



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

Report Nos.: 50-259/92-08, 50-260/92-08, and 50-296/92-08

Licensee: Tennessee Valley Authority  
 3B 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: February 24-28, 1992

Inspector: J. J. Lenahan 3/13/92  
 Date Signed

Approved by: J. O. Blake 3/13/92  
 Date Signed  
 J. O. Blake, Chief  
 Materials and Processes Section  
 Engineering Branch  
 Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of observation of repairs to valves in Unit 2 and 3, followup on IE Bulletin 87-02 and TI 2500/27, and review of instrument maintenance instructions.

Results:

In the areas inspected, one violation and no deviations were identified. The violation concerned a fire watch who was inattentive to his duties - Paragraph 3.c. A weakness was identified regarding licensee maintenance personnel not strictly adhering to work plan instructions when implementing repairs to Units 2 and 3 valve number 74-49 - Paragraphs 3.c and 3.d. Approach to resolution of technical issues was conservative, sound and thorough. Staffing was adequate.



## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*O. Zeringue, Vice-President, Browns Ferry Operations
- \*R. Baron, Site Licensing Manager
  - J. Maddox, Operations Support
  - D. Massey, Compliance/Licensing
- \*J. Scalice, Plant Manager

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, and quality control inspectors.

#### NRC Resident Inspectors

- \*C. Patterson, Senior Resident Inspector
- W. Bearden, Resident Inspector
- E. Christnot, Resident Inspector

\*Attended exit interview

### 2. Review of Instrument Maintenance Procedures - Units 1, 2, and 3 (61704)

The inspector examined procedure number MCI-0-00-TUB001, Compression Fittings Disassembly, Inspection, Rework, and Reassembly. This procedure provides instructions for disassembly, inspection rework, reassembly, and initial installation of compression fittings. The procedure specifies precautions and limitations, prerequisites, and detailed instructions for maintenance work on compression fittings. The instructions are step by step requirements recommended by various compression fitting manufactures. QC inspection holdpoints are specified in the body of each set of detailed installation instructions. Post maintenance testing instructions are specified in the "Return To Service" section of the procedure.

Deviations or violations were not identified.

### 3. Repairs to Shutdown Cooling System Valves Due to Excessive Leakage - Units 2 and 3 (37701 and 62700)

- a. Background - Prior to this inspection, the licensee shutdown Unit 2 to repair leaks in various systems and to perform minor maintenance work. The licensee inspected the Unit 2 drywell and identified four valves which had been leaking. These were valve numbers 68-3 and 68-77 on the recirculation system, and valve numbers 74-49 and 74-54 on the RHR system. Leaks had been identified on two of these valves, number 68-77 and 74-54, during the system hydrostatic test conducted



in April, 1991. Following completion of the system hydro test, the leaks were repaired under work requests 91-29716-17 (valve 68-77) and 91-29716-04 (valve 74-54). An additional 31 other work requests were issued to repair leaks from packing on other valves and in mechanical joints identified during the hydro test. During the current outage Valve numbers 68-3 and 68-77 were repaired by packing adjustments. The repair to valve number 75-54 required replacement of a gasket. The licensee requested a waiver of compliance to isolate the system to repair valve 75-54. The leak on valve 74-49 was through a vent line attached to the valve body. The vent line or weld connecting the vent line to the valve body had cracked resulting in the leak. The vent line was a 1 inch diameter schedule 160 pipe welded to a recessed hole in the valve body. Valve 74-49 is a manual isolation valve on the shutdown cooling portion of the RHR system.

- b. Review of Safety Assessment for Repairs - The licensee decided to remove the vent line from the valve body and install a tapered plug in the resulting 7/8 inch diameter opening in the valve body. The licensee issued a safety assessment, number SABFMDCN 920024, to address removal of the vent line and installation of the plug while Unit 2 was in a cold shutdown condition. The inspector reviewed the safety assessment report and attended the Plant Operating Review Committee (PORC) meeting during which approval was granted to implement the repair. The safety assessment addressed potential for leakage of primary coolant through the 7/8 inch diameter hole in the valve body during the repair, the affect of removal of the vent line on operation of the valve, the material requirements for the new plug, and the time limitations on closure of valve 74-49 during the repair, when the shutdown cooling portion of the RHR system would be isolated. Licensee operations personnel established the time limit for closure valve 74-49 based on measured temperature increases in the nuclear coolant system prior to start of the repair. The licensee also considered the requirements of Generic Letter 90-05, Guidance For Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping. The repair method selected was a permanent repair. A detailed scope of work and work sequence was discussed by licensee design engineers and maintenance personnel during the PORC meeting. Since the Unit 3 reactor vessel was defueled, the licensee decided to implemented the repair to Unit 3 prior to work on Unit 2. The purpose of this was to gain experience for the maintenance personnel who were selected to complete the Unit 2 repair work. The radiation exposures were lower in Unit 3, and the isolation of the shutdown cooling portion of the RHR system was not critical since the Unit 3 reactor was defueled.
- c. Observation of Repairs to Unit 3 Valve 74-49. The inspector witnessed repairs to Unit 3 valve number 74-49. This valve had a similiar configuration as the Unit 2 valve, with a vent line attached to the valve body. The inspector reviewed work plan number 92-49415-01, written to grind out the welds, remove the existing vent valves and one-inch diameter piping, plugging the vent line hole in

the valve body, and welding the plug in place. Valve 3-HCV-074-49 is an ASME Section XI, Class 1 component. The inspector witnessed removal of the vent valve and line, installation of the temporary plug in the hole in the valve body, cleaning of the area on the valve body where the plug was to be welded, installation of the permanent plug, and welding of the plug onto the valve body. The inspector noted that the information only liquid penetrant (PT) test was not performed on the weld after the root pass was completed per work instruction item V of the work request. Since this PT was for information only, the inspector did not consider that failure to perform the PT had any safety significant or was a procedural violation. However failing to perform the PT was an oversight which was an indication of a weakness on the part of licensee personnel in regards to verbatim compliance with work instructions.

