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

Report Nos.: 50-390/78-30 and 50-391/78-25

Docket Nos: 50-390 and 50-391

License Nos: CPPR-91 and CPPR-92

Categories: A2, A2

Licensee: Tennessee Valley Authority
830 Power Building
Chattanooga, Tennessee 37401

Facility Name: Watts Bar Nuclear Plant, Units 1 and 2

Inspection at: Watts Bar Dam, Tennessee

Inspection conducted: November 1-30, 1978

Resident Inspector: B. J. Cochran

Other Accompanying Personnel: A. R. Herdt (November 16, 1978)

Reviewed by: ARHerdt 12/18/78
A. R. Herdt, Chief Date
Projects Section
Reactor Construction and Engineering
Support Branch

Inspection Summary

Inspection on Novmember 1-30, 1978 (Report Nos. 50-390/78-30 and 50-391/78-25)
Areas Inspected: All phases of construction activities; status of licensee identified items; review of IE bulletins and unresolved items; electrical penetrations; construction fire prevention program; safety related piping (unit 2); reactor vessel internals (unit 1); welding of safety related piping (unit 2); electrical components (unit 1); reactor coolant pressure boundary piping; storage of components and equipment. The inspection consisted of 153 inspector-hours on-site by the resident inspector.
Results: No items of noncompliance or deviations were identified.

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DETAILS I

Prepared by: V.L. Brownlee for 12/15/78
B. J. Cochran, Resident Inspector Date
Reactor Construction and Engineering
Support Branch

Dates of Inspection: November 1-30, 1978

Reviewed by: V L Brownlee for 12/15/78
A. R. Herdt, Chief Date
Projects Section
Reactor Construction and Engineering
Support Branch

1. Persons Contacted

Tennessee Valley Authority (TVA)

T. B. Northern, Jr., Project Manager
S. Johnson, Assistant Construction Engineer
A. W. Roger, 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

The inspector also talked with craftsmen in their work areas and members of the engineering units.

2. Licensee Action on Previous Inspection Findings

(Closed) Infraction (390/78-24-01 and 391/78-21-01) "Piping Not Being Fabricated in Clean Areas".

The inspector has reviewed the licensee's response dated November 3, 1978 to this item of noncompliance.

TVA has revised WBNP-QCP-4.10 to more clearly define the intent of a "clean area" for pipe fabrication and to allow cleanliness inspections to be made in the fabrication areas. Personnel have been instructed in the use of the revised procedure.

This item is considered to be closed.

3. Unresolved Items

There were no new unresolved items identified during this inspection period.

4. Independent Inspection Effort

During this report period the inspector followed the construction of Units 1 and 2; storage of components and material; erection and installation of components, supports and equipment; base line inspection of the Unit 1 reactor vessel and concrete placement.

The inspector reviewed TVA audit reports WB-W-78-02 (Welding Surveillance and Weld Procedure Assignment), WB-G-78-13 (Print Room Control), WB-I-78-04 (Instrumentation Equipment Installation, Standard Test, Inspections and Documentation), WB-M-78-08 (Surveillance of NSSS Vendor Site Activities), and WB-G-78-15 (Release for Drilling, Chipping, Cutting of, or Welding to Permanent Structures of Components).

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

5. Licensee Identified Item

a. (Open) Item Nos. (390/78-30-01 and 391/78-25-01) Spacing of Cable Tray Supports

On November 22, 1978, TVA advised RII that the spacing of Category 1 cable tray supports was not in compliance with design criteria for bracing and supports. The licensee's report is due December 22, 1978.

b. (Closed) Items Nos. (390/78-26-02 and 391/78-22-02) "Safety Injection System Wiring Errors

The control circuitry for the emergency sump valves has been redesigned to permit the valves to isolate the raw water storage tank supply when that supply is depleted and automatically open the sump valves. This water from the sump is injected into the reactor to replace the coolant resulting from a loss of coolant accident.

This item is considered to be closed.

c. (Closed) Item Nos. (390/78-11-08 and 391/78-09-06) "Facility Cable Tray Support Installation - NCR/CAQR E-5"

As a result of questions regarding the adequacy of the electrical tray support plates to perform their required function if the center bolt is defective, TVA design engineering has analyzed six different bolt and base plate configurations. The result of their analysis confirms that if eight of the nine bolts in each support plate is properly installed, then the support will perform its intended function and will withstand the maximum shear and tension forces.

This item is considered to be closed.

d. (Open) Item Nos. (390-78-27-02 and 391/78-23-02) "Maldistribution of the ERCW Flow to CCS Heat Exchangers"

A qualified motor operator will be added to the existing manual valve and powered from emergency power train B to permit the operator to close the valve from the control room if power is lost on train A. Normally the valve will act as a throttle valve to balance flow through the heat exchangers during normal operation.

