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

MAR 23 1989

Report Nos.: 50-348/89-06 and 50-364/89-06

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

Inspection Conducted: February 27 - March 3, 1989

Inspector: P. G. Stoddart 3/23/89
P. G. Stoddart Date Signed

Accompanying Personnel: D. Seymour

Approved by: John B. Kahle 3/23/89
J. B. Kahle, Chief Date Signed
Radiological Effluents and Chemistry Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope

This routine, unannounced inspection was conducted in the areas of radiological effluent monitoring, liquid and gaseous radwaste treatment, plant chemistry, plant radiochemistry, radioactivity analysis, and environmental monitoring.

Results

One violation, one unresolved item, one inspection followup item and two information notices were closed (Paragraph 2). The plant chemistry program and staffing appeared to be adequate. The staffing conversion from a contract-reliant mode to on all Alabama Power employee staff was considered a licensee strength (paragraph 4). The plant radioactivity analysis equipment was in the process of being upgraded; the quality assurance measures being applied during equipment checkout and software evaluation were considered to be a licensee strength (Paragraph 6). The Semi-Annual Radioactive Effluent Release Reports for 1988 were reviewed and found to be adequate (Paragraph 8). HEPA filter and charcoal adsorber testing was reviewed and found to be adequate (Paragraph 10).

In the areas inspected, violations or deviations were not identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*S. Fulmer, Supervisor, Safety Audit and Engineering Review
*D. Grissette, Chemistry and Environmental Supervisor
*R. Hill, Assistant General Manager, Operations
*R. Livingston, Environmental Supervisor
*M. Mitchell, Health Physics Supervisor
*C. Nesbitt, Technical Manager

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

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*G. Maxwell, Senior Resident Inspector

*Attended exit interview

2. Action on Previous Inspection Findings (92701, 92702)

(Closed) Violation 50-348, 364/88-10-01: Failure to make self-absorption calculation corrections for counting gases when detectors were calibrated with solid polymer standards. Solid polymer matrix 4-liter standards were replaced with low density foam standards as of August 28, 1988. Vendor documentation stated that the density of the foam matrix was 0.015 to 0.02 g/cc and that no attenuation correction factors were necessary over the energy range from 60 keV to 1836 keV. The documentation also provided certification of NBS traceability for the calibration of the standards. Licensee representatives stated that the solid matrix standards had been removed from the count room and that the count room procedures had been revised to require utilization of the low density foam standards.

Calibration of licensee multi-channel analyzer (MCA) systems with the foam matrix standards will be confirmed during a later confirmatory measurements inspection. It was noted that at the time of this inspection, the licensee was in the initial implementation stage of replacing all plant MCA's. For this reason, the scheduling of the next confirmatory measurements inspection was held in abeyance until all of the new MCA systems had been installed and were operational. Based on the information supplied by the licensee, this matter was considered closed.

(Closed) Inspector Followup Item (IFI) 50-348, 364/88-10-02: Review licensee actions to improve analyses of Fe-55, which were not adequate for April 1988 spike analyses. The inspector reviewed licensee actions to improve onsite analysis capabilities for Fe-55. In response to the IFI,

the licensee contracted with a vendor to conduct required Fe-55 analyses until such time as in-house procedures for Fe-55 could be reviewed and improved. Based on discussions with vendors and with other licensees, the licensee contracted with a vendor to supply a new analysis procedure for Fe-55. As of the time of the inspection, the licensee had verified the accuracy of the procedure against known standards and was waiting delivery of unknown sample specimens as a final quality control check. Based on the licensee's work to date in remediation of the analysis problem, the inspector concluded that the licensee's response had been adequate. This matter was considered closed.

(Closed) Unresolved Item (URI) 50-348, 364/88-30-06, Review documentation providing basis for calibration factors used in calibrating mid range and high range noble gas channels of plant vent stack SPING. The inspector reviewed the licensee's documentation for the use of a Cs-137 solid source in the calibration of the mid-range channel of the licensee's high-range noble gas effluent monitor (Eberline Instrument Corporation "SPING" monitor). The licensee pointed out that the reference in Inspection Report No. (IR) 50-348, 364/88-30 to calibration of both the high-range and mid-range channels with a Cs-137 source was incorrect in that a Kr-85 source is used for calibration of the high-range channel and not Cs-137. The documentation provided appeared to be consistent with the recommendations of the NRR guidance on calibration of NUREG-0737 radiation monitors provided in Section 3 and in Attachment 1 of the August 16, 1982 letter to Regional Administrators signed by D. G. Eisenhut. On the basis of the above, this matter was considered closed.