During the welding activities the inspector noted that the designated fire watch appeared to be asleep. The inspector observed the fire watch person sitting with his back to the drywell wall, his head tilted back and eyes closed. The inspector observed the individual in this position for approximately two minutes, before he approached the individual, waved his hand before the individual's face and touched him gently. The individual did not respond, so the inspector shook his leg to awaken him. Technical Specification 6.8.1.1.f requires that written procedures be established, implemented and maintained covering implementation of the fire protection program. Attachment I to procedure number FPP-2, Fire Protection, requires a continuous fire watch to be present during welding activities. Attachment F to FPP-2 requires the person designated as fire watch to be on continuous alert for signs of fire or any act which may result in fire. The failure of the designated fire watch to be attentive to his fire watch duties and be continuous alert for any sign of fire during welding activities in the Unit 3 drywell during implementation of repair to valve 74-49 was identified to the licensee as violation item 296/92-08-01, Fire Watch Inattentive to Duties.

After the welding was completed, the inspector witnessed a quality control inspector perform a PT exam of the final weld. The inspector noted adherence to procedural requirements in the following areas: specified methods; penetrant materials; surface cleaning; surface temperature; surface drying time prior to penetrant application; penetrant dwell time; cleaning of excess penetrant from surface, develops application and development time; and examination technique. Two small potential indications were noted, however these were determined to be irregularities in the weld surface. These two small irregularities were removed with a metal file, and the surface was reprepared and reexamined. The final results were no reportable indications.

- d. Observation of Repairs to Unit 2 Valve Number 74-49. The inspector witnessed repairs to Unit 2 Valve 74-49, an ASME Class 1 Valve. The inspector reviewed work plan number 92-49415-00 which was written to

grind out the weld, remove the existing vent valves and one-inch diameter piping, plug the hole in the valve body and weld the plug in place. The work plan specified that the portion of the vent line where the leak occurred was to be saved and tagged for analysis as part of the determination for root cause of the problem. The inspector witnessed installation of the temporary plug in the hole in the valve body after the vent line had been removed, cleaning of the valve body in area where the plug was to be welded, removal of the temporary plug, and installation of the permanent plug. The inspector noted that water was not removed from the valve body cavity prior to installation of the permanent plug as stipulated in work instruction 0 of the work plan. Approximately one gallon per minute of water was leaking from the valve body after manual isolation valve 74-49 was closed. Licensee maintenance personnel were not able to install the tapered plug in a manner to stop leakage through the hole so that the weld root pass could be completed. The cognizant engineer instructed the craftsmen to remove the first plug, and fabricated an "O" ring on a second plug which he intended to install in place of the first plug. The use of the "O" ring, which was intended to seal the hole in the valve body and stop leakage so that the root pass weld could be completed, was not specified in the work plan and had not been approved by design engineering. Licensee management personnel directed maintenance personnel to stop work and reinstall the temporary plug so that the manual isolation valve could be reopened to restore the shutdown cooling system. Licensee management directed design engineering to review the problem and revise design documents so that a permanent repair could be completed. Subsequent to the inspection, the repair method was revised by engineering and resubmitted to PORC for approval. After PORC approval, the work plan was revised and repairs completed satisfactorily.

The failure of licensee personnel to drain the water from the valve body per work plan instruction "0" was another example of licensee maintenance personnel not complying verbatim with work instruction. The proposed use of an "O" ring on the tapered plug which had not been approved by design engineering is also an example of not following work instruction. However since licensee management personnel stopped work on the valve repair, these problems will not be identified as a violation of NRC TS requirements for failing to follow procedures. However this is a weakness in the licensee's maintenance program.

No deviations were identified.

4. NRC Temporary Instruction (TI) 2500/27

The licensee responded to NRC Bulletin 87-02, Fastener Testing to Determine Conformance with Applicable Material Specifications, by letters dated March 16, 1988, April 15, 1988, July 6, 1988, September 12, 1988, and January 27, 1989. The responses indicated that samples in three of



fifty-eight lots tested did not meet specification requirements and provided justification for acceptability of the fasteners. TI 2500/27 specifically addressed Browns Ferry sample lot numbers BF-11 and BF-12 which were SAEJ429 Grade 5 fasteners. These samples did not meet the chemical requirement for carbon content. The carbon content was 0.20 percent for BF-11 and 0.17 percent for BF-12 versus the required carbon content of 0.28 to 0.55 weight percent for SAEJ429 Grade 5 fasteners. These fasteners also had a minimal percentage of boron content. The licensee issued nonconformance report number CAQR BFP 880058 to document and disposition this problem. The licensee performed an engineering evaluation and determined that the fasteners were acceptable for use since they were used in QA Level III applications, and the fasteners met the mechanical strength requirements. The licensee's fastener testing program also disclosed that one sample lot, number BF-18, SA 193, Grade B7 bolts had a tensile strength of 100,000 psi versus the required minimum of 105,000. The licensee issued CAQR BFN 880059 to evaluate and disposition the use of these fasteners. The engineering evaluation disclosed that the end use application of these bolts resulted in tensile stresses, limited by design specifications, of less than 60 percent of the specified ultimate strength. The slightly low, (5 percent) tensile test results have no safety significance. The licensee also concluded that the out of specification chemical test results for sample BF11 and BF12 had no safety significance. TI 2500/27 is considered closed.

5. Exit Interview:

The inspection scope and results were summarized on February 28, 1992, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Violation Item 296/92-08-01, Fire Watch Inattentive to His Duties