



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

APR 08 1992

Report No(s): 50-348/92-10 and 50-364/92-10

Licensee: Alabama Power Company
600 North 18th Street
Birmingham, AL 55291-0400

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

Facility Name: Farley 1 and 2

Inspection Conducted: April 6-10, 1992

Inspectors:

[Signature]
for R. B. Shortridge

5/7/92
Date Signed

[Signature]
for E. B. Pharr

5/7/92
Date Signed

Accompanying Personnel: Antoinette Massey, Nuclear Engineer
Headquarters

Approval by:

[Signature]
J. P. Potter, Chief
Facilities Radiation Protection
Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and Safeguards

5/7/92
Date Signed

Summary

Scope:

This routine, unannounced inspection was conducted in the area of occupational radiation exposure during extended outages. Specific elements of this program included: organization and staffing; audits and appraisals; training and qualification; external exposure control; internal exposure control; control of radioactive materials and contamination; surveys and monitoring; and maintaining occupational exposures as low as reasonably achievable (ALARA). In addition, the licensee review of applicability of Information Notices (INs) was reviewed and one violation and one inspector followup item (IFI) were closed.

Results:

In the areas inspected, no violations or deviations from NRC regulations were identified. Several weaknesses were noted in the licensee's use of digital alarming dosimeters, root cause analysis of radiological discrepancies, and an adverse trend was noted in the number of hot particle personnel contaminations. The inspector observed the conduct of radiological operations in Unit 2 containment and noted that the radiological performance of both health physics technicians and craftsmen was good. Based on inspector observations, the licensee's program in radiation protection was functioning adequately to protect the health and safety of the public and plant personnel.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. Bouillon, Dosimetry Foreman
- *S. Freeman, Lead Auditor, Safety Audit and Engineering Review (SAER)
- *M. Graves, Health Physics (HP) Supervisor
- *P. Harlos, Senior Nuclear Specialist, SAER
- *M. Mitchell, HP Superintendent
- *D. Morey, General Manager, Nuclear
- *J. Osterholtz, Technical Manager
- *P. Patton, Plant Health Physicist
- *L. Stinson, Assistant General Manager, Operations
- *W. Warren, Technical Training Supervisor

Other licensee employees contacted included engineers, technicians, and office personnel.

Nuclear Regulatory Commission

- *G. Maxwell, Senior Resident Inspector
- *Attended April 10, 1992 Exit Meeting

2. Organization and Staffing (83729)

During the inspection, HP organization and staffing levels were reviewed and discussed with cognizant licensee representatives. No changes were noted in the organizational structure since a previous inspection conducted January 6-10, 1992, and documented in Inspection Report (IR) 50-348, 364/92-01. However, the inspector discussed with licensee representatives personnel changes within the HP organization. Since IR 92-01 the RadWaste Supervisor had moved to a senior training instructor position and the HP Supervisor will become the RadWaste Supervisor following outage completion. At the time of the inspection, the RadWaste Supervisor position was filled by a former senior nuclear specialist within the SAER group. Following completion of the outage the former senior nuclear specialist will be the HP Supervisor. A former HP foreman moved to fill the vacant SAER senior nuclear specialist position, thereby leaving two HP foreman positions vacant. Two offshift HP technicians were selected to fill these positions, therefore leaving two vacant HP technician positions at the time of the inspection.

The inspector was also informed that the licensee's final request for contract technicians to support outage activities was 88 ANSI N18.1 qualified senior technicians and 24 junior technicians. The inspector was further

informed that at the time of the inspection the licensee had 81 senior technicians and 24 junior technicians onsite. The licensee stated that the additional contract support was in response to needed surveillance for outage work scope.

The inspector reviewed resumes for the two former offshift HP technicians promoted to HP foremen, and selected ANSI contract technicians, and verified compliance with ANSI N18.1 requirements for supervisors and technicians, respectively. Through discussions with HP management and employees and direct observation of job support, the inspector noted that the present HP organization and staffing, including contract HP staffing, was adequate for ongoing activities.

No violations or deviations were identified.

3. Audits and Appraisals (83729)

T.S.6.5.2.8 requires audits of facilities activities to be conducted under the Manager, Safety Audit and Engineering Review (SAER) encompassing the conformance of facility operation to the Technical Specifications applicable License Conditions at least once per 12 months.