This item remains open until the motor operator is added.

e. (Closed) Item Nos. (390-78-27-03 and 391/78-23-03) "Inadequate Grounding of Temperature Indicator Controller"

An insulator has been placed between the fuse clip rivet and the instrument case to insulate the instrument against future shorts.

This item is considered closed.

f. (Closed) 50.55(e) (390/78-22-01 and 391/78-19-01) "Ice Condenser Structure Bolts Overtorqued"

Affected bolts were removed and the thread drilled out completely. A longer bolt was then used with a nut. This action will eliminate the possibility of weakened threads due to overtorquing. Westinghouse has also supplied TVA with corrected tensile loadings from which TVA calculated revised values for the rebolting. Westinghouse has performed tests and analysis and has demonstrated a similar situation does not exist at the Sequoyah Nuclear Plant.

This item is considered to be closed.

6. <u>Electrical Penetrations - (Units 1 and 2)</u>

There are three types of electrical penetrations for the Watts Bar Containment buildings; high voltage power, low voltage power, and instrumentation. Installed penetration assemblies and assemblies

stored in the warehouse were inspected. Of the installed assemblies, none were made up. All were protected from environmental and construction damage.

A review of TVA audit records identified two deficiencies regarding design qualification testing of prototype penetrations and overload and full current capacity tests. In answer to the deficiencies, design engineering stated that the procurement specification referenced the design qualification tests according to IEEE 317-1976 and that standard requires tests on representative penetrations according to service classification, and ratings testing was performed on Watts Bar modular type penetrations. Therefore, they concluded that the design has been qualified. The resolution of the second deficiency was that Westinghouse had performed heat dissipation tests on Watts Bar type penetrations and determined that the penetrations dissipate heat in excess of the maximum which will be experienced at Watts Bar. The final resolution was that the Watts Bar penetrations do meet the safety requirements and do not represent a hazard to the safe operation of the plant.

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

7. Fire Protection - Observation of Work and Work Activities (Units 1 and 2)

Safety related components and equipment are protected from fire damage by restricting the amount of combustible construction material within a given area. Wood scaffolding and forms are treated with an underwriter approved flame retardant. Flammable liquids are stored away from the construction area and only quantities needed for one day's use are allowed in the area; and housekeeping is a priority activity to prevent the accumulation of debris in any area. Fire watches are maintained on welding and cutting operations where fire potentials exist. Use of electrical heaters is controlled and limited to authorized use.

In addition to the aforementioned preventative measures fire prevention equipment is located in the pump houses, reactor, auxiliary, control, turbine and emergency diesel generator buildings, warehouses and outdoor storage areas. Inspection of the areas confirmed that water and ABC dye chemical portable extinguishers are readily available in all areas plus fire hoses equipped with fog nozzles installed inside the buildings and portable extinguishers and hose carts located in reel houses in the plant yard.

Discussions with the Public Safety Service Lieutenant Fire Fighter and examination of his records confirm that inspection and training requirements listed in the Watts Bar Construction Fire Prevention, Protection and Suppression Procedure, WBFI G-12, are being met.

Within the area examined, no items of noncompliance or deviation were noted.

8. Reactor Vessel Internals - Observation of Work and Work Activities (Unit 1)

The upper and lower reactor internals are in storage in their designated storage areas in the refueling canal with access and cleanliness controlled. Records confirm that inspections are performed monthly in accordance with WBNP-QCP-4.5, "Handling, Storage, and Maintenance of Permanent Mechanical Equipment". The internals are supported on supports fabricated in accordance with Westinghouse (W) drawing W-1195E29. TVA MMIPQ operations sheets 1-68-F-1-58 and 1-68-F-1-59 confirm that the internals lift frame was fabricated according to W drawing W-1141E17 and lifted in accordance with TVA Lifting Procedure WBNP-QCP-1.18. Records confirm that TVA has reviewed W installation procedures W-616-A- 407, W686-J-493, W-1141-E-17, and W-1188-E-24. W installation records confirm that the following attributes were performed in accordance with W procedures (616-A-407) and inspected:

- Installation of roto-lock inserts.
- Levelness of Core Barrel verified within ± 0.060 inch.
- Measurement of gap between clevis inserts and barrel to vessel nozzle.
- Distance from vessel surface to top of hold down springs and to core barrel assembly flange.
- Measurement of upper core plate insert gaps and head and vessel alignment pin gaps.
- Confirmed proper spacing of fuel assembly pins on upper and lower core plates.

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

9. Electrical (Components and Systems) - Observation of Work and Work Activities (Unit 1)

Electrical components selected for this inspection were: (1) Emergency Diesel Generator S/N 17401226-200, (2) 480 Volt Shutdown Board 1-BD-212-A-2-A, (3) 6900/480 Volt Shutdown Transformer 1-OXF-212-B2-B and 125 volt Vital Battery O-BAT-236-1-D. The inspection confirmed that the components were located and installed in accordance with the equipment

location drawings. Electrical hardware and cable storage areas were inspected and found to be in segregated areas, specially designated and controlled.

