



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

Report No.: 50-348/85-40 and 50-364/85-40

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: September 30 - October 4, 1985

Inspectors: D. Falconer
D. Falconer

11-13-85
Date Signed

C. Brooks
C. Brooks

11-13-85
Date Signed

Approved by: B. T. Debs
B. T. Debs, Acting Section Chief
Operational Programs Section
Division of Reactor Safety

11/13/85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 76 inspector-hours on site in the area of maintenance program implementation.

Results: One violation was identified:

348/85-40-01 - Failure to Follow Procedures (multiple examples).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *D. N. Morey, Assistant General Manager, Operations
- *L. A. Ward, Maintenance Superintendent
- *W. G. Ware, SAER Supervisor
- *T. W. Cherry, I&C Supervisor
- *H. Garland, Maintenance Supervisor
- *B. R. Yance, Sector Supervisor

NRC Resident Inspectors

- W. H. Bradford, Senior Resident Inspector
- B. Bonser, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 4, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

In addition to the enforcement items, the following inspector followup items were identified during the exit.

348, 364/85-40-03 - Calibration of Instrument Air System Pressure Switches.

348, 364/85-40-04 - Cleanliness Checks and Circuit Breaker Checks of the 5 KVA and 7.5 KVA Inverters.

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

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. One unresolved item identified during this inspection concerning the establishment of criteria to determine when print revisions are

necessary during the implementation of a Minor Departure From Design - Temporary (URI 348, 364/85-40-02) is discussed in paragraph 5.

5. Corrective Maintenance

The inspector reviewed selected portions of the licensee's corrective maintenance program to verify that the program is being implemented in accordance with regulatory requirements. The following corrective maintenance activities were included.

a. Feedwater Flow Control Valves

During an evaluation of test results from the performance of FNP-1-STP-256.15, Loss of Offsite Power Response Time Test on April 21, 1985, the licensee identified extremely fast stroke times for the Unit 1 feedwater flow control valves FCV-478, FCV-488, FCV-498, FCV-479, FCV-489 and FCV-499. FNP-1-STP-256.15 is utilized to obtain the stroke times of the feedwater flow control valves necessary to determine emergency safeguards features (ESF) feedwater isolation response times pursuant to Technical Specification (TS) Surveillance Requirement 4.3.2.3. This is accomplished by connecting a recorder to selected terminals at the Main Control Board (MCB) Auxiliary Panel and measuring the time between valve stroke limit switch actuations.

On April 25, 1985, suspecting that wiring errors in the limit switches, limit switch function boxes, and main control board indication lights of the six feedwater flow control valves as causing the selected terminals in FNP-1-STP-256.15 to indicate incorrect stroke times although correct valve indication was available at the MCB; the licensee originated maintenance work requests (MWR) 111728, MWR 111729, MWR 111730, MWR 111731, MWR 111732 and MWR 111733 to verify and correct valve operation and indication for the six feedwater flow control valves.

On May 15, 1985, the licensee implemented a temporary procedure change number (TCN) 6B to FNP-1-STP-256.15 to utilize test point connections necessary to obtain correct stroke time measurements of the six feedwater flow control valves. Test results demonstrated that each valve was within the feedwater isolation response time acceptance criteria. On May 18, 1985, electrical maintenance personnel completed maintenance activities pursuant to the above MWRs. Only MWR 111728 (FCV-478) indicated that wiring in the limit switch junction box and to the MCB indication was not in accordance with specified wiring drawings and that corrective action had been taken to correct these deficiencies. The other five MWRs indicated that the electrician had checked wiring at the junction box and limit switch and found it to be satisfactory. The electricians failed to identify that wiring at the limit switch junction box was not terminated in accordance with specified wiring drawings. During subsequent discussion between I&C and electrical maintenance, it was revealed that wiring errors were not

corrected for five of the six feedwater flow control valves. On May 31, 1985, the licensee originated MWR 113930, MWR 113931, MWR 113932, MWR 113933 and MWR 113934 to correct wiring errors on the five feedwater flow control valves on which maintenance activities completed on May 18, 1985, failed to identify and correct the deficiency.

