

# U. S. NUCLEAR REGULATORY COMMISSION

## REGION II

Docket Nos.: 50-348 and 50-364

License Nos.: NPF-2 and NPF-8

Report Nos.: 50-348/99-08 and 50-364/99-08

Licensee: Southern Nuclear Operating Company, Inc.

Facility: Farley Nuclear Plant, Units 1 and 2

Location: 7388 N. State Highway 95  
Columbia, AL 36319

Dates: October 31, 1999 to December 11, 1999

Inspectors: T. P. Johnson, Senior Resident Inspector  
R. K. Caldwell, Resident Inspector  
J. H. Bartley, Resident Inspector  
W. P. Kleinsorge, Senior Reactor Engineer (Section M2.1)  
D.B. Forbes, Radiation Specialist (Sections R1.1, R1.2, and R1.3)  
W. E. Smith, Radiation Specialist (Section R1.4)

Approved by: Joel T. Munday, Acting Chief  
Reactor Projects, Branch 2  
Division of Reactor Projects

Enclosure

## EXECUTIVE SUMMARY

### Farley Nuclear Power Plant Units 1 and 2 Nuclear Regulatory Commission Inspection Report 50-348,364/99-08

This integrated inspection to assure public health and safety included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a six-week period of resident and specialist inspections, including inservice inspection and radiation programs.

#### Maintenance

- Observed activities were well planned and conducted, including a Unit 1 steam generator flow transmitter repair, and Unit 2 baffle-former bolt replacement and reactor vessel inservice inspection (Section M1.1).
- An inadequate maintenance procedure and a failure to follow an administrative control procedure during the Unit 2 reactor vessel lower internals lift was a non-cited violation. The root cause efforts were thorough and well conducted, and appeared effective based on performance during subsequent lifts (Section M1.2).

#### Plant Support

- No regulatory exposure limits for occupational workers or members of the public were exceeded during the Unit 2 Reactor Vessel Lower Internals Lift (Section R1.4).

## REPORT DETAILS

### **Summary of Plant Status**

Unit 1 operated at or near full power for the period, except for a brief power reduction to 38% to repair a main steam flow transmitter.

Unit 2 continued to be shutdown for its cycle 13 refueling outage.

### I. Operations

#### **O1 Conduct of Operations**

##### **O1.1 Routine Observations of Control Room and Related Operations (60710 and 71707)**

The inspectors observed licensed control room operator and non-licensed operator performance during the period. Operator attentiveness to annunciator alarms and response to changing plant conditions were prompt. Operator performance during a Unit 1 load reduction to 38% to repair a main steam flow transmitter was excellent. Unit 2 core reload activities and Unit 2 midloop operations were effectively controlled, with risk in mind. Decay heat removal performance and availability were continually monitored.

#### **O2 Operational Status of Facilities and Equipment**

##### **O2.1 General Tours and Inspections of Safety Systems (71707)**

General tours of safety-related areas were performed by the inspectors to observe the physical condition of plant equipment and structures, and to verify that safety and risk significant systems were properly maintained and aligned. These systems included seismic monitoring, residual heat removal system, emergency diesel generator systems, and containment. Containment inspections were made for both units. The inspectors also verified that selected tagouts were implemented in accordance with procedural requirements.

### II. Maintenance

#### **M1 Conduct of Maintenance**

##### **M1.1 General Comments (61726 and 62707)**

The inspectors witnessed or reviewed portions of the selected maintenance and surveillance test activities in progress. This included a Unit 1 steam generator flow transmitter repair and Unit 2 outage related maintenance activities on the primary and secondary systems such as Unit 2 baffle-former bolt replacement and reactor vessel inservice inspection. For those maintenance and surveillance activities observed or reviewed, the inspectors determined that the activities were conducted in a satisfactory manner and that the work was properly performed in accordance with approved maintenance work orders. Personnel conducting the activities were, in general, knowledgeable of their assigned tasks. The inspectors also determined that the

observed activities were performed in a satisfactory manner and met the TS requirements. Related tagouts were reviewed and determined to be adequate.

#### M1.2 Unit 2 Reactor Vessel Lower Internals Lift

##### a. Inspection Scope (62707)

The inspectors reviewed the licensees' root cause investigation and recommended corrective actions following the lower internals lift.

##### b. Observations and Findings

On November 27, the licensee lifted the Unit 2 lower internals with the polar crane from the lower refueling cavity to the reactor vessel using procedure FNP-2-MP-1.2, Reactor Vessel Lower Internals Removal and Installation, Revision 7. During the lift, the primary height measuring system malfunctioned, and the highly irradiated portion of the lower internals was exposed. When Maintenance personnel recognized this error, the lower internals were placed in the reactor vessel.