The inspectors reviewed the licensee audits for radiation protection (RP) activities and noted that there had been no audits performed since this area was inspected in January 1992.

However, the inspectors performed a detailed review of the Radiological Incident Reporting (RIR) System and noted several weaknesses. Several internal methods are used by RP to identify radiological performance deficiencies. They are the RIR for significant deficiencies and Radiation Incident Warnings (RIW) for more minor performance deficiencies. The RIRs and RIWs are controlled by RP procedure FNP-0-RCP-10, Radiation Incident Reports, Revision 19, dated December 11, 1990. A recent inspection report, noted that for RIRs the licensee did not always document on the RIR or describe all the corrective actions taken to prevent recurrence of a problem regarding radiological performance. The inspector, in this review, noted that frequently root causes were not identified. While the RIR contains a large Root Cause Analysis Checklist HP Form 228, Revision 22, it does not require the determination or documentation of the root cause(s).

Therefore, without the root cause(s) listed, the inspector could not be sure that all necessary corrective actions were being taken to reduce or prevent poor radiological

performance problems. Also, as a result the analysis and trending of RIRs and RIWs was not evident. The inspector noted that 54 RIRs had been written in 1992 thus far, and that 45 were personnel contaminations and that 25 percent of these involved hot specks or hot particles. The inspector informed the licensee that the large percentage of hot particle contaminations appeared to be an adverse trend. Licensee representatives stated that they had already increased monitoring for hot particles and were performing surveys on personnel working in hot particle zones at least hourly. This included HP technicians, as well as support people.

No violations or deviations were identified.

4. Training and Qualifications (83729)

10 CFR 19.12 requires, in part, that the licensee instruct all individuals working in or frequenting any portions of a restricted area in the health protection aspects associated with exposure to radioactive material or radiation; in precautions or procedures to minimize exposure; in the purpose and function of protection devices employed; in the applicable provisions of the Commission regulations; in the individual's responsibilities; and in the availability of radiation exposure data.

The inspector reviewed the licensee's Radiation Worker Training program, both initial and annual retraining. The inspector noted that workers frequenting the Radiological Control Area (RCA), as well as HP technicians, were required to complete the annual training course which was intended to teach proper work habits to maintain exposures ALARA. The inspector reviewed the training material and noted that training on the recently implemented digidose system was included. The training included a practical demonstration of the Digital Alarming Dosimeters (DADs), proper usage, and their functions, including the different types of alarms and how to react to each. The inspector was informed that successful completion of the course required passing a written exam with 70 percent correct as well as 100 percent successful completion of a 6 question exam dealing with high radiation area and exclusion area access and controls.

The inspector was informed that in addition to the annual Radiation Worker retraining, HP developed training films to present topics which required intermediate training. Since the previous inspection, training films on the new digidose system and on reducing the spread of contamination were developed. The contamination reduction film was developed in response to the recent increase in identified personnel contamination events. The film stressed proper technique

and work habits to reduce the spread of contamination.

The inspector also reviewed the HP retraining program. The inspector was informed that course content was determined by feedback from students and recommendations from the training staff and plant supervision. Also, tasks performed infrequently but with a high degree of importance were included. Lectures emphasized theory, radiological considerations, and procedures and technical specifications related to plant systems. The inspector reviewed the 1992 HP continuing training schedule and noted that Radiation Monitor Team and Emergency Plan training, industry events, plant systems, and tagging and posting standards were to be included. Several vendor training courses were also scheduled. In addition, 10 technicians were scheduled to attempt certification training and examination by the National Registry for Radiation Protection Technologists (NRRPT) during the training cycle. The inspector was informed that NRRPT training was also taught during the 1991 continuing training cycle and 11 technicians successfully completed the certification course and examination.

During discussions with licensee representatives the inspector was informed that following the upcoming fall outage, HP technicians would receive training on 10 CFR Part 20 revisions. Also, training was planned to be offered to the different work groups to introduce the changes. Once programmatic changes were made in response to the revision, a training video would be offered during Radiation Worker training. The inspector was also informed that managers and supervisors from several work groups had participated in a two day training course in which philosophy prompting the changes was discussed.

