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

APR 05

Report Nos.: 50-335/90-07 and 50-389/90-07

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-335 and 50-389 License Nos.: DPR-67 and NPF-16

Facility Name: St. Lucie 1 and 2

Inspection Conducted: February 26 - March 2, 1990

Inspectors: F N Wright 4/5/90
F. N. Wright Date Signed

F N Wright for 4/5/90
R. B. Shortridge Date Signed

Clark A. Hughey 4/5/90
C. A. Hughey Date Signed

Approved by: J P Potter 4/5/90
J. P. Potter, Chief Date Signed
Facilities Radiation Protection Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This unannounced inspection of radiation protection activities included a review of the licensee's organization and management controls, training and qualifications, external and internal exposure controls, as low as reasonably achievable (ALARA) program, surveys and control of radioactive material, and follow-up of previously identified items.

Results:

Two violations were identified. One violation was identified for failure to have adequate written procedures for controlling access and activities in high radiation areas. Another violation was identified for failure to maintain positive access control to a high radiation area. Overall, the licensee's radiation protection program appears to be generally effective in protecting the health and safety of the workers. Licensee policy and procedures for qualifying vendor HP personnel was a program strength. The licensee exposure goals were agressive.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Alfera, Safety Supervisor
*J. Barrow, Operations Superintendent
*G. Boissy, Plant Manager
*H. Buchanan, Health Physics Supervisor
*E. Burgess, Quality Improvement Team
*G. Casto, Emergency Planning
*R. Church, Chairman, Independent Safety Evaluation Group
*T. Coste, Quality Assurance Staff
*J. Danek, Corporate Health Physics
*B. Frechette, Chemistry Supervisor
*J. Harper, Superintendent, Quality Assurance
*L. Jacobus, ALARA Coordinator
J. Leifhelm, Health Physics Instructor
*C. Leppla, Instrumentation and Controls Supervisor
*M. MacLead, Nuclear Engineering
*R. McCullers, Health Physics Operations Supervisor
*H. Mercer, Health Physics Technical Supervisor
B. Parks, Quality Assurance
*K. Payne, Health Physicist
*J. Powell, Technical Staff
*R. Riha, Nuclear Engineering Staff
*J. Riley, Procedures and Graphics Supervisor
*L. Rogers, Electrical Maintenance
*D. Sager, Site Vice President
*D. Sipos, Services Manager
*J. Spodick, Training Department
*J. Walker, Health Physics Emergency Preparedness
*H. Ware, Training
*D. West, Technical Staff Supervisor
*C. Wood, Outage Management
*E. Wunderlich, Reactor Engineering

Other licensee employees contacted during this inspection included craftsmen, technicians, and office personnel.

Nuclear Regulatory Commission

*J. Potter, Section Chief, Facilities Radiation Protection, Region II
*M. Scott, Resident Inspector

*Attended exit interview held March 2, 1990

2. Organization and Management Controls

The inspectors reviewed the licensee's organization, staffing levels, and lines of authority as they related to radiation protection program, and verified that the licensee had necessary staffing levels to monitor and control outage work activities in radiological areas.

The inspectors discussed with the Radiation Protection Supervisor the type, methods, and degrees of interaction with other plant work groups during the Unit 1 refueling outage. The inspectors determined that the licensee's radiation protection organization was adequately structured to support the refueling work.

The inspectors reviewed the licensee's program for self-identification of weaknesses related to the radiation protection program and the appropriateness of corrective action taken. In a previous inspection, the inspectors determined that the licensee was not identifying radiological protection program problems or deficiencies in a corrective action program to determine root causes and corrective actions. However, no violations of NRC requirements were identified and a continued review of the licensee's practices for initiating and documenting radiological protection program discrepancies will be reviewed during subsequent inspections. The licensee's procedure HP-101, Identification and Reporting of Radiological Events, Revision 4, required that the licensee document events reportable to the NRC. However, other deficiencies, such as failure to follow radiation protection procedures were not required to be documented on a radiological event report (RER). The licensee revised HP-101 in August 1989. The inspectors reviewed the revised procedure and determined that the licensee had specified requirements for documenting radiological program inadequacies and poor work practices. The inspectors reviewed selected radiological event reports made in 1990 and verified that the licensee was taking corrective action measures for the identified program inadequacies.

No violations or deviations were identified.

