



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

APR 17 1979

In Reply Refer To:  
RII:BJC  
50-390/79-13  
50-391/79-10

Tennessee Valley Authority  
Attn: Mr. H. G. Parris  
Manager of Power  
500A Chestnut Street Tower II  
Chattanooga, Tennessee 37401

Gentlemen:

This refers to the inspection conducted by Mr. B. J. Cochran of this office on March 5-30, 1979, of activities authorized by NRC License Nos. CPPR-91 and CPPR-92 for the Watts Bar Nuclear Station facility, Units 1 and 2, and to the discussion of our findings held with Mr. T. B. Northern, Jr. at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

During the inspection, it was found that certain activities under your license appear to be in noncompliance with NRC requirements. This item and references to pertinent requirements are listed in the Notice of Violation enclosed herewith as Appendix A. This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office, within 20 days of your receipt of this notice, a written statement or explanation in reply including: (1) corrective steps which have been taken by you, and the results achieved; (2) corrective steps which will be taken to avoid further noncompliance; and (3) the date when full compliance will be achieved.

In accordance with Section 2.790 of the NRC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations, a copy of this letter will be placed in the NRC's Public Document Room. If this letter contains any information that you believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must include a full statement of the reasons on the basis of which it is claimed that the information is proprietary, and should be prepared so that proprietary information identified in the application is contained in a separate part of the document. If we do not hear from you in this regard within the specified period, the letter will be placed in the Public Document Room.

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This item is considered closed.

- c. (Closed) Unresolved Item Nos. 390/79-04-03 and 391/79-03-03, "Inspection and Documentation Requirements for Pipe Whip Restraints". This unresolved item is closed and reopened as a deficiency in the Quality Assurance Records Program. Criterion XVII, Quality Assurance Records, of Appendix B to 10CFR50 requires that inspection and test records identify the inspector, type of observation, the results and acceptability. Contrary to this paragraph 6.3.2 of WBNP-QCP -2.4 R4 states "The CEU inspector's initials in the weld inspection verification column of Attachment A verifies that welded connections have been marked by the welding inspector as having been inspected." There is no documentation of the type of inspection or inspection results.

This is identified as a deficiency (390/79-13-04 and 391/79-10-04).

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection

In addition to observance of all construction activities in progress the following activities were inspected:

- Termination of control cables in control room panels.
- Placement of concrete in Unit 2 reactor building switch crane wall.
- Torquing of bolts in component cooling heat exchanger.
- Storage of vital batteries.
- Witnessed multi-cable pull approximately 1200/feet from shutdown boards at elevation 757 auxiliary building to diesel generator building.
- Witnessed the installation of Unit 2 reactor coolant pump impellers.
- Witnessed Westinghouse field engineers install inspection parts in Unit 2 steam generators upper barrel suction.
- Witnessed Southwest Research Institute set up equipment for performing baseline inspection of Unit 2 reactor vessel.

- Witnessed cadwelding rebar in the Unit 2 valve room.
- Review of TVA site QA Audits:
  - WB-M-79-01 Standard Inspection and Test Instructions for Mechanical Piping Systems
  - WB-M-79-02 Assembly and Installation of RPV Head and Control Rod Drive Mechanism
  - WB-W-79-01 Welding and Inspection of ERCW, SIS, UHIS, and HPFP Systems
  - WB-L-79-01 Concrete Placement and Documentation
  - WB-G-79-02 Control of AS-Constructed Drawings
  - WB-G-79-03 Erection and Inspection of Category 1 Cranes
- Confirmed the posting of 10CFR Part 21 Notices on five bulletin boards around the site.

6. Licensee Identified Items (50.55(e))

- a. (Closed) Item Nos. 390/77-13-U1 and 391/77-13-U1 "Discrepancy in Loca Analysis of Reactor Coolant Loop". Westinghouse reported to TVA that in performing the final reactor coolant loop analysis they had discovered discrepancies in their previous models. For seismic responses, these discrepancies included misrepresentations of the reactor coolant pump tie rods and reactor vessel support stiffnesses. The revised seismic and LOCA analyses resulted in new displacement of the reactor coolant loop branch nozzles.