The inspector considered the licensee's HP training to be appropriately inclusive and indepth of radiation protection topics and a strength to the overall HP program.

No violations or deviations were identified.

5. External Exposure Control (83729)

10 CFR 20.101 requires that no licensee possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter a total occupational dose in excess of 1.25 rems to the whole body, head and trunk, active blood forming organs, lens of the eyes, or gonads; 18.75 rems to the hands, forearms, feet and ankles; and 7.5 rems to the skin of the whole body.

The inspector reviewed 1992 first quarter external exposure records for workers involved with Radiation Work Permits (RWP) 2-92-80 and 2-92-123 associated with steam generator nozzle dam installation and HP coverage of such activities, respectively. Following discussions with licensee personnel, the inspector was informed that workers performing these outage activities were provided with multiple dosimetry due to the non-uniform radiation fields in the work area. The inspector noted that for the selected records reviewed the maximum whole body and extremity doses during the quarter were 500 millirem (mrem) and 1390 mrem, respectively.

The inspector concluded that the licensee monitored whole body and extremity doses adequately and that all external exposures were within 10 CFR 20 limits.

During tours in Unit 2 containment the inspectors inquired of approximately 10 work groups, working in high radiation areas, of the dose rates in their work area. Only one person answered correctly. The inspector noted that all personnel were wearing DADs. Prior to responding several workers monitored the dose rate on the DAD to see what the dose rate actually was. The failure of personnel to be knowledgeable of dose rates in their immediate work area was identified as a weakness in the exposure control program. In addition, the licensee was using what appeared to the inspector to be high alarm setpoints. For example, the inspector obtained an extension authorization to receive 300 mrem. However, the dose rate alarm was set for 185 mrem per hour (mrem/hr) and the accumulated dose alarm was set for 450 mrem. The inspector reviewed alarm setpoints for the majority of RWPs and noted the same alarm setpoints were representative for most RWPs. The inspector pointed out to the licensee that the setpoints did not appear to use ALARA concepts when using DADs with high alarm setpoints. The licensee stated that they had experienced problems with personnel response to the similarity in the dose rate and accumulated dose alarm and decided to set the alarms as stated above.

The inspector noted a licensee initiative to control external exposure in the steel cage (barrier) constructed in the Unit 2 containment basement around the Regenerative Heat Exchanger (RHX). In the past the RHX had been identified as meeting the requirements as a locked high radiation area. However, since there were no natural boundaries to facilitate locking, the licensee posted the area with triple rope barriers and a flashing red light. In response to increasing radiation levels the licensee made a safety conscious decision to build the lockable steel barrier to

prevent any unplanned or inadvertent exposure of personnel to high dose rates.

No violations or deviations were identified.

6. Internal Exposure Control (83729)

10 CFR 20.103(a)(1) states that no licensee shall possess, use, or transfer licensed material in such a manner as to permit any individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in Appendix B, Table 1, Column 1.

10 CFR 20.103(a)(3) requires, in part, that the licensee, as appropriate, use measurements of radioactivity in the body, measurements of radioactivity excreted from the body, or any combination of such measurements as may be necessary for timely detection and assessment of individual intakes of radioactivity by exposed individuals.

The inspector reviewed 1992 first quarter and second quarter, to date, internal exposure records for workers involved with RWPs 2-92-112 and 2-92-123 associated with steam generator eddy current work and HP coverage of such activities, respectively. For those records reviewed the inspector noted the results of the licensee's internal dose assessment efforts. No quarterly exposures in excess of the 520 Maximum Permissible Concentration-hours (MPC-hr) control measure had occurred since January 1, 1992.

The inspector was informed by licensee representatives that a potential internal contamination incident had occurred prior to the completion of the onsite inspection. The inspector was also informed that this was the first such event since January 1, 1992. The inspector verified that the licensee had initiated a series of invivo counts to assess the potential intake of radioactivity by the individual. The inspector informed licensee representatives that the licensee's assessment of the incident would be reviewed in detail during a future inspection.

No violations or deviations were identified.