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

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 last time the licensee had two refueling outages in one year was 1987 and the licensee's collective dose was 448 person-rem per unit. The licensee had a collective dose of 284.5 person-rem per unit in 1988 and 231.5 person-rem per unit in 1989. The licensee established their 1990

collective dose goal to meet a three year average goal of 288 person-rem per unit. In order to meet that goal the licensee would have to keep the collective dose total for 1990 below 692 person rem. The licensee's estimate of collective dose for 1990, based on work planned and historical data, was 748 person-rem. Significant dose tasks for 1990 included Unit 1 steam generator tube pull and plug tasks, and reactor coolant pump impeller inspection on Unit 2.

In efforts to increase staff involvement in the ALARA program, the Plant Manager requested each department head to develop an action plan to reduce their department dose. The plans were to be completed prior to the start of the Unit 1 outage. However, the Unit 1 outage began three weeks early and most plans were not completed or submitted. The ALARA Coordinator reported that the licensee had established a new annual personnel exposure limit of 2,500 millirem. The ALARA coordinator reported that the lowered administrative limit had heightened worker attention to keep personnel exposures ALARA.

In an effort to minimize primary system general corrosion rates, reduce deposition and activation of corrosion products on fuel cladding, and therefore, reduce general plant dose rate source term, the licensee had previously implemented an elevated lithium control program in the reactor coolant system. Although some source term reductions had been noted during previous outages, the licensee planned to suspend the elevated lithium control program immediately in Unit 1 and during the next fuel cycle in Unit 2. This change back to a coordinated lithium/boron pH control scheme was prompted by recent general industry concerns linking elevated lithium levels with primary water stress corrosion cracking.

During the inspection, the licensee remained below the estimated weekly dose projection. However, at the end of the inspection the licensee was 11 days behind schedule.

No violations or deviations were identified.

4. Training and Qualifications

The inspectors reviewed changes in the licensee's training program, policies, and goals relating to the radiation protection program and discussed the changes with licensee representatives. The inspectors verified that the changes should not adversely affect the licensee's program.

Prior to being allowed to perform unsupervised health physics (HP) technician job coverage, senior level vendor technicians were carefully screened by the licensee. The guidelines for the screening process were described in a recommended practice entitled "Guidelines for Training and Qualification of ANSI Contract Health Physics Technicians." This guidance was developed for and implemented at both the St. Lucie and Turkey Point sites. The licensee procedures defined standard duties for senior level vendor technicians, set minimum experience requirements, and established

training and testing requirements. The inspectors reviewed and discussed the program with cognizant plant personnel and noted the following program highlights:

a. The standard duties of a senior level HP technician were based on a focused job/task analysis.

b. Each vendor senior technician must pass a written examination based on the above described tasks. The test covered basic HP theory, equipment and procedure knowledge. Minimum passing score was 80 percent. Retesting was at the discretion of the HP Supervisor. No retesting was allowed for a score of less that 60 percent. Once a technician passed the test, retesting was not required as long as the technician had not been inactive for more than one year.

c. Technicians were also trained and tested annually on site specific policies and procedures with the same pass/fail criteria as above. Junior level technicians were not required to be tested, however, they were not allowed to perform senior level tasks unless they were directly supervised.

d. A review of the lesson plan developed for vendor technician training showed it to be very comprehensive and complete.

e. Minimum experience requirements, using ANSI/ANS 3.1-1978 as a basis, were defined in detail. Resumes of contract HP technicians were verified by contacting at least two of the individual's prior work sites.

f. A selected review of several vendor qualifications packages found them to be complete. These packages included test results, resume verification information, and experience evaluations.

The vendor HP technician qualification and training program was considered by the inspectors to be a licensee strength.

No violations or deviations were identified.

5. External Exposure Control and Personnel Dosimetry

The inspectors reviewed the licensee's external exposure controls including use of radiation work permits (RWPs), posting of radiological areas, access controls for high radiation and locked high radiation areas (HRAs), and licensee procedures. The inspector determined that the licensee's procedures for controlling access to HRAs were inadequate, in that, they did not adequately describe the licensee's methods for controlling and monitoring activities in high radiation areas. As a result the licensee received a violation for inadequate procedures, and a violation for not adequately securing a locked HRA, after inspectors were able to open a "locked high radiation" gate.

a. High Radiation Areas

10 CFR 20.202 defines a HRA as an area, accessible to personnel, in which there exists radiation at levels such that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.

