



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II

101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-259/81-03, 50-260/81-03 and 50-296/81-03

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

Facility: Browns Ferry Nuclear Plant

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

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

Inspection at Browns Ferry Site near Athens, Alabama

Inspectors: P. A. Taylor for
R. F. Sullivan, Senior Resident Inspector

3-3-81
Date Signed

P. A. Taylor for
J. W. Chase, Resident Inspector

3-3-81
Date Signed

P. A. Taylor for
G. L. Paulk, Resident Inspector

3-3-81
Date Signed

Approved by: F. S. Cantrell
F. S. Cantrell, Section Chief, RRPI Division

3/9/81
Date Signed

SUMMARY

Inspection on January 1-31, 1981

Areas Inspected

This routine inspection involved 203 resident inspector-hours in the areas of operational safety, reportable occurrences, maintenance, fuel handling, plant physical, radiation protection, reactor trips, surveillance testing, emergency procedures and scram discharge header monitoring.

Results

Of the 10 areas inspected, no violations or deviations were found in 7 areas, five violations were found in 3 areas; (Violation - Welding performed on safety related equipment and the welder's qualifications can't be determined, paragraph 5; Violation - Secondary containment not maintained, paragraph 5; Violation - Radioactive contaminated ladder found in a clean area, paragraph 6; Violation - Personnel working in a high radiation area without a dose rate meter, paragraph 6; Violation - Workers not kept informed of the radiation levels in areas they were working).

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DETAILS

1. Persons Contacted

Licensee Employees

H. L. Abercrombie, Power Plant Superintendent
J. L. Harness, Assistant Power Plant Superintendent (Maintenance)
J. R. Bynum, Assistant Power Plant Superintendent (Operations)
J. B. Studdard, Operations Supervisor
R. Hunkapillar, Assistant Operations Supervisor
A. L. Burnett, Assistant Operations Supervisor (Outage)
J. A. Teague, Maintenance Supervisor, Electrical
M. A. Haney, Maintenance Supervisor, Mechanical
J. R. Pittman, Maintenance Supervisor, Instruments
R. G. Metke, Results Section Supervisor
R. T. Smith, QA Supervisor
J. E. Swindell, Outage Director
B. Howard, Plant Health Physicist
R. E. Jackson, Chief, Public Safety
R. Cole, QA Site Representative Office of Power
R. E. Burns, Instrument Engineer
T. L. Chinn, Compliance Staff Supervisor

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

2. Management Interviews

Site management interviews were conducted on January 9, 16, 23 and 30, 1981, with the Power Plant Superintendent and/or his Assistant Superintendents and other selected members of his staff. The inspectors summarized the scope and findings of their inspection activities. The licensee was informed of the five apparent violations identified during this report period.

3. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (259/77-20-02) References in the nondestructive examination procedures on welds were outdated. The procedures were replaced with new ones.

4. Unresolved Items

There were no new unresolved items identified during the report period.

5. Operational Safety

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 room 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; purpose of temporary tags on equipment controls and switches; annunciator alarms; adherence to procedures; adherence to limiting conditions for operations; temporary alterations in effect; daily journals and data sheet entries; 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; instrument readings; housekeeping; radiation area controls; tag controls on equipment; work activities in progress; 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.

On January 8, 1981 at 1:20 p.m., while observing the inspection of the control rod drive accumulator level switches on Unit 3, an inspector noted the reactor building equipment air lock inside door open while the outside air lock door was open. This resulted in a loss of secondary containment while primary containment was not being maintained. The loss of secondary containment was due to personnel not adhering to administration instructions posted by the doors which requires that a second person be posted at one door to ensure it remains shut while opening the other door. On this date, no second person was posted at the door which was to remain shut. When the person opened the outside air lock door, the positive pressure in the turbine building blew open the inside door. On January 9, 1981, an inspector observed that an individual on Unit 2 failed to follow the posted administrative instructions but on this occasion did not result in a loss of secondary containment.

