



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

JAN 08 1991

Report Nos.: 50-348/90-34 and 50-364/90-34

Licensee: Alabama Power Company  
600 North 18th Street  
Birmingham, AL 35291-0400

Docket Nos.: 50-348 and 50-364

License Nos.: NPF-2 and NPF-8

Facility Name: Farley 1 and 2

Inspection Conducted: November 26-30, 1990

Inspector:

*F. N. Wright*  
F. N. Wright

*1/4/91*  
Date Signed

Approved by:

*J. P. Potter*  
J. P. Potter, Chief  
Facilities Radiation Protection Section  
Radiological Protection and Emergency  
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Division of Radiation Safety and Safeguards

*1/4/91*  
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection of radiation protection program activities included reviews of occupational exposure during extended outages, internal and external exposure controls, control of radioactive material, and as low as reasonably achievable (ALARA) programs.

Results:

The licensee's radiation protection staff appears to be generally effective in protecting the health and safety of the occupational radiation workers. One licensee identified violation was identified.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*P. Farnsworth, Supervisor, Radioactive Waste
- \*S. Fulmer, Supervisor, Safety Audit and Engineering Review
- M. Graves, Health Physics Sector Supervisor
- \*D. Harlos, Health Physics Foreman
- \*R. Hill, Assistant General Manager - Operations
- \*M. Mitchell, Health Physics Superintendent
- D. Moore, Radiation Monitoring Specialist
- \*D. Morey, General Manager, Nuclear Plant
- \*C. Nesbitt, Technical Manager
- \*P. Patton, Plant Health Physicist
- W. Roper, Senior Health Physics Technician
- \*L. Stinson, Assistant General Manager - Support

Other licensee employees contacted during this inspection included technicians and administrative personnel.

\*Attended exit interview held November 30, 1990

### 2. Organization and Management Controls (83750)

The inspector reviewed changes made to the licensee's organization, staffing levels, and lines of authority as they relate to the licensee's in-plant radiation protection organization. The review was made with respect to Technical Specification (TS) 6.2, Organization. The inspector evaluated the licensee's performance in the area by discussing the organization and staffing levels with cognizant personnel and reviewing organization charts.

The inspector also reviewed the licensee's outage organization and management controls for oversight of outage work activities. The licensee had approximately 65 senior and 20 junior vendor health physics (HP) technicians onsite to support the plant staff during the Unit 2 refueling outage. Plant HP foremen or supervisors were assigned to control and monitor all HP activities on shifts. The licensee promoted several senior plant HP technicians into temporary foreman positions to implement the management controls.

Management support for the radiation protection program is evidenced by increased budget and capital appropriations and enforcement of the radiation protection program requirements. Recent examples of management support for the program include the following: appropriations for ten new staff positions that includes five Technicians and five Nuclear Specialists, purchase of a new personnel dosimetry/access control program,

counting and respiratory test equipment, and various capacity portable high efficiency particulate air-filter units.

Within the scope of this review, no violations or deviations were identified.

3. External Occupational Exposure Control and Personnel Dosimetry (83724)

Evaluation of the licensee's performance in this area was based on observations during plant tours, discussions with licensee personnel, and review of licensee documentation.

10 CFR 20.203 specifies the posting, labeling, and control requirements for radiation areas, high radiation areas, airborne radioactivity areas, and radioactive material. Additional high radiation area requirements are specified in the license TS 6.12.

The inspector toured the licensee radiation control areas (RCAs) and made independent radiation surveys in Unit 2 Containment Building. The inspector determined that selected radiation and high radiation areas inspected and surveyed by the inspector appeared to be properly posted and controlled as required.

The inspector reviewed selected radiation work permits (RWPs) for appropriateness of the radiation protection requirements based on work scope, location, and conditions. The licensee appeared to be using adequate radiation protection controls for the reviewed tasks.

Within the scope of this review, no violations or deviations were identified.

4. Internal Exposure Control and Assessment (83750)

The licensee's respiratory protection program appeared to be generally effective in controlling exposures to airborne radioactivity. Respiratory protection procedures required the collection of a nasal smear for every employee using a respirator. Nasal smears having approximately 200 disintegrations per minute (dpm) required an investigation and follow-up bioassays to determine internal exposures. The licensee had three positive nasal smear measurements since January 1990, and the bioassays for those exposures indicated that the exposures were less than three hours at Maximum Permissible Concentrations (MPCs) specified in Appendix B of 10 CFR 20. The inspector observed the use of engineering controls to minimize exposures to airborne radioactivity during tours in the RCA.