10 CFR 50 Appendix B, Criterion V, states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures or drawings.

The failure of the licensee to wire the limit switch junction box and the indication lights at the MCB for FCV-478, FCV-479, FCV-488, FCV-489, FCV-498 and FCV-499 pursuant to prescribed wiring drawings is a violation of 10 CFR 50, Appendix B, Criterion V (348/85-40-01).

The second set of MWRs on the five feedwater flow control valves with uncorrected wiring errors were placed into the outage maintenance file to be completed during the Unit 1 1986 refueling outage. A review of these MWRs by the inspector revealed that item 8, Deficiency Tags, was checked "NO" indicating that Deficiency Tags were not placed to identify the deficiency. In that this abnormal plant configuration was not subject to minor departure from design requirements, the inspector considers the placement of deficiency tags to be required. FNP-0-AP-52, Equipment Status Control and Maintenance Authorization, states that if the reported condition on the work request requires corrective maintenance, the reviewing authority will ensure that a deficiency tag is placed at a location to best identify the fact that the deficiency has been reported. The licensee's failure to place deficiency tags pursuant to FNP-0-AP-52 will be identified as another example of violation (348/85-40-01).

A review of previous FNP-1-STP-256.15 test results revealed that extremely fast stroke times (approximately 1 second) for the feedwater flow control valves first occurred during the 1984 refueling outage. A procedure change had been developed from approved wiring drawings to connect the time recorder to the incorrectly wired terminals prior to the 1984 refueling outage. Utilization of this procedure resulted in nonconservatively incorrect stroke times for the six feedwater flow control valves. These stroke times were subsequently considered in the feedwater isolation response time verification as required by TS 4.3.2.3. Post test evaluation of the 1984 test data by the licensee failed to reveal that the stroke times for the six feedwater flow control valves were incorrect and provided non-conservative data for determining feedwater response times pursuant to TS 4.3.2.3. A review of FNP-1-STP-46.0, Main Feedwater Valves In-Service Test, conducted on April 20, 1984, verified that the actual stroke times for the six feedwater flow control valves were within the acceptance criteria of 5 seconds.

b. Electrical Penetration Maintenance

Records associated with maintenance on safety-related electrical penetration QIT52B037-N which was performed on June 23, 1985, and June 24, 1985, were reviewed. On June 23, 1985, the penetration failed causing a rod drop event and subsequent reactor trip on Unit 1. Maintenance Work request (MWR) No. 114481 and Minor Departure from Design No. 85-1163 were written to document the maintenance activities. The problem was indicated by blown fuses on shutdown bank "B" rods E-11 and L-11. Appropriate plant procedures were included in the work sequence steps of the MWR for troubleshooting to determine the cause of failure, including FNP-O-MP-67.0, Continuity Check for CRDM Cables and Coils, and FNP-O-MP-28.191 for replacement of the fuses.

Work sequence step 5 was vague in that once the troubleshooting efforts determined the failure cause, the instruction was simply to repair as necessary. The maintenance performed was documented in blocks 37 and 39 of the MWR. The problem was determined to be due to a short in the wires for rods E-11 and L-11 in penetration B037. The repair consisted of moving the E-11 wires to spare conductors in module A of penetration B037 (this is the module in which the four conductors for rods E-11 and L-11 were found shorted together) and moving the L-11 wires to spare conductors in module C of penetration B037. The MWR did not document the use of approved procedures, technical manuals or drawings, or the determination and retermination of the wires. Discussion with plant personnel indicated that drawing A-172398, Cable Termination Detail, Farley Nuclear Plant, Units 1 & 2, contained the instruction details for this work and was used by maintenance personnel. FNP-O-AP-52, Equipment Status Control and Maintenance Authorization, requires that the work sequence include delineation of the activities to be performed either by reference to approved procedures or by inclusion of steps written into the work sequence which incorporates the use of approved procedures, technical manuals, or drawings. Three additional failures to adhere to FNP-O-AP-52 associated with MWR No. 114481 were identified. The failure description, block 18, was not completed in accordance with paragraph 7.5.1 of AP-52 which specifies that a description of the failure shall be entered in block 18 for work requests which are generated as a result of equipment failures. This entry is used for trending and failure analysis. Block 25 was not annotated to indicate if any inspections were required during performance of maintenance in accordance with paragraph 7.5.6.4 of AP-52. Block 30 was not annotated to indicate if the MWR was associated with NPRD reportable equipment failure per paragraph 7.5.10 of AP-52. These items were discussed with plant management during an exit meeting on October 4, 1985. These items will be included as an additional example of violation (348/85-40-01).

