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

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Report No. 50-302/92-04

Licensee: Florida Power Corporation
3201 34th Street, South
St. Petersburg, FL 33733

Docket No. 50-302 License No. DPR-72

Facility Name : Crystal River 3

Inspection Conducted: January 27-31, 1992

Inspector: _____ 2/25/92
D. A. Seymour Date Signed

Approved by: _____ 2/25/92
T. R. Decker, Chief Date Signed
Radiological Effluents and Chemistry Section
Radiological Protection and Emergency Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of program organization, the disposal of potentially contaminated waste oil, the Post Accident Sampling System, maintenance of records on contaminated soil, effluent monitors, audits of program implementation, and secondary water chemistry.

Results:

The licensee had not made any changes to their organization which would adversely affect the ability to control radiation exposures or radioactive material (Paragraph 2).

The licensee was involved in the process of developing an integrated Radioactive Material Control Program that would improve the existing controls for the movement of materials into and out of the Radiation Controlled Areas and storage areas; and control the release of materials from the RCA to offsite vendors and laboratories. The inspector considered the licensee's actions a licensee strength (Paragraph 3).

The licensee was working to enhance their capabilities to perform onsite radiological analyses to provide quantification of noble gases, iodines, and non-volatile radionuclides in the reactor coolant system and containment atmosphere under post-accident conditions (Paragraph 4).

The licensee was maintaining records important to the safe and effective decommissioning of the facility, relative to records of spills or other unusual occurrences involving the spread of contamination, in and around the facility, equipment, or site (Paragraph 5).

The licensee's radioactive effluent monitoring instrumentation channels were operable; and the setpoint methodology presented in the ODCM was structured to prevent releases of effluents which would exceed the limits of 10 CFR 20 (Paragraph 6).

The licensee corrective actions relative to audit findings were timely and technically acceptable (Paragraph 7).

The licensee was taking corrective actions as necessary to mitigate the effects of saltwater ingress into their condensers (Paragraph 8).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. Alberdi,Manager, Nuclear Plant Operations
*J. Buckner, Nuclear Regulatory Specialist
*S. Chernenko, Senior Quality Auditor
*P. Ezzell, Radiochemistry and Environmental Specialist
*B. Hickle, Director, Quality Programs
*S. Johnson, Manager, Quality Audits
*J. Lane, System Engineer
*R. Pinner, Supervisor, Nuclear Chemistry
*S. Robinson, Superintendent, Nuclear Chemistry and Radiation Protection
*W. Rossfield, Manager, Site Nuclear Services
*R. Widell, Director, Nuclear Operations Site Support
*K. Wilson, Manager, Nuclear Licensing
*R. Yost, supervisor, Quality Audits

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

Nuclear Regulatory Commission

*P. Holmes-Ray, Senior Resident Inspector

*Attended Exit Interview

Acronyms and Initialisms used throughout this report are listed in the last paragraph.

2. Organization (84750)

Technical Specification (TS) 6.2.1 describes the licensee's organization.

The inspector reviewed the licensee's organization, staffing levels and lines of authority as they related to radiation protection and radioactive material control to verify that the licensee had not made organizational changes which would adversely affect the ability to control radiation exposures or radioactive material.

The inspector determined that there had not been any significant changes in the Nuclear Chemistry, Nuclear Waste, or Nuclear Protection Organizations in 1991. There had been some personnel shifts due to promotions, etc., but none that should impact the program adversely. The position of Manager, Nuclear Chemistry was vacant, with the licensee actively recruiting to fill this slot. A Nuclear Chemistry

Supervisor was assigned as a temporary manager in the interim.

There were some changes in the Site Nuclear Services Department. The position of Manager, Site Nuclear Services was filled. Radiological Emergency Planning no longer reported to Site Nuclear Services; but reported directly to the Director of Nuclear Operations Site Support. The ALARA Group was restructured to provide additional emphasis in this area. The purpose of these changes were to strengthen the ALARA Program and achieve source term and outage dose reduction.

Based on this review, the inspector determined that the licensee had not made any changes to the organization which would adversely affect the ability to control radiation exposures or radioactive material.

No violations or deviations were identified.

