



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30303

Report No.: 50-302/78-22

Docket No.: 50-302

License No.: DPR-72

Licensee: Florida Power Corporation  
P. O. Box 14042, Mail Stop C-4  
St. Petersburg, Florida 33733

Facility Name: Crystal River Unit 3

Inspection at: Crystal River Site, Crystal River, Florida

Inspection conducted: September 5-8, 1978

Inspectors: S. C. Ewald  
R. W. Zavadoski

Reviewed by:

*A. F. Gibson*  
A. F. Gibson, Chief  
Radiation Support Section  
Fuel Facility and Materials Safety Branch

*10/13/78*  
Date

Inspection Summary

Inspection on September 5-8, 1978 (Report No. 50-302/78-22)

Areas Inspected: Routine, unannounced inspection of previously identified items, licensee event reports, IE Bulletins and Circulars, gaseous and solid radioactive waste systems, coolant chemistry, posting of radiation areas, and dose ALARA evaluation of steam generator repair operations. The inspection involved 56 inspector-hours onsite by two NRC inspectors.

Results: Of eight areas inspected, no apparent items of noncompliance or deviations were identified in seven areas. Two apparent items of noncompliance were identified in one area (Infraction - failure to post a high radiation area (78-22-01) - paragraph 5. Infraction - failure to post two radiation areas (78-22-02) - paragraph 5).

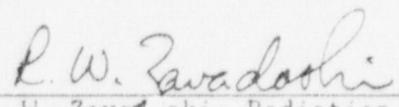
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## DETAILS I

Prepared by:

  
 S. C. Ewald, Radiation Specialist  
 Radiation Support Section  
 Fuel Facility and Materials  
 Safety Branch

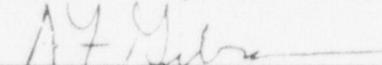
10/13/78  
Date

  
 R. W. Zawadzki, Radiation Specialist  
 Radiation Support Section  
 Fuel Facility and Materials  
 Safety Branch

10/13/78  
Date

Dates of Inspection: September 5-8, 1978

Reviewed by:

  
 A. F. Gibson, Chief  
 Radiation Support Section  
 Fuel Facility and Materials  
 Safety Branch

10/13/78  
Date1. Individuals Contacted

- \*G. P. Beatty, Jr., Nuclear Plant Manager
- P. F. McKee, Technical Services Superintendent
- \*J. L. Harrison, Assistant Chemical and Radiation Protection Engineer
- \*G. D. Perkins, Health Physics Supervisor
- \*G. H. Ruzala, Radwaste Management Supervisor
- \*R. E. Fuller, Plant Engineer
- \*T. C. Lutkehaus, Technical Support Engineer
- \*G. M. Williams, Compliance Plant Engineer
- W. A. Cross, Technical Specification Engineer
- J. Parrish, Plant Engineer

\*Denotes those present at exit interview.

2. Licensee Action on Previous Inspection Findingsa. (Open) Open Item (77-10-04) Primary to Secondary Leak Procedures

The licensee has made a number of changes to the secondary system to aid in controlling and monitoring releases from these systems if steam generator leaks are present. These changes are discussed in detail in paragraph 9. Various procedure changes required by these modifications are not yet formalized and the inspector stated this item would remain open until the revised procedures are approved.

b. (Closed) Unresolved Item (77-22-02) Monitor Setpoint Control

The inspector reviewed the new Procedure CH-280L, "Radiation Monitoring System Operating Parameters" approved May 18, 1978, and the revised Surveillance Procedure SP-701, "Radiation Monitoring Instrumentation Calibration". The inspector also reviewed the setpoint log maintained in the control room. The inspector verified these procedures and log include a defining list of setpoints and their bases as well as procedures to control setpoint changes and provide periodic verification of setpoints. The inspector checked 20 monitor setpoints against the setpoint log and had no questions.

c. (Closed) Unresolved Item (77-22-03) Waste Gas Loop Seal Modifications

The inspector toured the facility with the Radwaste Management Supervisor and inspected the various system modifications as per Maintenance Approval Requests (MARs) 77-9-19, 77-9-22, 77-9-23, 77-10-3, 77-10-3A, 77-10-4, and 77-10-5. All system changes were complete with the exception of a liquid level control switch for the surge tank installed in the gas header to the reactor coolant evaporator. Draining of any condensate in this tank will be accomplished manually until the switch arrives on site. The inspector had no further questions relative to these MARs but stated the effectiveness of the system changes would be indicated by any future loop seal related releases.

