UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-259/87-32, 50-260/87-32, and 50-296/87-32

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

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 Conducted: September 14-18, 1987

Inspector: _____ 10/14/87
for E. H. Girard Date Signed

Approved by: _____ 10/14/87
J. O. Blake, Chief Date Signed
Materials and Processes Section
Division of Reactor Safety

SUMMARY

Scope: This routine, announced inspection was in the areas of previous enforcement matters, microbiologically induced corrosion investigation, inservice testing program for pumps and valves, actions taken to implement Generic Letter 84-11 and inspector followup items.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. L. Lewis, Plant Manager
*D. C. Mims, Superintendent of Technical Support Services
*C. McFall, Compliance Engineer
J. C. Pettitt, Special Projects, Field Coordinator
H. E. Hodges, Mechanical Engineer, Mechanical Test Section
*C. T. Goodson, Inservice Inspection Coordinator
*M. J. May, Manager of Site Licensing and Safety
K. R. Mulling, Mechanical Engineer
*F. E. Hartwig, Project Manager
M. Koss, Metallurgist
W. Pratt, Mechanical Maintenance Engineer
R. Simmons, Inservice Inspection and Testing Engineer
*E. Crane, Inservice Inspection Engineer
G. Wade, Inservice Inspection (Personnel Qualifications)
G. Morris, Site Licensing Engineer

NRC Resident Inspectors

*G. L. Paulk, Senior Resident Inspector
*C. A. Patterson, Resident Inspector
*C. Brooks, Resident Inspector
*E. Christnot, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 18, 1987, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

The plant manager committed to provide a report to the NRC within 60 days supplementing the previous Browns Ferry GL 84-11 response and report.

The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

a. (Closed) Unresolved Item (259, 260, 296/84-40-02): Leakage Testing Acceptance Criteria for CIVs.

This item expressed concern as to the licensee's conformance with ASME Section XI leak test requirements for containment isolation valves (CIVs). The inspector has re-reviewed this matter with cognizant licensee personnel and considers the CIV leak test criteria stated in the licensee test program submittal of December 23, 1986, is acceptable for the current test interval. This item closed.

b. (Open) Unresolved Item (259, 260, 296/85-07-02): Adequacy of Procedures

This item identified concerns with regard to the adequacy of inspection requirements in the licensee's procedures for inspection of support installation. The inspector had previously determined that the results of re-inspections of supports being performed by the licensee in their Welding Project should be considered in determining the status of this item. According to licensee personnel, TVA is scheduled to submit a report of the Welding Project findings to the NRC on September 30, 1987. Pending NRC inspection of this submittal, the matter of the adequacy of the inspection procedures for structures will remain open.

c. (Closed) Violation (260/86-03-01): Failure to Follow Procedures for Housekeeping in Radiation and Contaminated Areas

The licensee's letters of response, dated March 31 and June 27, 1987, have been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's representatives and examined the corrective actions stated in the letters of response. The inspector concluded that the licensee had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions and taken the corrective actions necessary to prevent recurrence of similar circumstances. The corrective actions identified in the letters of response have been implemented.

d. (Closed) Violation (259, 260, 296/87-01-01): Ferrite Requirements for Welding Material

The licensee's letter of response, dated March 9, 1987, has been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's representatives and examined the corrective actions stated in the letter of response. The inspector concluded that the licensee had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions and taken the corrective actions necessary to prevent recurrence of similar circumstances.

The corrective actions identified in the letter of response have been implemented.

In reviewing the document utilized by the licensee to record, disposition and verify correction of the nonconformance described by this violation, the NRC inspector noted that one page was missing. The document, Corrective Action Report (CAR) 87-0007, did not contain the page that described the adverse condition. As this is a quality record, the inspector expressed concern at the loss. Subsequently, the licensee obtained a copy of the page from a non-quality record typing computer memory and added the page to the record copy.

e. (Closed) Violation (259, 260, 296/87-01-02): Storage of Compressed Gas Cylinders

The licensee's letter of response, dated March 9, 1987, has been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's representatives and examined the corrective actions stated in the letter of response. The inspector concluded that the licensee had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions and taken the corrective actions necessary to prevent recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

f. (Closed) Violation (259, 260, 296/87-11-02): Failure to Provide Adequate Measures for the Identification and Control of Welding Consumables