3. Contaminated Waste Oil (86750, 84750)

10 CFR 20.301 specifies, in part, that no licensee shall dispose of licensed material except: (a) by transfer to an authorized recipient as provided in the regulations; (b) as authorized pursuant to 20.302 or Part 61 of this chapter; or (c) as provided in 20.303, 20.306 or 20.106. These requirements protect the health and safety of the public by reducing the risk, and associated radiation dose, of inadvertent exposure of the public to radioactive materials.

Pursuant to these requirements, the inspector reviewed the licensee's methods for disposal of potentially contaminated waste oil. This is oil that is removed from the radiological controlled areas of the facility. The level that has been accepted by the NRC for the uncontrolled release of material is a non-detectable analysis at environmental level lower limits of detection (LLD).

During the inspection, the inspector determined, through discussions with the licensee, that the licensee had been analyzing waste oil at effluent level LLDs (higher than the environmental LLDs), and had released the oil to the offsite vendor when activity was not detected. However, in the Spring of 1991, the licensee became aware; through counterpart meetings with other licensees, discussions with NRC personnel, NRC inspection reports for other utilities, and NRC Information Notices; that this practice was not in agreement with NRC policy. At this point the licensee stopped this practice and began storing potentially contaminated oil onsite until this area had been reviewed and a course of action had been determined.

During this inspection, the inspector reviewed the licensee's actions in this area. The licensee performed a review which covered other waste streams as well as potentially contaminated waste oil. The licensee had developed a logic diagram which illustrated and clarified "decision" blocks in the process of determining the proper methods for the disposal or free release of materials.

The inspector determined that the licensee was involved in the process of developing an integrated Radioactive Material Control Program that would improve the existing controls for the movement of materials into and out of the RCA and storage areas; and control the release of materials from the RCA to offsite vendors and laboratories. The inspector also determined that the licensee had analyzed several plant specific situations relative to this topic, and had developed specific guidance for these situations.

The inspector also determined that the licensee had a gamma spectrometer, located at the Emergency Offsite Facility, which had the capability of counting at environmental LLDs. The licensee was in the process of determining the logistics of sending samples to this site for analysis to determine if the samples met the criteria for uncontrolled (free) release.

The inspector considered the licensee's response to this issue a licensee strength. The licensee took the initiative and researched this area in an effort to increase their understanding of this issue, and was developing a comprehensive program for the control and correct disposition of potentially contaminated material.

No violations or deviations were identified.

4. Post Accident Sampling System (PASS), (84750)

NUREG-0737, Criterion 2a provides specifications for the establishment of onsite radiological analysis capabilities to provide quantification of noble gases, iodines, and non-volatile radionuclides in the reactor coolant system (RCS) and containment atmosphere. TS 6.17.1 requires that procedures be established, implemented and maintained to obtain and analyze, under accident conditions, reactor coolant and containment atmosphere samples; and radioactive iodines and particulates in plant gaseous effluents. The PASS should provide these capabilities, and should enable the licensee to obtain information critical to the efforts to assess and control the course and effects of an accident.

Pursuant to these specifications, the inspectors reviewed portions of selected procedures for the operation, maintenance, and testing of the PASS, and discussed system operation, performance testing, and analytical capabilities of the PASS with the licensee.

The inspector reviewed the status of the unresolved item URI-91-15-01. This unresolved item dealt with a flow meter for the mid and high range accident radiation monitor on the Reactor Building vent which was not receiving an annual calibration. During this inspection, the inspector determined that this flow meter was "response" checked every two years. Although the flow used for this check was not quantified, a specific procedure was used, and the check was set up the same way each time (i.e., design flow through the instrument). The inspector determine that the auxiliary building also had this type of flowmeter, and that this flowmeter was handled in the same fashion.

The inspector reviewed the results of the response checks for the two flow meters. The reactor building flow meter flow-indications ranged from 0.313 to 0.390 cubic feet per minute (cfm); while the auxiliary building flow meter flow-indications ranged from 0.317 to 0.378 cfm. These results were within the acceptance criteria for the test and appeared to be within 20 percent of the design flow of the instrument (0.378 cfm).

