



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30303

JUL 10 1984

Report No.: 50-302/84-18

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 Dates: June 11 - 15, 1984

Inspection at Crystal River site near Crystal River, Florida

Inspector: J. L. Kreh 7-6-84  
J. L. Kreh Date Signed

Accompanying Personnel: J. E. Fairbent (NRC Headquarters) and  
J. A. MacLellan (Battelle Pacific Northwest  
Laboratories)

Approved by: W. E. Cline 7-6-84  
W. E. Cline, Chief Date Signed  
Emergency Preparedness Section  
Division of Radiation Safety and Safeguards

SUMMARY

Areas Inspected

This routine, unannounced inspection involved 84 inspector-hours on site in the area of emergency preparedness.

Results

In the area inspected, no violations or deviations were identified.

8408270432 840710  
PDR ADOCK 05000302  
PDR

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*R. E. Fuller, Manager, Site Nuclear Services
- E. K. Neuschaefer, Supervisor, Radiological Emergency Planning
- \*W. L. Rossfeld, Manager, Nuclear Compliance
- \*V. R. Roppell, Manager, Plant Engineering and Technical Services
- \*P. J. Skramstad, Nuclear Chemistry and Radiation Protection Superintendent
- \*J. L. Bufe, Nuclear Compliance Specialist
- \*W. A. Clemons, Nuclear Compliance Specialist
- \*M. S. Mann, Nuclear Compliance Specialist
- \*R. A. Arnold, Nuclear Emergency Team Instructor
- S. L. Lashbrook, Health Physics Supervisor
- W. P. Ellsbury, Nuclear Operations Technical Training Supervisor

Other licensee employees contacted included 3 Shift Supervisors, 2 technicians, and 1 operations analyst.

#### NRC Resident Inspector

- \*T. F. Stetka

\*Attended exit interview.

### 2. Exit Interview

The inspection scope and findings were summarized on June 15, 1984 with those persons indicated in paragraph 1 above.

### 3. Licensee Action on Previous Enforcement Matters

(Closed) Violation (302/83-13-07): Inadequate procedure for initial dose assessment. The inspector determined that a revised procedure exists for initial dose assessment (details, paragraph 8).

### 4. Unresolved Items

Unresolved items were not identified during this inspection.

### 5. Notification and Communications (82203)

The licensee's procedures for notification of offsite agencies are consistent with the emergency classification scheme, and contain provisions for verifying messages between the licensee and offsite authorities. EM-207 ("Reporting Requirements on Emergencies") was found to be complete. The content of the initial and follow-up messages in that procedure, although slightly at variance with the criteria in NUREG-0654, is consistent with the State's needs.

The emergency communications equipment provided for the use of the Control Room, TSC, EOF, and field monitoring teams appeared to be operational and to provide adequate primary and backup capability. The licensee's emergency communications links were successfully demonstrated during the April 1984 exercise.

The system for prompt public notification (known as the Early Warning Notification System) is tested and maintained by the Citrus and Levy County Emergency Management Agencies.

A previous inspection identified a need to establish a testing program for those emergency communications links in the Control Room, TSC, and EOF which are not used on a daily basis. The licensee had committed to implementing such a program by October 1, 1983. Table II ("Drill and Exercise Requirements") of procedure REP-06 ("Schedule for Radiological Emergency Plan Maintenance") specifies monthly communications drills between the Control Room and the State Warning Point, Tallahassee. The inspector reviewed records of these drills as well as records of biweekly testing of emergency communications equipment located in the TSC and EOF. Based on the above findings, the inspector follow-up item in this area (302/83-13-04) is closed.

No violations or deviations were identified in this program area.

6. Changes to the Emergency Preparedness Program (82204)

Changes to the Radiological Emergency Response Plan (RERP) and implementing procedures appeared to have received appropriate management review and to be in compliance with 10 CFR 50.54(q). Changes in emergency facilities, equipment, and instrumentation appeared to have been incorporated into the RERP. The licensee appeared to be using an effective procedure for distribution of plan and procedure revisions.