The violation of secondary containment while primary containment was not maintained was identified to the Plant Superintendent as an apparent violation (296/81-03-01) of technical specification 3.7.C.1. The Plant Superintendent accepted the apparent violation and stated that he would take disciplinary action on these individuals who did not adhere to the requirements for passage through the reactor building equipment air lock doors.

On January 15, 1981, prior to startup of Unit 3 after a refueling outage, an inspector reviewed work plan 7779R1, Installation of Hydrogen-Oxygen Monitoring Panel. At the time of this review, the work plan had not yet been reviewed by the plant quality assurance office. The review by the inspector indicated that a minimum of 70 welds on this safety-related system were made. The welder who made these welds could not be identified in the work plan thus his qualifications to do the welding can not be determined. The licensee issued Corrective Action Reports (CAR) 81-13 and 81-15 in which the failure to identify the welder was addressed as a significant condition adverse to quality. The licensee also reviewed all the weld rod check out

forms to ensure that only qualified welders checked out weld rods for these work plans. No problems were identified as a result of these reviews. Dye penetrant testing and hydrostatic testing has been performed on the welds.

The lack of documentation to prove that qualified welders performed the welding was identified as an apparent violation of 10 CFR 50 Appendix B Criterion IX and Topical Report TVA - TR75-1, paragraph 17.2.9. to the plant superintendent on January 16, 1980. (296/81-03-05).

6. Health Physics

During the inspection period the inspectors made frequent inspections of contaminated storage and work areas, radiation and high radiation areas and observed work in areas where a special work permit (SWP) was necessary. This inspection was conducted to assure that adherence to the requirements on the SWP was being followed and to verifying that the SWP was properly filled out.

On January 29, 1981, the licensee informed an inspector that a pile of scrap which was being readied for transport to TVA's local dump, contained a metal ladder which had been cut up into four pieces and was radioactively contaminated to levels of 150,000 dpm direct reading and 2000 dpm smearable. In addition, the metal scaffolding in the bed of a truck being readied for transport to the cooling water towers had radioactive contamination levels of 800 dpm smearable. These items were in a clean zone and were discovered during the required radiation survey made before the material leaves the plant protected area.

The levels of contamination on these items are below the limits listed in 10 CFR 20, however, plant procedure, Radiological Control Instruction (RCI)-1, requires that all items leaving a regulated area to a clean zone shall be surveyed by the plant health physics personnel and shall not be released to a clean zone if the item has greater than 200 dpm contamination. On January 30, 1981, inspector informed the Plant Superintendent that this incident was an apparent violation of technical specification 6.3.A.7 which requires that radiation control procedures shall be adhered to. The Plant Superintendent stated that this incident would be discussed with all personnel in the outage organization by February 4, 1981. (259/81-03-01, 260/81-03-01, 296/81-03-02).

On January 14, 1981, while observing the installation of the scram discharge header transducers for monitoring water level on unit 3 east header, an inspector observed three TVA personnel and one GE representative working in a high radiation area without a dose rate meter. The inspector determined that the special work permit (SWP) required that a dose rate meter be used because the general area survey indicated radiation level of 300 mr/hr. A radiation survey of the area where the personnel were working was determined to be 100 to 500 mr/hr. The inspector informed TVA's instrument engineer who was at the job site of the requirements on the SWP. The engineer had



the personnel in the high radiation area leave the area until a dose rate meter could be obtained. The engineer stated he was aware of the requirements, and had used a dose rate meter at a previous job site but had forgotten to have the dose rate meter at this job site.

