



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N. W. SUITE 818
ATLANTA, GEORGIA 30303

IE Inspection Report No. 50-302/76-9

Licensee: Florida Power Corporation
3201 34th Street, South
P. O. Box 14042
St. Petersburg, Florida 33733

Facility Name: Crystal River 3
Docket No.: 50-302
License No.: CPPR-51
Category: B1

Location: Crystal River, Florida

Type of License: B&W, PWR, 2452, Mwt

Type of Inspection: Routine, Unannounced

Dates of Inspection: May 11-14, 1976

Dates of Previous Inspection: April 13-16 and 20-23, 1976

Principal Inspector: F. Jape, Reactor Inspector
Reactor Projects Section No. 2
Reactor Operations and Nuclear Support Branch

Inspectors: G. L. Troup, Radiation Specialist
Radiation Support Section
Fuel Facility and Materials Safety Branch
May 11-14, 1976

S. D. Ebnetter, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch
May 12-14, 1976

F. U. Bower, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch
May 12-14, 1976

8002 270 845

Other Accompanying Personnel: None

Principal Inspector: Francis Jape 6-4-76
F, Jape, Reactor Inspector Date
Reactor Projects Section No. 2
Reactor Operations and Nuclear Support Branch

Reviewed By: R. C. Lewis 6/4/76
R, C, Lewis, Chief Date
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

SUMMARY OF FINDINGS

I. Enforcement Items

None

II. Licensee Action on Previously Identified Enforcement MattersA. IE Report 50-302/76-3, Item I.A.1

FPC's letter of response, dated March 24, 1976, has been evaluated. Followup of test documentation for charcoal adsorbers and discussions with licensee personnel confirmed completion of corrective actions. Item is closed. (Details I, paragraph 2)

B. IE Report 50-302/76-3, Item I.A.2

FPC's letter of response, dated March 24, 1976, has been evaluated. Examination of HEPA filters stored in the warehouse confirmed implementation of corrective actions. Item is closed. (Details I, paragraph 3)

C. IE Report 50-302/76-8, Items I.A. 1 and 2

Licensee's response to the notice of noncompliance items in IE Report 50-302/76-8 is due June 7, 1976.

III. New Unresolved Items76-9/1 Diesel Generator Control Panels

Diesel generator control panel tops are open for ventilation. The open tops are not protected from the overhead fire water spray system, and actuation of the water spray could impair operation of the diesel generator electrical system. (Details II, paragraph 7)

IV. Status of Previously Reported Unresolved Items75-8/6 Instrumentation Inside of Shielded Cubicles

Licensee is reviewing and evaluating recommendations by Architect-Engineer on instrument locations. Item remains open. (Details I, paragraph 4)

76-3/1 Test Procedure for HEPA Filters and Charcoal Adsorbers

Test Guide 55 has been revised and inspector's comments resolved. Item is closed. (Details I, paragraph 5)

V. Unusual Occurrences

None

VI. Other Significant Findings

None

VII. Management Interview

A management interview was held on May 14, 1976, with Mr. J. Alberdi, and members of his staff. Closeout of previously identified non-compliance items and unresolved items was discussed.

The new unresolved item related to the diesel generator control panels was discussed. Management agreed to protect the cabinet openings from fire water spray and to audit other class IE areas to assure similar conditions are corrected. The inspector's findings regarding review of Class IE equipment was also discussed.

