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

Report Nos.: 50-348/85-31 and 50-364/85-31

Licensee: Alabama Power Company
600 North 18th Street
Birmingham, AL 35291

Docket Nos.: 50-348 and 50-364 License Nos.: NPF-2 and NPF-8

Facility Name: Farley 1 and 2

Inspection Conducted: July 11 - August 10, 1985

Inspectors: _____ 8/20/85
W. H. Bradford Date Signed

_____ 8/20/85
B. R. Bonser Date Signed

Approved by: _____ 8/21/85
F. S. Cantrell, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, unannounced inspection entailed 170 inspector-hours on site in the areas of monthly surveillance observation, monthly maintenance observation, operational safety verification, engineered safety system inspection, and followup of events.

Results: Within the areas inspected no violations or deviations were identified.

REPORT DETAILS

1. Licensee Employees Contacted

   J. D. Woodard, Plant Manager
   D. N. Morey, Assistant Plant Manager
   W. D. Shipman, Assistant Plant Manager
   R. D. Hill, Operations Superintendent
   C. D. Nesbitt, Technical Superintendent
   R. G. Berryhill, Systems Performance and Planning Superintendent
   L. A. Ward, Maintenance Superintendent
   L. W. Enfinger, Administrative Superintendent
   J. E. Odom, Operations Sector Supervisor
   B. W. Vanlandingham, Operations Sector Supervisor
   T. H. Esteve, Planning Supervisor
   J. B. Hudspeth, Document Control Supervisor
   L. K. Jones, Material Supervisor
   R. H. Marlow, Technical Supervisor
   L. M. Stinson, Plant Modification Supervisor
   W. G. Ware, Supervisor, Safety Audit Engineering Review

   Other licensee employees contacted included technicians, operations personnel, maintenance and I&C personnel, security force members, and office personnel.

2. Exit Interview

   The inspection scope and findings were summarized during management interviews throughout the report period with the plant manager and selected members of his staff. The inspection findings were discussed in detail. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters (92702)

   This subject was not addressed in the inspection.

4. Monthly Surveillance Observation (61726)

   The inspectors observed and reviewed Technical Specification required surveillance testing and verified that testing was performed in accordance with adequate procedures; that test instrumentation was calibrated; that limiting conditions were met; that test results met acceptance criteria and were reviewed by personnel other than the individual directing the test; that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel; and that personnel conducting the tests were qualified.

The inspector witnessed/reviewed portions of the following test activities:

STP-33.2	-	Reactor Trip Breaker Train Operability Test.
STP-35.1	-	Unit Startup Technical Specification Verification.
STP-35.1A	-	Mode 2 Surveillance Check List.
STP-35.1B	-	Mode 1 Surveillance Check List.
UOP-1.3	-	Startup of Unit Following at Power Reactor Trip, Appendix 1, Calculation of Estimated Critical Condition.
UOP-1.2	-	Startup of Unit from Hot Standby to Minimum Load.
STP-42.2	-	Turbine Latch Functional Test (Throttle Valves).
STP-151.3	-	Main Turbine Trip Devices Operability Test.
STP-34.1	-	Containment Inspection (Post Maintenance).
STP-29.1	-	Cycle 4 Shutdown Margin Calculation (Tavg - 547°F).
STP-1.0	-	Operations Daily and Shift Surveillance Requirements.
STP-33.0	-	Solid State Protection System Operability.
STP-33.1	-	Safeguards Test Cabinet Train Functional Test
STP-80	-	Diesel Generators Operability Test.
ETP-101	-	Testing of Control Rod System.

Within the areas inspected no violations or deviations were identified.

5. Monthly Maintenance Observation (62703)

Station maintenance activities of safety-related systems and components were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and were in conformance with Technical Specifications.

The following items were considered during the review: limiting conditions for operations were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; 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 were properly certified; radiological controls were implemented; and fire prevention controls were implemented.

Work requests were reviewed to determine the status of outstanding jobs to assure that priority was assigned to safety-related equipment maintenance which may affect system performance. The following maintenance activities were observed/reviewed:

1-B	-	Diesel Generator
2-B	-	Diesel Generator
1-2A	-	Diesel Generator
1-C	-	Component Cooling Water Pump
Unit 2	-	MSIV-3370A and 3369A

Unit 2 - TDAFP Warmup Valve HV-3234A
Unit 2 - Rod Control System
2-B - Inverter
2-A - Solatron Regulator

Within the areas inspected no violations deviations were identified.

6. Operational Safety Verification (71707)

a. The inspectors observed control room operations, reviewed applicable logs and conducted discussions with control room operators during the report period. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified proper return to service of affected components. Tours of the auxiliary, diesel and turbine buildings were conducted to observe plant equipment conditions, including fluid leaks and excessive vibrations.

b. Inspectors verified compliance with selected Limited Condition for Operations (LCO) and results of selected surveillance tests. The verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions and review of completed logs, records, and chemistry results.