Within the scope of this review, no violations or deviations were identified.

5. Control of Radioactive Waste, Contamination, and Materials; and Surveys and Monitoring (83750)

The inspector reviewed licensee controls for radioactive contamination and surveys. Evaluation of the licensee's performance in this area was based on observations and radiological surveys made during plant tours, discussions with licensee representatives, and review of documentation.

The inspector reviewed and discussed the licensee's programs for Control of Radioactive Contamination, Radioactive Waste Processing and Volume Reduction, and Personnel Contamination Trends.

a. Control of Radioactive Contamination

TS 6.8.1 requires that written procedures be established, implemented, and maintained covering applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, 1978.

Regulatory Guide 1.33, November 1972, Appendix A, Paragraph 7.e. recommends radiation control procedures for controlling radioactive contamination.

The inspector reviewed the following Radiation Control and Protection Procedures:

- FNP-O-RCP-29, Contamination Guidelines, Revision 17, November 12, 1990 and
- FNP-O-RCP-57, Radioactive and Potentially Radioactive Material Handling, Revision 15, July 11, 1990.

FNP-O-RCP-57 provides guidelines for releasing equipment and material leaving the RCA. The procedure requires that material leaving the RCA and Protected Area meet the unrestricted release criteria specified in FNP-O-RCP-29.

FNP-O-RCP-29 provides contamination control guidelines that are used in the RCA and the release guidelines for surface contamination levels released to unrestricted areas. The procedure requires that material leaving the RCA for unconditional release to unrestricted areas be surveyed and evaluated for reactor produced activity to ensure the items meet the following limits:

Fixed surface contamination

Alpha Non-Detectable (ND) with an Alpha Scintillation Counter

Beta-Gamma ND with a Geiger Mueller (GM) Detector and, if used, ND with a Gamma Scintillation Detector

## Transferable surface contamination

Alpha	less than 20 dpm/100 cm <sup>2</sup>
Beta-Gamma	ND with a GM Counter for 100 cm <sup>2</sup>

The procedure requires surveys to be made in areas having background radiation levels to permit a survey capable of detecting less than 5,000 dpm/100 cm<sup>2</sup> of fixed radioactivity and less than 1,000 dpm/100 cm<sup>2</sup> of smearable radioactivity.

The licensee utilizes green plastic bags to collect clean trash (non-contaminated) in the RCA and security Protected Areas. Clean trash leaving the RCA must be surveyed prior to its release. The clean trash leaving the RCA is placed in an unsecured area for temporary storage. The trash remains there until it receives another survey. Bags clearing that survey are moved to an adjacent storage bin where they are secured (locked-up) until they are loaded onto a vehicle for transportation to the site landfill.

The inspector determined that the licensee had recently found procedural violations for surveys and controls of radioactive waste. On November 12, 1990, HP technicians discovered a contaminated desiccant column outside the licensee's RCA in a clean trash holding area. The technicians were surveying the exteriors of the bags with a GM detector and found a bag containing the column that measured 400,000 dpm/scan. The technicians confiscated the bag and surveyed its contents. They did not find any smearable contamination on the exterior of the column or other material in the bag. A isotopic analysis found activation products in the column, primarily cobalt-60.

The HP staff determined that the column had been used with Steam Generator (SG) leak test equipment during the Unit 2 refueling outage. The test equipment had been disassembled following completion of the SG test and the licensee did not know how the column had ended up in the clean waste bag. The connective hoses that had been utilized with the desiccant column were not in the bag with the column and the licensee began a search to locate the hoses. The staff considered the possibility that the hoses could also be in a clean waste bag and subsequently released for disposal to the site landfill.

As a precautionary procedure, two HP technicians were dispatched to the site landfill on November 13, 1990, to search for the hoses. The technicians did not find the test hoses but, found a bag that contained contaminated paper up to 1,500 dpm/scan. The bag was returned to the RCA for further examination. The licensee later found the hoses inside the Unit 2 Containment Building.



The licensee began two investigations concerning the events;

- (1) Radiological Incident Report (RIR) 90-98, to determine how the contaminated desiccant column could have been placed into a clean waste bag and released outside the RCA.
- (2) RIR 90-99, to determine how the contaminated paper towel could have been released from the RCA and the Protected Areas without detection.

