



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

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Report No.: 50-302/90-02

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 16-19, 1990

Inspector:

[Signature]
 W. B. Groersen

2/7/90
 Date Signed

Accompanying Personnel: J. P. Potter

Approved by:

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

2/7/90
 Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of occupational radioactive safety; transportation of radioactive materials; followup on previous inspector identified items; and followup on Information Notices.

Results:

Based upon results of interviews with licensee management, supervision, health physics technicians; review of records, inspector observations; and health physics personnel knowledge of functions and responsibilities regarding department operations. The inspector found the radiation protection, solid waste, and transportation of radioactive materials program to be adequately managed and controlled. It appeared that adequate management involvement was provided to support the Radiation Protection Program. Two non-cited violations were identified in the areas of waste shipment manifest documentation and documentation of engineering elevation for DOT Specification 7A Type A packages.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *G. Clymer, Nuclear Waste Manager
- B. Colt, ALARA Specialist
- *S. Garry, Corporate Health Physicist
- *J. Gilbert, Nuclear Waste Supervisor
- *B. Hickle, Manager, Nuclear Plant Operations
- *S. Johnson, Manager, Site Nuclear Services
- *A. Kazemfar, Supervisor, Radiological Support Services
- S. Lashbrook, Instrument Supervisor
- *T. Mosley, Nuclear Waste Supervisor
- *J. Roberts, Assistant Nuclear Chemistry and Radiation Protection Superintendent
- *S. Robinson, Nuclear Chemistry and Radiation Protection Superintendent
- *W. Rossfeld, Manager, Nuclear Compliance
- *D. Wilder, Radiation Protection Manager
- *M. Williams, Nuclear Regulatory Specialist

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

NRC Resident Inspectors

- *W. Bradford, RI
- *P. Holmes-Ray, SRI

*Attended exit interview

2. Audits and Appraisals (83750)

Technical Specification (TS) 6.5.2.9 requires that audits of facility activities be performed under the cognizance of the Nuclear General Review Committee (NGRC), including the following: (1) the conformance of facility operation to provisions contained within the TSs and applicable license conditions at least once per 12 months; (2) the Offsite Dose Calculation Manual (ODCM) and implementing procedures at least once per 24 months; and (3) the process control program and implementing procedures for solidification of radioactive wastes at least once per 24 months.

The inspector reviewed Audit Report 89-08-CREW (Chemistry, Radiation Protection, and Environmental Waste) conducted during the period of August 14-September 1, 1989. The audit included a review of radwaste shipments and documentation, the Process Control Program, the ALARA and Radiation Protection programs, and followup of activities associated with previously-identified audit findings and concerns. The audit findings had

no major safety problems; however, the findings as well as the required corrective actions were being tracked by the responsible party.

The inspector also reviewed radiation controlled area (RCA) walk-through inspections conducted periodically in 1989 by the Corporate Health Physicist. The walk-through inspections were documented in memo format to the Radiological Support Services Supervisor, with copies sent to appropriate managers in the Radiation Protection Organization. In general, the walk-throughs identified items of substance related to the Radiation Protection Program, however, it did not appear that formal mechanisms were in place to effect corrective actions for deficiencies noted.

No violations or deviations were identified.

3. Changes (83750)

The inspector reviewed the licensee's Radiation Protection Program to determine if any major changes occurred since the last inspection in organization, personnel, facilities, equipment, programs and procedures. It was observed that no significant changes occurred in the licensee's Radiation Protection Organization. It appeared that the licensee was adequately staffed to manage the normal operations for the one unit site. The licensee's Radiation Protection Organization consisted of 23 health physics technicians (HPTs) (six vacancies), two assistant HPTs, four chief HPTs (one vacancy), four health physics (HP) supervisors, and the Radiation Protection Manager (RPM). The RPM reported to the Nuclear Chemistry and Radiation Protection Superintendent who, in turn, reported directly to Nuclear Plant Operations Manager. In preparation for the upcoming refueling outage, the licensee plans to supplement its radiation protection staff with approximately 106 contract HPTs. Normally, the licensee will employ approximately 75 contract HPTs to supplement the staff. However, the licensee anticipates that extra HP coverage will be needed during this outage to cover the installation of the steam generator (SG) nozzle dams and reactor coolant pump shaft inspections.