DETAILS I

Prepared by:

G. L. Troup
G. L. Troup, Radiation Specialist
Radiation Support Section
Fuel Facility and Materials Support Branch

6/4/76
Date

Dates of Inspection: May 11-14, 1976

Reviewed by:

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

6/4/76
Date

1. Individuals Contacted

J. Alberdi - Project Manager
G. P. Beatty, Jr. - Nuclear Plant Superintendent
P. F. McKee - Assistant Nuclear Plant Superintendent
J. R. Wright - Chemical and Radiation Protection Engineer
J. L. Harrison - Assistant Chemical and Radiation Protection Engineer
G. D. Perkins - Health Physics Supervisor
R. E. Fuller - Chemical and Radiation Protection Plant Engineer
E. D. Yochheim - Radiochemist (B&W)
D. W. Pedrick, IV - Compliance Engineer
J. C. Hobbs, Jr. - Manager, Generation Testing
E. E. Froats - Manager, Site Surveillance
R. S. Dorrie - Quality Engineer

2. Test Documentation For Charcoal Adsorbers

- a. This item was originally discussed in IE Report No. 50-302/76-3, Details II, paragraph 2 and dealt with noncompliance with the requirements of the FPC Quality Assurance Program requirements and purchase specification requirements for charcoal adsorbers for ventilation systems. FPC letter of March 24, 1976 stated the corrective action taken on this item, including verification of required documentation and supplemental tests which will be performed.
- b. A licensee representative showed the inspector copies of a letter from the equipment supplier and test results which had been performed by the charcoal supplier to confirm that the material supplied is the proper material. The licensee had previously received reports from the supplier on the performance of that type of charcoal. The licensee representative stated that the performance data for the specified type of charcoal and documentation showing that the material received

is the specified type of charcoal constitutes the required "objective evidence" required by the FPC order. The inspector had no further question and advised licensee management that this item was closed.

- c. The FPC letter of March 24, 1976 further stated that tests will be performed by the manufacturer on a composite sample of the charcoal batches provided. These tests will be in addition to previously conducted tests. The inspector stated that the results of these tests would be reviewed at a later date.

3. HEPA Filter and Charcoal Adsorber Warehousing

- a. This item was originally discussed in IE Report No. 50-302/76-3, Details II, paragraph 3 and dealt with noncompliance with the requirements of the FPC Quality Assurance Program requirements and FPC written procedures for the warehousing of HEPA Filters and charcoal adsorbers for ventilation systems. FPC letter of March 24, 1976 stated the corrective actions taken on the item, including inspection of units which were in cartons showing physical or weather damage, relocation of the units into an environmentally controlled warehouse and rearrangement of the units in storage.
- b. As noted in IE Report No. 50-302/76-7, Details II, paragraph 2, the inspector had previously observed the storage of the units in the environmentally controlled warehouse. A licensee representative showed the inspector copies of the periodic inspections conducted of the storage conditions in the warehouse. The licensee representative also informed the inspector that the manufacturer had been contacted regarding storage requirements for the units and that the manufacturer had indicated that there are no specific limits on the stacking of the units. However, the licensee chose to store the HEPA filters individually and the charcoal adsorbers four units on each pallet. The storage requirement is based on the manufacturer's shipping instructions in the absence of any specific storage requirements.
- c. Test Guide TG-000-55-1, HEPA and Charcoal Filter In-place Leak Test, specifies requirements for inspection of the units prior to installation in the system as well as the in-place leak test. A licensee representative informed the inspector that the pre-installation inspections and in-place tests would be conducted by the manufacturer's representatives and would serve as the final checks prior to acceptance of the units by FPC.

- d. The inspector informed licensee management that he had no further questions on this item and that it is considered closed. Results of the inspections and in-place testing will be reviewed at a later date.

4. Instrumentation Inside of Shielded Cubicles (75-8/6)

- a. This item was originally discussed in IE Report No. 50-302/75-8, Details III, paragraph 5, and dealt with potentially high personnel exposures resulting from the maintenance and calibration of instruments located inside of shielded cubicles.
- b. The licensee's architect-engineer had prepared a review of the installation of the instrumentation with proposals for resolution of the installation of the instrumentation. A licensee management representative informed the inspector that the architect-engineer's review was being studied to determine the acceptability of each proposal. Included in the study are frequency requirements for calibration or maintenance, time required to perform work, anticipated radiation levels and resulting personnel exposures, and alternate instrument locations. As this study is incomplete and no final decision has been made on the architect-engineer's proposals, the inspector informed licensee management that this item remains open.