The licensee provided the inspector documentation from the instrument manufacturer which indicated that: the flow meters were calibrated at the manufacturers prior to installation at Crystal River; any recalibration of the flow meters components would have to be performed by the manufacturer; and, unless the flowmeters were damaged by some "unusual circumstance," they should not need recalibration. The licensee indicated that they recognized the need to perform a calibration-check of the flow meters responses on a annual basis to verify the accuracy of the flow measurements. They planned on developing and implementing a procedure for this by the end of March, 1992. This calibration-check would include the use of a known flow through the instruments. The licensee also verbally indicated that they had the ability to perform onsite analysis of the charcoal cartridge and particulate filter, as required by NUREG-0737 criteria.

The inspector will review the licensee's calibration-check procedure, the results of the calibration-check, and the licensee's ability to perform onsite analyses of accident level samples, during a subsequent inspection. URI 91-15-01 will remain open until this information is reviewed.

The inspector also reviewed the training the Chemistry Technicians received on the PASS. The inspector determined that the technicians received an annual requalification on the PASS, which included approximately two days of classroom instruction and testing, and additional time with "hands-on" operation of the system. The instructor would present the technicians with accident scenarios during the hands-on portion of the training. During this portion of the training the students would operate the system if it was available, otherwise their actions would be simulated.

In addition to this training, the technicians performed monthly functional tests of the different sample paths of the PASS. These tests included comparing sample results against NUREG-0737 PASS acceptance criteria. Weekly quality control checks were also performed on the gamma spectrophotometer for activity and resolution. In addition, the boron analyzer received a daily quality control check with a 1000 parts per million boron standard. The licensee indicated that they were planning on structuring the monthly, weekly, and daily checks to ensure that the maximum number of technicians received the opportunity to participate. The inspector also determined that the licensee also sent representatives to an annual Pass Ownership Meeting.

Based on this review, the inspector determined that the training the technicians received on the PASS met the licensee's commitment to the NRC for NUREG-0737 required training.

The inspector reviewed the results of the monthly functional tests of the PASS. The licensee's system for analyzing reactor coolant was designed with an in-line gamma spectrometer, which provided the licensee with "live time" isotopic analysis. This instrument was chosen to analyze the potentially high activities that would result in an accident involving fuel failure. As a result, the instrument had a low (relative to effluent levels) efficiency for counting gammas, but would not become saturated and have a high dead-time. In other words, the instrument had higher LLDs than would a standard effluent- level gamma spectrometer.

As a result of this design, the monthly functional tests comparing the activities of routinely sampled and analyzed reactor coolant to the PASS sample results typically resulted in measured activities for the routine sample and LLD levels for of the PASS sample.

The inspector reviewed the data sheets which summarized the results of these monthly analyses for the time period of January 1991 to December 1991. The inspector noted that the

licensee met the acceptance criteria for boron, pH, hydrogen, chlorides and selected isotopics (iodines, etc.) in reactor coolant during the months of May, June, July and August, 1991. The Reactor Building and Auxiliary Building atmospheres were also designed to be analyzed by a in-line gamma spectrometer. The monthly functional tests were limited to analysis of the Auxiliary Building atmosphere because of valve line up constraints during normal plant operation. The activity of this sample was typically too low to be quantified. Auxiliary Building atmosphere was analyzed during the months of January, March, May and October, 1991.

The PASS continued to have maintenance problems during the time frame reviewed. The licensee indicated that they were evaluating the pros and cons of maintaining, trouble-shooting, and upgrading their current system; versus replacing it with a manual system.

Based on this selective review, the inspector concluded that the licensee was working to enhance its capabilities to perform onsite radiological analyses to provide quantification of noble gases, iodines, and non-volatile radionuclides in the RCS and containment atmosphere.

No violations or deviations were identified.

5. Contaminated Soil (84750, 86750)

10 CFR 50.75 (g) (1) requires licensees to keep records of information important to the safe and effective decommissioning of the facility in an identified location until the license is terminated by the Commission, including records of spills of other unusual occurrences involving the spread of contamination,in and around the facility, equipment, or site.

Pursuant to these requirements, the inspector interviewed the licensee to determine whether there was any contaminated soil on the site. Based on these interviews, and based on a document review, the inspector determined that a small amount of contamination had been identified in June of 1991 in the Radiation Controlled Area (RCA), outside of a building. The amount of activity present was not high enough to be detected with the type of instrument typically used by the industry for standard area surveys or smear techniques (approximate sensitivity of a standard survey instrument is 1 E-04 microcuries per gram (μCi/g)).