The Post-Accident Sampling System (PASS) was recently inspected (NRC Report No. 50-302/84-07) and found to be operable. An earlier inspection determined that the (pre-PASS) interim system for postaccident sampling had procedural and equipment weaknesses. Since the interim system is no longer used, the inspector follow-up item in this area (302/83-06-05) is closed.

A previous inspection identified a need to incorporate descriptions of training courses for the Dose Assessment Team and the Sampling Team into training procedures. The inspector determined that TDP-307, Rev. 4, contains (in sections 5.10 and 5.11) suitable information on said courses, including program objectives, description of the training programs, qualification prerequisites, and maintenance of qualification status. These 2 training programs are also described more generally in RERP Section 19.2. Based on the above findings, the inspector follow-up item in this area (302/83-13-05) is closed.

No violations or deviations were identified in this program area.

7. Shift Staffing and Augmentation (82205)

The inspector reviewed EM-206 ("Emergency Plan Roster and Notifications") and interviewed appropriate licensee personnel. A review of Table B-1 revealed that the licensee appears to meet the goals in NUREG-0654. The licensee has also conducted drills which verify that the 30-minute and 60-minute augmentation criteria can be met.

The call roster is now updated weekly using a computer file. Employment status is automatically verified by computer cross-reference to the personnel files, and qualification status is updated weekly by the training department. The inspector verified employment status and training dates for approximately 10% of personnel on the roster. No discrepancies were noted. Based on the above findings, the inspector follow-up item in this area (302/83-13-06) is closed.

No violations or deviations were identified in this program area.

8. Dose Calculation and Assessment (82207)

The former dose assessment procedure, EM-204, has been divided into three separate procedures: EM-204(A) (initial assessment method), EM-204(B), (computer method), and EM-204(C) (manual method). During walk-throughs conducted by the inspector, 3 Shift Supervisors demonstrated their ability to perform dose calculations within the 15-minute criterion. Required mathematical manipulations have been reduced to a minimum so that EM-204(A) is now a single, concise procedure which results in rapid production of protective action recommendations. Based on the above, the violation (302/83-13-07) and inspector follow-up item (302/84-04-02) related to this area are closed.

Walk-throughs with the Shift Supervisors also revealed some ambiguity on whether the new meteorological instrumentation or older instrumentation should be used. The new instrumentation should be "tagged out" until it has been accepted.

Inspector Follow-up Item (302/84-18-01): Review EM-204(A) and the training of Shift Supervisors to assure adequate instruction has been given on meteorological instrumentation.

The primary dose assessment method is described in EM-204(B). This procedure employs an Apple IIc computer and special software to provide near-real-time dose projections. The program has been revised to allow changes of meteorological data entered for previous time steps as well as refinements in the source term necessitated by survey results or other factors. The program now can also provide dose forecasts for any desired downwind distance. Revision 2 of EM-204(B) still does not specify whence the Apple IIc computer is to be obtained. Based on the above findings, one inspector follow-up item in this area (302/83-06-02) is closed, but another (302/83-13-08) remains open.

EM-204(B) gives instructions on the detection of a "sea-breeze" phenomenon, but does not identify actions to be taken when it is detected. The procedure does not specify that wind speed, wind direction, and  $\Delta T$  will be determined using the average of the previous 15 minutes (see related discussion, paragraph 9c).

Inspector Follow-up Item (302/84-18-02): Review procedures to assure the inclusion of instructions on meteorological data-averaging time and compensation for the "sea-breeze" phenomenon.

The dose assessment model does not allow for decay of the source term prior to a release. Radioactive decay which occurs between the time of shutdown and the time when the release begins can reduce offsite doses by a factor of ten or more.

Inspector Follow-up Item (302/84-18-03): Revise the dose assessment model to compensate for source-term decay prior to release. The decay factor should be included for both the manual and computer calculation methods (EM-204(B) and EM-204(C)).