d. (Open) Open Item (77-22-04) Maintenance of Gaseous Release Records

The inspector discussed the implementation of new computer codes and training programs discussed in RII Reports 50-302/78-1 and 50-302/77-22. These programs have not yet been implemented due to the outage that began March 3, 1978, and the anticipated modifications that will be required when new "standard" technical specifications are issued. A review of records revealed the interim measures discussed in RII Report 50-302/77-22 have been effective in eliminating the problem of lost gaseous release records. Gaseous releases are discussed further in paragraph 13.

e. (Closed) Infraction (78-05-01) Failure to Follow Survey Procedures

The inspector reviewed clarifications made to the radiation survey Procedure RP-202, "Radiological Surveys" as discussed in the licensee's response of April 14, 1978. The revised procedure received final approval May 2, 1978. The inspector had no further questions on this item.

- f. (Closed) Unresolved Item (78-09-03) Radiological Safety Expertise - Nuclear General Review Committee (NGRC)

The inspector reviewed the information and qualifications data submitted by the licensee on May 23, 1978. Based on the information submitted, the inspector had no further questions relative to this item.

- g. (Open) Open Item (78-09-04) Incore Instrument Pit Shielding

The inspector observed installed shielding during a tour of containment September 6, 1978. Licensee representatives stated the shielding is incomplete due to some necessary field modifications but that installation should be complete prior to the next refueling outage. The inspector stated the final shielding installation and resultant radiation levels would be reviewed when data is available.

- h. (Open) Open Item (78-09-05) Shielding of Fuel Transfer Tubes

The inspector discussed this item with licensee representatives who stated a MAR and associated work order calling for installation of permanent shielding at the transfer tube is under review. The inspector discussed the posting precautions and temporary shielding currently in use and had no questions. The inspector stated the item would remain open pending installation of permanent shielding.

- i. (Closed) Open Item (78-09-06) Neutron Exposure Records

The inspector discussed this item with the Health Physics Supervisor who stated arrangements have been made to submit calculated neutron exposures to the dosimetry vendor for inclusion in personnel dose records. The inspector had no further questions.

- j. (Closed) Open Item (78-09-07) Medical Review of Respirator Users

The inspector discussed the medical review performed prior to authorizing an individual's use of a respirator. The Health Physics Supervisor discussed the program with the corporate physician and submitted the final program for approval on August 16, and received verbal approval on the same date. The inspector noted the acquisition of pulmonary function equipment on site and licensee representatives stated cut-off criteria were being developed in cooperation with the corporate physician. The inspector had no further questions.

k. (Closed) Open Item (78-09-08) Termination Report Format

This item concerned the format used to report whole-body (bioassay) data in termination reports. The inspector reviewed the report format as corrected September 8, 1978, and was told all subsequent termination reports would be made with the revised program. The inspector had no further questions.

3. Licensee Event Reports (LERs)

- a. (Closed) LER No. 78-15-04T: This event involved a resin spill during contaminated resin solidification operations on May 11, 1978. This event was discussed in detail in RII Report No. 50-302/78-13 and follow-up actions will be reviewed as Open Item (78-13-01).
- b. (Closed) LER Nos. 78-20-04T and 78-21-04T: These events involved the receipt of spent fuel shipping casks with removable contamination in excess of 22,000 dpm/100 cm<sup>2</sup>. In both cases the cask was decontaminated to acceptable levels. The apparent cause of the contamination was traced to two causes; (i) uptake and subsequent "sweating" out of activity by the stainless steel cask, and (ii) possible discrepancies from use of different types of smear paper at the shipping and receiving facilities. The inspector discussed the event with licensee representatives and had no further questions with respect to their actions.
- c. (Closed) LER No. 78-23-03L: This event involved the inoperability of the fuel building ventilation monitor (RMA4) and discussed a discrepancy in technical specifications. This item is discussed in detail in paragraph 8.
- d. (Closed) LER Nos. 78-29-03L and 78-32-03L: These events involved the inoperability of the auxiliary building ventilation monitor (RMA<sup>2</sup>) due to component failures. The inspector discussed the events with the radwaste management supervisor and verified consideration was given to possible generic implications of these failures. The inspector had no further questions.