The isotopes identified during these analyses were cesium-134 and 137, and cobalt-60 at levels ranging from 8.4 E-07 to 5.5 E-05 μCi/g. This contamination was discovered when the licensee collected small samples of "silt-like" material

that had collected in depressions on the asphalt-covered berm; and performed gamma spectrophometric analysis on these samples. Samples collected in a similar manner outside the RCA in adjoining areas outside the building did not indicate the presence of contamination originating from the licensee's activities.

The licensee concluded that the source of the contamination was probably due to the practice of storing storage containers with fixed contamination outside (the building) in the RCA. Over time, minute amounts of "fixed" contamination was displaced from the shipping containers due to changes in temperature, humidity, and rain. The low level activity was attributed to long term build up that was concentrated at low points on the berm. The licensee discontinued the practice of storing shipping containers with fixed contamination outside, and switched to metal boxes (as opposed to wood). The licensee also vacuumed the berm to remove any contamination, sealed cracks in the asphalt, and resealed the asphalt surface.

The licensee performed a follow-up soil analysis of the areas in November 1991. The same levels of activity for the same radionuclides were detected. The licensee concluded that this was probably remnants of previous berm spills and low level contamination washed off from storage containers. The licensee planned on cleaning up the berm after every major outage. This would include vacuuming of the dirt and debris.

The licensee also sampled and analyzed areas of the berm outside of the RCA and identified the presence of cesium-137 in one of these samples. The licensee attributed this activity to fallout based on the absence of cobalt-60, a common activation product for nuclear reactors. Cobalt-60 was present in those samples taken in the RCA which indicated cesium-137.

The licensee concluded that the low levels of activity present in the RCA did not present a radiation dose hazard, did not contribute significantly to background levels, and did not constitute a radioactive contamination problem based on the licensee's standard of less than 300 disintegrations per minute per 100 square centimeters for a clean area inside the RCA.

The inspector determined, based on this selective review, that the licensee was maintaining records of information important to the safe and effective decommissioning of the facility.

No violations or deviations were identified.

6. Radioactive Effluent Monitoring Instrumentation (84750)

TS 3.3.3.8 requires that radioactive liquid effluent monitoring instrumentation channels shall be operable with their alarm/trip setpoints set to ensure that the concentrations of radioactive material released to unrestricted areas shall be less than or equal to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. The setpoints shall be determined in accordance with the Offsite Dose Calculation Manual (ODCM).

TS 3.3.3.9 requires that radioactive gaseous effluent monitoring instrumentation channels shall be operable with the effluent release isolation alarm/trip setpoints set to ensure that the dose rate at or beyond the site boundary, due to radioactive materials released in gaseous effluents shall be limited as follows:

a. Noble gases: less than or equal to 500 millirem (mrem) per year total body and less than or equal to 3000 mrem per year to the skin.

b. Iodine-131, tritium, and radioactive particulates with half-lives of greater than eight days: less than or equal to 1500 mrem per year to any organ.

The setpoints shall be determined in accordance with the ODCM.

The radioactive liquid and gaseous instrumentation is provided to monitor and control the releases of radioactive materials in effluents during actual or potential releases. The setpoints should be set to ensure the alarm/trip will occur prior to exceeding the limits of 10 CFR 20.

Pursuant to these requirements, the inspector reviewed the methodology in the ODCM, and selected related documentation, relative to the determination of the setpoints for the liquid and gaseous effluent monitors.

The inspector also inspected monitor displays in the Control Room, to verify that there was a visible response of the meters to a source check of the detectors associated with the instrumentation.

The inspector also discussed system operation and monitor operability with the licensee. The licensee indicated that effluent monitors were operable a high percent of the time. For the first six months of 1991, the licensee reported that there were no monitors inoperable for 30 days or greater.

Based on this selective review, the inspector determined that radioactive effluent monitoring instrumentation channels were operable, and the setpoint methodology presented in the ODCM was structured to prevent releases of effluents which would exceed the limits of 10 CFR 20.

No violations or deviations were identified.