In the event the computer is unavailable, a manual dose assessment method may be used. The manual method, as described in EM-204(C), uses maps and transparent overlays to estimate the atmospheric diffusion and radiological dose. Dose Assessment Team personnel walk-throughs conducted by the inspector demonstrated competence on both the manual and the computer methods, which produced equivalent results.

Tables 1 and 2 of EM-204(C) are used to select the proper diffusion isopleth overlay based on atmospheric stability class. The licensee intended for selection of the overlay to be based on either  $\Delta T$  or the 15-minute range of wind direction, but the table format suggests that both parameters should be considered in the selection process. The procedure for using these tables is unclear, and more instructions for their use are needed. Also EM-204(C) does not specify the height on the meteorological tower from which wind speed and direction should be obtained (33 or 175 feet).

Inspector Follow-up Item (302/84-18-04): Revise EM-204(C) to assure that the method of selection of diffusion isopleth overlays is clear.

Inspector Follow-up Item (302/84-18-05): Specify in EM-204(C) the height on the meteorological tower from which data should be obtained.

The default value (in the manual method) for the duration of release is 1 hour versus the 2-hour value in the computer method and the State's method. The inspector follow-up item in this area (302/83-06-03) remains open.

No violations or deviations were identified in this program area.



## 9. Follow-up on Meteorological Issues (92701)

## a. Surface Effects on Meteorological Data

The licensee has installed a new meteorological tower, located about 3500 feet west of the Unit 3 containment structure. The ground adjacent to the meteorological tower is relatively clear and level, and influences of the nearest coal storage area and the nearest structures should be minimal. However, the new tower is closer to the Gulf than the old tower, and the data from the new tower need to be analyzed to determine that the upper level of measurement is within the thermal internal boundary layer for periods of onshore flow. The new meteorological measurements system needs to be documented with respect to location (relative to the Gulf, prominent buildings, structures, and other topographic features), heights of measurement, instrument specifications and manufacturers, sensor orientations, data reduction processes, data recorders, and surveillance, maintenance, and calibration procedures. The licensee needs to estimate the overall system accuracy for each parameter and compare these system accuracies with those presented in Regulatory Guide 1.23. The procedure for calibration of the meteorological system (SP 158) incorrectly identifies an acceptable accuracy for wind direction as  $\pm 10^\circ$  instead of  $\pm 5^\circ$  as recommended in Regulatory Guide 1.23. Based on the relocation of the meteorological tower, the previous inspector follow-up item in this area (302/82-13-01) is closed but a new item is opened.

Inspector Follow-up Item (302/84-18-06):

- (1) Determine that upper measurements on the new tower are within the boundary layer (A study similar in technical depth to Gilbert Associates study, "An Analysis of Crystal River Meteorological Tower Data for Gulf Breeze Effects", was discussed with licensee representatives.)
- (2) Complete documentation of new meteorological measurements system (including update to RERP and FSAR 2.3.3, and Tech Spec change).
- (3) Determine that accuracy of measurements complies with accuracy specifications of RG 1.23.

## b. Alternate Meteorological Data

With the installation of the new meteorological tower, the licensee has proposed to use the old meteorological tower as a source of backup information. Although the measurements on this tower are affected by the presence of a nearby coal pile, the measurements are more representative of site conditions than alternative sources of meteorological data such as from Cross City or Ruskin, FL. The licensee needs to identify likely surface effects on the meteorological measurements at the old tower and under what conditions these effects may be significant, and appropriately qualify use of such backup information in dose

assessment procedures. Based on these findings, the previous inspector follow-up item in this area (302/82-13-02) is closed but a new item is opened.