(Closed) Information Notice (IN) 50-348, 364/88-IN-22: Disposal of sludge from onsite sewage treatment facilities. The inspector determined that the licensee had received the IN and had taken appropriate compensatory action. Wet sludge from the onsite sewage treatment was sampled as it was being pumped to a tank truck for transport to a municipal sewage disposal plant. If radioactivity is detected in sludge samples, the truck contents will be treated as radioactive waste. This matter was considered closed.

(Closed) IN 50-348, 364/88-IN-31: Steam generator (S/G) tube uncovery analysis deficiency. IN 88-31 informed licensees of a recently-identified deficiency in the safety analyses which were required at the time of licensing. This was concerned with the possibility of increased radioactivity releases to the environment following a steam generator tube rupture due to the uncovery of tubes at the top of the tube bundles of Westinghouse PWRs. The inspector confirmed that the licensee had received the IN and had initiated action to compensate for the deficiency. The licensee was initially notified of the potential problem by Westinghouse on January 4, 1988, and received an interim assessment of the radiological consequences in a report dated April 18, 1988. Final action by the licensee in this matter was deferred until June 3, 1988, pending issue of an analysis by the Westinghouse steam generator owner's group (SGOG) which would address the regaining of the lost margin of the 10 CFR 100 guidelines. This matter was considered closed.

No violations or deviations were identified.

3. Audits (84750)

The inspector reviewed three audits which had been conducted in the inspection review areas since June 1988. The audits covered onsite non-radiological environmental monitoring, (issued July 12, 1988), radiological environmental (offsite) monitoring (issued July 12, 1988), and the plant chemistry program (issued September 28, 1988).

The inspector discussed audit results and reviewed followup actions for identified items with cognizant licensee representatives. The inspector also reviewed the audit committees' procedures and methods established for each audit and determined that the audits appeared to have been prepared and conducted by staff with adequate technical background and expertise in the subject areas. Identified items had been tracked and corrective measures had been promptly implemented.

No violations or deviations were identified.

4. Plant Chemistry Programs (84750)

The inspector discussed the plant primary and secondary reactor coolant chemistry programs with licensee representatives, toured the primary and secondary chemistry laboratory areas, and reviewed current chemistry procedures.

The water chemistry control room and sampling station included secondary coolant online monitoring for dissolved oxygen, pH, cation conductivity, specific conductivity, sodium, and hydrazine (feedwater). The monitoring system sampled from more than 30 separate points in the secondary water system, with the online computer polling and recording each monitor every six minutes and providing averaged hourly trends and records. The system was installed in the period 1986-1988, and featured a large wall-mounted flow schematic diagram with alarm lights at significant test points.

The licensee utilized an all-volatile treatment (AVT) chemistry control program implementing the SGOG guidelines. Morpholine was used for pH control, with hydrazine added as an oxygen scavenger. Decomposition products of morpholine included acetates and formates. In order to minimize the concentrations of formates and acetates, licensee representatives stated that the rate of blowdown of the steam generators had to be maintained at approximately 90 to 95 gallons per minute (gpm) per unit, or about 30 to 32 gpm per steam generator. At the time of the inspection, reactor conditions were such that both the primary coolant radioactivity concentration and the primary-to-secondary leak rate were at low levels, and the corresponding radioactivity concentrations in the secondary coolant system of both Units 1 and 2 were at or below minimum detectable activity (MDA) of approximately 2 to 5 E-08 uCi/ml. The low level of radioactivity concentration and the concentrations of morpholine, acetates, formates, and ammonia in the blowdown, augmented by an

approximate factor of 100 dilution by cooling tower blowdown prior to discharge, enabled the licensee to discharge the SG blowdown directly without processing.