7. Control of Radioactive Materials and Contamination, Surveys and Monitoring (83729)

The licensee is required by 10 CFR 20.201(b), 20.401, and 20.403 to perform surveys and to maintain records of such

surveys necessary to show compliance with regulatory limits.

During tours of the RCA and containment the inspector performed radiation and contamination surveys to assess licensee surveys. The inspector noted similar survey results to that posted by the licensee. The inspector reviewed RCA surveys, and radioactive material shipment surveys and noted they were documented in accordance with NRC requirements.

The inspector reviewed licensee actions in correcting a labeling violation. All material within the RCA appeared to be labeled in accordance with 10 CFR 20.203 (f). The inspector discussed the actions with the Radiation Protection Manager and noted the improvement in informing the workers of the contents and radiation levels of radioactive material containers.

The inspector monitored work in containment for steam generator maintenance (eddy current testing and sludge lancing), resistance temperature detector (RTD) replacement, and check valve maintenance. All operations were well performed radiologically, with good contamination controls.

No violations or deviations were identified.

8. Program for Maintaining Exposures As Low As Reasonably Achievable (ALARA) (83729)

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 inspector reviewed the licensee's program to maintain occupational exposure ALARA. During discussions with licensee representatives the inspector was informed that the cumulative dose for the first quarter of 1992 was 183.659 person-rem, as measured by thermoluminescent dosimeters (TLDs), with the licensee projecting an annual site cumulative dose goal of 848 person-rem. The inspector was also informed that the licensee's revised cumulative dose goal for the ongoing Unit 2 outage was 377 person-rem. As of April 8, 1992 the licensee's collective dose for the outage was 207.7 person-rem as measured by DADs whereas the projected outage-to-date dose goal was 221 person-rem. The licensee further informed the inspector that a projected cumulative dose goal of 380 person-rem had been initially set for the 1992 Fall Unit 1 outage.

The inspector discussed with licensee representatives several successful outage jobs to date which had contributed

to the lower than projected cumulative dose. Following the previous outage in which 81 person-rem resulted from work associated with leaking nozzle dams, the licensee purchased state-of-the-art nozzle dams with maximum integrity against leaking, which were installed and removed robotically. At the time of the onsite inspection the licensee had made no generator entries due to nozzle dam work scope. During nozzle dam installation the licensee had accumulated 6.6 person-rem total and was projecting approximately 2 person-rem during removal of the dams. The licensee also discussed RTD and associated piping removal for which the licensee assigned a projected goal of approximately 79 person-rem and of which the licensee had actually accumulated approximately 43.6 person-rem as of April 8, 1992. The inspector was informed at the time of the onsite inspection that RTD removal work scope was approximately 70-75 percent complete. In addition, the licensee was performing their 10 year inservice inspection (ISI) during this outage and due to incorporation of previous lessons learned and coordination of work groups the licensee only accumulated 2.1 person-rem during the removal of the lower internals. At the time of the onsite inspection the licensee was preparing for initiation of the steam generator tube plugging and sleeving, both of which were to be done robotically. The licensee planned to install approximately 90 plugs and 120 sleeves. Original plans were for 220 sleeves with a projected dose of 23 person-rem but since only 120 sleeves were actually required the licensee expected to collect approximately 50-75 percent of the projected goal.

During discussions with the inspector, the licensee attributed much of the reduced outage collective dose to extensive use of mockups and training, especially for many first time jobs; and lessons learned during previous outages. Licensee representatives also discussed coordination of work scope as attributing to the lower collective dose.

In addition, the inspector discussed with cognizant licensee representatives the lithium/boron coordinated chemistry program which was implemented during the fuel cycle prior to the Unit 2 outage. Following shutdown the licensee injected boron into the Reactor Coolant System (RCS) which produced a crud burst. The Reactor Coolant Pumps (RCPs) were then run for 48 hours with peroxide being added to the system, with approximately 6 hours of RCP run time remaining. Licensee data indicated that approximately 1700 Curies (Ci) of cobalt-58 (Co-58) was removed from the RCS whereas using the same process during the 1991 unit one outage removed only 200 Ci, approximately, of Co-58. Licensee representatives attributed the substantial increase in source term removal

to the use of fresh letdown demineralizer beds and 6 micron absolute filters at RCS letdown and seal water return and a 1 micron absolute seal injection filter. The licensee informed the inspector that approval has been granted to go to a 1 micron filter at the seal water return and discussions concerning an additional 24 hour run time of the RCPs following peroxide injection were underway. Licensee representatives stated that both efforts should further increase the effectiveness of the cleanup.