The licensee formed a root cause team to evaluate this event and recommend corrective actions. The root cause team concluded that personnel error, combined with an inadequate maintenance procedure and failure to follow administrative control procedure FNP-0-ACP-15.0, Pre-Job Briefing, Rev. 2, and poor communications and oversight by maintenance, health physics, and operations, resulted in the event. Corrective actions included procedure revisions, training, pre-job briefing enhancements, a reemphasis of communications and stop work authority, oversight enhancements, Radiation Work Permit (RWP) changes, and a review of related outage activities. These corrective actions were completed prior to the upper internals and reactor head lifts. The root cause analysis and corrective actions were documented in Occurrence Report (OR) 2-99-1056.

The inspectors reviewed the event, including the reportability determination, the root cause report, OR 2-99-1056, the RWP, and related procedures. The inspectors also attended root cause team meetings and management briefings. The inspectors noted the root cause to be thorough and well conducted. The inspectors interviewed the event team leader concerning the investigation progress, management support and preliminary casual factors.

Technical Specification 6.8.1a. requires that written procedures be established, implemented, and maintained for the procedures recommended in Appendix 'A' of Regulatory Guide (RG) 1.33. Both procedure FNP-0-ACP-15.0 and procedure FNP-2-MP-1.2 were identified as covered by RG 1.33. Contrary to the above, personnel failed to follow procedure FNP-0-ACP-15.0 in that communication with other groups and contingency planning were not covered during the pre-job briefing. Also, procedure FNP-2-MP-1.2 was inadequate in that it did not contain guidance to use an alternate height measuring system if the primary height measuring system failed. Consistent with Section VII.B.1.a of the NRC Enforcement Policy, this violation is identified as Non-Cited

Violation (NCV) 50-364/99-08-01, Inadequate Lower Internals Lift Procedures and Failure to Follow ACP-15.0. This violation is in the licensee's corrective action program as OR 2-99-1056.

c. Conclusions

The inspectors concluded that the investigation was proceeding in a timely manner with management support and that causal factors were being identified to prevent recurrence. An NCV was identified for failure to follow procedure FNP-0-ACP-15.0 and inadequate procedure FNP-2-MP-1.2.

M2.1 Inservice Inspection (73753)

To evaluate the licensee's Inservice Inspection (ISI) program, the inspectors reviewed procedures, observed ISI examinations, and reviewed selected records. Observations were compared with applicable procedures, the Updated Final Safety Analysis Report, and American Society of Mechanical Engineers Boiler and Pressure Vessel Code Sections V and XI, 1989 Edition, No Addenda.

The inspectors concluded that the inservice examination procedures reviewed were concise and well written. Inservice examinations observed were conducted in accordance with approved procedures, by qualified and certified examiners using certified/calibrated equipment and materials.

### III. Engineering

**E8 Miscellaneous Engineering Issues**

E8.1 (Closed) LER 50-348, 364/99-003: Control Room Ventilation Radiation Monitors Inoperable (92700)

This issue was discussed in Inspection Report (IR) 50-348, 364/99-07, Section O1.3. No new safety issues were identified by this LER.

E8.2 (Closed) LER 50-364/99-002: Steam Generator Tube Degradation and Tube Status (92700)

Both resident and specialist inspectors reviewed SG activities during this outage. No new safety issues were identified.

E8.3 (Closed) Violation (VIO) 50-348, 364/98-03-04: Inadequate Safety Assessment for Mis-wired Hot Shutdown Panel MOVs

In Inspection Report 50-348, 364/98-03, the NRC identified that no further licensee response to this violation was required. However, the violation was not identified as closed. Accordingly, VIO 50-348, 364/98-03-04 is administratively closed.

**IV. Plant Support**

**R1 Radiological Protection and Chemistry Controls**

R1.1 Tour of Radiological Protected Areas (86750)(71750)

During the ongoing Unit 2 outage, the inspectors reviewed survey data and observed activities in progress. Independent radiological surveys were performed by the inspectors for selected storage areas and verified the licensee was effectively controlling and storing solid radioactive material. All radioactive material storage areas observed were appropriately posted to specify the radiological conditions and Radiation Work Permit requirements.

The inspectors toured the RCA and both containments during the period. Plant personnel observed working in the RCA generally demonstrated good knowledge and application of radiological control practices. Health physics technicians provided positive control and support of work activities in the RCA. A Unit 1 containment entry at power was effectively controlled, and dose accumulated was ALARA. The original dose estimate was about 6 person-Rem. Management elected to lower Unit 1 power in order to effect dose reduction. As a result, the actual dose accumulated was 1.5 person-Rem.

The inspectors observed a licensee conducted contaminated injured man drill which included transporting the personnel to the medical facility via the contract ambulance service. The drill was comprehensive and drill participants properly executed their tasks and adequately demonstrated their ability to handle this type of emergency.