The licensee's blowdown processing system was not used but was available if needed to reduce radioactivity concentrations in SG blowdown. The processing system had a design capacity of 50 gpm; if the processing system were required to be used, the present 90 gpm blowdown would have to be reduced to 50 gpm or less. This, in turn, would require changes in the rate of addition of morpholine and hydrazine to the system and would make the control of pH at the desired level more difficult due to buildup in acetate and formate concentrations.

In the inspector's review of monthly plant performance monitoring reports, it was noted that on December 8, 1988, routine Unit 1 steam generator blowdown chemistry results indicated that cation conductivity and chloride ion concentration had increased to above procedural action limits. Uncorrected cation conductivity was 2.04 umho/cm and chloride ion peaked at 32.6 parts per billion (ppb). Fluoride peaked at 21.2 ppb and sodium increased slightly from 0.7 ppb to 1.2 ppb. The licensee observed that the ratio of chloride to fluoride was similar to that of trichlorotrifluoroethane, a solvent commonly used to clean equipment. It was suspected that such a solvent might have been used in Unit 1 secondary coolant system maintenance but licensee investigation was unable to provide confirmation. All parameters were back in specification limits within 16 hours.

Sludge lancing was performed on the Unit 1 steam generators in April 1988, during the eighth refueling shutdown. Total mass of sludge removed was 2,317 pounds. This was reported to be the third consecutive reduction in sludge since the fifth refueling outage, when 3,444 pounds was removed.

The inspectors discussed chemistry department staffing with licensee personnel. At the time of the previous chemistry inspection in August 1987 (IR No. 50-348, 364/87-21, issued September 10, 1987), Chemistry Department shift staffing consisted of 25 chemistry technicians, divided between five shifts, and four speciality chemistry technicians on day shift. Of the 25 shift chemistry technicians, seven were contract personnel and eight were new Alabama Power Company employees in processing or training status. Each of the five shifts was assigned two Alabama Power Company chemistry technicians, each with two to four years Alabama Power Company experience, and three contractors or new employees.

Since the August 1987 inspection, the Chemistry Department was reorganized to include counting room personnel. At the time of this inspection (March 1989), all Chemistry Department personnel were Alabama Power Company employees and shift staffing was 40 chemistry technicians, divided into five shifts consisting of one chemistry foremen and seven chemistry technicians, five of whom were assigned chemistry duties and two of whom were assigned counting room duties. A typical shift chemistry foreman had six to ten years of plant chemistry experience, while three to four of the

seven shift chemistry technicians on each shift had four to six years of plant chemistry experience and the remaining three to four of the seven chemistry technicians on each shift had less than four years of plant chemistry experience. The inspector considered the conversion to an all-licensee-employee staff to be a licensee strength.

Chemistry training at Plant Farley was accredited by the Institute for Nuclear Power Operation (INPO).

No violations or deviations were identified.

5. Plant Radiochemistry (84750)

Technical Specification (TS) 3/4.4.9, "Specific Activity," establishes requirements for determinations of Dose Equivalent Iodine (DEI) and average effective energy (E-Bar) for reactor coolant system primary coolant. TS 3/4.7.1.4, "Activity," establishes requirements for determination of DEI and for the specific activity of the secondary coolant. The inspector reviewed logs and trending graphs for DEI, E-Bar, gross gamma activity and isotopic concentrations for primary coolant and gross radioactivity and DEI determinations for secondary coolant for two 1-month periods selected at random. The specific activity and DEI appeared to be consistently a small fraction of the TS limits at all times during the periods selected. Typical equilibrium DEI values for the previous six months opeation were: Unit 1 - 1.2 E-02 uCi/ml and Unit 2 - 6.0 E-04 uCi/ml.

No violations or deviations were identified.