Although general area dose rates in the reactor building did not decrease as the licensee expected due to the successful coordinated chemistry cycle and early boration, they did find that when draining RCS piping to midloop contact dose rates increased by only 100 mrem/hr at one hot leg, otherwise dose rates did not increase as expected. The licensee attributed this to the successful coordinated chemistry cycle.

The inspector noted that licensee efforts to reduce RCS source term and to implement lessons learned and training concepts into outage work scope was successful. The inspector informed licensee representatives that their program for maintaining personnel exposures ALARA during outage activities appeared to be functioning adequately.

No violations or deviations were identified.

9. Information Notices (92701)

The inspector determined that the following Information Notices (IN) had been received by the licensee, reviewed for applicability, distributed to appropriate personnel, and that action, as appropriate was taken or scheduled:

- 89-13: Alternative Waste Management Procedures in Case of Denial of Access to Low-Level Waste Disposal Sites
- 89-27: Limitations on the Use of Waste Forms and High Integrity Containers for the Disposal of Low-Level Radioactive Waste
- 89-35: Loss and Theft of Unsecured Licensed Material
- 89-47: Potential Problems with Worn or Distorted Hose Clamps on Self-Contained Breathing Apparatus
- 90-01: Importance of Proper Response to Self-Identified Violations by Licensees
- 90-08: Kr-85 Hazards from Decayed Fuel

- 90-33: Sources of Unexpected Occupational Radiation Exposures at Spent Fuel Storage Pools
- 90-44: Dose-Rate Instruments Underresponding to the True Radiation Fields
- 90-47: Unplanned Radiation Exposures to Personnel Extremities Due to Improper Handling of Potentially Highly Radioactive Sources
- 90-48: Enforcement Policy for Hot Particle Exposures
- 90-49: Stress Corrosion Cracking in PWR Steam Generator Tubes
- 90-56: Inadvertent Shipment of a Radioactive Source in a Container Thought to be Empty
- 88-63, Supp. 1: High Radiation Hazards from Irradiated Incore Detectors and Cables
- 91-36: Nuclear Plant Staff Working Hours
- 91-37: Compressed Gas Cylinder Missile Hazards
- 91-39: Compliance with 10 CFR Part 21, "Reporting of Defects and Noncompliance"
- 91-40: Contamination of Non-Radioactive System and Resulting Possibility for Unmonitored Uncontrolled Release to the Environment
- 88-63, Supp. 2: High Radiation Hazards from Irradiated Incore Detectors and Cables
- 91-60: False Alarms of Alarm Ratemeters Because of Radiofrequency Interference

10. Licensee Action on Previous Inspection Findings (92702)

(Closed) 50-348 and 364/92-01-02, Violation: The licensee's procedure was inadequate for labeling containers of radioactive material in that most radioactive material was marked as such but generally the labels did not bear a description of contents or radiation level.

The licensee changed the procedure and took corrective actions to label radioactive material containers on site satisfactorily. This item is closed.

11. Exit Meeting

The inspector met with licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on April 10, 1992. The inspector summarized the scope of the inspection and did not receive any dissenting comments. The licensee did not identify any documents given to the inspector as proprietary.



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

JUN 02 1992

Docket Nos. 50-348, 50-364
License Nos. NPF-2, NPF-8

Southern Nuclear Operating Company, Inc.
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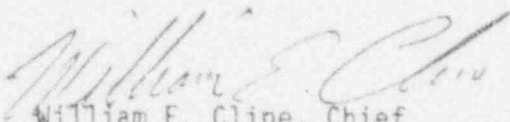
Gentlemen:

SUBJECT: NRC INSPECTION REPORT NOS. 50-348/92-10, 50-364/92-10

The cover letter for the subject report issued May 8, 1992, was incorrectly date stamped April 8, 1992.

We regret any inconvenience resulting from this error.

Sincerely,


William E. Cline, Chief
Radiological Protection and
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