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

Report Nos.: 50-259/84-53, 50-260/84-53, and 50-296/84-53

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 Conducted: November 26 - December 25, 1984

Inspectors: C. A. Patterson for
G. L. Paulk, Senior Resident — 1/14/85 Date Signed

C. A. Patterson
C. A. Patterson, Resident — 1/14/85 Date Signed

Approved by: C. A. Patterson for
F. S. Cantrell, Section Chief
Division of Reactor Projects — 1/14/85 Date Signed

SUMMARY

Scope: This routine, inspection involved 155 resident inspector-hours in the areas of operational safety, maintenance observation, surveillance observation and reportable occurrences.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Licensee Employees Contacted

J. A. Coffey, Site Director
G. R. Jones, Plant Manager
J. E. Swindell, Superintendent - Operations/Engineering
J. R. Pittman, Superintendent - Maintenance
J. H. Rinne, Modifications Manager
J. D. Carlson, Quality Engineering Supervisor
D. C. Mims, Engineering Group Supervisor
Ray Hunkapillar, Operations Group Supervisor
C. G. Wages, Mechanical Maintenance Supervisor
T. D. Cosby, Electrical Maintenance Supervisor
R. E. Burns, Instrument Maintenance Supervisor
A. W. Sorrell, Health Physics Supervisor
R. E. Jackson, Chief Public Safety
T. L. Chinn, Technical Services Manager
T. F. Ziegler, Site Services Manager
J. R. Clark, Chemical Unit Supervisor
B. C. Morris, Plant Compliance Supervisor
A. L. Burnette, Assistant Operations Group Supervisor
R. R. Smallwood, Assistant Operations Group Supervisor
T. W. Jordan, Assistant Operations Group Supervisor
S. R. Maehr, Planning/Scheduling Supervisor
C. R. Hall, Design Services Manager
W. C. Thomison, Engineering Section Supervisor
A. L. Clement, Radwaste Group Controller

Other licensee employees contacted included licensed reactor operators, senior reactor operators, auxiliary operators, craftsmen, technicians, public safety officers, Quality Assurance, Quality Control and engineering personnel.

2. Exit Interview (30703)

The inspection scope and findings were summarized on December 21, 1984, with the Plant Manager and/or Assistant Plant Managers and other members of his staff.

3. Licensee Action on Previous Enforcement Matters

Not inspected during this period.

4. Unresolved Items*

There were two new unresolved items as noted in paragraph 6 and 7.

5. Operational Safety (71707, 71710)

The inspectors kept informed on a daily basis of the overall plant status and any significant safety matters related to plant operations. Daily discussions were held each morning with plant management and various members of the plant operating staff.

The inspectors made frequent visits to the control rooms such that each was visited at least daily when an inspector was on site. Observations included instrument readings, setpoints and recordings; status of operating systems; status and alignments of emergency standby systems; onsite and offsite emergency power sources available for automatic operation; purpose of temporary tags on equipment controls and switches; annunciator alarm status; adherence to procedures; adherence to limiting conditions for operations; nuclear instruments operable; temporary alterations in effect; daily journals and logs; stack monitor recorder traces; and control room manning. This inspection activity also included numerous informal discussions with operators and their supervisors.

General plant tours were conducted on at least a weekly basis. Portions of the turbine building, each reactor building and outside areas were visited. Observations included valve positions and system alignment; snubber and hanger conditions; containment isolation alignments; instrument readings; housekeeping; proper power supply and breaker alignments; radiation area controls; tag controls on equipment; work activities in progress; radiation protection controls adequate; vital area controls; personnel badging, personnel search and escort; and vehicle search and escort. Informal discussions were held with selected plant personnel in their functional areas during these tours. Weekly verifications of system status which included major flow path valve alignment, instrument alignment, and switch position alignments were performed on the core spray systems.

A complete walkdown of the accessible portions of the scram discharge volume level system was conducted to verify system operability. Typical of the items checked during the walkdown were: lineup procedures match plant drawings and the as-built configuration, hangars and supports operable, housekeeping adequate, electrical panel interior conditions, calibration dates appropriate, system instrumentation on-line, valve position alignment correct, valves locked as appropriate and system indicators functioning properly.

*An Unresolved Item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

During this report period Unit 1 reactor remained at power. Following a refueling outage, Unit 3 reactor continued power escalation while conducting required testing and correcting machinery problems. Unit 1 experienced two events of single recirculation pump trips this month. The trips were attributed to drive motor breaker faults.

Unit 2 continued in a refueling and maintenance outage. Inspection of welds in the piping system for intergranular stress corrosion cracking was completed and seven welds with indications of cracking were found.