4. IE Circulars and Bulletins

- a. Circular 78-03, "Packaging Greater Than Type A Quantities of Low Specific Activity Radioactive Material for Transport": The inspector discussed this circular with the radwaste management supervisor and had no questions. Solid waste is discussed further in paragraph 10.

- b. Bulletin 78-07, "Protection Afforded by Air-Line Respirators and Supplied Air Hoods": The inspector discussed the bulletin and the Los Alamos studies that support the bulletin with the Health Physics Supervisor. The Health Physics Supervisor stated demand mode air-line respirators are not used on site. Acquisition of flow measuring devices for use with supplied air hoods is being considered, however, the licensee has not yet used an air supplied hood where a protection factor was required.
- c. Bulletin 78-08, "Radiation Levels From Fuel Transfer Tubes": This topic was discussed in RII Report No. 50-302/78-9 and is discussed in paragraph 2 of this report.

## 5. Facility Tours

- a. The inspectors toured portions of the Radiation Controlled Area (RCA) on each day of the inspection and toured containment on September 6. The inspector commented favorably on housekeeping inside containment and noted a marked improvement in the auxiliary building during the week. The inspectors performed random radiation level surveys during these tours.
- b. During the tour of containment on September 6, the inspectors found four unsealed, unposted and unlabeled 55 gallon drums just inside the containment access hatch. General area radiation levels (about 12 inches from drum surface) ranged from 30 mrem/hr to 500 mrem/hr. Levels near the hottest drum ranged from 200 to 500 mrem/hr. Subsequent surveys revealed contact levels as high as 2000 mrem/hr. Discussions with licensee representatives indicated the drums contained miscellaneous solid waste from containment including a vacuum cleaner filter used to remove debris from the reactor cavity. This filter was the apparent source of the high radiation levels. The drums were removed to the waste drumming area and the area roped off and posted as a high radiation area. 10 CFR 20.202(b)(3) defines a high radiation area to be an area with general radiation levels in excess of 100 mrem/hr. and 10 CFR 20.203(c) requires these areas be conspicuously posted as high radiation areas. The inspector stated that failure to post the high radiation area when the drums were in containment was in noncompliance (78-22-01) with 10 CFR 20.203(c).
- c. During a tour of the RCA on September 7, the inspectors noted the access ladder to the decay heat pit was only posted as a contaminated area. The inspectors climbed down into the pit and surveys indicated general area radiation levels of 10 to 40 mrem/hr. The inspectors informed chem/rad personnel who immediately posted the area as a radiation area. During the same RCA tour, the inspectors found radiation levels ranging from 1 to

30 mrem/hr near a large number of 55 gallon drums in the waste drumming area. The drums were not labeled and the area was not posted or roped off. The inspectors notified chem/rad personnel who promptly roped and posted the area. Discussions with licensee representatives indicated these areas had been properly posted and the ropes and/or signs were taken down, for one reason or another, and had not been replaced. 10 CFR 20.202(b)(2) defines a radiation area to be an area with general radiation levels between 5 and 100 mrem/hr and 10 CFR 20.203(b) requires these areas be conspicuously posted as radiation areas. The inspector stated failure to have the above two areas properly posted was in noncompliance (78-22-02) with 10 CFR 20.203(b).

#### 6. Process Monitor Saturation

The inspector and radwaste management supervisor discussed the potential for saturation of Geiger-Mueller (GM) tubes used in various ventilation or other process monitors. If a GM tube is exposed to high radiation fluxes the tube will go into mode of continuous discharge (saturation) and the ratemeter circuitry generally associated with these tubes will indicate a very low countrate. Where this potential exists, circuit changes are frequently made to prevent this nonconservative indication by the monitor readout. Licensee representatives agreed to review their process monitors to determine if tube saturation might pose a problem for these systems. The inspector stated the results of this review and any subsequent modifications would be reviewed during a future inspection (78-22-03).