TVA reanalyzed 10 class 1 branch lines which, according to the new response spectra, would be most adversely affected by the revised seismic and LOCA data. The 10 lines including all ECCS branch piping, 8 RCL piping nozzles, 3 RCP nozzles, and 4 RPV nozzles are in the safety injection, upper head injection, chemical volume and control, and residual heat removal systems. Line sizes range from 14 inches to 1-1/2 inches NPS. Additionally, Westinghouse analyzed the pressurizer surge and incore-monitoring lines in their final analyses.

The study concludes for the 10 lines analyzed that there is no significant impact to the existing designs. Stress levels, support loads, and nozzle loads, although there were increases in certain areas of the problems analyzed, still remain acceptable.

Since the study concludes that the existing designs are acceptable, the safe operation of the plant is not adversely affected.

This item is considered to be closed.

- b. (Closed) Item Nos. 390/79-13-01 and 391/79-10-01 "Deficient End Tie Welds in Polar Crane Bridge Assembly" (Unit 1). This item was discovered as a result of an inspection ordered following discovery of some deficient welds on the Unit 2 polar crane at Watts Bar Nuclear Plant. Four welds on the bridge assembly end ties of the Unit 1 polar crane do not meet the requirements of AWS-D1.1-72. These four welds contain slag inclusions and exhibit lack of fusion to varying degrees. The deficiency was due to a failure of the fabricator to follow welding procedures.

If this deficiency had gone uncorrected, the polar crane bridge assembly would have performed satisfactorily under normal conditions. However, it is possible that during a postulated seismic event, the Unit 1 polar crane bridge assembly could have failed, possibly allowing the crane to fall onto the operating deck of the Unit 1 reactor.

If the polar crane were to fall onto the operating deck, the resulting damage to the reactor coolant system or the reactor control system may have impaired the ability of the reactor unit to reach and maintain a safe shutdown condition. If the bridge assembly had failed under seismic conditions during a refueling outage, the polar crane could have fallen on the operating deck and possibly damaged the reactor fuel and/or the reactor vessel. Damage of this magnitude has the potential for a condition adverse to the safe operation of the plant.

The deficient welds in the unit 1 polar crane bridge assembly was repaired in accordance with a procedure written by site employees and approved by TVA's Division of Engineering Design. Upon completion of repair, each weld was examined by magnetic particle test in accordance with TVA Construction Specification, G-29M.

This item is opened and closed in this report.

- c. (Closed) Item Nos. 390/79-13-02 and 391/79-10-02 "TVA Piping Analyzed Using Unverified TPIPE Program". TVA found, that support design loads for several piping supports were higher in the new runs. This deficiency was found in the chemical and volume control system (CVCS) analyzing the problem using a test version of TPIPE. This resulted in nine incorrect support design loads and one incorrect anchor design load.

The piping analyzed with the unverified program was Class D piping in low pressure portions of the CVCS. However, examination of the new, correct loads and their effect on the supports have demonstrated that, had the nonconformance gone uncorrected, the supports would have performed their design function and would not have been subject to failure. Thus the nonconformance would not have adversely affected the safe operation of the plant.

The result of their study was no support or anchors required design modification. The possibility of the error affecting other analysis was investigated and it was determined that this was an isolated case.

This item is opened and closed in this report.

- d. (Open) Item Nos. 390/79-13-03 and 391/79-10-03, "Lower than Required Factor of Safety for Welded Anchorages". TVA notified RII that review of Watts Bar anchors and plate revealed that if plates acted flexibly cracking could occur due to stress concentrations in a zone of brittleness (heat affected zone). TVA reported that a smaller load carrying capability occurs which also results in a lower factor of safety than required by TVA specifications.
- e. (Open) Item Nos. 390/79-13-05 and 391/79-10-05, "Control Bistable Failures". TVA notified RII that certain bistables in electric control loops located in the auxiliary control room fail in the wrong direction on loss of power. Bistables involved include those controlling signals to power-operated relief valves, pressurizer back-up heaters, and auxiliary spray valves. The failures seem to be caused by installation errors.
- f. (Open) Item Nos. 390/79-13-06 and 391/79-10-06, "ERCW Drain Valves from Diesel Generator Heat Exchanger". TVA notified RII that the ERCW drain valves from the Diesel generator heat exchanger were procured as safety Class G rather than Class C as required by the ERCW system drawings.
- g. Closed) Item Nos. 390/79-08-06 and 391/79-05 -06, "Weld Fabrication Deficiencies on SIS Accumulators". This deficiency involved poor vendor workmanship in a weld deposited clad area adjacent to the accumulator outlet nozzles. The accumulator vessels are carbon steel, with an austenitic stainless steel clad. In the area of the nozzles, the clad is hand deposited weld material. It is in these areas on six of eight accumulators installed in both units that the deficient areas were discovered.

