UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-390/79-26 and 50-391/79-22

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

Facility Name: Watts Bar Nuclear Station

Docket Nos. 50-390 and 50-391

License Nos. CPPR-91 and CPPR-92

Inspection at Watts Bar Site near Spring City, Tennessee

Inspector: B. J. Cochran — Date Signed 7/16/79

Approved by: F. S. Cantrell, Acting Section Chief, Reactor Projects Section No. 1 — Date Signed 7/16/79

SUMMARY

Inspected on May 29 - June 29, 1979

Areas Inspected

This routine, resident inspection involved 119 inspector-hours onsite in the areas of storage of safety related components, pipe supports and restraints, welding of safety related piping, termination and pulling electrical cables, fire protection equipment, outdoor storage of material and components, testing of concrete, hydro test of main steam and feedwater piping, testing the diesel generator starting air system, reviewing radiographs, glass blasting of the Unit 2 reactor cavity and refueling water storage tank, repair of damaged cables and hi potting installed power cables.

Results

Of the areas inspected, no apparent items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted

   Licensee Employees

   *T. B. Northern, Jr., Project Manager
   *S. Johnson, Assistant Construction Engineer
   *A. W. Rogers, Supervisor QA
   *C. O. Christopher, Assistant Construction Engineer (Civil)
   *R. L. Heatherly, Supervisor, QC&R Unit
   J. H. Perdue, Supervisor, Electrical Engineering Unit
   J. M. Lamb, Supervisor, Mechanical Engineering Unit
   *H. C. Richardson, Construction Engineer
   *J. G. Shields, Assistant Construction Engineer
   J. E. Treadway, Construction Superintendent
   W. C. English, Assistant Construction Superintendent

   Other licensee employees contacted included construction craftsmen, technicians, security force members, and office personnel.

   *Attended exit interview

2. Exit Interview

   The inspection scope and findings were summarized on June 1, 8, 15, 22, and 25, 1979, with those persons indicated in Paragraph 1 above. The resident inspector met with the licensee construction project manager and engineering supervisors each week to review the resident inspector's activities and findings. No items of noncompliance or deviations were identified.

3. Licensee Action on Previous Inspection Findings

   These items were not examined during this inspection period.

4. Unresolved Items

   There were no unresolved items identified during this inspection.

5. Independent Inspection Effort (Units 1 and 2)

   a. During this inspection period the following non-programatic construction activities were inspected, observed or witnessed:

      1) Outdoor fire equipment buildings, each building contains one mobile fire hose reel, a fire axe, two hose nozzles, and an Ansul mobile extinguisher.

2) Outdoor storage of stainless steel pipe and pipe hangers.

3) Installation of electrical equipment in the Hypochloride building.

4) Testing of concrete in the wall of RHR pump room 1AA. Strength of core samples tested within acceptable limits.

5) Reviewed CB&I radiographs of welds on the CVCS holdup tanks.

6) Inspected two cables found damaged. One two conductor cable (2-3PL-30-3062-R) installed in cable tray between nodes 3B2343 and 3B2361 was found with both conductors cut. Another two conductor cable (1-3V-67-6222-A) in the Unit 1 480 volt shutdown board (1-BD-212-A1A) was found with the insulation damaged. The cables were nonconformed.

7) Observed the hot hydro test of Unit 1 main steam and feedwater piping.

8) Observed the flush of the Unit 1 RHR system into the reactor vessel and refueling cavity.

9) Observed the resetting of the Unit 1 reactor vessel head on the vessel in preparation for continuing installation of the upper head injection system and ventilation ducts. The polar crane digital dynamometer indicated the lifting weights of 145 tons.

10) Observed glass blasting of the Unit 2 reactor refueling cavity liner.

11) Observed the refacing the seat of the upper head injection flow control valve (1-FCV-87-21).

12) Witnessed the repair of cable (1-5PP-82-470-A) damaged when craftsman drilled into tray. Repairs were in accordance with the TVA standard splicing medium voltage insulating conductors, SD-E12.5.3 using a 3M cable repair kit.

13) Witnessed the hi-potting of Unit 1 safety injection system pump 2A power cable (2-5PP-63-600-A) at 30,000 volts.

14) Observed the glass blasting of the Unit 2 refueling water storage tank.

15) Observed the testing of the diesel generator starting air system by pressurizing the system to 300 psi and checking all fittings for leaks.