The events concerning the contaminated desiccant column (RIR 90-98) were still under review by the licensee and were not investigated during the inspection. However, the licensee was informed that there appeared to be violations of licensee procedures for:

- Failure to control radioactive material from the RCA and/or
- Failure to make a survey or an adequate survey to detect radioactivity within the column.

The inspector reported to licensee management that the issues concerning the contaminated desiccant column would be an Unresolved Item (URI) 50-348/90-34-01, to be reviewed during a future NRC inspection.

At the time of the inspection, the licensee had completed its review and corrective action for the contaminated waste material found at the licensee's landfill (RIR 90-99).

The technicians dispatched to the site landfill returned 17 green bags of clean trash to the RCA for closer review. Four of the bags contained materials such as yellow tape and radioactive material tags that were not to be released from the RCA for unconditional release. A radioactive isotopic analysis detected about 1,500 dpm of fission and activation products on the paper towel. The contaminated towel was disposed of as radioactive waste. No additional contaminated material was found in the other bags.

The licensee determined which technicians had authorized unconditional release of the contaminated waste from the licensee's RCA with a unconditional release tag found on the bag.

According to the statements obtained in the licensee's investigation, there were three HP technicians dispatched to the RCA exit to survey clean trash out of the RCA. The technicians found several green bags of clean waste to survey and some other paper boxes. The technicians reported that they surveyed the bags for removable contamination and placed three bags into a bag monitor that alarmed. The technicians removed the bags and began putting one bag at a time into the bag monitor. The monitor would not alarm with just one bag in it. However, due to the length of time the monitor was taking to monitor the trash the technicians decided to frisk all of the material with

friskers. One medium size zip lock bag that had .0 cpm/scan with no smearable was found during their surveys that was removed and disposed as radioactive waste. The rest of the waste, approximately five large green bags and two cardboard drums, were released from the RCA as clean trash for unconditional release.

FNP-0-RCP-57 states that when clean trash is presented for release from the RCA the HP technicians are to perform a surveillance and contamination survey.

Paragraph 4.1.2.1 requires the HP technicians to make a visual inspection of the contents, with the technician looking for articles of protective clothing, radiation signs, rope, labels. The survey is to be performed on each bag but does not require the contents to be emptied and each item inspected.

Paragraph 4.1.2.1 also specifies the radioactive contamination survey requirements. The survey procedure requires the technician to:

- (1) Conduct a random survey of the contents, of a random number of the bags, using a HP-210 detector (Thin Window GM) and ratemeter, and
- (2) Survey with a bag type monitor (scintillation). The procedure states that in some cases the HP Supervision may approve the use of an equivalent detector to the bag monitor. The procedure goes on to say that the substitution would only be allowed when absolutely necessary.

According to the Radiation Protection Manager (RPM), the technicians did not use a bag monitor or equivalent detector and simply failed to detect the low level contamination on the towel. The licensee provided training to the HP staff regarding the compliance of the procedure requirements. The inspector stated that failure to make adequate surveys necessary to comply with licensee procedure requirements appeared to be a Non-Cited Violation (NCV) of the licensee's procedures (50-348/90-34-02).

The licensee identified violation is not being cited because the criteria specified in Section V.G.1 of the NRC Enforcement Policy was satisfied.

Within the scope of this review, no deviations were identified.

b. Personnel Contamination Trends

The licensee documented 127 personnel contaminations in 1988 and 105 personnel contaminations in 1989. The personnel contamination goal for 1990 was to reduce the total number of personnel contaminations to no more than 65. However, through the end of November 1990, the licensee had 99 personnel contaminations for the

year, of which 49 were skin, 37 were clothing and three were nasal contaminations. No adverse trend in personnel contamination was detected.

Personnel contamination having particles with activities greater than 25,000 dpm were documented as hot particles and the VARSKIN dose assessment program was utilized to calculate personnel exposures. Personnel contamination involving hot particles continued to decrease. The licensee had 90 hot particles in 1988 and 37 in 1989. Through the end of November 1990, the licensee had detected 13 hot particles for the year. The maximum calculated skin dose for a hot particle exposure for the first 11 months of 1990 was 2,500 millirem for a particle found on a workers extremity. Several factors have collectively assisted the staff in reducing the number of personnel contaminations involving hot particles, including:

- ° Decontamination of the licensee's fuel transfer canal. (The source of many of the hot particles found in 1988.)
- ° Increased surveys of valves prior to work.
- ° Increased frequency of monitoring hot particle buffer zones.
- ° Use of sensitive laundry monitors for protective clothing.