The licensee's letter of response, dated May 7, 1987, has been reviewed and determined to be acceptable by Region II. The inspector held discussions with the licensee's representatives and examined the corrective actions stated in the letter of response. The inspector concluded that the licensee had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the present conditions and taken the corrective actions necessary to prevent recurrence of similar circumstances. The corrective actions identified in the letter of response have been implemented.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Microbiologically Induced Corrosion (MIC) Investigation

The licensee's investigation of MIC in their Emergency Equipment Cooling Water (EECW) stainless steel piping was described to the NRC inspector in a briefing in the NRC Residents Office on September 17, 1987. Licensee personnel stated that a sample consisting of 95 welds had been

radiographed for evidence of MIC. Eight of these welds were found to have indications of MIC but investigators consider the attack to be minimal (one of the welds leaked due to through-wall MIC pitting). The inspector was informed that the licensee planned to present their "corporate" plans for addressing MIC to the NRC in an October meeting.

During the MIC discussions, it was noted that 30 of the 95 EECW welds radiographed were found to contain weld defects that would be considered rejectable in ASME Class 1 or 2 welds. The welds in question were Class 3 welds, which do not require radiography and, therefore, have no radiographic acceptance standards specified. Although the weld defects found in the EECW welds had been noted and recorded by radiographers, there had been no effort made to determine if the defects represented serious deficiencies in the piping. The NRC inspector expressed concern that the defects had not been documented as potential conditions adverse to quality for evaluation and disposition by qualified licensee engineering personnel. The inspector noted there did not appear to be clear, well organized direction, planning and management of the MIC investigation. Licensee personnel stated that the weld defects would be documented for appropriate review and disposition.

This matter will be examined further in subsequent inspections by NRC resident and/or region based personnel.

Within the area inspected, no violations or deviations were identified.

6. Inservice Testing (IST) Program for Pumps and Valves

The licensee's IST program and its associated requests for relief from Code requirements are being reviewed by Region II pursuant to preparation of a safety evaluation. The program indicates that it was prepared to conform to ASME Section XI (80W80) (the "Code") requirements. During the current inspection, the NRC inspector reviewed documents, observed hardware and discussed testing requirements with the cognizant licensee engineer, as follows, to aide in the Region II evaluation:

a. The NRC inspector observed one of the Diesel Fuel Transfer Pumps (pump 3B). The cognizant licensee engineer indicated how pump flow would be measured to confirm a test flow of ±10% of a reference value. This test requirement is to be proposed in the licensee's revision to their relief request PV-1.

b. The NRC inspector observed Unit 3 hydraulic control valve 67-51. The cognizant licensee engineer described how it operated and why specifying a maximum stroke time was difficult. He indicated that TVA design personnel were being requested to specify a maximum stroke time for such valves or to indicate why they were not required for safe shutdown. This is related to relief request PV-26.

c. The NRC inspector observed the Unit 1 fuel pool check valve 78-526. The cognizant licensee engineer explained how the valve would be tested quarterly. This appears to negate the need for relief request PV-22.

d. Relief request PV-21 requested relief to leak test containment isolation gate valves in the direction opposite to that in which they are pressurized in accident conditions. The NRC position is that, as the valves are containment isolation valves, leak testing requirements of 10 CFR 50, Appendix J, must apply; and that, since such wrong direction testing is contrary to Appendix J requirements, the licensee must obtain an exemption from the Appendix J requirements. The licensee stated that they had requested an exemption, but that they had been informed that it was unnecessary. The inspector verified that the licensee had been so informed in a letter, dated October 24, 1984, from D. Eisenhut (NRC) to H. Parris (TVA). This letter provided a safety evaluation of Appendix J exemption requests submitted by TVA in 1976 and 1977. The NRC evaluation of testing the gate valves in the wrong direction is contained in Section 2.0, No. (4) of the safety evaluation and states that no exemption is required since the wrong direction testing tends to reduce seating force and results in a conservative measurement. The inspector noted that, although this might be correct for globe valves, it is incorrect for the gate valves described in the exemption. The inspector indicated that he would inform cognizant NRC management of the error and that no licensee action was required at this time. The inspector requested the licensee to obtain and forward him copies of the drawings of the valves described in the exemption request to aide in further NRC examination of the significance of the wrong direction testing.

e. The licensee has indicated that they plan to submit an additional relief request for their IST program which will propose to have Technical Specification (TS) 4.6.D.1 requirements replace the Code requirements for testing Main Steam Relief Valves (MSRVs). The inspector discussed this matter with personnel responsible for maintenance and testing of the MSRVs. TS 4.6.D.1 requires half of the MSRVs to be bench checked or replaced with bench checked valves each refueling outage. The Code requires testing of a small sample with sample size expanded if failures are detected. The inspector found that the TS was more conservative in test Frequency but that its one shortcoming was that there was no clear requirement that any valve must be tested after plant use or that any testing be performed on removed valves before return of the plant to operation. This would appear to allow failures that occurred during operation to go unrecognized. The cognizant licensee engineer was informed of the NRC inspector's concern with regard to this possible shortcoming of the proposed testing only to TS requirements.