6. Plant Radiological Counting Rooms (84750)

At the time of the inspection, Plant Farley was in the process of replacing their older model MCAs with computer-based intrinsic germanium detector MCAs. As of the end date of the inspection, two new MCAs had been installed in the Unit 1 Counting Room and calibration and computer software verification procedures were being performed. One new MCA had been installed in the Unit 2 Counting Room but had not been tested or calibrated. During the checkout of the Unit 1 MCA's, the older MCA's in the Unit 2 Counting Room were utilized for all Unit 1 and Unit 2 counting room work. When the Unit 1 MCA's have been calibrated and the software verified, the Unit 1 Counting Room will be declared operable and the new Unit 1 MCA's will be used for all plant counting purposes, while the older Unit 2 MCA's will be removed from service, a second new MCA will be installed and both new Unit 2 MCA's will be calibrated and computer software will be verified before the new equipment is placed in service. When the Unit 2 Counting Room is returned to service, Plant Farley will have redundant Counting Room capability. At some later date, an additional essentially identical MCA will be installed and checked out at the licensee's technical Support Center for emergency preparedness purposes. A sixth MCA will be installed at the Training Center and will be used in the training of counting room personnel. Due to the nature of

training, which will require set up, calibration, and a degree of software programming by students, the Training Center MCA would not always be in a verifiable calibration status and would not routinely be available for alternative or backup operational counting room purposes. Under emergency conditions, the Training Center MCA could be made operational within a matter of hours.

Licensee representatives stated that tentative dates for declaring the Plant Farley Counting Rooms operational were approximately May 1, 1989, for Unit 1, and approximately July 1, 1989, for Unit 2.

It was emphasized that these dates were only tentative and could be impacted by the required verification testing of computer software and that delays could be expected if the vendor was required to make substantive changes to the software program - which, in turn, would require further verification testing. The licensee's emphasis on Quality Assurance and software verification, as evidenced in the procurement, testing, and preliminary implementation of the new MCAs was considered by the inspector be a licensee strength.

The licensee noted that the vendor had full responsibility, under the procurement contract, for providing a viable and verifiable computer software program for the MCA's. Apparent delays in the implementation of the new MCA's and replacement of the older units was indicated by licensee representatives to be attributable to failure of the vendor to meet the procurement specifications with respect to quality assurance for software programming and verification testing, with the licensee declining to accept delivery until the specifications had been met.

No violations or deviations were identified.

7. Offsite Dose Calculation Manual (84750)

During discussions with licensee personnel concerning computer software for the new MCA's in the Unit 1 Counting Room, the inspector noted that the dose calculation programs being verified utilized the guidance of Revision 1 to Regulatory Guide 1.109 (October 1977), while the Offsite Dose Calculation Manual (ODCM) and chemistry procedures implementing or supplementing the ODCM referenced Revision 0 of Regulatory Guide 1.109 (March 1976). Licensee representatives stated that a revision to the ODCM had been prepared referencing Revision 1 of Regulatory Guide 1.109 and at the time of the inspection was in the corporate concurrence chain prior to submitting the ODCM to NRR for approval. The inspector inquired if the revision to the ODCM included the recent guidance on incorporation of the Radiological Effluent Technical Specifications into the ODCM and was informed that it was not included but that the ODCM would be revised again at later date. The inspector also inquired concerning the need to revise certain Chemistry Department procedures when the revised ODCM was

implemented and were informed that appropriate revisions were being drafted and reviewed.

No violations or deviations were identified.

8. Semi-Annual Radioactive Effluent Reports (84850)

TS 6.9.1.8 requires the licensee to submit, within 60 days after January 1 and July 1 of each year, routine radioactive effluent release reports covering the operation of the plant during the previous six months of operation. The inspector reviewed the effluent reports for January - June 1988 and July - December 1988. A tabular summary of releases is shown in the Attachment.

Within the exception of tritium releases in liquid effluents, releases of radioactivity in liquid and gaseous effluents were substantially below the average releases from 24 PWRs in Region II. Tritium releases were above average tritium releases from 24 PWRs in Region II and were approximately equal to 1986 and 1987 tritium releases from Plant Farley. Projected offsite radiation doses to persons in the environment were a small fraction of permissible limits established in Appendix I of 10 CFR Part 50 and in 40 CFR Part 90. Doses were calculated utilizing an approved ODCM, the atmospheric dispersion assumptions of Regulatory Guide 1.111 and the factors and assumptions of Regulatory Guide 1.109.

The data and relevant material provided in the licensee's submittals conformed to the guidance provided in Regulatory Guide 1.21 and appeared to be adequate.

No violations or deviations were identified.