10 CFR 20.203(c)(2) requires a licensee who establishes a HRA to control each entrance by one of three methods. These include:

(1) A control device that would cause the level of radiation to be reduced below 100 millirem per hour upon personnel entry into the area.

(2) A control device to notify persons entering the area and licensee supervision of the entry.

(3) Maintain the area locked except during periods when access to the area is required, with positive control over each entry.

In lieu of the "control device" or "alarm signal" requirements of 10 CFR 20.203(c)(2), licensee Technical Specification (TS) 6.12 requires that areas having dose rates greater than 100 millirem per hour but less than 1,000 millirem per hour be conspicuously posted as a HRA and access controlled by use of a RWP. Additionally, persons permitted to enter such areas shall be provided with or accompanied by one of the following:

(1) A radiation monitoring device which continuously indicates the dose rate in the area.

(2) A radiation monitoring device which continuously integrates the radiation dose rate in the area and alarms when a preset dose is received, or

(3) A HP qualified individual with a dose rate monitoring device, who is responsible for providing positive control over the activities within the area, and who shall perform periodic radiation surveillance at the frequency specified by the facility Health Physicist on the RWP.

TS 6.12.2 requires that each HRA accessible to personnel, in which there exists radiation at levels such that a major portion of the whole body could receive, in any one hour, a dose in excess of 1,000 millirem, be secured to prevent unauthorized entry. The requirement states the following:

(1) That areas having dose rates greater than 1,000 millirem per hour (mrem/hr) shall be locked to prevent unauthorized entry with keys controlled by licensee supervision.

(2) Doors shall remain locked except during access by personnel under an approved RWP which shall specify the dose rates in the area with maximum allowable stay times for individuals in the area.

(3) In lieu of the stay time specification of the RWP, direct or remote (such as use of closed circuit TV cameras) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive access control over activities within the area.

(4) Individual areas accessible to personnel with radiation levels such that a major portion of the body could receive in one hour a dose in excess of 1,000 millirem, that are located in large areas such as containment where no enclosure exists for purposes of locking and no enclosure can be reasonably constructed around the individual areas, shall be roped off, conspicuously posted and provided with a flashing light as a warning device.

TS 6.11 requires that procedures for personnel radiation protection be consistent with the requirements of 10 CFR Part 20 and be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

Over a three day period, inspectors observed work in Unit 1 Containment Building and in the Unit 1 and 2 Auxiliary Buildings. On February 26, 1990, while performing radiation and high radiation surveys in the Unit 1 Containment Building, the inspectors were able to open a gate leading to a locked HRA. The inspectors entered a HRA boundary and observed a radiation level of 400 mrem/hr at the surface of a locked gate leading to the Unit 1 Regenerative Heat Exchanger (RHEx) room. With very little effort the inspectors were able to obtain an 18 inch wide opening in the 42 inch doorway, by repeatedly pushing on the gate and raising the chain. The inspectors immediately notified the HP Operations Supervisor. The HP supervisor made a cursory survey inside the RHEx room and then properly locked the gate. After a brief investigation the HP Supervisor found that the lock could only enter the outside links on each end of the chain and that the chain, if only wrapped once around the gate and post, would provide the 18 inch opening.

HP supervision stated that a memorandum identifying the problem and the correct method for locking the gate to the Unit 1 RHEx room would be issued to all HRA key holders and further training would be provided. The survey performed by the HP supervisor revealed dose rates of 200-1,700 mrem/hr at 18 inches and 3,000 mrem/hr on contact on the RHEx. The inspectors informed licensee management that the failure to sufficiently lock the gate to the RHEx room to prevent unauthorized entry was an apparent violation of TS 6.12.2 (50-335/90-07-01).

During the inspection, the inspectors observed a worker installing a snubber in a HRA on the -5 foot elevation of the Unit 1 containment building. The worker was in a high radiation area working off the floor in the overhead, without a radiation monitor. When questioned about the location of a monitoring device the worker stated that he had a dose rate monitoring device near the area. The worker had to leave his position in the overhead to obtain it. The worker stated that HP had initially performed the area survey and then left. The worker was aware of the dose rates in the immediate area where he was working.

The inspectors observed a similar situation in the Unit 1 Auxiliary Building. A worker was working on a ladder in a HRA without a radiation monitor or a HP technician with a monitor near by. The inspector determined that the worker did have a radiation monitor a few feet away at the HRA boundary. When questioned about the dose rates in the area where he was working, the worker reported the dose rates were nearly twice those measured by the inspectors.