Within the area examined, no violation or deviation was identified.

7. Inspection of Licensee's Actions Taken to Implement Generic Letter (GL) 84-11: Inspections of Boiling Water Reactor Stainless Steel Piping (25589) - Unit 2

This matter is a restart issue for Browns Ferry.

The NRC inspector conducted a review to assess the actions of the license based on the initial suggestions contained in GL 84-11 and related correspondence concerning specific licensee commitments.

The related correspondence, identified from the NRC Document Control System, is listed below:

Date	Correspondence
6/7/84	Letter from L. Mills (TVA) to H. Denton (NRC), Response to GL 84-11
6/15/84	Letter from D. Vassallo (NRC) to H. Parris (TVA), Safety Evaluation of TVA Response to GL 81-04 (and NUREG 0313R1) stating that response was not acceptable and that the evaluation should aid the licensee in responding to GL 84-11
5/22/85	Letter from J. Domer (TVA) to D. Vassallo (NRC), states TVA does not consider it necessary to change TS to conform to leakage test recommendations of GL 84-11
3/11/86	Letter from J. Domer (TVA) to D. Muller (NRC), provides final report documenting GL 84-11 Unit 2 pipe inspections and results
3/26/86	Letter from M. Grotenhuis (NRC) to S. White (TVA), provides Safety Evaluation Report (SER) on TVA responses of 2/13/85 (Unit 1 only), 5/3/85, (Unit 3 only), 5/22/85 and 6/7/84. The letter indicates the responses are acceptable for the upcoming refueling outages but requests additional information. The SER comments negatively on certain exceptions that TVA stated with regard to GL 84-11 and requested an additional response addressing the following:

- Post Induction Heating Stress Improvement (IHSI) Inspection

  Provide assurance that if 100% of the IHSI welds are not inspected the examination of the remaining welds will be completed at the next refueling outage. Of course, the sampling will be expanded if crack indications are reported in the IHSI treated welds.

- Reactor Coolant Leakage Monitoring

  Provide assurance that the Technical Specifications will be changed to monitor the leakage rate every four hours and to limit the inoperable period of the sump monitoring system to 24 hours or, provide an acceptable basis for any variations from those limits.

- Weld Overlay Design

  Provide assurance of adequate margin in IGSCC resistance by making each overlay repair consist of a minimum of two layers or, provide an acceptable basis for any variations from the minimum two layers.

11/10/86 Letter from R. Gridley (TVA) to D. Muller (NRC), provides response to 3/26/86 letter from NRC (above) indicating conformance with the proposed requirements

12/12/86 Summary report of 11/4/86 NRC/TVA meeting to discuss Unit 2 Safe End Replacement.

The inspector's review was accomplished through examination of related licensee documentation and previous NRC inspections and through discussions with cognizant licensee personnel. The review addressed the licensee's inspection program, competence of ultrasonic (UT) examiners, leak detection, performance of inspection and subsequent actions.

Items based on actions suggested by GL 84-11 were checked by the NRC inspector in each of these areas. The items checked and the inspector's findings relative to each is as follows:

a. Inspection Program (for IGSCC susceptible welds as described in GL 84-11)

(1) Item: The program requires the inspection of 20% of the welds not inspected previously (four minimum) for each pipe size.

Finding: The licensee's June 7, 1984 response letter stated that they would examine 100% of the accessible stainless steel welds greater than or equal to four inches before induction heating stress improvement (IHSI) during their Cycle 5 refueling outage for Unit 2. In their March 11, 1986 letter reporting the results of the examinations, they indicated that none of their 12 four inch diameter welds had been ultrasonically examined because of configuration. Also, many of the other welds had not been completely scanned because of configuration (e.g., no examination from one side because of rapidly changing fitting thickness). The NRC inspector verified that the licensee's scan plan for the Unit 2, Cycle 5 outage had required the examinations as stated in the original response letter.