9. Environmental Monitoring (84750)

An inspector accompanied licensee personnel during collection of offsite air samples from six locations. No water or milk samples were scheduled for collection during the inspection but the licensee representative pointed out the sampling locations. Sample collecting procedures and sample handling techniques appeared to be adequate.

No violations or deviations were identified.

10. HEPA Filter and Charcoal Adsorber Testing (84750)

The inspectors reviewed records of in-place High Efficiency Particular Air (HEPA) filter leak testing, in-place charcoal adsorber leak testing, and laboratory testing of charcoal adsorber samples for radioiodine retention which had occurred since April 1, 1988. Systems tested between April 1, 1988, and the time of the current inspection included the Unit 1 and Unit 2 Penetration Room ventilation system Trains A and B, the Control Room recirculation filter Trains A and B, and the Control Room pressurization system. It was noted that the "A" train charcoal in both

the Unit 1 and Unit 2 Penetration Room filter systems failed the halogenated hydrocarbon leak tests. The charcoal in both trains was changed out and the systems were satisfactorily retested.

The inspector reviewed the testing personnel certification packages attached to the completed work packages and determined that the test personnel appeared to be qualified to perform the tests. The tests appeared to have been conducted in conformance with the criteria of ANSI N510-1980 and with the guidance of Regulatory Guide 1.52, Revision 2, March 1978.

No violations or deviations were identified.

11. Exit Interview

The inspection scope and results were summarized on March 3, 1989, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below.

One violation, one URI, one IFI item and two INs were closed (Paragraph 2). The plant chemistry and radiochemistry programs appeared to be adequate; the conversion to an all Alabama Power employee chemistry staff was considered a licensee strength (Paragraph 4). Plant MCA equipment was being upgraded at the time of the inspection, and the quality assurance measures and software verification requirements being applied to checkout of the MCAs were considered another licensee strength (Paragraph 6). Semi-Annual Radioactive Effluent Release Reports for 1988 were reviewed and found adequate (Paragraph 8). HEPA filter and charcoal adsorber testing was adequate (Paragraph 10).

Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

No violations or deviations were identified.

ATTACHMENT

Table 1:
Plant Farley Radioactive Effluent Releases CY 1988

Unit 1 (Curies)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Gases:					
Fission/Activation Products	2.38E+02	6.76E+02	2.15E+01	2.47E+01	9.60E+02
Iodine	2.76E-05	1.14E-03	1.63E-06	4.39E-07	1.17E-03
Particulates	3.91E-06	4.27E-04	2.93E-06	3.13E-13	4.28E-04
Tritium	3.13E+00	1.24E+01	4.74E+01	5.26E+01	1.15E+02
Liquids:					
Fission/Activation Products	3.07E-02	3.6E-02	4.8E-03	8.1E-03	8E-02
Tritium	2.01E+02	1.21E+02	1.06E+02	8.8E+01	5.16E+02

Unit 2 (Curies)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual Total
Gases:					
Fission/Activation Products	8.1E+01	4.39E+02	5.6E+01	1.5E+01	5.91E+02
Iodine	9.21E-07	1.27E-06	1.22E-07	3.83E-08	2.35E-06
Particulates	0	4.27E-09	2.22E-08	1.29E-07	1.55E-07
Tritium	1.21E+01	1.5E+01	1.85E+01	1.4E+01	5.97E+01
Liquid:					
Fission/Activation Products	3.54E-02	2.89E-02	6.47E-03	1.45E-02	8.53E-02
Tritium	2.41E+02	1.74E+02	1.62E+02	1.76E+02	7.53E+02

Plant Farley releases were compared to 1987 average releases, per unit, for 24 PWRs in Region II.

Table 2:

Comparison of Plant Farley Releases in 1988 to Average release from 24 PWRs in Region 2

Gases: (Curies)	Farley Unit 1 1988	Farley Unit 2 1988	PWR Average 1987	PWR Median 1987
Fission and Activation Products	9.60E+02	5.91E+02	1.79E+03	8.15E+02
Iodine and Particulates	1.60E-03	2.51E-06	1.41E-02	6.56E-03
Liquids: (Curies)				
Fission and Activation Products	8E-02	8.53E-02	8.26E-01	6.60E-01
Tritium	5.16E-02	7.53E+02	3.61E+02	3.47E+02