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

Report Nos.: 50-259/84-16, 50-260/84-16, and 50-296/84-16

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

Docket Nos.: 50-259, 50-260 and 50-296

License Nos.: DPR-33, DPR-52, and DPR-68

Facility Name: Browns Ferry 1, 2, and 3

Inspection Date: May 8-11, 1984

Inspection at Browns Ferry site near Decatur, Alabama

Inspector: J. L. Coley — May 31, 1984
J. L. Coley — Date Signed

Approved by: J. J. Blake — June 1, 1984
J. J. Blake, Section Chief — Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine unannounced inspection involved 26 inspector-hours on site in the areas of review of program, work activties and records for Induction Heat Stress Improvement (IHSI) of safety-related piping, IE Bulletins, previous enforcement items, and inspector followup items and unresolved items.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

*J. Pittman, Assistant Plant Superintendent
*J. Swindell, Assistant Plant Superintendent
*C. Rozear, Compliance Engineer
*J. Miller, Outage Supervisor
*M. Gothard, ISI Group, Supervisor-Chattanooga
*J. Lewis, ISI Group, Mechanical Engineer-Chattanooga
*R. Latimer, Plant NDE Unit, Supervisor

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

Other Organization

R. Bond, General Electric, Project Manager
*C. Root, General Electric, Operations Engineer
B. Husband, General Electric, QC Supervisor

NRC Resident Inspectors

*G. Paulk, Senior Resident Inspector
*C. Patterson, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 11, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings.

3. Licensee Action on Previous Inspection Findings

(Closed) Deviation, 259, 260, 296/83-41-02: Failure to Take Action to Preclude Reoccurrence.

TVA's letter of response dated January 10, 1984, has been reviewed and determined to be acceptable by Region II. The inspector held discussions with TVA's Compliance Engineer and examined the corrective actions as stated in the letter of response. The inspector concluded that TVA had determined the full extent of the subject noncompliance, performed the necessary survey and follow-up actions to correct the present conditions, and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

(Closed) Violation, 259, 260, 296/83-14-01: Inadequate Corrective Action.

TVA's letter of response dated June 24, 1983 has been reviewed and determined to be acceptable by Region II. The inspector held discussions with TVA's Compliance Engineer and examined the corrective actions as stated in the letter of response. The inspector concluded that TVA had determined the full extent of the subject noncompliance, performed the necessary survey and follow-up actions to correct the present conditions, and developed the necessary corrective actions to preclude recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

(Closed) Unresolved item 259, 260, 296/81-07-03: Identification of Portion Examined for Welds on Sample Basis.

During a previous inspection an inspector found that TVA's ultrasonic procedure N-UT-9 Rev. 1 failed to specify requirements for identifying the location of the portions of welds examined on a sampling basis. Revision 2 of TVA's procedure N-UT-9 added paragraph 13.3 which required, when a portion of a weld is to be examined, the examination report shall contain a sketch which clearly establishes the location reference system for the examination. The revision change resolves the inspector concern identified in this item.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Reactor Coolant Loop Piping - Induction Heat Stress Improvement - Unit 3 (55176B)

The purpose of the Induction Heat Stress Improvement (IHSI) process being performed on Unit 3 recirculation system, core spray system, residual heat removal system, and reactor water clean-up system piping at the Browns Ferry facility is to reduce the tendency of piping to experience intergranular stress corrosion cracking (IGSCC) and therefore maintain the margin of safety as required by TS 3.7.G. TVA's program for IHSI is delineated in Special Mechanical Maintenance Instruction 14.4.1.3-J entitled - Induction Heat Stress Improvement. The scope of this program procedure is to detail the IHSI process. This process is an integral part of a contingency program to improve the immunity to IGSCC in the Class 1 austenitic piping systems. Successful IHSI treatment piping will put existing tensile stress on the wetted surfaces (ID) into a residual compressive state, thus increasing its resistance to IGSCC. This specification is limited to circumferential weld joint, heat affected zones (HAZ). General Electric has been contracted by TVA to perform the IHSI. The applicable code for the IHSI work is the ASME B&PV Code Sections III, V, IX & XI (77S78).