Following retermination of the CRDM stationary coil wires, FNP-O-67.0, Continuity Check of CRDM Cables and Coils, was performed. Coil resistance was recorded on the MWR to be 11.7 ohms for rod E-11 and 11.6 ohms for rod L-11. The MWR indicates that the coils were returned to service following this check, although the acceptance criteria provided in MP-67.0 requires that coil resistance readings must fall within the range of 8 to 11 ohms. Discussions with plant personnel indicated that the manufacturer's instruction book U-213116A-CRDM-O-106A was used for the acceptance criteria in this case. This instruction book indicates that the stationary gripper coil resistance is a function of coil temperature and varies between 8.92 ohm at 25°C and 14.9 ohms at 200°C. FNP-O-MP-67.0 prerequisites do not place restrictions on coil temperatures. Coil temperatures are not measured or recorded during the procedure nor does the acceptance criteria indicate that it is applicable to coils at ambient temperature only. The inadequate acceptance criteria in MP-67.0 is another example of a violation against 10 CFR 50, Appendix B, Criterion V (348/85-40-01).

The wiring change in penetration B037 was documented on Temporary Minor Departure from Design No. 85-1163. FNP-O-AP-8, Design Modification Control, establishes the requirements for this program. Section 16.1 of AP-8 states that the four criteria must be evaluated to determine if a change can be implemented as a Minor Departure from Design - Temporary. The second criteria is that the work complies with recognized industry standards and good engineering practice. There was no indication of what good practice the wiring change complied with. Furthermore, the description of the change on the minor departure form indicated that two wires were moved by jumpers to a different module within penetration B037. Plant maintenance personnel indicated that no jumpers were used, the wires were determined and redetermined to a different module. Section 16.2.7 of AP-8 requires that the description of the change must provide a complete and thorough description of the change with attached sketches and marked up drawings as necessary for illustration. This was identified to plant management as an additional example of a violation for failure to adhere to plant instructions (348/85-40-01).

AP-8, Design Modification Control, Section 17.1 requires that drawings shall be revised whenever the need is identified, and that typically, site prepared revisions shall be used to input changes to drawings which will correct them to the as-built condition of the plant. Drawings D-181931 and D-181932, Power Penetration QIT52B037-N, were not revised to reflect the as-built condition following the wiring change performed under MWR 11481. Although this wiring change was expected to remain until the next Unit 1 outage in the fall of 1986, plant personnel do not routinely update drawings when a Minor Departure from Design - Temporary is in effect. This was identified as an unresolved item pending clarification of the terminology "when the need is identified" (348/85-40-02).

10 CFR 50, Appendix B, Criterion XVI requires that the cause of significant conditions adverse to quality be determined and corrective action taken to preclude repetition. Although the cause of the rod drop event on June 23, 1985, has been attributed to an insulation breakdown between conductors in the A module of penetration B037 due to natural end of life, the licensee failed to investigate the full extent of insulation breakdown in the penetration. The limited investigation during troubleshooting determined that conductors A9, A10, A13 and A14 were shorted together. The insulation integrity between the remaining conductors was not determined prior to returning the penetration module to service. The licensee has experienced many failures of control penetrations and has, on a limited number of these, experienced an apparent propagation of the insulation breakdown to adjacent conductors within the penetration. Since power to stationary and movable gripper coils for four control rods continue to be supplied through the degraded penetration, repetition of the rod drop event is considered possible without additional testing and/or evaluation. Corporate levels of management were aware that the rod drop event could recur and that engineering judgement was used to delay corrective action until the next refueling outage when the penetration module is scheduled to be replaced. Licensee representatives stated that the probability of another rod drop event would not decrease if the remaining wires in module A were re-routed to spare conductors in undamaged modules. They based this on experience with previous penetration failures which indicated that the failures were due to a complete rapid breakdown of insulation and not a progressive insulation degradation that could be trended to predict failure.