Radiological Control Instruction (RCI) - 10 requires that for any work in a high radiation area (greater than 100 mr/hr), a dose rate meter will be with the individual or group of individuals who enter the area. The Plant Superintendent was informed on January 16, 1981, that failure to follow the requirements of the SWP and RCI-10 was an apparent violation of Technical Specification 6.3.A.0.7 which requires that radiation control procedures be adhered to. (296/81-03-03)

While making a tour of unit 3 reactor building on January 15, 1981, the inspectors observed carpenters on the west scram discharge header (SDH) north end removing scaffolding. The inspector questioned the foreman in charge of the job as to the requirements of his SWP since the area the workers were in was posted as a high radiation area and no dose rate meter was observed in the area. The foreman stated that the health physics technician did not require a dose rate meter nor did the SWP which he was told to use. The inspector reviewed the SWP No. 01-3-37187 and found that it had been issued for general work and cleanup. The general area was documented at 40 mr/hr and that no rate meter was required. The health physics technician who authorized the use of that SWP by the workers stated that the job was only 5 or 10 minutes long, so he cautioned the workers to stay clear of the SDH piping and that he also was "keeping an eye" on them. The general area where the workers were removing the scaffolding was surveyed by plant health physics personnel and found to vary from 60 mr/hr to 150 mr/hr. The inspector noted also that the health physics technician was approximately 200 feet from the work area and his view of this area was obstructed by equipment. The two workers in this area received an exposure, as registered by their dosimeters of 7mrem and 10 mrem.

The Plant Superintendent was informed by the inspector that failure to inform workers of the radiation levels in which they were working was an apparent violation of 10 CFR 19.12 which requires that workers to be kept informed of radiation in portions of restricted area in which they are in (296/81-03-04).

7. Reactor Trips

The inspectors reviewed activities associated with the below listed reactor trips during this report period. The review included determination of cause, safety significance, performance of personnel and systems, and corrective action. The inspectors examined instrument recordings, computer printouts, operation journal entries, scram reports and had discussions with operations, maintenance and engineering support personnel as appropriate.

On January 3, 1981, Unit 2 tripped at 11:24 a.m. from 100% power due to a turbine trip caused by failure of the generator bus tie breaker. Four main steam relief valves actuated to relieve reactor high pressure. No emergency core cooling was initiated. Systems performed as designed.

8. Inspector Followup Items

The inspectors followed up on the Confirmation of Action letter issued on November 10, 1980, as a result of the Health Physics Appraisal inspection performed on October 20-31, 1980. The Confirmation of Action letter addressed four items in which TVA was to take action to alleviate deficiencies in the personnel contamination monitoring program. The inspectors reviewed each area to ensure that the proper action had been taken.

- a. Plant instructions were revised on November 7, 1980, to require individuals exiting a contamination zone to have a whole body contamination survey performed prior to donning personal clothing.
- b. On November 5, 1980, the Plant Superintendent informed all employees by memorandum that they must use the hand and foot monitors when exiting regulated areas.
- c. TVA has increased the frequency of functional checks on personnel friskers to three times per week.
- d. Quality Assurance has performed and is performing surveillance of personnel contamination monitoring to evaluate the effectiveness of the actions taken.

No violation or deviations were identified within the areas inspected.

9. Reportable Occurrences

The below listed licensee event reports (LER's) were reviewed to determine if the information provided met NRC reporting requirements. The determination included adequacy of event description and corrective action taken or planned, existence of potential generic problems and the relative safety significance of each event. Additional inplant reviewed and discussion with plant personnel as appropriate were conducted for those reports indicated by an asterisk.

LER No.	Date	Event
*259-8025	4/11/80	RHR injection valve failed to close
*259-8057	8/80/80	Technical Specification 4.6.G.6 testing not performed.
259-8073	10/9/80	River delta T exceeded 5° F.
259-8074	10/23/80	Seismic monitor inoperable.
*259-8079	11/21/80	Electrical ground in HPCI pump