The inspector reviewed TVA's programs and procedures, reviewed training and certification records, observed work, and reviewed completed IHSI records. In addition to the above, the inspector compared ISI ultrasonic strip charts with strip charts recorded after IHSI to determine whether IHSI was performed in accordance with NRC requirements and SAR commitments, including applicable ASME code requirements, and to insure no adverse effects were experienced that would affect the ISI results obtained earlier in the Unit 3 outage.

a. Procedure Review

The following procedures were reviewed to determine their adequacy and if they had been approved:

GE Procedure No. P504P214	Induction Heating Stress Improvement Process
GE Procedure No. BFNP-IHSI-01	Procedure for Installation
GE Procedure No. BFNP-IHSI-02	Procedure for IHSI Equipment Preoperational Testing
GE Procedure No. BFNP-IHSI-03	Procedure for Thermocouple Attachment and Removal
GE Procedure No. BFNP-IHSI-04	Procedure for Coil Installation and Fire Alignment
GE Procedure No. BFNP-IHSI-05	Procedure for IHSI Weld Treatment
Welding Specification No. P8T	AE-2002 - Weld Procedure Specification
TVA-BFNP Procedure No. N-UT-25 Rev. 2	Ultrasonic Examination of Piping Welds for the Detection of Low-Level Crack Like Reflectors Originating at the Pipe ID
TVA-BFNP Procedure No. N-PT-1 Rev. 5	Liquid Penetrant Examination Using the Color Contrast Solvent Removable Method

In addition to the above review, the inspector reviewed qualification records of four individuals qualified at BFNP and eight individuals qualified off site. Records of certification, qualification, and calibration of equipment were also reviewed.

b. IHSI Records Review

The following completed IHSI recirculation weld records were reviewed to determine whether the total time at temperature did not exceed that by the approved procedures and applicable code:

Weld Joint Nos.
KR-3-16
GR-3-11
GR-3-12
GR-3-13
KR-3-17
GR-3-14
GR-3-15
GR-3-16
KR-3-18
GR-3-17
GR-3-20
KR-3-21

c. Observation of Activities

The inspector observed IHSI in process to assure that the following item were satisfied:

(1) Weld area was instrumented to provide time temperature recordings for the duration of the entire heat treatment cycle.

(2) The temperature monitoring instruments are properly calibrated as required by the applicable procedure.

(3) Sufficient thermocouples or other appropriate temperature measuring devices are used to measure the anticipated hottest and coldest temperatures of the weld during holding at temperature and to measure temperature variation.

(4) The IHSI temperature and holding time is specified, is adhered to, and is consistent with applicable Code requirements based on the material type and thickness.

(5) The maximum initial temperature, heat-up and cooldown rates are specified, are adhered to, and are consistent with the applicable requirements.

(6) The temperature records being generated reflect adherence to the above requirements.

(7) Adequate QA coverage is available.

d. Review of Post IHSI Ultrasonic Records (Strip Charts)

The inspector compared strip chart records of ultrasonic examinations performed during the ISI examinations to the strip chart records obtained from ultrasonic examinations performed of the following welds after IHSI:

System	Weld Joint No.	Pipe Size
Core Spray System	DCS-3-14	12"
Core Spray System	DCS-3-14	12"
Recirculation System	GR-3-1	28"
Recirculation System	GR-3-13	12"
Recirculation System	GR-3-14	12"
Recirculation System	GR-3-2	28"
Recirculation System	GR-3-44	22"
Recirculation System	KR-3-15	22"
Recirculation System	DSWC-3-3	6"
Recirculation System	DSWC-3-4	6"

Within the areas examined, no violations or deviations were identified.

6. Inspector Follow-up Items - Units 1, 2, & 3 (92701B)

a. (Closed) Inspector Followup Item 259, 260, 296/81-13-08, "Torus Modifications." All torus work has been completed in the Units 1, 2 and 3 torus. The only outstanding work to be completed IAW NUREG 0661 is the attached piping outside the torus of all three units. The inspector reviewed portions of the completed work package for Units 1 and 2 (Plant Modification 1-433-19). Outstanding work outside the torus is on the integrated schedule to report completion to NRC. Based on the inspector review and the licensee's commitment to report the final status, this item is considered closed.

b. (Closed) IFI 259, 260, 296/81-13-06: NUREG 0313. TVA was requested by NRC in a letter dated February 26, 1981 to implement the requirements of NUREG 0313. In this letter, NRC asked TVA for a response by July 1, 1981, proposing a schedule to accomplish the requested action or description, schedule and justification for alternative action to accomplish the indicated objectives. TVA's commitment to NUREG-0313

was outlined in a letter from L. M. Mills to H. R. Denton, dated July 2, 1981. TVA has performed examinations in accordance with their proposal on all units at Browns Ferry. However, NRC to date has not responded to TVA's proposal. TVA's letter proposing a program of compliance to NUREG 0313 is sufficient to close this item.