Discussion with regional personnel concerning the propriety of restarting the unit without checking conductors adjacent to those which had failed indicates that sufficient technical basis existed.

With respect to MWR 114481, the following areas were inspected with satisfactory results.

- Qualification and training of maintenance personnel
- Maintenance history records
- Measuring and Test Equipment (M&TE) program implementation
- Parts and materials identification
- Consideration for radiological, temperature, pressure and electrical hazards
- Provisions for fire protection, cleanliness and housekeeping
- Reportability in accordance with 10 CFR 50.73

LER 85-12 was reviewed for completeness regarding the rod drop event. The LER was misleading in that it stated that the wires to the dropped rods were re-wired to a different module whereas one of the rods was actually re-wired to spare conductors in the same faulted module. The LER also did not address the corrective action taken to preclude recurrence of the event.

c. Additional MWR Reviews

The following MWRs were reviewed with no further discrepancies noted:

- MWR 114489 control room emergency pressurization units (common)
- MWR 115624 "A" feed regulating valve (Unit 2)
- MWR 114483 "A" steam generator LI-476 (Unit 1)
- MWR 112043 MSIV limit switches (Unit 1)
- MWR 94322 on replacement of FCV122 and associated piping (Unit 1)
- MWR 111823 containment auxiliary hatch (Unit 1)
- MWR 114703 Loop 3 Tavg (Unit 1)
- MWR 114562 pressurizer level (Unit 2)
- MWR 114473 RCS loop Delta-T (Unit 1)

d. Machinery History Records

Maintenance history records for the equipment indicated above was reviewed and verified to be properly stored as quality assurance records. Document retrieval is facilitated by use of the computerized data management system which can be searched by the equipments TPNS number. This TPNS number is entered in block 2 of the MWR. The plant performance group is tasked with detection of repetitive equipment failures, however this area was not inspected due to time limitations.

6. Preventative Maintenance

The inspector reviewed the implementation of the preventive maintenance program for selected components in the Compressed Air System and the 120 volt Vital Instrument Power System. Vendor manuals and plant maintenance procedures were reviewed to verify that critical components within each system were provided periodic preventive maintenance pursuant to vendor recommendations. Within the areas inspected, the inspector identified the following concerns:

a. Compressed Air System Pressure Switches

FSAR section 9.3.1.5 states that the following pressure switches located in the system allow for an order of priority in removal of various compressed air loads in the event of a system failure:

| <u>Actuation Point</u> | <u>Function</u> |
|---------------------------------|--|
| 80 psig decreasing manual reset | Closes N1P19V901; isolates service air header |
| 70 psig decreasing manual reset | Opens N1P19V902; bypasses air dryers and filters |
| 55 psig decreasing manual reset | Closes N1P19V904; isolates nonessential air header |

45 psig decreasing manual reset

Closes N1P19V903; isolates
essential air header

The FSAR does not commit to a periodic calibration of these pressure switches nor does the licensee provide periodic calibrations of the switches. The inspector noted that due to the functions of pressure switches being referenced in the FSAR, periodic calibration should be provided. The licensee concurred. Incorporation of periodic calibration checks of the above pressure switches will be an inspector followup item (348, 364/85-40-03).

b. 5 KVA and 7.5 KVA Inverters

The 5 KVA and the 7.5 KVA inverters contain four breakers within the inverter cabinet. These breakers are the AC input breaker, the AC output breaker, the battery disconnect breaker, and the DC input breaker. The inspector noted that the licensee's periodic maintenance program did not address the functional checking of these breakers. The licensee concurred.

The vendor manual on the inverters strongly recommends the establishment of a periodic cleaning schedule of the inverter's rectifier assembly and transformer to remove accumulated grime and dust to prevent these parts from operating at excessive temperatures. Currently, the licensee's preventive maintenance program on these inverters does not specify periodic cleaning of these components.

Pending the incorporation of the above items into the preventive maintenance program, this will be identified as an inspector followup item (348, 364/85-40-04).

Within the area of preventive maintenance program implementation, no violations or deviations were identified.