Within the areas inspected no items of noncompliance or deviations were identified.

b. The following Watts Bar QA audits were examined:

1) WB-G-79-07, Documentation of Inspections, Tests, and other Activities Performed

2) WB-G-79-08, Preparation and Documentation of Seismic Support Variances

3) WB-G-79-09, Production Lot Acceptance of Expansion Type Anchor Bolts

4) WB-W-79-04, Site Radiography

5) WB-M-79-06, Tests and Inspections for ASME Section III Piping Systems

6) WB-M-79-07, TVA Surveillance of NSSS Vendor Site Activities

7) WB-C-79-03, Fabrication and Inspection of QA Miscellaneous Steel

6. Licensee Identified Items

a. (Closed) Item Nos. 390/79-08-04 and 391/79-05-04, Water Hammer in Main Feed Water Line (MEB 79-07) (10 CFR 50.55(e) Reports dated 3/7/79 and 5/21/79). TVA has completed a detailed study of the main feedwater check valves installed at Watts Bar Nuclear Plant. Evaluations of the check valves were made using two procedures. The first procedure compared the energy levels that the Watts Bar feedwater check valves are capable of sustaining with the energy levels that similar design check valves are capable of sustaining at several other TVA and non-TVA nuclear facilities. The second procedure of the evaluation consisted of analysis of the main feedwater check valve disc by equating the disc strain energy to the disc kinetic energy at closing. A fluid transient analysis of the pipe break/water hammer event was performed to determine the disc kinetic energy at closure. This evaluation shows the closing kinetic energy to be less than the potential strain energy capacity of the disc, and a stress slightly above yield at the disc center. This study has shown that the main feedwater line break check valves at Watts Bar would maintain their integrity and would continue to function as designed following the most severe main feedwater line break postulated. Based on these studies and analyses, TVA is satisfied with the adequacy of the Watts Bar main feedwater check valves to perform their intended function under all expected accident conditions.

b. (Closed) Item Nos. 390/79-04-02 and 391/79-03-02, Pipes Embedded in Structural Concrete (CEB A-2) (10 CFR 50.55(e) Reports dated 2/8/79 and 6/15/79). The structural integrity of the affected structures was evaluated, and it was concluded that the structural capacities would not be impaired by embedded pipes having been subjected to pressure greater than 200 psi. The piping systems were designed, fabricated,

and tested in accordance with recognized piping codes, either with ASME Code, NFPA Code, or ANSI Codes, as specified by the design documents. Use of these codes gives assurance of the structural adequacy and leak tightness of the embedded pipes. Therefore, TVA intends to use the pipes as constructed. The seismic category I structures affected are the intake pumping station, diesel generator building, and auxiliary building. The results of the investigations indicate that the integrity of the structures and the piping systems were not degraded. Therefore, had the deficiency gone uncorrected, the safety of operation of the plant would not have been adversely affected.

c. (Open) Item Nos. 390/79-26-01 and 391/79-22-01, Containment Building Pipe Penetrations (CEB-79-23)

On June 8, 1979, TVA notified the resident inspector of a possible 50.55(e) item concerning the design of the containment building pipe penetrations. The design analysis did not consider movement of the containment building in the negative direction following a LOCA.

d. (open) Item Nos. 390/79-26-02 and 391/79-22-02, ERCW Valves on the Discharge of the Component Cooling Water Heat Exchanger (MEB 79-23)

On June 7, 1979, TVA notified the resident inspector of a potential 50.50(e) item concerning the ERCW valves on the discharge of the CCW heat exchanger.

ERCW valves A&B on the discharge of the CCW heat exchanger "C" receive automatic opening signals on initiation of a safety injection system signal. On loss of power there is insufficient ERCW flow for both A & B supplies.

e. (Open) Item Nos. 390/79-26-03 and 391/79-22-03, Reactor Vessel Lower Head Insulation (CEB 79-21)

On June 7, 1979, TVA notified the resident inspector that the Watts Bar reactor vessels are subject to the same potential damage as described in IE Information Notice 79-11.

f. (Open) Item Nos. 390/79-26-04 and 391/79-22-04, "Design of Spring Pipe Supports" (SWP-79-W-A)

On June 5, 1979, TVA notified RII of a potential 50.55(e) item concerning the design of the spring pipe hangers. The designers did not consider the sum of the thermal and safe shutdown earthquake deflections in the design of some spring pipe supports. Spring supports were selected based only on thermal deflections in accordance with ANSI B 31.1 and pipe support vendors spring selection instructions. TVA is analyzing the matter to insure their hangers will support both seismic and thermal loadings.

g. (Open) Item Nos. 390/79-26-05 and 391/79-22-05, Pressurizer Surge Line Break Point Location

On June 14, 1979, TVA notified the resident inspector of a potential 50.55(e) item concerning the location of the break point on the pressurizer surge line. Westinghouse provided TVA with an analysis that indicates the pressurizer surge line break point is at a different location than initial design analysis indicated.