#### 7. Steam Generator Repair Dose ALARA Review

- a. The inspector reviewed Man-Rem data associated with the B "once thru steam generator" (OTSG) repair effort. Summary reports indicate approximately 150 Man-Rem associated directly with the B-OTSG repair and an estimated additional 50 Man-Rem for other maintenance and repair efforts resulting from the Burnable Poison Rod problems. The Health Physics Supervisor estimated the total facility dose commitment, thus far, for 1978 to be 250 Man-Rem.
- b. Of the various precautions exercised during the outage, perhaps the most significant reduction in Man-Rem resulted from the use of removable shielding for the upper tube sheet and OTSG dome. Access to the upper tube sheet is via a 16 inch manway, thus requiring the shielding to be assembled inside the OTSG dome. Extensive practice dry-runs resulted in a total dose of 5.5 Man-Rem for installation and removal of the shielding. Based on relative radiation level reduction, the inspector estimated use of the shielding reduced the total Man-Rem commitment by 450 Man-Rem with most of the reduction resulting from shielding the tube sheet.

- c. The inspector compared predicted Man-Rem estimates, prepared for planning purposes, with actual data and found no substantial differences. The total estimated dose commitment was 125 to 250 Man-Rem as compared to 150 Man-Rem expended. In all categories, with one exception, the actual doses were within or below the range estimated. One category, removing chips from tube ends, required 79 Man-Rem and had been predicted to take 33 to 66 Man-Rem. The inspector commented that, especially in light of the many variables affecting dose commitment, the Man-Rem estimates were remarkably good.

#### 8. Fuel Building Ventilation Monitor

- a. Technical Specification 3.3.3.1, Table 3.3-6 references a fuel pool area gaseous activity ventilation system isolation monitor. The fuel pool ventilation monitor (RMA4), as installed, does not, however, have an isolation function. Isolation is provided by the auxiliary building ventilation monitor (RMA2). This discrepancy was identified in LER 78-23-03L, dated April 26, 1978. The inspector discussed this item with licensee representatives as summarized below.
- b. The fuel pool ventilation system is one of several systems feeding the main auxiliary building ventilation system, thus any release of activity will be detected by both RMA4 and RMA2. It should also be noted that the auxiliary building ventilation system HEPA and charcoal filter banks are continuously on line and, therefore, the only isolation function of RMA2 is to secure the ventilation system supply fans. The inspector commented that, while a release in the fuel pool area would result in securing the fuel pool area supply fans, it would also secure ventilation supply for all systems feeding the auxiliary building stack. The inspector suggested that the licensee review the impact of securing all ventilation supply fans in the auxiliary system when it would only be necessary to secure one component. Based on this review, perhaps it would be advantageous to modify RMA4 to include local isolation capability. License representatives acknowledged the inspector's comments and agreed to review the systems involved. The inspector stated the results of the licensee's efforts would be reviewed during a future inspection (78-22-04).

#### 9. Secondary System Modifications

- a. The licensee has made several significant changes to the secondary system as a precaution against the potential for steam generator tube leakage and a (low level) contaminated secondary system. The inspector discussed the various changes, described

below, with licensee representatives and noted that necessary procedure changes have not yet been formally approved, but exist in the nature of various temporary changes authorized by Technical Specification 6.8.3.

- b. The major reasons for the following changes were to provide monitored discharge paths in the secondary system, provide control and separation of potentially contaminated secondary systems, and reduce the volume of secondary liquids that might become contaminated.
- i) Steam generator blowdown rerouted to the condenser for control and volume reduction.
  - ii) Use of the Secondary Neutralization Tank (SDT-1) for batch releases. This tank is normally used to hold demineralizer regeneration liquids, however, if primary to secondary leakage exists, these resins will not be regenerated and SDT-1 will be used as a batch release tank. Effluent lines with monitors, recorders, and interlocks required by Environmental Technical Specification 2.4.1 have been installed.
  - iii) Reroute SDT-1 overflow. Since SDT-1 may hold low-level contaminated liquids, the overflow line was rerouted to the turbine building sump instead of the (non-contaminated) industrial waste ponds.
  - iv) Reroute Nuclear Services Seawater Sump directly to the industrial waste ponds rather than thru the turbine building sump. This will greatly reduce liquid volumes to be accounted for.
  - v) Reroute Condenser Air Removal Exhaust to the fuel pool area ventilation system. This will assure proper monitoring treatment, and accountability for any secondary system gaseous activity.
  - vi) Coating of the lower level (95' elevation) of the turbine building with sealant to facilitate any decontamination efforts required because of secondary system activity.
  - vii) Installation of an isolation dam around the sewerage lift station (95' elevation of turbine building) to prevent contamination by secondary system liquids.