Inspector Follow-up Item (302/84-18-07): Qualify use of backup tower information when effects of coal pile may be significant.

c. Capability of Meteorological System to Assess the Impact of Shoreline Environment upon Plume Trajectory

The new meteorological measurements system will likely reflect occurrences of sea-breeze (or Gulf Breeze) circulation at the site, pending confirmation that the upper level of measurement is within the thermal internal boundary layer (see paragraph 9a). Current dose assessment procedures recognize that sea-breeze circulation will affect plume trajectory, and provide some rudimentary visual indicators to identify the position of the sea-breeze front (inland penetration) and low-level wind direction changes for the purposes of plume tracking. However, the dose assessment procedures are based on a straight-line-trajectory atmospheric dispersion model which cannot integrate spatial and temporal variations in wind direction. The procedures also identify "affected area" as a  $67\frac{1}{2}^{\circ}$  sector, centered on a downwind direction. During variable wind direction conditions, such as sea-breeze circulation, the affected area may be much larger, and may change considerably as a function of time. Although the licensee has improved the dose assessment procedures to recognize the possibility of variations in plume trajectory, the procedures are restricted by the simple atmospheric dispersion model and the availability of meteorological data from only the plant site. The licensee needs to continue to improve the capability to identify and follow plume trajectories during variable meteorological conditions, and to expand the potential affected area accordingly to compensate for uncertainties in projected plume position (see related discussion, paragraph 8). Based on these findings, the inspector follow-up item in this area (302/82-13-03) remains open.

10. Inspector Follow-up Items Related to Protective Action Decision-Making (92701)

The inspector observed that EM-202 ("Duties of the Emergency Coordinator"), Rev. 22, Section 3.0, assigns to the Emergency Coordinator the responsibility for classifying an emergency and formulating protective action recommendations. The procedure also expressly prohibits the Emergency Coordinator from delegating the decision-making related to these areas of responsibility. In addition, the procedure specifies that, once the EOF is operational, the EOF Director will assume responsibility for protective action recommendations. The inspector follow-up item in this area (302/83-13-03) is closed.

The inspector reviewed EM-203 ("Recommended Protective Actions for Gaseous Plume Exposure"), Enclosure 1, and RERP Table 14.1 to determine whether the

"keyhole" approach (as discussed in NUREG-0654) has been incorporated into the licensee's protective action guidance. EM-203 conforms with Federal guidance in this respect, but RERP Table 14.1 does not. The next revision of the RERP should eliminate this inconsistency. The inspector follow-up item in this area (302/84-04-01) remains open.

Upon further examination of EM-203, Enclosure 1, and RERP Table 14.1, the inspector noted that neither specifies appropriate protective action recommendations for a condition in which dose to the general population is projected to be greater than 25 rems whole body and/or 125 rems thyroid. The 2 sets of guidelines are inconsistent with each other and with Federal guidance. Licensee personnel indicated that these problems were inadvertent, and attributable, at least in part, to mishandling by word-processing personnel.

Inspector Follow-up Item (302/84-18-08): Review EM-203 and the RERP to verify that protective action guidelines based on projected doses to the general population are consistent with NUREG-0654 guidance.

11. Other Inspector Follow-up Items (92701)

(Closed) Inspector Follow-up Item (302/81-14-18): Train some EOF personnel in the use of radiological monitoring equipment contained in the EOF kit. Review of training records indicated that 4 members of the corporate HP staff received training in instrument familiarization on September 27, 1983, with future annual retraining required by REP-06.

(Closed) Inspector Follow-up Item (302/81-14-54): Include high-range (200 R) dosimeters in emergency kits. Procedure RP-219, Rev. 9 ("Inventory and Availability of Emergency Supplies/Equipment"), indicates that 4 high-range (100 R) dosimeters have been added to the emergency kits for each of the 3 Control Rooms at the Crystal River site (CR-3, CR-1&2, and CR-4&5). Ten high-range dosimeters have been included in the kits for the Radiation Emergency Team (verified by the inspector), and 8 for the Environmental Survey Team.

(Open) Inspector Follow-up Item (302/81-14-58): Establish traffic evacuation plan for the entire Crystal River site (Units 1-5). The inspector reviewed a consultant's report dated March 2, 1984 on "Crystal River Unit 3 Evacuation Time Estimates", and was told by licensee personnel of plans to develop by October 1, 1984, a site evacuation procedure based on this study.