Within the scope of this review, no violations or deviations were identified.

#### c. Radioactive Waste

The total volume of radioactive waste shipped for burial disposal decreased in 1990 due to increased vendor volume reduction processes that included super compacting and incineration. In 1988 and 1989, the licensee shipped approximately 17,000 cubic feet (ft<sup>3</sup>) of radioactive waste for burial disposal. In the first 11 months of 1990, the licensee was able to reduce the total volume shipped for burial to about 3,000 ft<sup>3</sup>.

Measures to reduce the amount of radioactive waste generated included:

- ° Repair of protective clothing (PC's) garments to reduce their disposal.
- ° Use of recoverable PC garments as absorbing cloths inside the RCA to reduce the disposal of paper absorbing cloths.
- ° Use of off-site vendor decontamination services for recovering contaminated wood and metal material and equipment.
- ° Maximizing filtration capacities and use of resin filters.



- ° Reuse of depleted ventilation charcoal with new charcoal in low level liquid radioactive waste stream processing.
- ° Decontamination of contaminated areas.
- ° Trash sorting for recoverable material and equipment.

The licensee was also trying and evaluating several new volume reduction activities to determine their effectiveness in reduction of radioactive waste volume. Management support for the radioactive waste volume reduction program was evidenced by increased authorization of budget and capital expenditures to support decontamination and volume reduction methods, processes, and equipment. The licensee has a dedicated radioactive waste and decontamination staff that is part of the radiation protection staff.

Within the scope of the review, no violations or deviations were identified.

d. Facility Radioactive Contamination

The licensee's recoverable area of contaminated floor space was approximately 10,000 square feet (ft<sup>2</sup>) of an area of 132,000 ft<sup>2</sup>. The recoverable area did not include areas having a whole body radiation dose rates exceeding 1,000 mrem/hr or containments. The area contaminated in 1990 decreased slightly, by approximately 1,000 ft<sup>2</sup>.

Within the scope of the review, no violations or deviations were identified.

6. Maintaining Occupational Exposures As Low As Reasonably Achievable (83750)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures as low as reasonably achievable. The recommended elements of an ALARA program are contained in Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be ALARA," and Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures ALARA."

The inspector reviewed the licensee's ALARA program policies, procedures, and selected records; and discussed the ALARA goals and activities for the Unit 2 refueling outage work.

The 1990 collective personnel radiation exposure goal was 374 person-rem with an additional goal of 76 person-rem for unscheduled outages. The licensee had one unscheduled outage in 1990 and the licensee's collective personnel exposure through the end of November was approximately 325 person-rem. The licensee's original personnel exposure goal for the scheduled Unit 2 refuel outage was 283 person-rem, that was revised with

additional steam generator work and changed to 308 and the outage dose through the end of November was 220.

The major dose contributor for the Unit 2 refueling outage was due to S/G work. The licensee performed 100 percent eddy current testing on all steam generators and made tube plugs as necessary. The row 1 tubes for all three S/Gs had been plugged prior to initial reactor startup. During the outage, the row 1 tubes were unplugged and eddy current tested. Acceptable tubes received "U" bend heat treatment and were placed in service. Unacceptable tubes were replugged.

Within the scope of this review, no violations or deviations were identified.

#### 7. Exit Interview

The inspection scope and findings were summarized on November 30, 1990, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. Dissenting comments were not received from the licensee. Proprietary information is not contained in this report.

The inspector reported that there appeared to be two violations concerning the control of radioactive waste in areas outside the licensee's RCA. The inspection stated that the violation concerning the contaminated paper towel that had been found at the site landfill appeared to be a licensee identified violation and that the violation concerning the contaminated desiccant column would be an unresolved item to be reviewed in a following inspection.

<u>Item Number</u>	<u>Description and Reference</u>
50-348/90-34-01	URI concerning a contaminated desiccant column found outside the licensee's RCA (Paragraph 5).
50-348/90-34-02	Non-cited licensee identified violation concerning failure to perform and adequate radioactive contamination survey for trash leaving the licensee's RCA and Protected Area (Paragraph 5).