5. Test Procedures for HEPA Filters and Charcoal Adsorbers (76-3/1)

This item was originally discussed in IE Report No. 50-302/76-3, Details II, paragraph 5 and dealt with apparent inadequacies in Test Guide TG-000-55-0, HEPA and Carbon Filter In-place Leak Test, which were identified by the inspector during a review of the test guide. The inspector reviewed revision 1 to the test guide and determined that the revision essentially corrected the inadequacies of the original document. The inspector informed licensee management that he had no further questions and that this item was considered closed.

6. Installation of Primary Sample Coolers

This item was originally discussed in IE Report No. 50-302/75-8, Details III, paragraph 6 and dealt with potentially high personnel exposures from unshielded sample coolers in the primary sample room. As discussed in IE Report No. 50-302/76-7, Details II, paragraph 5, an engineering change notice (ECN-3000) had been issued to install shielding around the primary sample cooler. The inspector observed the shielding and found that the shielding was essentially complete. In response to a question, a licensee representative informed the

inspector that the finished shield would be painted or coated for contamination control rather than leaving the bare lead exposed. The inspector advised licensee management that he had no further questions on the installation.

DETAILS II

Prepared by J E Gordon For 6/4/76
 F. U. Bower, Reactor Inspector Date
 Engineering Support Section No. 1
 Reactor Construction and
 Engineering Support Branch
S. D. Ebner 6/3/76
 S. D. Ebner, Reactor Inspector Date
 Engineering Support Section No. 1
 Reactor Construction and Engineering
 Support Branch

Dates of Inspection: May 12-14, 1976

Reviewed by J E Gordon 6/4/76
 T. E. Conlon, Chief Date
 Engineering Support Section No. 1
 Reactor Construction and Engineering
 Support Branch

1. Persons Contacteda. Florida Power Corporation (FPC)

J. Alberdi - Project Manager
 R. C. Bonner - Electrical Construction Supervisor
 E. E. Froats - QA Supervisor
 D. Olsen - QA Engineer, Instrumentation
 T. Baker - Records Supervisor
 C. Snipes - QA Engineer, Electrical

b. Gilbert Associates, Inc. (GAI)

S. Hunt - QC Electrical Engineer

2. Scope of Inspection

An examination was performed of a sample of the Class 1E equipment QC records for a selected group of such items to determine what test and inspection qualifications had been certified by the appropriate agencies. The groupings of equipment from which the samples were chosen included:

- a. Switchgear
- b. Motor Control Center

- c. Valve Operators
- d. Motors
- e. Logic Equipment
- f. Cable
- g. Diesel Generator Control Equipment

The qualification parameters examined for this sample included:

- a. Equipment Design Specification Requirements
- b. Test Plan
- c. Test Set-up
- d. Test Procedure
- e. Acceptability

3. Conclusions

Within the framework of the general requirements as set forth in the licensing documents and the specific requirements as defined in the procurement, "Requirement Outlines," no items of noncompliance were noted and there are no further questions other than that noted as Unresolved Item 76-9/1 as discussed in paragraph 4.f.

4. General Discussions of Inspection Items

a. Switchgear

480V Unit substation ES-3A was selected for examination. Requirement Outline (RO) 2936 set forth the equipment qualifications and acceptance criteria and formed the basis for competitive quotations by the several manufacturers of this type equipment.

Examination of the QC records produced documents confirming that all required tests, inspections and certifications had been performed and the acceptance criteria had been met or exceeded in all cases.

No items of noncompliance were identified and there are no further questions.

b. Valve Operators (In Containment)

The item selected for review was the motor operator for valve number CAV-126. This valve is in the chemical additions system and is physically located inside the containment structure. Procurement requirements and acceptance criteria were established by RO-2951. A standard model Limitorque operator was specified with the special capabilities necessary to perform satisfactorily

in the seismic and post accident environments imposed by the licensing requirements.

A search of the QC records produced documentation confirming that all required tests and inspections had been performed and the acceptance criteria had been met.