The following systems and components were observed/verified operational:

- Station electrical boards in the control room and various electrical boards throughout the plant for proper electrical alignment.

- Certain accessible hydraulic snubbers.

- Accessible portions of service water and component cooling water systems.

- Units 1 and 2 suction and discharge piping and valves on auxiliary feedwater system.

- Diesel generators and support systems.

- Certain accessible portions of CVCS piping and valves to and from the charging/high head safety injection pumps.

- Certain portions of RHR and containment spray system.

- Portions of various other systems (safety-related and nonsafety-related).

c. The inspectors routinely attended meetings with certain licensee management and observed various shift turnovers between shift supervisors, shift foreman, and licensed operators. These meetings and discussions provided a daily status of plant operating, maintenance, and testing activities in progress, as well as discussions of significant problems.

d. The inspectors verified by observation and interviews with security force members that measures taken to assure the physical protection of the facility met current requirements. Areas inspected included the organization of the security force; the establishment and maintenance of gates, doors, and isolation zones; that access control and badging were proper; and procedures were followed.

e. During the reporting period on July 23, 1985, 1B diesel generator was started for surveillance testing prior to taking 1-2A diesel generator out of service for maintenance. On starting 1B diesel, the diesel tripped on overspeed and the generator did not reach rated voltage. The licensee made various adjustments which included changing out an electrical relay and voltage regulator control board. The diesel was started again. The start time was within the technical specifications requirement of 12 seconds but the diesel would not load above 98%. The vendor representative checked the fuel rack setting and found the rack setting to be at the 110% rack setting. The 110% load rack setting was set in November, 1981 to limit the load to 110% of 4075 KW rated value or 4450 KW. The 110% load adjustment had not changed.

The licensee started 2-B diesel generator on July 26, 1985, at 4:07 p.m. to make a comparison between the two diesel generators. When the diesels were both loaded to approximately 4 MW, 2-B diesel indicated approximately 100 amperes less load. The Shift Supervisors calculated that 2B MW meter was reading approximately 0.8 MW High. Calibration documentation of the MW meter indicates the meter and transducers were calibrated on February 24, 1982. The fuel racks were set to 49-50 for 4000 KW and 55-56 for 4500 KW on the 1B and 2B diesels. Surveillance test were performed satisfactorily.

The licensee initiated an engineering review to determine if a long term trend could be detected in fuel rack position at rated load and other factors associated with performance.

An evaluation was conducted to determine whether the last 24 hour load test was unsatisfactory. The licensee determined the last 24 hour load test to be satisfactory based on the fact that loads on the machines were approximately the same during November, 1984 and July 1985. The apparent differences in load between megawatt meter and calculated are all within the error band of the metering system, phase amp differences, and readability factors of the installed meters.

The documentation reviewed by the licensee included shop test by the vendor prior to shipment, preoperational test data, surveillance and operability tests and maintenance records.

Within the areas inspected no violations or deviations were identified.

f. On August 8, 1985, during Unit 1 spent fuel inventory, the licensee determined that fuel assembly Z-D3 was still in pool location Z-44 instead of core location H-4. Fuel assembly C-03 had been moved from pool location Z-42 and placed in core location H-4.

Fuel assembly Z-D3, a optimized demonstration assembly, had undergone four cycles of irradiation prior to cycle 7. It had a average burnup of 39,556 MWD/MTU. Fuel assembly C-03, a zircaloy clad design had undergone four cycles of irradiation. It had achieved an average burnup of 38,960 MWD/MTU.

The licensee contacted Westinghouse Corporation for a preliminary evaluation of fuel assembly mislocation and Southern Company Services, and transmitted various core test results along with copies of incore flux maps for analysis. Westinghouse Corporation advised the licensee in a letter of August 8, 1985, that reactivity coefficients, kinetics parameters, and shutdown margin for Cycle 7 are virtually unaffected by the misloading. Westinghouse Corporation recommends continued full power operation of Unit 1, as there is no evidence of any safety concern and ample margin to the Technical Specifications limits has been demonstrated.

The licensee will continue to pursue the safety evaluation.

7. Engineered Safety Systems Inspection (71710)

The inspectors performed various system inspections during the inspection period. These inspections were performed by the inspectors observing four system operators over a two day period in their assigned work area performing their operating duties in the radiation controlled area of the Unit 1 and Unit 2 auxiliary buildings. Overall plant conditions were assessed with particular attention to equipment condition, radiological controls, security, safety, adherence to technical specification requirements, systems valve alignments, and locked valve verification. Major components were checked for leakage and any general conditions that would degrade performance or prevent fulfillment of functional requirements. The inspectors verified that approved procedures and up-to-date drawings were used.

