ECN or CTR for corrective action.

The licensee is reviewing this area and gathering the information to adequately address these concerns. This item is identified as inspector followup item 390/84-35-04.

13. Plant Tours (71302)

The senior resident inspector-construction made routine surveillance tours of work and working conditions in Unit 2 Containment and the Auxiliary Building.

Two inspection tours were made of Unit 1 security controlled facilities in response to concerns about housekeeping and maintenance of safety of in-place equipment. The inspector found that equipment and personnel were being adequately protected, that walkways were clear of obstructions and measures had been taken to keep water and oil off the floors. Unavoidable inconvenience and congestion were caused by the machines and hoses required by the insulators and sealers, and by the welding machines and equipment required for pre-operational testing. During a day's time about 1,000 construction personnel and 300 nuclear power test and maintenance employees were working in the Unit 1 Containment and Auxiliary Building. No violation of housekeeping requirements or safety hazards were identified during these tours.