This deficiency was discovered during an inspection by TVA Construction personnel made during installation of a field modification by Westinghouse. The TVA inspectors initially found evidence of porosity and pitting on the backclad areas next to the accumulator nozzles.

TVA and Westinghouse developed a repair procedure to correct this deficiencies. Repairs have been completed and inspected.

This item is considered to closed.

- h. (Closed) Item Nos. 390/78-27-01 and 391/78-23-01, "Reduced SIS Flow at Low Reactor Coolant System Levels". Blowdown testing of the Safety Injection System accumulators at Sequoyah revealed an injection piping flow resistance (f L/D factor), as calculated from the test results, that varies with backpressure at the injection points to the reactor coolant system. The variation is apparently due to the backpressure effect on cavitation occurring downstream of the injection line orifice. Reduced backpressures (caused by low reactor coolant pressures) result in cavitation which reduces the expected injection flow rates. The flow may be reduced enough to invalidate injection water assumptions made in the LOCA analysis by Westinghouse. Because of the similarity of the Watts Bar design to the Sequoyah design, this deficiency also affects the Watts Bar Nuclear Plant. The Watts Bar SIS accumulators were modified with the same orifice change as used and successfully tested at Sequoyah Nuclear Plant. Testing at Watts Bar will be completed in the normal preoperational testing program.

This item is considered to be closed.

- i. (Open) Item Nos. 390/79-13-07 and 391/79-10-07, "Incorrect Analysis of ERCW Pipe Systems at Temperatures Less than Ambient". TVA reported to RII that this analysis of the safety related portion of the ERCW piping system for temperatures from minimum through ambient to the maximum specified temperature was not completed as required by ASME III NC 3652.3. TVA analyzed for minimum to ambient and for ambient to maximum whereas the Code requires a calculation from minimum to maximum.
- j. (Open) Item Nos. 390/79-13-08 and 391/79-10-08, "Heating and Ventilation System Hanger Design". TVA reported to RII that recent design review revealed that certain heating and ventilating ductwork in the auxiliary building was not designed with sufficient supporting hangers to provide seismic Category 1 integrity. This condition typically occurs at locations where the ductwork is cantilevered beyond existing hangers to mate with expansion joints at blowers or other required integrity.

7. Reactor Coolant Pressure Boundary Piping (Welding) Observation of Work and Work Activities (Unit 2)

Weld 2-74A-DO-23-11 in the RHR system was selected for inspection. At the time of the inspection the root pass was completed and inspected. Field weld operation data sheet 2-74-F-5-7 identified the class of weld, weld procedure, size pipe, pipe sub assembly identification, weld filler material, inspection requirements, inspector and welder identification. Discussions with the welder verified that he was knowledgeable about the procedure requirements and appeared to be conscientiously concerned about doing good work. Examination of the isometric sketch SK. E-2882-1C23 confirmed the sub-assembly identification. Further examination of welder and inspectors' qualification records confirmed that they were qualified for the weld and inspections listed on the weld operation sheet.

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

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

Welds in the Residual Heat Residual Removal system were selected for inspection. Fitup and tack weld for weld 2-074A-T024-01 was observed. Operation sheet 2-74-F-500-38 identified the Class as TVA Class B and ASME Class 2. All inspection hold points were made to date. The second weld 2-074A-T024-07 was inspected during the final pass. Weld operations sheet confirmed the weld class, weld procedure, type material and inspection requirements.

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

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

Piping in the Emergency Raw Cooling Water (ERCW) system was selected for inspection. The inspector observed the installation of piping subassemblies 1-67-S-30-40 to 1-67-S-30-41 and subassemblies 1-67-S-30-44 to 1-67-S-30-40. Covered by weld operation sheets 1-67-F-C4-9 and 1-67-F-C4-15 for weld numbers 1-067C-T276-02 and 1-067C-T277-01. Examination of the operation sheets confirmed that inspections were made by the welding engineer and mechanical engineer. Examination of QC records confirmed that the inspectors were qualified to perform the inspections noted on the operation sheet and the welders were qualified to weld procedure GT8B-0-3.

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