No items of noncompliance were identified and there are no further questions.

c. Motor Control Centers

Motor Control Center (MCC) 3B-2 was selected for examination. This is a 480V unit serving engineered safeguards loads. RO-3085 listed the general and specific requirements and acceptance criteria for all components as well as the total assembly.

A search of the QC record file produced documentation of all required tests, inspections and certifications of acceptability for each of the listed requirements.

No items of noncompliance were identified and there are no further questions.

d. Cable

All voltage ranges of the power and control cables were selected for examination. These cables were furnished by the Kerite Company. Requirements governing the performance parameters of these cables were established by RO-3081.

A search of the QC records produced documents confirming that all required tests and inspections had been performed and the results accepted by the reviewing agencies. Tests and inspections were specified for qualifications of the several general types of cables required in the environments anticipated by the licensee's technical consultants. Test results were available and accepted for the full range of tests as described in industry standards such as IPCEA, IEEE and NEMA. Additionally, special fire propagation tests, radiation exposure tests and elevated pressure, temperature and humidity tests were performed with the results acceptable to the licensee's examiners.

No items of noncompliance were identified and there are no further questions.

e. Engineered Safety Features Logic Cabinets

The inspector selected pressure switch cabinets which are part of the engineered safety feature relative to the containment pressure system for audit. The design requirements for these cabinets are specified in Requirement Outline RO-3065, "Engineered Safeguards Actuation Relay Cabinets" which was prepared by Gilbert Associates, Inc. (GAI). RO-3065 also contains requirements for the engineered safeguard actuation and relay cabinets.

Paragraph 2.04 requires compliance with all applicable NEMA, USAS, ASTM, ASME, IPCEA, EEI, IEEE, UL and other such regular published and accepted standards and paragraph 2.12 requires shop tests and certification of proof of conformance.

Paragraph 3.12.3, "Qualifications Tests," subitem 4, requires two pressure switch cabinets, cabinet 3A4 and one other be seismic tested in each of three perpendicular axes in accordance with paragraph 3.11.2. The specification required monitoring of a representative number of circuits, such that the tested items would be instrumented to measure "g" loads and that nondestructive measurements be performed before and after application of vibration forces. Paragraph 3.11.3 specified the test to be documented to provide proof that the equipment will meet minimum requirements without malfunctions when tested per RO-3065 and IEEE-344.

The cabinets were fabricated by Unit Electric Control (UEC) in accordance with RO-3065 and purchase order PR3-3679. The QA records indicate that shop tests and inspections were performed. The files contain GAI certificates of inspection, reports of witnessing of tests, seismic test procedures and inspection tests. The records indicate the seismic qualification tests were performed by Radiation, Inc. on cabinets PSC-3A4 and PSC-3A1. Seismic test results are documented in Radiation, Inc. Report 6984, "Seismic Qualification Test Program," and all units successfully met the RO-3065 specifications including circuit continuity during vibration testing. The test results were reviewed by GAI without comment. Report 6984 also included the test results of seismic tests on ES actuation cabinets 5C, 5D, 3, 3A and 3B.

f. Diesel Generator and Associated Electrical Cabinets

The design requirements for the diesel generator and associated equipment are specified in requirements outline RO-2820 prepared

by GAI. Paragraph 2.04 is the standard GAI paragraph which requires conformance to the applicable industry codes and standards. Paragraph 5.02 states the unit must start and accept load within 10 seconds and this requirement must be proven. In addition, the reliability of the unit must be proven by factory test demonstrations of 99 out of 100 successful consecutive starts per paragraph 5.03.

Paragraph 12.01 states that the unit must be capable of operation with the fire protection system in operation. Additional requirements of paragraph 12 require hi-pot tests of field windings, windings and control circuits. All normally accepted shop tests shall be performed and pressure containing systems are to be hydrostatically tested. Paragraph 17 details seismic requirements for the systems components. The diesel generator system was procured from Fairbanks Morse (F-M) Division of Colt Industries under purchase order PR3-1218.