The inspector notified HP supervision of the events and inquired as to what constitutes periodic radiation surveillance or continuous HP job coverage. HP supervision at first stated continuous coverage required direct eye contact within voice control of the workers. However, a later definition was given by HP supervision. That definition basically stated that periodically a HP technician should visit the job site at his discretion based on the radiological conditions at the job site.

The inspectors questioned HP technicians in the containment building and the auxiliary building as to what conditions would exist before periodic job coverage should be changed to continuous coverage. None of the answers, when provided by the HP technicians showed any consistency.

The inspector determined that the licensee staff was uncertain as to what continuous coverage was and when it was to be applied and that the licensee's procedures provided no guidance on what activities required continuous coverage. HP supervision stated that HP procedures did not define periodic coverage or continuous coverage required by the TS 6.12. Licensee procedures did not define periodic radiation surveillance requirements, duties, and responsibilities for health physics personnel monitoring activities within HRAs.

The inspectors reviewed licensee procedures to determine the type of instruction that was provided by the licensee for personnel entering HRAs. Licensee procedures did not define worker monitoring responsibilities within high radiation areas, when radiation monitoring devices were issued for purposes of meeting TS 6.12 requirements.

Failure to approve and maintain written procedures addressing radiological protection requirements for activities in HRAs as required by licensee TS 6.12 was identified as an apparent violation of licensee TS 6.11 (50-335/90-07-02)

The inspectors identified additional procedural weaknesses which included:

Lack of guidance or definition of what constitutes an acceptable barrier for meeting the requirements of TS 6.12.2.

Lack of guidance concerning acceptable uses of flashing warning lights used in meeting access control requirements of TS 6.12.2 for areas impracticable to lock.

Licensee representatives acknowledged procedural inadequacies for high radiation areas and committed to develop, approve, and maintain written procedures for HRA activities.

b. Personnel Monitoring

10 CFR 20.202 requires each licensee to supply appropriate personnel monitoring equipment to specific individuals and require the use of such equipment. During tours of the plant, the inspectors observed workers wearing appropriate personnel monitoring devices.

The majority of personnel entering containment were observed to place their thermoluminescent dosimeter (TLD) and self-reading dosimeter (SRD) in a clear plastic bag and tie it to the chest area on the outside of the protective clothing. However, workers performing floor scabbling in the Unit 2 auxiliary building were working in a radiation area with paper suits over their TLDs and SRDs. The inspectors informed the Health Physics Operations Supervisor that this was considered to be a poor radiological work practice since it inhibited the worker from frequently monitoring their SRD without an increased risk of contamination. HP supervision reported that they would evaluate this practice to determine if changes were needed.

Two violations were identified.

6. Internal Exposure Control

10 CFR 20.103(b) requires the licensee to use process or engineering controls, to the extent practicable, to limit concentrations of radioactive material in air to levels below that specified in Part 20, Appendix B, Table 1, Column 1, or limit concentrations when averaged over number of hours in any week during which individuals are in the area, to less than 25 percent of the specified concentrations.

The use of process controls and engineering controls to limit radioactive concentrations in air was discussed with licensee employees and controls

were observed in the Unit 1 Containment and Auxiliary Buildings. The licensee was also observed to use containment devices for work in highly contaminated areas and drip containers on valves with radioactive leaks.

10 CFR 20.103(b) requires that when it is impracticable to apply process or engineering controls to limit concentrations of radioactive material in air below 25 percent of the concentrations specified in Appendix B, Table 1, Column 1, other precautionary measures should be used to maintain the intake of radioactive material by an individual within seven consecutive days as far below 40 MPC-hours as is reasonably achievable.

10 CFR 20.103(c) (2) provides that the licensee may make allowances for the use of respiratory protection equipment in estimating exposures of individual to radioactive material in air provided the licensee maintains and implements a respiratory protection program that includes, as a minimum, written procedures regarding supervision and training of personnel and issuance records.

The inspectors reviewed the licensee's procedures for use of supplied air respirators. The inspectors observed that breathing air mainfolds, pressure gauges, and carbon monoxide monitors inside containment were calibrated and working properly. Breathing air was currently in use in the steam generator cubicles and on the refueling floor for reactor vessel cavity cleanup.