(Closed) Inspector Follow-up Item (302/81-14-67): Establish a procedure to address maintenance of perishable supplies in the emergency kits. RP-219 specifies that gasoline for the portable generator in the Environmental Survey Vehicle is to be replaced quarterly, and batteries in all emergency kits are to be changed during each quarterly inventory (except calculator batteries - first quarter only).

(Closed) Inspector Follow-up Item (302/83-06-04): Consider providing for a second offsite monitoring team. The licensee is now able to deploy a second



team if necessary. An emergency kit for the second monitoring team is essentially complete, and a corporate vehicle (used by the Mail Room within the Crystal River complex only) is available for use by that team. The inspector noted that training records indicate that more than 20 persons are qualified for the Environmental Survey Teams.

(Open) Inspector Follow-up Item (302/83-06-06): Review equipment and procedures for upgrading as appropriate and provide additional training for the Emergency Medical Team. The inspector discussed the training program in this area with the cognizant instructor. As of June 8, 1984, 19 of the HP staff and 5 Operations personnel were on the roster for Emergency Medical Team training. Self-study of applicable procedures (principally EM-213 and RP-219) started in January 1984; classroom training is being developed and is scheduled to commence in August 1984.

(Closed) Inspector Follow-up Item (302/83-13-01): Review EM-202 and EM-207 for inclusion of the 15-minute notification criterion. EM-207 directs the Emergency Coordinator to notify the State Duty Warning Officer via the State Hot Ring Down Telephone System within 15 minutes of any emergency declaration. EM-202 references EM-207 for making notifications.

(Open) Inspector Follow-up Item (302/83-13-02): Review the planned revision dates for EM-202 and EM-207. Revision of the EPs and APs to consider human factors has been completed, but no EMs have yet been scheduled for such revision.

(Closed) Inspector Follow-up Item (302/83-13-09): Include EOF instruments in calibration and maintenance program. The inspector discussed this area with the cognizant licensee representative and reviewed the schedule for calibration and maintenance of EOF instruments. The inspector observed that instruments in the EOF emergency kit had current calibration stickers.

(Closed) Inspector Follow-up Item (302/83-13-10): Review the RERP and EM-203 to assure that the emergency exposure guidelines have been revised. The inspector observed that RERP Table 14.1 and EM-203 both give the whole-body dose limits as 25 rems for nonlifesaving activities and 75 rems for lifesaving activities.

(Closed) Inspector Follow-up Item (302/83-13-11): Review the RERP and EM-203 to assure that the "greater than" sign has been removed from the emergency worker thyroid limit. Both RERP Table 14.1 and EM-203 state, "Control exposure of Emergency Team members except lifesaving missions to 25 rem whole body, 125 rem thyroid."

(Open) Inspector Follow-up Item (302/83-13-12): Review the RERP, RP-101, and EM-203 to assure consistency in the dose limit for emergency workers involved in lifesaving activities. The licensee has decided upon 75 rems as the applicable limit. This item remains open, however, because the second reference to the lifesaving dose limit in RP-101, Rev. 19, still reads "100 rem" (Section 7.5.2). The inspector was assured that the next revision of RP-101 (currently in progress) will correct this inconsistency.

## 12. Summary Of Findings On Previous Open Items

The following lists of item numbers summarize the disposition of open items which were evaluated during this inspection (details above):

<u>CLOSED</u>	<u>REMAIN OPEN</u>
50-302/81-14-18	50-302/81-14-58
81-14-54	82-13-03
81-14-67	83-06-03
82-13-01	83-06-06
82-13-02	83-13-02
83-06-02	83-13-08
83-06-04	83-13-12
83-06-05	84-04-01
83-13-01	
83-13-03	
83-13-04	
83-13-05	
83-13-06	
83-13-07	
83-13-09	
83-13-10	
83-13-11	
84-04-02	