h. (Open) Item Nos. 390/79-26-06 and 391/79-22-06 Reciprocating Charging Pump Accumulator Bellows (CEB 79-24)

On June 14, 1979, TVA notified the resident Inspector of a potential 50.55(e) item concerning design deficiency for the bellows in the reciprocating charging pump accumulator.

i. (Open) Item Nos. 390/79-26-07 and 391/79-22-07, Electrical Junction Boxes in Containment (EEB79-8)

On June 16, 1979, TVA notified the resident inspector of a potential 50.55(e) item concerning the electrical junction boxes located in containment. The unventilated NEMA 4 junction boxes may not withstand the containment pressure following a LOCA.

j. (Open) Item Nos. 390/79-26-08 and 391/79-22-08, Deficiencies in the Penn Ventilation Company QA Program (QEB 79-3)

On June 15, 1979, TVA notified RII of a potential 50.55(e) item concerning the QA program of Penn Ventilation Company. During a recent audit of the Penn Ventilation Company QA program, TVA identified ten program deficiencies. The Penn Ventilation Company supplies safety related fans and ventilators.

k. (Open) 390/79-26-09, Barton Steam Generator Level Transformers

On June 13, 1979, TVA notified RII of a potential 50.55(e) item concerning the Barton supplied level transmitters. Westinghouse notified TVA that seven steam generator level transformers supplied by Barton for Unit 1 had failed the accuracy test following the high temperature and radiation environmental testing.

7. IE Bulletins

IE Bulletin 79-07 identified discrepancies in piping analysis computer codes. The licensee was requested to review his analysis and provide answers to RII. In response to bulletin questions, TVA advised that no analysis was performed using the Response Spectrum Model Analysis or Time History Analysis described in the IEB 79-07. In no instance was an algebraic technique used to combine pipe responses.

8. Safety Related Components (Observation of Work and Work Activities) (Unit 2)

Outdoor storage of stainless steel piping was inspected. All sections inspected had end caps, proper identification and were stored on dunage off the ground.

Safety Injection System Flow Control Valve 2-FCV-63-5 was inspected for proper installation. Valve and piping is installed in a horizontal run. The valve and piping was checked for level. Cable is pulled to motor operator but has not been terminated. Inspection verified that the valve is adequately protected.

Residual Heat Removal Heat Exchangers 2A and 2B, Containment Spray Heat Exchangers 2A and 2B, Motor Driven Auxliary Feed Water Pump 2-AA and 2BB, Turbine Driven Auxiliary Feed Water Pump 2-AS and the Boron Injection Tank 2A were inspected. All of the above equipment is installed with bases torqued and grouted. Pumps and motors (drivers) are not coupled and pipe is supported by temporary hangers.

Care is taken to protect the equipment from damage from dirt, debris, and construction activities.

Within the areas examined no items of noncompliance or deviations were identified.

9. Safety Related Pipe Support and Restraint Systems (Units 1 and 2)

For this inspection effort, pipe supports and restraints in the residual heat removal (RHR) heat exchanger and fuel pool cooling (FPC) pump areas were examined. The welding of structural members to embedded plates, the bolting of plates to the wall, floor or ceiling with anchor bolts, the alignment of structural members with the piping and the unique identification of the support and restraint were inspected.

The following fixed supports were inspected:

MK-74-1-RHR-R21
MK-74-1-RHR-R20
MK-74-1-RHR-R122
MK-74-1-RHR-R213
MK-74-1-RHR-R214
MK-74-1-RHR-R22
MK-74-1-RHR-R86
MK-78-1-FPC-R45
MK-78-1-FPC-R56
MK-78-1-FPC-R63
MK-78-1-FPC-R71
MK-78-1-FPC-R72
MK-78-1-FPC-308

The welds were performed by qualified welders according to welding procedure No. SM11-B-3. Inspection and documentation of the installed supports were performed in accordance with QCP 4.8. No bending or deformation was detected. Sliding supports are buttered to prevent the stainless pipe from rubbing against carbon steel. The supports are sized to permit freedom of movement.

The following spring supports were inspected:

MK-78-1-FPC-6
MK-78-1-FPC-V75
MK-74-1-RHR-V121
MK-74-1-RHR-V87
MK-74-1-RHR-V70

The restraints are set in place but have not been set for the hot and cold condition.

The following mechanical restraints were inspected:

MK-78-1-FPC-R48
MK-78-1-FPC-R49
MK-78-1-FPC-R37
MK-78-1-FPC-R55
MK-78-1-FPC-R74
MK-74-1-RHR-R19
MK-74-1-RHR-R88

The sliding members of the restraints are wrapped with plastic and tape to protect them from dust and construction debris.

All supports and restraints are individually identified by a metal plate welded to the structural member. Each plate is stamped with the unique identification number.

