



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

Report Nos.: 50-259/84-23, 50-260/84-23, and 50-296/84-23

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 Dates:

Inspection at Browns Ferry site near Decatur, Alabama

Inspectors:	<u><i>Ross C. Butcher for</i></u>	<u>7/13/84</u>
	G. L. Paulk, Senior Resident	Date Signed
	<u><i>Ross C. Butcher for</i></u>	<u>7/13/84</u>
	C. A. Patterson, Resident	Date Signed
Approved by:	<u><i>F. S. Cantrell</i></u>	<u>7/13/84</u>
	F. S. Cantrell, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine inspection involved 160 resident inspector-hours in the areas of operational safety, maintenance observations, surveillance observation and reportable occurrences.

Results: Two violations were identified - Failure to take prompt corrective action on the shutdown room cooling nonconformance report, revision one and inadequate diesel generator surveillance per Technical Specification 4.9.A.1.d.

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REPORT DETAILS

1. Persons Contacted

J. A. Coffey, Site Director
G. T. Jones, Plant Manager
J. E. Swindell, Superintendent - Operations/Engineering
J. R. Pittman, Superintendent - Maintenance
J. H. Rinne, Modifications Manager
L. W. Jones, 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
Ray Cole, QA Site Representative
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
G. 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

The inspection scope and findings were summarized on June 25, 1984, with the Plant Manager and/or Assistant Plant Managers and other members of his staff. Two violations were discussed - Failure to take prompt corrective action on the shutdown board room cooling nonconformance report, revision one (details in paragraph 5) and inadequate diesel generator surveillance per Technical Specification 4.9.A.1.d (details in paragraph 7). The licensee acknowledged the findings and took no exceptions. An enforcement meeting was held June 21, 1984, in the Region II office in Atlanta to discuss previous violations concerning design errors. This meeting is covered in Report 84-21.

3. Licensee Action on Previous Enforcement Matters (92702)

- a. (Closed) Violation (259/84-07-02) Kf breakpoint factor computer entry in error. A new standard practice and specialists retraining was completed to address the concerns in this area.
- b. (Closed) Violation (259/260/296/84-07-04/05) CAD inoperable during reactor operation. Operating Instruction 84 was clarified to prevent recurrence of the valving error that caused the inoperability.
- c. (Closed) Deviation (259/260/84-07-01) Failure to report evaluation of pipe support problems. This item has been adequately addressed by the licensee to prevent recurrence.

4. Unresolved Items* (92701)

Unresolved items were not identified during this inspection.

5. Operational Safety (71707, 71710)

The inspectors were 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

*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.

control adequate; vital area controls; personnel badging, personnel search and escort; and vehicle search and escort. Informal discussions were held with selected plant personnel at their functional areas during these tours. Weekly verifications of systems status which included major flow path valve alignment, instrument alignment, and switch position alignments were performed on the shutdown board room ventilation and diesel generator starting air systems.

A complete walkdown of the accessible portions of the high pressure coolant injection 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, hangers 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.

During this report period, unit 3 continued in a 350-day refueling outage, unit 1 operated at full power, and unit 2 operated at 60% power.

On June 3, 1984, unit one turbine tripped and the reactor scrammed. A cooling and heating problem of the excitation rectifier for the generator gave indication of a ground and the turbine tripped. The unit returned to service the same day. Unit one was shut down on June 20 because unidentified leakage exceeded the Technical Specification limit of 5 gallons per minute. The cause of the leak was the 'B' recirculation pump seal which is being replaced. Also the jet pump instrument nozzles were inspected and no evidence of cracking found. It is planned to return the unit to service the week of June 25, 1984.

The inspector toured the unit 1 control room on June 19, 1984 when the unidentified leakage was greater than 4 gallons per minute and approaching the Technical Specification limit. Two chart recorders on the back of the control room panels indicated upward trends in temperatures. Recorder TR-80-1 for drywell atmosphere cooling temperature showed an upward trend of 150°F. from 08:30 a.m. until 12:00 noon. Recorder TR-85-7C control rod hydraulic temperature showed an upward rise of 50°F. over the past 1-1/2 hours. Discussions with the unit operators revealed they were unaware of these temperature rises. Investigation by the plant operator found both of these recorders had malfunctioned.

Unit two operated at 60% power during this period to conserve fuel burnout. On June 16, 1984 the turbine tripped and a reactor trip followed. Workers checking the lube oil sump level float accidentally bumped the low level turbine trip float tripping the turbine. The unit returned to service the same day.

Weld overlay repairs of the jet pump instrumentation nozzles cracking is underway for unit three. Cracks were found in both loops 'A' and 'B' nozzles. No cracks have been found on unit one and unit two will be inspected during the refueling outage in August. (See LER BFRO-50-296/84006)

A roving fire watch is posted to inspect the unit one and unit two areas where the electrical cable separation is inadequate. The inspector made a tour with the fire watch and all cable trays being inspected are identified with red tape (IE Report 84-20).