c. (Closed) IFI 259, 260, 296/81-13-07, NUREG-0619. During discussions with the licensee, the inspector was informed that the Unit 1 feedwater spargers were being replaced to satisfy NUREG 0619 requirements, in accordance with TVA's letter of response to the NRC dated January 23, 1981. The changes on the feedwater sparger have been completed. This inspector followup item was written to cover the work on Unit 1 and examination on all units. TVA completed all work during cycle 4 for Unit 1 and the BFNP-Surveillance Instruction-4.6.G paragraph 19.1 delineates the examination requirements of NUREG 0619. This item is considered closed.

d. (Closed) Inspector followup item No. 259/81-16-06: "Nonretrievable Welding CMTR." The inspector reviewed a memorandum from J. H. Miller, Supervisor of Field Services to T. L. Chinn, Supervisor of Compliance Staff, dated July 21, 1983. The memo reported that TVA had performed an extensive search of Certified Material Test Reports (CMTR) for 7018 electrodes and had found the certification documentation for control number 9338. However, the other control number, TTT-0009, apparently was not located because the number used by the inspector cannot be traced to any numbering sequence on Form 575, heat number, lot number, batch number or control number. The inspector held discussions with the supervisor of field services and was informed that all weld rods at the Browns Ferry site are certified material; however, unless the previous NRC inspector could further identify what the number TTT-009 is used to designate that TVA could not identify specifically its control number. The inspector concluded that the previous NRC inspector apparently copied the number incorrectly and this item is considered closed.

e. (Closed) Inspector Followup Item 259, 260/81-13-05 "Jet Pump Holddown Assembly Replacement." TVA's work in replacement of jet pump beam hold down assemblies was tracked by the above inspector followup item in report No. 81-13. Continued NRC surveillance of this item was reported in Report No. 82-17. During this inspection, the inspector reviewed the completed replacement work packages for Units 1 & 2. TVA had replaced all 20 jet pump beam bolt assemblies with new improved jet pump beam bolt assemblies. Since General Electric Company's report NEDE 24362-1 shows the improved assemblies service life will surpass the remaining service life of both Units, TVA does not plan to continue inspection previously required by IE Bulletin 80-07 for Units 1 & 2. Unit 3 was UT inspected during the current outage with satisfactory

results; however, replacement of the beam bolt assembly for Unit 3 will not be accomplished until the next planned outage. This follow-up item will remain open for Unit 3 until the licensee completes work on Unit 3.

Within the areas examined, no violations or deviations were identified.

7. IE Bulletins - Units 1, 2 & 3 (92703B)

a. (Closed) IE Bulletin No. 84-01, Crack in Boiler Water Reactor Mark I Containment Vent Headers, Units 1, 2, & 3. The inspector has reviewed TVA letters of February 16, 1984 and April 25, 1984, and determined that the requested actions of the bulletins have been acceptably addressed. The inspector held discussions with TVA's Compliance Engineer and reviewed supporting documentation to verify that the actions identified in the letter of response had been completed.

b. (Closed) IE Bulletin No. 80-13, Cracking in Core Spray Spargers Units 1, 2, & 3. This Bulletin required the licensee to perform a visual inspection of the Core Spray Spargers and the segment of piping between the inlet nozzle and the vessel shroud. This inspection was to be performed at the next outage and each following refueling outage until further notice by NRC. The licensee was also required to provide NRC a written report of the results. TVA's letters of response dated January 5, 1981, for Unit 3, October 15, 1980, for Unit 2 and July 8, 1983, for Unit 1 have been reviewed by Region II and considered acceptable. Visual inspections performed by the licensee did not reveal any cracks. In addition TVA will continue to monitor the Core Spray Spargers until further notice by NRC. The licensee has incorporated this surveillance requirement into special Mechanical Maintenance Instruction (MMI) 14.3-A. This MMI is now carried as a periodic work item for all subsequent refueling outages and is invoked by surveillance instruction 4.6.G. page 37 section 19.3. The inspector will closed this bulletin based on an in-place program for reinspection. However, visual inspections are required until further notice by NRC.

Within the areas examined, no violations or deviations were identified.