The inspectors observed a Unit 1 reactor coolant system filter change out and the transfer of spent resin from the Unit 1 and Unit 2 spent resin storage tanks to resin liners located in the solidification building. The inspectors verified the licensee was following procedures for these infrequently performed radioactive waste processing evolutions.

R1.2 Water Chemistry Controls (84750)

The inspectors reviewed implementation of selected elements of the licensee's water chemistry control program for monitoring primary and secondary water quality as described in the Technical Specification (TS) limits and the Offsite Dose Calculation

Manual (ODCM). The primary and secondary chemistry parameters reviewed were maintained well within the relevant TS and ODCM limits for power operations.

### R1.3 Transportation of Radioactive Materials (86750)

The inspectors evaluated the licensee's transportation of radioactive materials programs for implementing the Department of Transportation (DOT) and Nuclear Regulatory Commission (NRC) transportation regulations for shipment of radioactive materials. The inspectors observed the preparation of a shipment of radioactive material, reviewed procedures, and determined that the procedures adequately addressed the shipping requirements. Personnel performing shipments of radioactive material had met the recurrent training requirements. Licensee's records for four shipments of radioactive material performed since the last inspection of this area were reviewed and the inspectors determined the shipping papers contained the required information.

### R1.4 Personnel Exposure During Unit 2 Reactor Vessel Lower Internals Lift

#### a. Inspection Scope (83750 and 84750)

An inspection was conducted following the Unit 2 Reactor Vessel Lower Internals Lift on November 27 to determine whether members of the public or occupational workers received radiation exposure exceeding the regulatory limits in 10 CFR 20.1301 and 10 CFR 20.1201 respectively.

#### b. Observations and Findings

The inspectors toured the Unit 2 Containment 155' elevation, the protective area outside the equipment hatch, and the area outside the restricted area boundary. The inspectors reviewed radiological survey data; airborne air sample results; electronic dosimetry and Unit 2 containment radiation monitors histograms; individual statements included in OR 2-99-1056; dosimetry badge results; Radiation Work Permits (RWP) entries; access lists of personnel entering the Protected Area during event; and a map of plant boundary for effluent release. The licensee records show that one worker received 671 mrem based on dosimetry badge results. This amount was greater than the RWP administrative dose limit of 450 mrem, but within regulatory limits.

The inspectors also did independent dose calculations for areas outside the restricted area with a potential for public occupancy. Based on this independent calculation, the inspectors determined that the dose to any individual in an unrestricted area was within regulatory limits.

c. Conclusions

Based on the above assessment and review the inspectors concluded that no regulatory limits had been exceeded.

**S1 Conduct of Security and Safeguard Activities**

S1.1 Routine Observations of Plant Security Measures (71750)

The inspectors verified that portions of the site security program plan were being properly implemented. Disabled vital area doors were properly manned and controlled. Security personnel activities observed during the inspection period were performed well. Site security systems were adequate to ensure physical protection of the plant. This included additional activity during the Unit 2 refueling outage period.

**V. Management Meetings**

**X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on December 14, 1999. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

**Partial List of Persons Contacted**

Licensee

R. V. Badham, Safety Audit Engineering Review Supervisor  
 C. L. Buck, Technical Manager  
 R. M. Coleman, Outage and Modification Manager  
 C. D. Collins, Operations Manager  
 K. C. Dyar, Security Manager  
 S. Fulmer, Plant Training and Emergency Preparedness Manager  
 J. S. Gates, Administration Manager  
 D. E. Grissette, Assistant General Manager - Operations  
 J. G. Horn, Outage Planning Supervisor  
 J. R. Johnson, Maintenance Manager  
 R. R. Martin, Engineering Support Manager  
 C. D. Nesbitt, Assistant General Manager - Plant Support

L. M. Stinson, Plant General Manager - FNP  
 R. J. Vanderbye, Emergency Preparedness Coordinator

### Partial List of Opened, Closed, and Discussed Items

<u>Type</u>	<u>Item Number</u>	<u>Description and Reference</u>
<u>Closed</u> NCV	50-364/99-08-01	Inadequate Lower Internals Lift Procedures and Failure to Follow ACP-15.0 (Section M1.2)
LER	50-348, 364/99-003	Control Room Ventilation Radiation Monitors Inoperable (Section E8.1)
LER	50-364/99-002	Steam Generator Tube Degradation and Tube Status (Section E8.2)
VIO	50-348, 364/98-03-04	Inadequate Safety Assessment for Mis-wired Hot Shutdown Panel MOVs (Section E8.3)

### List of Inspection Procedures (IP) Used

IP 60710:	Refueling Activities
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operation
IP 71750:	Plant Support Activities
IP 73753:	Inservice Inspection
IP 83750	Occupational Exposure
IP 84750:	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750:	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92700	Events Report Review