7. Audits (84750)

TS 6.5.2.9 requires audits of facility activities to be performed including:

a. The Radiological Environmental Monitoring program and the results thereof at least once per 12 months.

b. The ODCM and implementing procedures at least once per 24 months.

c. The Process Control Program and implementing procedures for solidification of radioactive wastes at least once per 12 months.

d. The performance of activities required by the Quality Assurance Program for effluent and environmental monitoring at least once per 12 months.

The purpose of the audits was to help ensure that the licensee effectively implemented the programs which controlled these various areas. These programs ensured that the licensee effectively controlled, quantified, and monitored releases of radioactive materials; and that the Environmental Monitoring Program was effectively implemented.

Pursuant to these requirements, the inspector reviewed Audit Reports for 1990 and 1991, titled "Chemistry, Rad Protection & Environmental Waste," and "Chemistry, Rad Protection and ALARA," respectively.

The audit performed in 1990 assessed the administration, control and implementation of the Nuclear Chemistry (including the ODCM), Radiation Protection, Rad Waste, and Environmental Monitoring programs; and assessed the effectiveness of the interfaces among the organizations having responsibilities for these programs. The audit performed in 1991 covered the same areas, but also included the ALARA Program. The audit activities included personnel interviews, record reviews, plant walkdowns, and performance monitoring.

Their were four audit findings and seven concerns identified during the 1990 audit; and two audit findings and three concerns identified during the 1991 audit. The inspector reviewed the Problem Reports associated with the audit findings, and the observations and recommendations associated with the concerns, in the areas pertinent to this inspection and determined that the licensee corrective actions were timely and technically acceptable.

The inspector determined that the licensee's corrective actions for identified deficiencies was adequate.

No violations or deviations were identified.

8. Secondary Chemistry (84750)

Water chemistry can have a major impact on component performance, availability, and expected life. Steam generator material integrity is closely aligned with the control and minimization of several different secondary water chemistry parameters, including sodium.

The facility had two condensers with two waterboxes per condenser. The removal of waterboxes from service causes the licensee to reduce or shutdown reactor power. During this inspection, the inspector determined that the licensee was experiencing continued problems with condenser waterbox tube leaks. The tubes were made from a copper-nickel alloy, which, while efficient for heat transfer, is susceptible to corrosion. The licensee was measuring 65 parts per billion (ppb) sodium in the "B" water box, and up to 120 ppb sodium in the "D" water box. The licensee also experienced leaks in the "C" waterbox. Typical values for sodium are 1 to 2 ppb.

The licensee introduced sawdust into the condenser cooling water to temporarily plug these leaks. The principle involved was that the condenser vacuum would hold the piece of sawdust against the leak, plugging it. The licensee also reduced power by 25 percent and took leaking waterboxes off line for repair. The inspector observed the licensee attempt to identify the location of the tube leaks in the "B" waterbox by using a technique involving a film of soap bubbles over the tube openings on the tube sheets. A tube leak will cause the film to be sucked into the tube. Helium or freon also can be used to identify tube leaks. The licensee located and plugged several tubes using these techniques during the course of this inspection.

The licensee planned on retubing the worse waterbox with titanium tubes during the upcoming April, 1992 outage. The other waterboxes will be retubed during subsequent outages.

There are 10,418 tubes per waterbox. The licensee had performed 100 percent eddy current testing during previous outages, and plugged any tube with greater than 80 percent through-wall leakage.

The inspector also reviewed portions of the procedure which provided the licensee guidance on action levels and described actions to be followed with respect to salt water leaks into a waterbox. The inspector determined that the procedure was adequate for its intended purpose.

Based on this review, the inspector determined that the licensee was taking corrective actions as necessary to mitigate the effects of saltwater ingress into their condensers.

No violations or deviations were identified.

9. The inspection scope and results were summarized on January 31, 1992 with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results as listed in the summary. No violations or deviations were identified. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

10. Acronyms and Initialisms

ALARA	As Low As Reasonably Achievable
cfm	cubic feet per minute
LLD	Lower Limit of Detection
mrem	millirem
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PASS	Post Accident Sampling System
ppb	parts per billion
RCS	Reactor Coolant System
TS	Technical Specifications
μCi	microcurie