#### 10. Solid Radioactive Waste

- a. An inspector reviewed individual solid radwaste shipment records for 1978 and found no examples of noncompliance with the requirements of 10 CFR 71 or 49 CFR 173.
- b. The inspector noted the shipment of significant levels of activity, in the form of solidified resins, in single packages. Typical activities in these resin casks were about 100 curies per cask. The casks are shipped as Low Specific Activity (LSA). The inspector expressed concern at the shipment of this activity in casks not certified to Type B container specifications. Licensee representatives supplied a Certificate of Compliance for the cask in question which authorizes shipment of greater than Type A quantities but still LSA material. Further discussions revealed the resin cask was tested to the normal conditions of transport criteria specified for Type B containers in 10 CFR 71.35. Casks for LSA material only are exempt from meeting the hypothetical accident criteria of 10 CFR 71.36. The inspector had no further questions.

#### 11. Tests of Reactor Coolant Water Quality

The inspector reviewed new surveillance Procedures SP-709, RC, Decay Heat Removal and RC Makeup Systems' Radiochemistry Surveillance Program, dated June 29, 1978, and approved July 27, 1978, and SP-713, RC Support Systems' Chemistry Surveillance Program, dated June 29, 1978 and approved July 27, 1978. The procedures reviewed by the inspector appear to meet the requirements of the technical specification. The inspector also selectively reviewed test results for the period January 1, 1978, thru September 1, 1978, of reactor coolant chemistry and radiochemistry and verified that the water quality was maintained within technical specification limits and tested at a frequency consistent with the specifications. The inspector had no further questions in this area.

#### 12. Ventilation Systems

The inspector reviewed the documentation of Procedures SP-185, Reactor Building Ventilation Exhaust System Testing, SP-186, Control Room Emergency Ventilation System Testing and SP-187, Auxiliary Building Ventilation Exhaust System Testing, for compliance with technical specification. The inspector verified that all field tests performed were in accordance with ANSI N519-1075, Testing of Nuclear Air-Cleaning Systems, as required by technical specifications. The licensee's program for insuring activated carbon methyl iodine sample testing after every 720 hours of system operation was reviewed by the inspector. The program seemed adequate to insure meeting the requirements of the

technical specifications. The inspector also reviewed the results of the carbon sample testing for conformance with efficiency requirements and with the 31-day turn-around requirement. Both conditions were met. The inspector, accompanied by the licensee's representative, visually inspected the storage of replacement HEPA filters and carbon cells. The filters and cells were found in an environmentally controlled warehouse and were in the process of being restacked. The inspector noted that carbon cells were being stacked no more than five high, consistent with standard industry practice. The inspector, accompanied by the licensee's representatives, visually inspected the Reactor Building Purge Exhaust System, both externally and internally, and found everything to be in order. Accompanied by the licensee's representative, the inspector independently measured the air face velocity with a hot wire anemometer for hoods containing radioactive materials. All hoods showed an average face velocity greater than 100 fpm, which is acceptable industry practice. The inspector noted that, overall, the licensee's representatives appear to have more than adequate control over ensuring the efficiency of air filtration systems as required by technical specifications.

#### 13. Gaseous Releases

An inspector reviewed selected gaseous release records for the period January 1978 thru August 1978. The inspector verified the analyses specified by technical specifications have been performed and the various limits on release rates and total gas decay tank activity limits specified in environmental technical specifications have not been exceeded. The inspector noted the problem of missing gaseous effluent data discussed in RII Rpt. No. 50-302/77-22 has apparently been brought under control by the various interim measures discussed in that report and RII Rpt. No. 50-302/78-1. The inspector had no questions relative to individual gaseous release records.

#### 14. Exit Interview

At the conclusion of the inspection on September 8, 1978, the inspectors met with management representatives (denoted in paragraph 1). The inspector summarized the scope and findings of the inspection. Items discussed included two items of noncompliance, two new open items and the status of previous items.