The QA records for PR3-1218 contained objective evidence of material certifications, shop tests, inspections, and qualification data. The records were extensive and included certificates of shop inspection for compressed air tanks in accordance with ASME requirements, documentation of IEEE-115 tests required for generating machines, and certificates of inspection for electrical cabinets.

Performance test results demonstrating conformance with design requirements for voltage dip (less than 30%) and load acceptance (full load within 30 seconds) were available as were mechanical tests (including hydrostatic tests of starting air and jacket coolant system) conducted per procedure 2269CC. Electrical shop tests were conducted in accordance with applicable specifications and procedure 11-866-985.

The 100 start reliability requirement was proved by type test conducted in October 1968 on model 38TD8 1/8 systems which is the type model supplied to Crystal River 3. Seismic qualification was by calculation and covered eight items including electrical control cabinet. Horizontal and vertical mode analysis was performed using computer codes. The analysis appeared to be complete and to verify design requirements.

Paragraph 12.01 of the requirements outline specified that the diesel generator system must be capable of operating with the fire protection system in operation. There was information available which would support the contention that this requirement could be met by the system. An inspection of the installed system revealed that the diesel generator Class IE cabinets had circulating fans installed on the top surfaces which were essentially open to the ambient environment. The fire protection spray system is installed above the cabinets and it appears that upon spray actuation, the water could enter the cabinets through the fan opening and possibly impair the functional operation of the cabinets.

This was discussed with the licensee and it was stated that the situation would be remedied and an audit of other Class IE equipment would be conducted. This is identified as Unresolved Item 76-9/1.

g. Motor In Containment

The inspector selected the motor in the reactor building fan assemblies for audit. The design requirements for this system are detailed in requirements outline RO-2787 prepared by GAI. GAI standard paragraph 2.04 specified that the applicable codes and standards shall be applicable. Paragraph 3.04.5 stated that the equipment may be subject to spray water containing 1% by weight sodium thiosulfate, 1.3% by weight boric acid and sufficient sodium hydroxide to establish a pH of 9.5. Paragraph 3.04.7 delineated motor design requirements to protect against emergency ambient of paragraph 3.03. The motor housing must be able to withstand external pressure of 70 psi and the motor insulation must withstand an accumulated radiation dose of 10⁷ rads. The original issue of RO-2787 was revised by Addendum A to specify the motor to be a Westinghouse unit. Seismic requirements were specified in paragraph 3.05 and factory tests were required by paragraph 3.06. Addendum A specified in paragraph 3.04.7, sub-item 10, that the motor should be qualified for intended service by prototype test.

The Reactor Containment Fan Cooler (RCFC) System was procured from Westinghouse under purchase order PR3-1199. The QA records for PR3-1199 contained objective evidence of performance of specified shop and factory tests. Certifications of RCFC motor shop tests performed by Westinghouse, Buffalo Division, were available for AHF-1A, 1B, and 1C. Reports of commercial tests for induction motors including no-load, voltage, current, speed, and dielectric tests in water submersion were available. Westinghouse quality release forms verified pressure tests and performance tests per procedure T-70A23-A. GAI certificates of inspection for all three units were also available. Sturtevant Laboratory Performance Test T-70A23-A for Fan Type 360S was performed to verify performance in accordance with AMCA Bulletin 210.

The documentation cited the following Westinghouse Reports as evidence of qualification of the motor and of the reactor fan cooler system:

| <u>Component</u> | <u>Report</u> |
|--------------------|---------------|
| Motor Insulation | WCA-7343-L |
| Motor Cable Splice | WCAP-9003 |
| Motor Unit | WCAP-9003 |

The data noted that the above tests did not include the effects of sodium thiosulphate spray but that the motor does not see the spray because of protective enclosures. It was noted that the above reports were submitted to the NRC for evaluation. They were not available at Crystal River and the final disposition with regard to adequacy is referred to NRC-NRR.