*259-8081	11/12/80	FSV-84-19 solenoid coil not environmentally qualified.
259-8087	12/30/80	PDIS-75-28 was found at outside technical specification limits.
*259-8088	12/31/80	1C diesel generator tie breaker tripped
259-8089	1/8/81	Reactor water level switch was found set out of technical specification limits.
*259-8090	1/8/81	Continuous air monitor was inoperable.
259-8091	1/15/81	Drywell hydrogen monitor was inoperable.
*260-8016	4/8/80	MS line sensing line blocked
*260-8037	9/26/80	Fuel assemblies misorientated
*260-8040	10/14/80	5 main steam relief valves failed to actuate within 1%.
*260-8041	10/21/80	Loaded fuel with control rod withdrawn
260-8042	10/27/80	MSIV's exceeded allowable leakage rate
*260-8043	11/6/80	Scram accumulator level switches inoperable.
260-8044	11/10/80	Refueling zone inboard isolation time delay relay was out of tolerance.
*260-8046	11/24/80	Instrument line was missing internals for excess flow check valve.
*260-8047	11/20/80	Inadequate dilution of water to environment
*260-8048	11/28/80	Drywell pressure transmitter not qualified
260-8049	12/3/80	Leak rate testing exceeded technical specification
*260-8050	12/12/80	Intermediate range monitors did not respond during initial startup.
260-8051	12/12/80	Level switch did not operate within technical specification limit
260-8052	12/12/80	3 gallon SDIV level switch did not operate
260-8053	1/2/81	Leak in 2C RHR heat exchanger
*260-8054	12/10/81	Main steam relief valves did not lift within 1% of set pressure.
260-8055	1/6/81	CS discharge pressure switch was found set outside technical specification limits.
260-8056	1/6/81	Reactor water level switch was found set outside technical specification limits.
260-8057	1/13/81	MS line low pressure switches were found set outside technical specification limit.
260-8058	1/19/81	SDIV level switches, 25 gallon inoperable
260-8101	1/15/81	SDIV level switch was inoperable
*296-8016	6/11/80	Cooling water flow to 3D diesel was inadequate
296-8030	9/5/80	Turbine first stage pressure switch setpoint drifted
*296-8036	9/29/80	3A diesel generator would not trip
*296-8040	11/7/80	3B diesel generator lube oil circulating pump inoperable
296-8042	11/14/80	Drywell high pressure setpoint drifted
*296-8043	11/17/80	Flow bias circuitry for APRM's was inoperable
296-8045	12/1/80	3-PS-1-76 setpoint drifted

296-8046	11/28/80	SLC pump inoperable
*296-8047	12/1/80	3B&D core spray room cooler had inadequate cooling flow.
296-8048	12/5/80	EECW to 3B RHR seal heat exchanger had inadequate flow.
*296-8049	12/11/80	3D RHR pump tripped
296-8050	12/11/80	3B SLC pump breaker tripped
296-8051	12/15/80	Drywell H2 sensor would not calibrate
296-8052	12/15/80	3-PS-68-95 setpoint drifted
*296-8054	1/8/81	8 MSRV's failed to actuate within 1% of setpoint
*296-8055	1/8/81	CAM-3-RM-90-250 was inoperable
*296-8057	1/16/81	CAM-3-RM-90-251 was inoperable
296-8058	1/6/81	MSIV's exceeded leakage criteria

Within the areas inspected no violations or deviations were identified.

10. Scram Discharge Header Monitoring

Efforts to make the G.E. supplied continuous monitoring system (CMS) operational continued into January with G.E. engineers on site. Testing of the new system was performed on unit 3 which was in cold shutdown for refueling. The original monitoring system which required 30 minute checks of the local sensor recording strip charts were maintained in service for operating units 1 and 2. When unit 3 resumed operation, the old system was placed in service.

As a result of the on site effort, an improvement in sensor response was attained by optimizing transducer location. The vendor further decided that changes to the circuit design were desirable. The vendor committed to TVA that the updated drawings and parts required for the modified system would be provided by January 30, 1981.

TVA notified the NRC by letter to the Director, Region II, dated January 20, 1981, that problems were encountered and the revised schedule for having the CMS operable. The schedule showed that the system would be operable on unit 3 within three days of receipt of material from the vendor. Modifications to units 1 and 2 would then be completed in another week. Region II found the revised schedule acceptable.