The licensee was in the process of making extensive modifications to the RCA access control point. The modifications were necessary for better control of individual ingress to and egress from the RCA. In addition, the licensee was in the process of installing a computerized radiation work permit (RWP) tracking system for improved control and monitoring of individual and task dose. The licensee had also purchased four additional Eberline PCM-1Bs for placement at the main exit of the RCA. The equipment purchase for improved and more efficient techniques to monitor and control personnel contamination was considered a program improvement.

No violations or deviations were identified.

4. Planning and Preparation (83750)

The inspector discussed with licensee representatives outage planning and management support for radiation protection planning. As mentioned in Paragraph 3 of this inspection report, management supported the Radiation Protection Organization by authorizing the increase of its HP staff by 93 Senior HPTs and 13 lead HPTs. Included in the discussion was the total collective dose budget for the refueling outage, the most significant dose-intensive jobs planned for the outage and HP pre-planning. The licensee had budgeted 322 man-rem for refuel outage number 7. The following were the most dose-intensive jobs planned by the licensee:

◦ Steam generator eddy current testing	-	16.0 man-rem
◦ Steam generator nozzle dam installation/removal	-	25.0 man-rem
◦ Control rod drive mechanism: remove/clean inspect/replace	-	20.0 man-rem
◦ Reactor coolant pump 1D refurbishment	-	35.0 man-rem
◦ Scaffolding assemble/disassemble	-	18.0 man-rem

The HP department was budgeted 32.0 man-rem for job coverage and surveillance. The inspector reviewed a HP outage planning document for refuel number 7 (no title, no date). The plan consisted of a detailed outline of HP activities for: (1) refueling; (2) preventative and component maintenance; (3) in-service inspections; (4) special maintenance (boron corrosion inspections); (5) radwaste; and (6) surveillances. The plan also provided useful information on pre-outage preparations, surveys and postings, equipment history, HP coverage strategies, time allocation, responsibilities, work instructions, and radiological considerations. It was apparent after reviewing this document, that the licensee incorporated experience from and lessons learned during previous outages to aid in improving performance.

No violations or deviations were identified.

5. Radiation Source and Field Control (83750)

The inspector discussed with licensee representatives methods of reducing out-of-core radiation sources and fields to reduce occupational radiation exposure at Crystal River 3. The licensee was considering the use of hydrogen peroxide to chemically decontaminate the primary system especially since chemical decontamination is one of the most cost-effective ways to reduce doses to occupational workers (NUREG/CR-5158, "Worldwide Activities on the Reduction of Occupational Exposure at Nuclear Power Plants," June 1988). At the time of this inspection, the licensee was still in the advanced planning stage and was in the process of procedural development. The licensee's experience in using this chemical decontamination process will be reviewed during a subsequent inspection. The licensee had also planned to install SG nozzle dam rings (two per SG), during refuel number 7 to facilitate the installation and subsequent removal of SG nozzle dams during future

refueling outages. The dose reduction initiatives discussed above were considered as ALARA program improvements.

No violations or deviations were identified.

6. Shipping of Low-Level Wastes for Disposal and Transportation (83750)

10 CFR 71.5 requires that licensees who transport licensed material outside the confines of its plant or other place of use, or who deliver licensed material to a carrier for transport, shall comply with the applicable requirements of the regulation appropriate to the mode of transport of the Department of Transportation (DOT) in 49 CFR Parts 170 through 189.

10 CFR 20.311(b) requires that each shipment of radioactive waste to a licensed land disposal facility be accompanied by a shipment manifest and also specifies the required entries on the manifest.

10 CFR 20.311(d) requires, in part, that any generating licensee who transfers waste to a licensed waste processor who treats or repackages waste shall comply with the requirements of 10 CFR 20.311(b) and (c).