6. Maintenance Observation (62703)

Plant maintenance activities of selected safety-related systems and components were observed/reviewed to ascertain that they were conducted in accordance with requirements. The following items were considered during this review: the limiting conditions for operations were met; activities were accomplished using approved procedures; functional testing and/or calibrations were performed prior to returning components or system to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; proper tagout clearance procedures were followed; Technical Specification adherence; and radiological controls were implemented as required.

Maintenance requests were reviewed to determine status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which might affect plant safety. The inspectors observed the below listed maintenance activities during the report period:

a. MMI23 - High Pressure Coolant Injection System maintenance

b. Unit 2 outage/refueling activities

c. Scram discharge volume tank level switch installations

d. Limitorque pinion gear inspection

e. MMI 987 - Maintenance of Limitorque operators

f. EMI/6 - CSSC Limitorque switch gearbox lubricant replacement

A maintenance worker employed by a contractor at the site was injured when he fell about 10 feet inside the Browns Ferry Unit 2 torus at 2:13 p.m. on December 12, 1984. He was one of a group of workers cleaning the torus of the unit, which has been shut down for refueling and maintenance since September 15, 1984.

The worker's protective clothing was removed while first aid was administered. He was then taken by ambulance to a Decatur, Alabama hospital, accompanied by Tennessee Valley Authority (TVA) health physics personnel. At the hospital, it was determined that his socks, underwear, and an area of his lower left leg were contaminated. The TVA health physics personnel

decontaminated the worker. No contamination was present at the hospital or in the ambulance.

In accordance with its emergency plan, TVA declared an unusual event which was terminated at 6:25 p.m. The worker was treated at the hospital for a bruised shoulder and a slight concussion. He was kept one day at the hospital for observation.

A valve inspection program continued for motor operated limitorque operators following the failure of the Unit 3 High Pressure Coolant Injection (HPCI) steam isolation valve during unit startup (IE Report 84-48). The following valve problems have been detected:

Unit	Valve Number	Valve Name	Problem
1	73-16	HPCI Steam Isolation	loose motor pinion gear set screw.
2	73-34	HPCI Pump discharge	loose motor pinion gear set screw.
3	73-16	HPCI Steam Isolation	missing driven gear retainer ring, split ring retainer, and split ring.

The licensee identified the Unit 3 problem after reassembly of the valve following the pinion gear inspection. As a result of the missing retainers on Unit 3 HPCI valve 73-16, the licensee is reinspecting all valves previously inspected. The missing retainers hold the driven gear (worn shaft clutch gear) onto the shaft (Limitorque dwg. # 08-408-001-4). Axial movement of the gear one-quarter of an inch would prevent the dogs (¼" projections) on the clutch from engaging, preventing movement of the valve while the electric motor operated. Inspection by the licensee is in progress; therefore, this item will remain unresolved for further followup. (259/84-53-01)

The inspectors reviewed the plant file on IE Information Notice No. 79-03 "Limitorque Valve Geared Limit Switch Lubricant". Plant personnel have developed a procedure (EMI-16, "CSSC Limitorque Switch Gearbox Lubricant Replacement") and have implemented an inspection and replacement program for the limit switch lubricant during each refueling period for valves located in high ambient temperatures. Data sheets for the most recent performance of EMI-16 on Units 2 and 3 were reviewed and found to be adequate.

7. Surveillance Testing Observation (61726)

The inspectors observed and/or reviewed the below listed surveillance procedures. The inspection consisted of a review of the procedure for

technical adequacy, conformance to technical specifications, verification of test instrument calibration, observation on the conduct of the test, removal from service and return to service of the system, a review of test data, limiting condition for operation met, testing accomplishing by qualified personnel, and that the surveillance was completed at the required frequency.

a. Local Power Range Monitor (LPRM) Calibration - Surveillance Instruction 4.1.B-3

b. Coolant Conductivity Sampling - TI38

c. SI 4.1.A-8 - Scram Discharge Volume Tank Level Checks

d. SI 2 - Operator Control Room Logs

e. SI 4.5.A.1.b - Core Spray Pump Operability

The inspector observed SI 4.1.B-3 in progress at Step 7, "Adjust LPRM amplifier gains." The gain adjustment was being repeated on many LPRM's due to problems encountered on the previous shifts which were attributed to inexperienced technicians and procedural inadequacies. During the previous shift, while performing step 7.13 which requires adjustment of the gain until the meter reads 100% (corresponding to 8.0 volts), the technicians were unable to achieve a 100% meter reading on many LPRMs. Rather than evaluating the cause of the apparent problem, the technician recorded the "best" meter readings they were able to obtain and continued in a likewise manner on the remaining LPRM's. Upon shift change, the oncoming personnel realized that the problem was due to the technicians not selecting the proper range gain pot. The inexperienced technicians were unaware that they should select the most appropriate Lo/Medium/Hi gain adjustment pots to achieve the required meter readings. No mention of this option could be found in the procedure.