On June 14, 1984, a leak occurred in the unit one reactor water cleanup room. Two assistant unit operators entered the room to isolate the leak and became contaminated. One operator's hair was contaminated to 320,000 DPM and another operator's forearm and back of the neck was contaminated to 30,000 DPM. One operator could not be decontaminated until his hair was cut. Both workers received whole body counts revealing no contamination.

Media interest occurred this month with the release of TVA's SALP report (IE Report 84-09). This interest centered around the identified weaknesses at Browns Ferry and the fact that no improvements have been made since the last SALP period. In addition, media interest occurred over the enforcement meeting held June 21, 1984, in Region II concerning identified design deficiencies at the plant (IE Report 84-20). It was pointed out that the NRC was previously told that problems with electrical cable separation had been corrected after the Browns Ferry fire on March 22, 1975.

On June 16, 1984, the units one and two diesel generator 'B' failed to shutdown until fuel was choked to the engine. The cause was due to a ground in the test oscillograph while performing testing. The diesel was declared inoperable from 6:15 p.m. to 9:47 p.m. until the cause was discovered.

On the same day the unit three diesel generator '3EB' experienced two inadvertent starts. During the performance of a special test (EMI-37) to replace relays with cracked coil spools the diesel started unexpectedly. A repeat of the procedure from the beginning point resulted in another start. During the replacement of the relays the procedure called for removing one terminal connection directly behind another connection which was still connected. Due to the physical arrangement of the connections, a short was inadvertently made between the terminals which resulted in the inadvertent start of the diesels. The procedure was revised to reverse the order of removing these connections.

During the inspector's review on June 14, 1984, of licensee event report BFR0-50-259/84022 dated June 8, 1984, it was discovered that the report did not include unit three and stated that units one and two were the only units affected by this event. This event was the discovery, during a review of 10 CFR 50, Appendix R, that design errors existed with the electrical board room cooling equipment. Upon receipt of an accident signal (LOCA) and concurrent loss of offsite power, the exhaust fans for the electrical board rooms for units one and two were permanently load shed and could not be restarted unless the load shed logic controls were jumpered. Further, a single failure of a reactor Motor Operated Valve Board (MOV) 1A or 2A causes the loss of both the normal exhaust fan and the emergency air-conditioner, leaving the board room with no cooling.

The initial nonconformance report (BFN MEB 8403) was issued May 11, 1984 and incorporated into Emergency Operating Instruction EOI-36, Loss of Coolant Accident Inside Drywell, on May 12, 1984. Revision one of the nonconformance report was issued May 12, 1984 and was not incorporated into EOI-36 until June 15, 1984. Revision one concluded that for unit three, loss of MOV 3A, the redundant cooling systems were lost for the electrical board room on elevation 621.

Additionally, a recommended temporary step was added to open the outside doors to the fan tower when establishing an exhaust path for cooling to the room when the exhaust fan and room air-conditioner were without power. The safety evaluation stated that the analysis was contingent upon opening an access door upstream of the fan and the concurrent opening of the vent tower doors. This was applicable to all three units. Unit one was operating at 100% power and unit two at 60% power during this period.

On June 15, 1984, EOI-36 was revised to include opening the outside doors to the vent towers. Also, a note was added at this time stating that "Operation of an upper elevation emergency A/C unit isolates the supply and exhaust air flow path to a lower elevation S/D board room". Operating Instruction 57, Auxiliary Electrical System, was revised June 15, 1984, to identify the loss of the redundant cooling systems in event of a single power board failure.

The inspector asked, on June 16, 1984, to see the final safety evaluation and temperature profile curves (marked as preliminary in Revision one) stated in the evaluation to be completed around June 1, 1984; however, this evaluation will not be completed until July 3, 1984.

Discussions with plant personnel revealed that a communications error resulted in the corrective actions not being implemented.

The Plant Manager was informed of this oversight on June 14, 1984 and on June 25, 1984, in an exit meeting of violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action (259, 260, 296/84-23-01).

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 systems 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 adhered to; 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 this report period:

- a. Unit three outage maintenance
- b. Shuffle of unit three fuel assemblies in spent fuel pool
- c. Modifications to unit three diesel generators
- d. Testing of EECW water for proper chlorination
- e. Unit ventilation towers inspection of temporary access doors in the ducting.

There were no violations or deviations in this area.

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 accomplished by qualified personnel, and that the surveillance was completed at the required frequency.

- a. S.I. 4.2.B-36 HPCI Turbine Steam Line High Flow
- b. S.I. 4.9.A.1.d Diesel Generator Annual Inspection
- c. S.I. 2 Operator Daily Logs
- d. S.I. 4.2.B-37 HPCI Steam Line Space High Temperature

Technical Specification 4.9.A.1.d requires that each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations. Surveillance Instruction 4.9.A.1.d (S.I. 4.9.A.1.d) is used to comply with this requirement. During a review of S.I. 4.9.A.1.d and the manufacturer's recommended maintenance instructions, Electro-Motive Division Maintenance Instruction (MI) 1742, referenced in S.I. 4.9.A.1.d, the inspector found that not all maintenance is being performed as recommended in MI 1742.