The inspector reviewed selected records of radioactive waste and materials shipments made during 1989 and January 1990. The shipping manifests examined, for shipments made directly to a licensed land disposal facility (Barnwell), were prepared consistent with 49 CFR requirements. The radiation and contamination survey results were within the limits specified for the mode of transport and shipment classification and the shipping documents were being completed and maintained as required. In 1989, the licensee had begun making shipments directly to a licensed waste processor (Scientific Ecology Group) (SEG) for processing and supercompaction of non-compacted waste. The inspector observed that in at least three circumstances, the shipment manifests were not completed in accordance with the requirements of 10 CFR 20.311 (b). Specifically, the licensee failed to identify clearly on the shipment manifest the waste classification. The problem was the licensee considered the shipments to the licensed waste processor as radioactive materials shipments and therefore considered the shipment manifest requirements of 20.311(b) not applicable. 10 CFR 20.311(a) states that the purpose of the requirements of Paragraph 20.311 was to control transfers of radioactive waste intended for disposal at a land disposal facility and establish a manifest tracking system and supplement existing requirements concerning transfers and recordkeeping for such wastes. The material shipped to SEG had no commercial value and was intended for disposal at Barnwell. The inspector informed licensee representatives that failure to include the waste classification on the shipment manifest was a violation of 10 CFR 20.311(b); however, this NRC identified violation is not being cited because the criteria specified in Section V.A. of the NRC Enforcement Policy were satisfied (Non-cited Violation) (NCV: 50-302/90-02-01). The licensee initiated appropriate corrective action before the end of this inspection by submitting Waste Procedure WP-101,

"Package, Storage, and Shipping of Radioactive Material" for revision. The revision was to include a requirement that all shipments of materials to a waste processor will include a shipment manifest. The licensee committed to have this procedure revised and approved as soon as practicable following this inspection.

The inspector also reviewed the shipping papers and documents associated with a DOT Specification 7A Type A shipment (Shipment No. 90-3, January 17, 1990). The licensee was shipping a thermoluminescent dosimeter (TLD) calibrator containing 0.5 millicuries of Sr-90 back to the manufacturer. During the records review, the inspector observed that the licensee failed to maintain on file documentation of testing, engineering evaluations, or comparative data showing that the container marked as DOT Specification 7A Type A met the requirements of that package (49 CFR 178.350). This failure was identified as a violation of 49 CFR 173.415(a). 49 CFR 173.415(a) requires that each shipper of a DOT Specification 7A package must maintain on file for at least one year after the latest shipment a complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that specification. This NRC identified violation is not being cited because the criteria specified in Section V.A. of the NRC Enforcement Policy were satisfied (NCV: 50-302/90-02-02). The licensee initiated appropriate corrective action before the termination of this inspection by contacting the package manufacturer (Container Products Corporation) and requesting a full report of the results of the engineering analysis and comparative analysis. At the exit meeting, the licensee committed to obtain this report from the package manufacturer as soon as practicable following this inspection. To prevent recurrence, the licensee initiated a procedure revision to WP-102, "Radioactive Shipment Certificates of Compliance," Revision 14, March 29, 1987, to include a requirement to have all the necessary Certificate of Compliance paperwork in place before package acceptance or shipment. 49 CFR 173.421 excepts up to 0.4 mCi of Sr-90 in normal or special form from specification packaging. The inspector had no further concerns.

Two NCVs were identified.

7. Radiological Incident Reporting (83750)

The inspector reviewed a sample of 1989 radiological occurrence reports to determine if programmatic problems exist and if licensee-identified deficiencies were properly addressed. Most of the reports reviewed dealt with personnel contamination due to gas leaks in the Auxiliary Building from pre/post filter change outs. The inspector noted that one personnel contamination event (PCE) involved a HPT who left the site with identified, isolated, and contained spots of contamination on his hands and left forearm and subsequently returned to the site with additional contamination identified on the individual's upper chest and lower back. On July 1, 1989, a HPT who had been involved with changing a prefilter on a makeup pump became contaminated on his left forearm and eventually his