One additional procedural problem was discovered by the technicians and was being submitted as procedural change. This problem involves Step 7.18 which requires adjustment of the Average Power Range Monitor (APRM) gain pot to obtain a pre-determined percent power on the meter. Prior to the step, the procedure requires the APRM meter function switch to be selected to read the LPRM being adjusted. If the APRM gain pot is adjusted without first selecting "AVG" on the APRM meter function switch, the pre-determined APRM percent power can not be obtained since the meter will continue to display LPRM power.

During surveillance testing (S.I. 4.1.A.8) conducted December 6, 1984, on Unit 1 east scram discharge instrument volume high level scram instrumentation, the licensee discovered that the printout from the sequence of events recorder did not correspond to the level instrument being tested. Additionally, it was discovered that the 'F' (LS-85-45F) and 'E' (LS-85-45E) instrument electrical cables were reversed. The level instruments were installed under work plans 10326 and 10369 prior to the beginning of the

cycle commencing December 29, 1983. The installation error went undetected during all previous monthly surveillance tests for the past eleven months. Correct installation of these cables was verified by quality control inspectors at the time of installation, (P.O. 392). The error was due to incorrect cable tagging of the conduit runs.

Both 'E' and 'F' level instruments are float type switches. The adequacy of the cabling routed to the reactor protection system was verified by a post modification test to insure that either instrument caused a unique half scram. This test was performed under maintenance request A265132 and A203195 on December 14, 1984.

Reveiw of plant Surveillance Instruction SI 4.1.A-8, Reactor Protection System High Water Level in Scram Discharge Tank, and discussions with plant personnel revealed a potentially generic problem with the performance of surveillance instructions at the plant. The exact instrument being tested was not specified to all personnel. An alarm was verified as being received but the alarm printout was not checked for an entry for the correct instrument.

Similar problems with the instrument designations for the scram discharge instrument volume level instruments were noted during a post-trip review for the Unit 3 trip occurring December 9, 1984. On the east side the instruments were designated A, B, C and D instead of E, F, G and H on the sequence of events recorder printout. The same problem existed on Unit 1.

This problem is potentially generic in that computer entries, printouts and information used to conduct post-trip reviews may be in error. The licensee committed to verify a sampling of computer output data. (Open Item 259/84-53-02)

In summary, the following can be concluded from this problem.

a. The Unit 1 cabling installation for LS-85-45F and LS-85-45E was not in accordance with the work plan drawing.

b. The quality control verification was ineffective in finding the cable routing error.

c. The surveillance instruction (S.I. 4.1.A.8) was inadequate in that it was run eleven times without noting the relay trip error of the scram discharge volume 'E' and 'F' switches.

d. The computer alarm printout data was in error during original data point entries and not verified during monthly surveillance. This error existed on Units 1 and 3.

The above items will remain an unresolved item for further inspector follow-up and review (259/84-53-03).

During the performance of SI 5.4.A.1.b (II) (Core Spray System II - Pump Operability) on Unit 3, December 16, 1984, FCV-3-75-50 failed to meet the acceptance criteria for closure time. The valve closed in 31 seconds as compared to the maximum allowable closure time of 30 seconds. Core Spray Loop II was declared inoperable at 2230 on December 16, 1984, due to this condition. After continued evaluation by plant personnel, the core spray loop was declared operable at midnight; however, valve FCV-3-75-50 was declared inoperable and a caution tag was attached to the valve stating that the valve must remain closed when the core spray system is required to be operable. Valve FCV-3-75-50 is a normally closed pump test bypass valve which is throttled open during the monthly pump operability surveillance to establish the required pump discharge head. The valve receives a close signal when the core spray pump automatically starts. Several days of trouble shooting by plant personnel failed to find any problems with the valve or control circuitry. The valve finally closed in 29-30 seconds after the valve packing was loosened. Plant personnel indicated that the long term solution would probably involve adjustment of the valve position limit switches which control the valve stroke limits such that the 30 second stroke time is more easily met. The inspectors voiced their concern with that approach after a review of the plant Final Safety Analysis (Section 7.4.3.4) which specifies that the 30 second acceptance criteria is the valve's full stroke operating time. The acceptability of this approach would depend upon the definition of the valve full stroke operating time. This item will remain open (259/84-53-04).

8. Reportable Occurrences (90712, 92700)

The below listed Licensee Event Report (LERs) were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of event description, verification of compliance with technical specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event. Additional in-plant reviews and discussion with plant personnel, as appropriate, were conducted for those reports indicated by an asterisk. The following licensee event reports are closed:

LER No.	Date	Event
*259/84-37	11-14-84	Reactor protection system wiring error.
*259/84-36	9-29-84	RCIC controller inoperable

No violations or deviations were noted in this area.