A model 645E4 turbocharger 20 cylinder diesel engine is the power source for the Model 999-20 generating plant used for the emergency diesel generators at the plant. MI 1742 is subtitled "Scheduled Maintenance Program 999 System Generating Plants". This instruction states to perform maintenance

on some items on a weekly, monthly, or yearly basis and on elapsed hours of run time for other items.

One of the yearly maintenance items is to check the settings of the overspeed trip setting and the lash adjusters. The electrical maintenance section performs the overspeed trip setting yearly per S.I. 4.9.A.1.d but no check is made of the lash adjusters by the mechanical maintenance section. Mechanical Maintenance Instruction 6 (MMI-6) is used for the maintenance performed by the mechanical section on the diesel engines to comply with S.I. 4.9.A.1.d and makes no mention of the lash adjusters. The hydraulic lash adjusters are used to maintain zero lash between the end of the exhaust valve stems and the valve bridge which operates the exhaust valve.

The engine manual for the model 645E4 engine gives a detailed procedure for checking the settings of the lash adjusters using a test stand and associated tools.

Unit 1 and Unit 2 shared diesels now have greater than 500 hours run time, but some of the 500 hour checks are not being performed in any inspection program. Examples of these are checks on the crankshaft, connecting rods, and piston to head clearance measurement. In addition, the current revision of MI 1742 was not being used by the plant. Some confusion existed about which instruction was used to set up the scheduled maintenance program. Discussions with plant section supervisors indicates that there are no formal tracking systems to assure vendor manuals required for maintenance or repair are maintained current. Some question also existed as to whether all required vendor manuals were available on site.

The plant manager was informed of these findings during a daily meeting on June 8, 1984, and was notified this item was a violation of Technical Specification 4.9.A.1.d on June 25, 1984 in an exit meeting (259, 260, 296/84-23-02).

8. Reportable Occurrences (90712, 92700)

The below listed Licensee Event Reports (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, except for 259/84-22, are closed:

<u>LER No.</u>	<u>Date</u>	<u>Event</u>
*259/80-03	January 12, 1980	MSIV's leakage during LLRT.
*259/80-11 R5	February 1, 1980	Purge and vent system design problem.

*259/82-57 R2	August 16, 1982	PCIS relay coil failure (16A-K72) causes isolation of hydrogen analyzers.
*259/82-64 RI	August 23, 1982	Unit I, Station II cable tray fixed - spray system strainer clogged.
*259/84-22 (Not Closed)	June 8, 1984	Design oversight on load shed logic.
*259/84-24	June 2, 1984	Reactors scram due to turbine trip.

There were no violations or deviations in this area. However, LER 259/84-22 did not adequately address the proper applicability of the design deficiency. Units 1 and 2 were identified as being the only units affected by the event. Followup inspection by the resident revealed that this design deficiency also affected Unit 3 operations. The Plant Manager was informed of this discrepancy and he indicated a followup report would be submitted to correct the initial LER applicability error.

9. Regulatory Performance Improvement Program (RPIP)

As part of the regional oversight of the RPIP, the responsible project section chief reviewed the status of the RPIP, the minutes of the meetings of the RPIP Oversight Review Committee on 4/9, 4/23, 5/7 and 5/21/84 and attended the schedule meeting on June 4, 1984. Reports at the meeting indicated that RPIP milestones are being met. Discussion with plant personnel during a plant tour indicated that a number of persons feel that the RPIP is for upper management and do not feel that they have any responsibility in the program. These concerns were discussed with the Plant Manager on June 5, 1984.

10. In Office Review

The following items were evaluated by the Reactor Safety, Radiation Safety and Safeguards, and Reactor Projects regional staff. Based on this review and the results of the latest Resident and Region based inspection activities in the affected functional areas, the following items were determined to require no additional specific followup and are closed.

a. Dockets 50-259/260/296/

81-CI-13	IFI	Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors.
79-44-03	Open	Update of Gamma Analysis Software

81-07-03	Unresolved	Identification of Portion of Welds Examined on Sampling Basis
81-07-04	Unresolved	ISI Schedule
81-31-01	Unresolved	Earthfill Compaction Test Graph Calibration
81-13-05	IFI	Jet Pump Holddown Assembly Replacement
81-19-19	IFI	Inadequate Temperature Difference Recorder
81-19-35	IFI	Cross Reference EQI and Emergency Instructions
81-27-01	Unresolved	Failure to Post a Radiation Area
81-30-03	IFI	Procedure for Operation & Calibration of Geli System
81-30-05	IFI	Correction Factors for Radioactive Measurements
82-31-01	IFI	Document & Establish Schedules for Testing or Evaluating the PNS System
82-33-03	IFI	Procedure Specifies Improper Test Frequency
82-38-04	IFI	Improve Communications and Information Flow
82-38-05	IFI	Increase Control and Coordination Measures for News Information
82-38-06	IFI	Use Status Boards and Maps More Effectively
82-38-08	IFI	Improve Radiological Contamination Control Measures Used During Accident Response
b. Docket 50-260		
82-11-02	Unresolved	Questioned Vent Line Installation
82-32-01	Unresolved	Arc Strikes