fingers. The area of contamination on the individual's left forearm was approximately 3 cm². Radioactive material removed from the area of contamination was analyzed and a distribution of nuclides similar to that found in the licensee's reactor coolant system was identified. Initially, it was believed that the HPT may have had an uptake of radioactive gas during the prefilter change since there had been several gas leaks in various areas of the Auxiliary Building. Whole body count results were inconclusive. After the whole body count, several attempts to decontaminate the individual were made. It was later decided by the site physician that the individual's skin was too irritated for further decontamination. The contaminated area of the forearm was wrapped in plastic and gloves were placed on the hands to induce sweating. After a whole body frisk by both an RM-14 probe and a PCM-1B whole body frisker was performed, the individual was released from the site. Survey results indicated approximately 2,000 cpm on the forearm and 500 cpm on the fingers. On July 3, 1989, whole body frisks were performed and additional contaminated areas were identified on the individual's upper chest and back. Leeching from the HPT's forearm was suspected as the source of the additional contamination. The Site RPM directed HPTs to perform contamination surveys of the individual's home and car. The following three items in the individual's home were identified as containing radioactive material: (1) pocket-ion chamber (300 cpm); (2) Saran Wrap from the contaminated arm (100 cpm); and (3) one pair of underwear (2,000 cpm). An Operations Report (89-0164) was written on July 4, 1989, to document the discovery of radioactive material in an uncontrolled area. The licensee performed skin dose calculations using VARSKIN and made the following assumptions: (1) contamination was from handling the Teletector which came into contact with the prefilter; and (2) irradiation time of 9.5 hours. The licensee calculated a skin dose of 0.387 rem. The inspector had no further concerns regarding this issue.

No violations or deviations were identified.

8. Facility Statistics (83750)

The inspector reviewed the facility's goals and results with regard to the total annual collective dose, contaminated floor space, and personnel contamination for 1989. The 1989 station collective dose was 217 person-rem. Approximately 157 person-rem was accumulated during the reactor coolant pump 1A outage during the period March-May 1989. The licensee was well within its 1989 goal of 250 person-rem. Since 1987, the station's three year ending average collective dose has been decreasing. The three year ending averages for the period 1987-1989 were: 587 person-rem, 356 person-rem, and 271 person-rem, respectively. The inspector also observed that number of PCEs for 1989 (78 PCEs) increased from the previous year (47 PCEs). This increase was not unusual, since the licensee experienced more outage days in 1989 and, obviously, the probability of PCE increases during outage periods. The inspector observed no apparent trends in the number of PCE reports generated since 1986. The inspector also reviewed the licensee's contaminated floor space control and reduction program. Since 1985, the licensee has significantly

reduced the contaminated floor space (excluding the Reactor Building). From 1985-1989, the year ending contaminated floor space was: 20,750 ft²; 13,500 ft²; 8,900 ft²; 7,800 ft²; and 7,400 ft², respectively. The licensee maintains a total area of approximately 90,000 ft².

No violations or deviations were identified.

9. Information Notices (92701)

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

IN 89-47: Potential problems with worn or distorted hose clamps on self-contained breathing apparatus.

10. Action on Previously Identified Inspector Followup Items (IFIs) (92701)

- a. (Closed) IFI 50-302/88-33-02: Resources in the ALARA Organization were not adequate to have an effective dose reduction program. The inspector reviewed the response to this IFI which was identified in a special NRC ALARA assessment in a letter to the NRC dated February 10, 1989. In response to this item, the licensee performed an ALARA self-assessment which was conducted during the Fall of 1989, and documented in a memo dated December 6, 1989. The self-assessment did not recommend a permanent increase in staffing to supplement ALARA resources, but did recommend that the ALARA related work planning load be spread to line personnel, work planners, HP planners, job sponsors, first-line supervisors, HP Supervisors, and HPTs. It also recommended that ALARA implementation for field operations be the responsibility of the first-line supervisor, craft personnel, and HP Supervisors; and that ALARA program management should remain the responsibility of the ALARA Specialist and the ALARA Committee. Each of the recommendations identified an individual responsible for implementation. Although this item is considered closed, final implementation of this recommendation will be reviewed during subsequent inspections.
- b. (Closed) IFI 50-302/88-33-03: The RWP program lacks a formal hold program to review the status of jobs approaching or exceeding exposure estimates. In a letter from FPC to NRC dated February 10, 1989, part of the licensee's response to this ALARA finding was to assess how the RWP hold program could be formalized through procedures and policies. The inspector reviewed Administrative Instruction, AI-1600, ALARA Program Manual, Revision 7, dated January 26, 1990, and noted that ALARA hold points were described in Section 4.7. The procedure authorized either the ALARA Specialist or the HP Supervisor to halt any job evolution for the following two cases: (1) the recorded job dose exceeds 110 percent of the estimated dose budget for the evolution; and (2) changing conditions