Inspection records confirm that the equipment is regularly inspected, the generators rotated, battery electrolyte measured, transformer fluid levels checked and shutdown boards checked for cleanliness. Inspection of the electrical measurement and test equipment records confirm that calibrations are maintained at the specified frequency and reference standards are traceable to bureau standards.

Drawings and specifications examined during this inspection were:

45-W-826-8 R5
45-W-826-9 R5
45-W-880-12BR3
45-W-880-12FR2
45-W-806-9 R3
45-W-814-9 R3
45-N-2226-1 R6
45-N-240 R5
45-N-244-1 R4
45-N-280-1 R5
45-N-280-2 R3
WBFI-E-9
WBNP-QCP-3.1
WBNP-QCP-3.5

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

10. Safety Related Piping (Welding) - Observation of Work and Work Activities (Unit 2)

Welding of pipe in the Chemical Volume Control System (CVCS) was selected for inspections during this period. Completed welds 2-063B-D197-13, 2-062B-D139-01, 2-062B-D136-02, 2-062B-D137-02, and 2-062B-D137-07 were inspected.

Documents examined during this inspection were:

a. Field Weld Operation Sheets: 2-63-F-20-13, 2-62-F-20-1, 2-62-F-25-2, 2-62-F-25-13, 2-62-F-25-7, and 2-62-F-26-2

b. Weld Procedures: GT-88-01, GT-88-C-2, GT-SM-88-0-1A.

c. NDE Procedures: VT-3.M.5.1, PT-3.M.1.1, RT-3.M.3.1

d. Delta Ferrite - 5.M.2.1(a)

e. Weld Checklist Procedures:

(1) Pre-Fitup Cleanness - WBNP QCP 4.10
(2) Fitup - P.S.I. M.1.2.(a)
(3) Oxygen Purge - P.S.I.M.1.2.(a)
(4) Preheat - P.S.I.M.1.2.(a)

Welder and NDE inspectors qualifications were confirmed.

In the area inspected, no items of noncompliance or deviations were identified.

11. Reactor Coolant Pressure Boundary Piping - Observation of Work and Work Activities (Unit 2)

Weld numbers 2-63-F-19-6A and 2-63-F-20-5 in the ten inch accumulator lines off loops 1 and 2 cold legs were selected for inspection. The completed welds, drawings, specifications and records were examined.

Records confirm that pipe was installed according to the isometric drawings, inspection was performed at all identified points of inspection, welds were made by qualified welders using a qualified weld and weld repair procedures, weld filler material was controlled according to procedures and all records were properly prepared and filed in a fire proof storage area. Records also confirm that all NDE was performed by qualified personnel according to Watts Bar NDE procedures.

Documents examined during this inspection were:

a. Drawings: 47W813-1
E-2882-IC-196
E-2882-IC-197
47-W-304-2

b. Field Weld Operation Sheets:
2-063B-D196-06A
2-063B-D197-05

c. NDE Procedures:
WBNP-QCP-4.13 R2

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

12. Safety Related Piping - Observation of Work and Work Activities (Unit 2)

Piping in the 1A1 Emergency Diesel generator fuel oil supply system was selected for inspection. The fuel oil supply systems for each diesel generator consists of one 68,000 gallon storage tank, embedded under the base of its associated diesel generator, two 550 gallon day tanks and connecting piping.

Welds 0-018B-T036-04, 0-018B-T036-01, 0-018B-T047-02, 0-018B-T047-01, 0-018B-T049-02, 0-018B-T049-01, 0-018B-T034-04, 0-018B-T034-01, 0-0-18B-T038-04, and 0-018B-T038-01 were inspected. Examination confirmed that the tanks and piping were installed in accordance with sketch TVA-586-3 Sheet 1B1 Rev. 1. The installed components are afforded adequate protection against adjoining construction activity.

Records confirm that inspections were performed by qualified inspectors according to qualified procedures. Weld material was issued and controlled according to procedures.

The following documents were examined:

a. Field Weld Operation Sheets - 0-18-F-6
0-18-F-5
0-18-F-2-39
0-18-F-2-38
0-18-F-2-46
0-18-F-2-45
0-18-F-1-2
0-18-F-1-1
0-18-F-1-10
0-18-F-1-9

b. Weld Procedures - GT-18-01 Rev. 5
GT-11-0-1A Rev. 3

c. Fitup Procedure - P.S.I.M.1.2.(a)

d. Cleanliness Procedure - WBNP-QCP-4.10R7

e. Preheat Procedure - P.S.I.M.1.2.(a)

d. Visual Inspection Procedure - WBNP-QCP-4.13 R2

g. Drawings - 47W840-1
17W585-1
17W585-2
17W585-3

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

13. Exit Interview

The resident inspector met with the licensee construction project manager and engineering supervisor each week to review the resident inspector's activities and findings.

No items of noncompliance or deviations were identified.