Surveillance testings, valve line-ups and maintenance tagging operations were observed to be in accordance with procedures and administrative controls.

Portions of the following systems were observed for proper operation, valve alignment and valve verification:

Chemical volume and control systems.
Component cooling water system.
Boric acid transfer system.
Service water system.
Containment spray system.
Residual heat removal system.
Penetration room ventilation system.
Spent fuel pool cooling and ventilating system.

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

8. Onsite Followup of Events (93702)

On July 15, 1985, at 7:49 p.m. Unit 2 tripped during a severe thunder-storm. A lightning strike was observed in the near vicinity of Unit 2.

The lighting surge caused a momentary loss of DC power in several rod control cabinets which released control rod stationary gripper coils and allowed the control rods to fall into the core. The reactor tripped on a negative rate trip. Thirty seconds after the turbine tripped the generator output breakers are designed to open and A, B, and C 4160 volt buses transferred from the auxiliary transformer to the startup transformer by a fast dead bus transfer. Generator breaker 1002 opened about 25 seconds after the trip and the other generator output breaker 1102 opened about 18 seconds later. They should have operated simultaneously. The manner in which they opened did not result in a fast dead bus transfer to A, B, and C 4KV buses. This resulted in the loss of all three reactor coolant pumps as well as condensers circulating water pumps and condensate pumps. Thirty seconds after the trip the automatic fast dead bus transfer did take place and A, B, and C 4 KV buses were energized from the startup transformer.

Natural circulation was established and the reactor remained stable on natural circulation for 25 minutes. A reactor coolant pump was started at this time as required by operating procedure.

The licensee has found no cause for the generator output breakers to open early. Therefore to prevent a loss of all reactor coolant pumps on a future potential reactor trip, "B" 4KV bus is aligned and left on the startup transformer for the duration of this cycle. The appropriate procedures have been changed to reflect this change in operating procedure. Unit 1 will continue to operate A, B, and C 4KV buses on the auxiliary transformer when at power operation.

On July 17, 1985 at 3:38 p.m. Unit 1 tripped while in re-start from the previous trip of July 5, caused by lo-lo-steam generator level in B steam generator. All systems functioned as designed.

The reactor was critical again on July 17 at 6:30 p.m. and the plant startup proceeded on schedule.

Unit 1 tripped on July 18, 1985 at 10:18 p.m. from 100% power. All systems functioned as designed. There was no safety injection.

The trip was caused by a false signal to the thrust bearing wear relay on the turbine driven main feedwater pump.

The trip occurred when an electrician who was working in the control board on another system in close proximity to the back of the thrust bearing monitor, came into contact with an insulated wire to the monitor. The wire to the monitor broke loose at the terminal board which caused the turbine trip. This wire to the monitor was not secured as it should have been; it did not enter the back of the monitor compartment through a penetration in the box which was provided. Had this wire been run as required, the lead would not have broken loose at the terminal block. The licensee has corrected this error.

All systems functioned as designed.

At 6:17 a.m. on July 19, 1985, Unit 1 shut down banks were pulled. An alarm was received that control rods MG set "A" had tripped on overcurrent. A system operator was dispatched to put the MG set back in service. Through error he tripped the "B" MG set which was running and caused the shutdown banks rod gripper coils to deenergize the rods to fall into the core. The reactor operator opened the reactor trip breakers from the control board.

On August 2, 1985, at 2:16 a.m. Unit 2 tripped from 100% power due to a over-temperature-delta-temperature ($OT\Delta T$) initiation. Trouble had been encountered on loop 3 of $OT\Delta T$. This channel had been removed from service and placed in test. While this channel was in test position, 2-B inverter tripped. This generated a two out of three coincidence on the $OT\Delta T$ protective circuit which tripped the unit. All systems functioned as designed. There was no safety injection initiation signal.

The power supply was transferred to 2-A Solatron regulator. About thirty minutes after the transfer was completed a voltage oscillation was experienced. This caused various indicating lights to blink and a buzzing sound was heard inside some cabinets in the control room. The licensee investigation revealed the sound was originating in a relay panel to the condenser steam dump controls. The licensee changed out two cards in the Solatron Regulator to clear the problem.

The licensee verified by performance testing of the safeguards systems that these systems were unaffected by the power oscillations. While pulling rods to return to power operation the licensee found that control rods M-6 and F-4 were greater than 12 steps out of sequence with the other control rods. All control rods were immediately inserted.

The investigation revealed bad stationary gripper firing cards. Cards A-1 and J-1 were replaced. Visicorder traces which had been run prior to firing card replacement were normal after replacement.

The licensee prepared an Engineering Test Procedure No. 1010 - "Testing of Rod Control System," which allowed withdrawal of control rod banks out of their normal sequence. One bank at a time was withdrawn for purposes of isolating and detecting maintenance problems. The unit was returned to power operation on August 5, 1985.

The inspector had no further questions.