No violations or deviations were identified.

7. Surveys, Monitoring, and Control of Radioactive Material

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations and (2) are reasonable under the circumstances to evaluate the extent of radioactive hazards that may be present.

The inspectors reviewed the plant procedures which established the licensee's radiological survey and monitoring program and verified that the procedures were consistent with regulations, Technical Specifications and good Health Physics (HP) practices.

The inspectors reviewed selected records of radiation and contamination surveys performed during the period of January and February 1990, and discussed the survey results with licensee representatives. During tours of the plant, the inspectors observed HP technicians performing radiation and contamination surveys.

The inspectors performed independent radiation and loose surface contamination surveys in the Auxiliary and Unit 1 Containment Buildings and verified that the areas where properly posted.

The inspectors discussed with the licensee the methods used to release material from the restricted area and observed technicians performing release surveys for material.

No violations or deviations were identified.

8. Hot Particle Control Program

The inspectors discussed the hot particle control program with a cognizant licensee representative and reviewed the licensee procedures that described the control program and dose assignment methodology.

Known and potential hot particle zones were identified by procedure and required additional survey and worker requirements including additional protective clothing, continuous HP coverage, and trash and equipment removal techniques when work was being done in these areas.

Areas were surveyed for hot particles using gross masslin mopping or wiping and using a paint roller type device with sticky tape that would be rolled over a floor or other surface. The masslin cloth and the paint roller would then be surveyed directly for hot particles or any other significant contamination. The documented results of these surveys would be identified as a "Hot Particle Survey."

The radiation dose to the skin from particles/skin contamination was computed using the acceptable VARSKIN computer code.

During the Unit 1 outage, strippable paint had been applied to the surfaces of the reactor cavity prior to cavity flood-up for refueling operations. The licensee was very enthusiastic about the use of these coatings in that previous experiences had resulted in significant reductions in contamination levels and dose rates in the cavity after draining and removal of the coating from the walls and floor. The use of underwater vacuums to remove crud from the floor of the cavity also greatly assisted in these reductions.

No violations or deviations were identified.

9. Licensee Actions on Previously Identified Inspector Findings

(Closed) IFI 50-335/89-01-02: This item concerned the establishment and implementation of criteria for initiating investigations of radiological protection program deficiencies. The inspectors verified that criteria, for performing investigations of program deficiencies, were incorporated into written procedures and they also reviewed selected Radiological Event Reports. The IFI is discussed in Paragraph 2.

(Closed) IFI 50-335/89-19-01: This item concerned the licensee's procedure for estimating radioactivity of material from direct radiation measurements made with survey instrumentation. The inspector verified that the licensee had provided guidance in written procedures for

selecting appropriate equations when estimating radioactivity from direct radiation surveys. The licensee also revised procedure forms to improve documentation of the calculated results.

10. Exit Interview

The inspection scope and findings were summarized on March 2, 1990, with those persons indicated in Paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings and a violation (50-335/90-07-01) listed below.

At the exit meeting, the inspectors notified licensee management that their procedures for access controls and monitoring requirements for HRAs was a program weakness. The licensee acknowledged deficiencies with their written procedures for controlling assess to HRAs. The licensee committed to reviewing and revising licensee procedures to better define high radiation area control policies and requirements. Upon further review of the activities identified during the inspection the inspectors determined that a lack of procedural guidance in written instructions was a violation of TS 6.11. During a telephone conversation on March 15, 1990, between J. Potter and R. B. Shortridge of the NRC and H. Buchanan of Florida Power and Light, the licensee was informed that failure to have adequate written procedures for controlling activities in HRAs was a violation (50-335/90-07-02) of TS 6.11. Dissenting comments were not received from the licensee. The inspectors reported that the licensee's policies and procedures for qualifying vendor HP personnel was a program strength. The inspector also reported that the licensee's collective dose goals for meeting three year industry averages was aggressive and appeared to have management's support.

The inspectors noted that staff participating in addressing ALARA initiatives and goals appeared to be increasing. Proprietary information is not contained in this report.

Item Number	Description and Reference
50-335/90-07-01	Violation - Failure to maintain positive access control to a HRA (Paragraph 5).
50-335/90-07-02	Violation - Failure to maintain adequate written procedures for activities in HRAs (Paragraph 5).

Licensee management was informed that two IFIs discussed in Paragraph 9 were closed during this inspection.