or scope of work will prevent successful achievement of the established dose budget. Additionally, a memo from the Director, Nuclear Plant Operations to Job Sponsors and First-Line Supervisors dated March 23, 1989, detailed the HP staff and ALARA Specialist's responsibility to initiate ALARA "holds" if during the job the actual doses are approaching or exceeding the dose estimate. This item is considered closed.

- c. (Closed) IFI 50-302/88-33-04: It is not evident that FPC has an effective audit program that identifies ALARA problems. In response to this item, the Corporate Health Physicist of the licensee's Site Nuclear Services Department conducted an ALARA program self-assessment during the Fall of 1989, and documented the final recommendation for the ALARA assessment in a memo dated December 8, 1989. Thirteen areas were reviewed and an action responsibility list identifying personnel to take the lead in implementing each recommendation was noted. Some of the areas assessed included: ALARA Policy and management; data management; job reviews; design reviews, dose tracking; rework tracking; and ALARA training for engineers. In general, the audit was detailed enough to provide a thorough assessment of the ALARA program. This item is considered closed.
- d. (Closed) IFI 50-302/88-33-05: Person-hour estimates used for dose projections for specific tasks are overly conservative. The inspector reviewed the licensee's response to this item, which was identified during the NRC ALARA assessment, in a letter from FPC to NRC dated February 10, 1989. The licensee indicated that mechanisms were being evaluated to separate person-hours expected in radiation areas versus person-hours for the total job. The inspector observed that AI-1600, ALARA Program Manual, provided guidance for the Nuclear Integrated Planning Department, Job Sponsors, and First-Line Supervisors to provide accurate person-hour estimates for tasks and evolutions in a radiation field. This item is considered closed.
- f. (Closed) IFI 50-302/88-33-07: Consider ALARA effects from operating with defective fuel. The inspector reviewed the licensee's response to this item, which was identified during the NRC ALARA Assessment, in a letter from FPC to NRC dated February 10, 1989. The licensee stated that programs and guidelines were in place that address operation with failed fuel and that additional actions were in the development stage when the NRC assessment took place. Since the above mentioned letter was written, the licensee performed an evaluation of the impact of failed fuel on plant operation, dated May 24, 1989. The evaluation was in response to an INPO Significant Event Report (01-89). The licensee incorporated the applicable recommendation into Performance Monitoring Guidelines (PMGs). PMG-2, Reactor and Fuel Integrity Performance Monitoring, Revision 2, dated September 20, 1989, was revised to include more specific guidance regarding activities, responsibilities, and actions for responding to fuel failures. This item is considered closed.

11. Exit Meeting

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 19, 1990. The inspector summarized the scope and findings of the inspection, including the NCVs. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
50-302/90-02-01	NCV - Failure to identify clearly on the shipment manifest (of material shipped to SEG in 1989) the waste classification as required by 10 CFR 20.311(b) (Paragraph 6).
50-302/90-02-02	NCV - Failure to maintain on file documentation of engineering evaluations showing that a DOT Specification 7A Type A package met the appropriate requirements as required by 49 CFR 173.415(a) (Paragraph 6).

During the exit meeting, licensee representatives indicated that Revision 7 to Administrative Instruction, AI-1600, ALARA Program Manual, would be completed as soon as practicable and sent to the Region II office so that the IFIs identified during the NRC ALARA assessment (88-33-02, 88-33-03, and 88-33-05) could be closed. AI-1600 was received and reviewed by the NRC on January 29, 1990. The items referred to above were considered closed.