Within areas inspected no items of noncompliance or deviations were identified.

10. Safety Related Piping - Observation of Work and Work Activities (Unit 1)

The inspector observed non-welding work activities for safety related (SR) piping. The applicable code for installation of SR piping is TVA Class C, ASME Class 3.

a. Observation of specific work activities were conducted to determine conformance with inspection and/or work procedures, record keeping, installation specifications or plans, specified materials, specified NDE, calibration and use of proper test equipment, and qualified inspection and NDE personnel.

   1) Subassemblies 0-77-S-2-60, 0-77-S-2-59, 0-77-S-2-58 were inspected for proper identification and protection. Field weld operation sheets 0-77-F-501-75 and 0-77-F-501-77 for welds 0-077D-T035-17

and 0-077D-T036-17 were examined to confirm that inspection requirements were identified and inspection performed of the fitup activity in progress.

2) Subassemblies 1-67-S-30-22(78) and 1-67-S-30-21(78) in the ERCW to the control rod drive mechanism cooler piping were inspected. Field weld operation sheet 1-67-F-49-23 was examined for inspection hold points, material identification, weld and welder identification and NDE requirements.

b. The following piping "run" was inspected for compliance with installation specifications or plans.

Within the areas examined, there were no items of noncompliance or deviations identified.

11. Electrical (Cables and Terminations) Observation of Work and Work Activities (Unit 1)

Cable trays in the auxiliary building and cable spreading room were inspected for identification, segregation (control and power), sharp edges and burrs and cleanliness.

Installed cable in trays is protected from adjacent construction activities.

Observed the termination of the following cables:

Cable I.D.	Panel
1-CR-2551 1/3L 14AWG	1-PNL-99-R4
1-2PL-1-1601 1/3L 14AWG	1-PNL-99-R4
1-2PL-3-1155 1/3L 14AWG	1-PNL-99-R4
1-2CR-1-2545 1/3L 14AWG	1-PNL-99-R4
1-2PM-63-3874J 1/3C 14AWG	1-PNL-99-R3
1-2CR-68-2525 1/3C 14AWG	1-PNL-99-R2
1-2CR-68-2574 1/3C 14AWG	1-PNL-99-R2
1-2MN-92-578 1/2C 12AWG	1-PNL-99-R2
1-2PM-68-1042 1/3C 14AWG	1-PNL-99-R18
1-2CR-62-2716 1/3C 14AWG	1-PNL-99-R18
1-2PM-62-112 1/3C 14AWG	1-PNL-99-R18
1-2PM-30-1849 1/2C 12AWG	1-PNL-99-R7
1-2PM-30-1852 12C 12AWG	1-PNL-99-R7

Within the areas examined, there were no items of noncompliance or deviations identified.

12. Electrical (Components and Systems) Observation of Work and Work Activities - Unit 2

a. The control rod drive control panels, CRDM MG set switchgear, and reactor trip switchgear were selected for inspection.

Cabinets inspected were:

Solid State Power Cabinets -

2-PNL-85-L121	for control rod banks B&D and shutdown rod bank B
2-PNL-85-L119	for shutdown rod banks C & D
2-PNL-85-L118	for control rod banks A&C and shutdown rod bank A

Part Length Control Rod Cabinet -

2-PNL-85-L114

DC Hold Supply Cabinet -

2-PNL-85-L123

Control Rod Drive Logic Cabinet -

2-PNL-85-L122

Control Rod Drive MG Set Switchgear Cabinet -

2-PNL-85-L115

Reactor Trip Switchgear Cabinet -

2-PNL-85-L116

The cabinets are set in place and welded to embedded steel plates in the floor. Doors are kept closed unless work is being done inside the cabinet.

Cabinets and solid state components are kept clean and free from debris and dust.

b. Terminated Cables Inspected:

2-2RR-85-1256 1/3C 14AWG
2-2RR-85-1250 1/3C 14AWG
2-2RR-85-1195 1/3C 14AWG
2-2RR-85-1203 1/3C 14AWG

Cable screws are tight, ring type lugs are installed correctly, and cables are properly identified and laced in a good workmanship manner.

c. Cable storage areas inside the auxiliary building were inspected. Cables were stored on reels in designated approved storage areas. The areas were clean and cables properly protected.

d. Inspection of installed motors confirmed that all heaters were connected and in operation, as evidenced by indicating light. Motors are clean and protected from construction debris.

e. Control rod drive MG sets, 2-GEN-85 A and B and the Pressurizer Heater Supply transformer were inspected. The MG sets are set in place but have not been wired. The transformer has been set in place and filled with ASKAREL for protection. It has not been wired at this time.

Within the areas inspected no items of noncompliance or deviations were identified.