Aside from the vendors efforts, TVA pursued another approach toward providing a monitoring system with alarms in the control room. TVA utilized the same type UT monitor used in the previously installed system in combination with the vendor supplied transducer and equipment to transmit and annunciate information in the control room. The control room operator was provided with an alarm for high water level and another for loss of local power to the UT monitor. By the end of the month TVA had design approval of their system and had installed and tested the system on unit 3. Plant Operation Review Committee's approval of the test results and the procedures is needed to declare the system operable.



No violations or deviations were identified during the review of the above activities.

11. Scram Accumulator Level Switches

On November 6, 1980, TVA reported to the NRC that 17 accumulator level switches out of 185 would not operate on unit 2 and the same number was reported on January 27, 1981, for unit 3. These switches sense leakage from the water side of the scram accumulator to the nitrogen side and cause an alarm to actuate in the control room and locally when leakage is detected. Investigation by TVA into the large failure rate revealed no conclusive evidence to support why the switches failed. Inspection of some of the failed level switches, showed that some had an adhesive type substance on the spring which could have prevented the switch from operating; but it could not be concluded that this caused all 34 failures. Where this adhesive substance came from could not be determined other than to assume from either the lubricant on the accumulator "O"ring which separates the water from nitrogen or from the lubricant used on the threads of the switches. The possible cause for the large number of failures also being considered is an inadequate test procedure. Electrical Maintenance Instruction (EMI)-50 which tests the level switches did not require venting the test pump prior to hookup. This could allow for the introduction of air into the level switch housing which would not allow the switch to function properly. TVA is continuing their investigation by revising EMI-50 to ensure the test pump is vented prior to hookup to the scram accumulator and by testing the accumulator level switches on unit 1 as conditions permit under the revised EMI to see if the venting of the test pump solved the problem.

Within the areas inspected no items of noncompliance were identified.

12. Plant Physical Protection

During the course of routine inspection activities, the inspectors made observations of certain plant physical protection activities. These included personnel badging, personnel search and escort, vehicle search and escort, communications and vital area access control.

Turnstiles, one on either side of the enclosed guard station at the west gatehouse, were installed and placed in service on January 12, 1981. This addition provides improved control for access to the protected area.

No violations or deviations were identified within the areas inspected.

13. Maintenance

The inspector made direct observation of the installation of a replacement water accumulator for rod drive 34-27, unit 2, on January 8, 1981. The rod was declared inoperable as required by Technical Specifications.

Within the areas inspected no violation or deviations were identified.

14. Surveillance Testing

The inspector observed the conduct of surveillance testing for the Standby Liquid Control System, Surveillance Instruction (SI) 4.4.A.1, on January 19, 1981, on unit 3. The completion of the surveillance satisfied the requirement for monthly loop functional testing.

On January 14, 1981, an inspector observed the conduct of surveillance testing on the reactor high pressure scram switches, Surveillance Instruction (SI) 4.1.A.5. The surveillance test was performed in accordance with the instruction. All gauges and meters were in calibration, all the latest revisions were entered in the instruction and the instrument technician were knowledgeable of the procedure and the effects this surveillance had on the plant.

No violations or deviations were identified within the areas inspected.

15. Special Test

The inspector on January 12, 1981 observed the performance of Special Test 168, Inspection for Missing Tags, in the unit 1 fuel pool. The test required the movement of fuel bundles, dechanneling of fuel assemblies, and the search of fuel racks to locate missing identification tags which had fallen into the fuel pool in May 1979.

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

16. Emergency Procedures on Anticipated Transient Without Scram (ATWS)

A review was made of plant operating and emergency procedures to verify that conditions of concern relating to an ATWS event were adequately addressed in the procedures. The review included a range of potential control rod problems from single rod malfunction to all rods failing to scram. Also included in the review was, failure of a scram to be initiated when required and the initiation of the standby liquid control system when needed. A total of five procedures were reviewed. The inspector determined that the conditions of interest were addressed in the procedures; however, some minor changes appeared advisable to more clearly define desired operator action. The licensee implemented these procedure changes on January 27, 1981.

No violations or deviations were identified within the areas inspected.