(2) Item: The program requires the inspection of 20% of the welds previously inspected and found not to contain cracks (two minimum) for each pipe size.

Finding: The licensee's Inservice Inspection Program, SI 4.6.G, paragraph 19.15, specified examination of all of the welds in accordance with the commitment stated in their June 7, 1984 letter. As noted in (1) above, the licensee's scan plan also specified the examinations.

(3) Item: The program requires the inspection of all unrepaired welds previously found to contain cracks or indications of cracks.

Finding: The licensee's program and their scan plan required examination of all stainless steel welds as stated in their June 7, 1984 response.

(4) Item: The program requires the inspection of all weld overlays on top of welds containing cracks or indications of cracks longer than 10% of the circumference.

Finding: The licensee's program and their scan plan required examination of all stainless steel welds as stated in their June 7, 1984 response.

(5) Item: The program requires the inspection of all welds treated by the induction heating stress improvement (IHSI) technique and not previously examined after IHSI treatment.

Finding: The licensee's response of June 7, 1984, stated that a 25% sample of the stainless steel welds (greater than four inches) would be examined following IHSI during the Cycle 5 refueling outage. It indicated that the sample would be selected from those welds which required recording/evaluation of indications and that any additional welds needed to complete the 25% would be selected from those with the highest propensity for cracking. The licensee letter of November 10, 1986, responding to the March 26, 1986 letter from the NRC, stated that post IHSI inspections not performed in the Cycle 5 outage would be completed in the Unit 2 Cycle 6 refueling outage.

The NRC inspector verified that the Unit 2, Cycle 5 scan plan specified post IHSI examination of 25% of the welds that had received IHSI treatment for Unit 2.

(6) Item: The program requires a visual examination for leakage of the reactor coolant piping during each plant outage in which the containment is deinerted.

Finding: Although the licensee's June 7, 1984 response letter may be interpreted as indicating that the visual examination will be performed as stated, it is not completely clear on the matter. A check by the NRC inspector found that the licensee's program (as implemented by SI 3.3.1.A) requires the subject examination to be performed each refueling outage and that the examination (per discussions with cognizant TVA personnel) is intended to meet the requirements of the 74S75 revision of ASME Section XI. This is not in accordance with the recommendations of GL 84-11, Attachment 1, paragraph E. GL 84-11 indicates the examination should be performed each outage in which the containment is deinerted (not each refueling outage) and that the examination should be performed consistent with the 1980 edition of Section XI.

At the NRC inspector's request, the licensee agreed to clarify their GL 84-11 response through a supplemental submittal to the NRC.

b. Competence of Ultrasonic Test (UT) Examiners

(1) Item: The program requires qualification by a formal performance capability demonstration test such as that being conducted at the Electric Power Research Institute (EPRI) Nondestructive Examination Center.

Finding: The inspector found that the above stated qualification requirements are not implemented through requirements prescribed by the licensee's program or procedures. The program (SI 4.6 G) does not specify special Intergranular Stress Corrosion Cracking (IGSCC) UT examination procedure or personnel qualification. Two procedures commonly used for the examinations were checked and one (UT-25) was found to contain qualification requirements for Levels I and II personnel but none for Level III personnel. The other procedure (NUT-29) did not contain the special qualification requirements for any level of personnel.

Note: Region II inspection specialists who have observed the exams and checked personnel and procedure qualifications have found them to be satisfactory.

(2) Item: The program requires personnel who are performing as SNT-TC NDT Level I UT examiners to demonstrate field performance capability. As an alternate, Level I examiners may work only with or under the direct supervision of Level II or III personnel.

Finding: The NRC inspector found that, as stated in b.(1) above, the licensee's program does not state special IGSCC personnel qualification requirements.

c. Leak Detection and Leakage Limits

(1) Item: The technical specification (TSs) requires a plant shutdown for inspection and corrective action when any leakage detection system indicates, within any period of 24 hours, an increase in the rate of unidentified leakage in excess of 2 gpm or its equivalent.

Finding: The inspector found that the licensee's TSs (3.6.C and 4.6.C) included requirements similar to the above but somewhat less restrictive than stated in GL 84-11.

The TS requirements were incorporated in a September 14, 1987 change. NRC evaluation and acceptance of this change will be verified by the inspector in a subsequent inspection.

(2) Item: The TSs require that at least one of the leakage measurement instruments associated with each sump shall be operable. The outage time for inoperable instruments shall be limited to 24 hours or the licensee shall immediately initiate an orderly shutdown.

Finding: The licensee's TS requirements (3.6.C and 4.6.C are similar to the above but not identical. For example, they permit one instrument to be inoperable for 72 hours, after which they must be in cold shutdown with 24 hours. As noted in (1) above, the TS requirements were incorporated September 14, 1987, and NRC evaluation and acceptance of this change will be verified in a subsequent Region II inspection.

d. Performance of Inspection

(1) Item: The welds have been inspected by the licensee in accordance with a. above.

Finding: The inspector found that the licensee's updated scan plan indicated that the examinations stated in the licensee's March 11, 1986 letter had been completed. The inspector examined the following sample of examination records (selected from the scan plan) to further verify completion of the examinations as stated:

Weld No.	Size	UT Report	Date	Examiner	Comments
GR 2-3	28"	RO618	11/30/84	LII-JDB	
KR 2-13	12+"	RO568	2/27/85	LII-CQS LII-OB	Post IHSI

GR 2-12	12"	R0595	2/26/85	LII-CQS LII-OB	Post IHSI
GR 2-15	12"	R0765	6/20/85	LII-HMH	Overlay Weld
		R0767	7/19/85	LII-EWS	
		R0769	7/19/85	LII-WLG	
GR 2-19	12"	R0515	11/15/84	LII-JDB	
GR 2-26	28"	R0521	11/15/84	LII-CQS	
GR 2-27	28"	R0619	11/30/84	LII-IBH	
GR 2-28	28"	R0620	11/30/84	LII-IDH	
KR 2-36	12+"	R0444	4/8/85	LII-CQS	Post IHSI
KR 2-37	22"	R0581	4/2/85	LII-CQS	Post IHSI

In addition to the records check indicated above, the NRC inspector verified that previous NRC Inspections 259, 260, 296/84-51 and 85-33 observed proper licensee performance of UT examinations on welds DS-RHR-2-4, KR 2-36, KR 2-14 and KR 2-37.

(2) Item: The UT examiners demonstrated their competence prior to examining welds using the essential parameters of their qualified procedures.

Finding: From a review of records, the inspector determined that the licensee was using properly qualified examiners for the examinations tabulated above.

e. Subsequent Activity

Item: The program provides for scope expansion and additional inspection when new cracks are found or existing cracks grow to unacceptable size.

Finding: In their response to GL 84-11, the licensee did not address scope expansion and additional inspection. The licensee's program provides for conformance with ASME Section XI.

The inspector questioned licensee personnel regarding their failure to examine any four inch weld because of "configuration" and was informed that they planned to conduct additional examinations, including radiography, to assure the welds were satisfactory and that a supplementary report documenting the examinations would be submitted to the NRC. This report will include clarification of leakage check practices as referred to in a.(6) above. The plant manager agreed to provide an interim report for the above if a final report is not submitted within 60 days.

Within the areas inspected, no violation or deviations were identified.

8. Inspector Followup Items (IFIs) (92701)

a. (Closed) IFI (259, 260, 296/84-40-05): Interpretation of RG 1.26.

This concern originated from the NRC inspector's review of the licensee's determination of components to be included in their IST program. The inspector finds the current program submittal acceptable based on a proper interpretation of RG 1.26, and the matter is adequately resolved.

b. (Closed) IFI (259, 260, 296/84-40-08): Exercising Testable Check Valves.

This item documented a question from the inspector to the licensee asking whether they tested their testable check valves in a manner that assured they were exercised to the positions required to fulfill their functions. The licensee has informed the inspector that the subject valves are tested by methods which assure they are exercised to the positions required to fulfill their functions. The inspector considers the question answered.

c. (Open) IFI (259, 260, 296/84-40-07): Historical Information on Equipment.

The licensee informed the inspector that corrections being undertaken relative to this area were still in progress and that the item was not ready for NRC review. This item involves the licensee's development of a program to assure their information on safety-related equipment is maintained accurate and up-to-date.

d. (Open) IFI (259, 260, 296/86-04-03): Adequacy of Work Plan Records.

This item deals with deficiencies the licensee identified in completion of work plan records. The inspector was informed that the licensee had not completed corrective actions relative to the matter and that it was not ready for final NRC inspection.