UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-302/95-14

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: June 25 through August 5, 1995

Inspector: R. Butcher for 9/1/95
R. Butcher, Senior Resident Inspector Date Signed

Accompanying Inspectors:

R. Carrion, Radiation Specialist
T. Cooper, Resident Inspector
D. Forbes, Radiation Specialist
T. Volk, Physical Science Technician

Approved by: K. Landis 8/31/95
K. Landis, Acting Branch Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

These inspections were conducted by the resident and Regional inspectors in the areas of plant operations, surveillance observations, maintenance observations, plant support, self assessment, on-site engineering evaluation, on-site follow-up of written reports of non-routine events and 10 CFR Part 21 reviews, plant operations follow-up, maintenance activities follow-up, engineering activities follow-up, radioactive waste treatment, effluent and environmental monitoring, solid radioactive waste management, and transportation of radioactive materials. Numerous facility tours were conducted and facility operations observed. Backshift inspections were conducted on June 27, 30; July 13, 16, 18, 19, 20, 22, 27, 28, 29, 31; and August 1, 2, 1995.

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Results:

During this inspection period, the inspectors had comments and findings in the following areas:

Plant Operations:

Within the scope of this inspection, the inspectors determined that the licensee continued to demonstrate satisfactory performance to ensure safe plant operations.

The decision to declare the B EGDG inoperable due to oil loss through a defective breather cap was considered a conservative and prudent call and is considered a strength. (paragraph 1.8.2.1)

The licensee's preparations for Tropical Storm Erin were timely, proactive, and very conservative. This was identified as a strength. (paragraph 1.1.2.5)

Maintenance:

A Non-Cited Violation (50-302/95-14-03) was identified regarding the failure to follow procedure for the installation of control complex habitability envelope door seals. (paragraph 1.3.2)

Engineering:

A Non-Cited Violation (50-302/95-14-01) was identified regarding the potential for loss of the Nuclear Services Closed Cooling Water pumps due to a postulated fire in the remote shutdown panel room. (paragraph 1.10.2.3)

A Violation (50-302/95-14-02) was identified regarding the failure to maintain separation per 10 CFR 50, Appendix R, for the two trains of the makeup and purification system. (paragraph 1.10.2.4)

An **Unresolved Item (50-302/95-14-04) was identified concerning available emergency feedwater for natural circulation cooldown. (paragraph 1.10.2.1)

**Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

Plant Support:

The licensee's organization of its Chemistry Department and Radwaste Group satisfied Technical Specification requirements. (paragraph 2.1.2)

The licensee demonstrated that a good Count Room radiochemical analysis program was in place, including an effective program in place to maintain the calibration of its detectors. (paragraph 2.2.2)

The Annual Radioactive Effluent Release Report indicated that doses to the public due to licensee operations were minimal. (paragraph 2.3.2)

The licensee had an effective program in place to analyze radiological effluents, direct radiation, etc. due to plant operations. (paragraph 2.4.2)

The concerns presented in IN 94-81 were not an issue at Crystal River. (paragraph 2.5.2)

The licensee's radwaste shipping documentation was thorough and in compliance with the applicable regulations. (paragraph 2.6.2)

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REPORT DETAILS

1.0 Persons Contacted

1.1 Licensee Employees

W. Bandhauer, Nuclear Shift Manager
*D Bates, Manager, Quality Systems
*P. Beard, Senior Vice President Nuclear Operations
G. Boldt, Vice President Nuclear Production
*J. Campbell, Manager, Nuclear Plant Technical Support
*R. Davis, Manager, Nuclear Plant Maintenance
G. Halnon, Manager, Nuclear Plant Operations
*B. Hickle, Director, Nuclear Plant Operations
*L. Kelley, Director, Nuclear Operations Site Support
*G. Longhouser, Manager, Nuclear Security
W. Marshall, Nuclear Shift Manager
*J. Maseda, Manager, Nuclear Engineering Design
*P. McKee, Director, Quality Programs
*R. McLaughlin, Nuclear Regulatory Specialist
*B. Moore, Production Manager
W. Neuman, Senior Nuclear Operations Engineer
*S. Robinson, Manager, Nuclear Quality Assurance
W. Rossfeld, Manager, Site Nuclear Services
*L. Santilli, Manager, Electrical Maintenance
W. Stephenson, Nuclear Shift Manager
F. Sullivan, Nuclear Shift Manager
*P. Tanguay, Director, Nuclear Engineering and Projects
*D. Wilder, Manager, Radiation Protection
G. Wilson, Nuclear Shift Manager
*K. Wilson, Manager, Nuclear Licensing

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation, and corporate personnel.

1.2 NRC Resident Inspectors

*R. Butcher, Senior Resident Inspector
*T. Cooper, Resident Inspector

*Attended exit interview

1.3 Other NRC Personnel on Site

R. Carrion, Radiation Specialist, Region II
D. Forbes, Radiation Specialist, Region II
P. Kellogg, Operational Programs Section Chief, Region II
L. King, Reactor Inspector, Region II
M. Miller, Resident Inspector, St. Lucie Nuclear Plant
T. Peebles, Operations Branch Chief, Region II
W. Tobin, Sr. Physical Security Specialist, Region II
S. Young, NRR
T. Volk, Physical Science Technician, Region II

2.0 Other NRC Inspections Performed During This Period

2.1 From July 10 through 14, 1995, Mr. P. Kellogg, Operational Programs Section Chief, Region II (on site part time), Mr. T. Peebles, Operations Branch Chief, Region II (on site part time), and Mr. L. King, Reactor Inspector, Region II, were on site to conduct a followup inspection of the licensee's Service Water System Self Assessment. The results of this inspection will be documented in Report 50-302/95-10.

2.2 On July 10, 1995, Mr. M. Miller, Resident Inspector at the St. Lucie NP was on site to renew his badge and tour the CR facility. The St. Lucie residents are required to be prepared to respond to the CR site if required. No inspection report will be issued.

2.3 From July 24 through 28, 1995, Mr. W. Tobin, Sr. Physical Security Specialist, Region II, conducted an inspection in the safeguards area. The results of this inspection will be documented in Report 50-302/95-12.

2.4 From July 24 through 28, 1995, Mr. R. Carrion, Radiation Specialist; D. Forbes, Radiation Specialist; and T. Volk, Physical Science Technician (on site July 24 through 26), Region II; were on site to conduct a confirmatory measurements inspection. The results of this inspection is attached as attachment two to this Report.

2.5 On August 1, 1995, Mr. S. Young, NRR and Mr. D. Nebuda, U.S. Corps of Engineers, were on site to discuss issues regarding the vehicle bomb rule with the licensee. No inspection report will be issued.

3.0 Plant Status

At the beginning of this reporting period, Unit 3 was operating at 60% power and had been on line since December 4, 1994. The unit power had been reduced to allow turbine valve testing and replacement of the condensate pump motor brushes and stoning of the slip rings. The unit was returned to 100% power at 6:00 a.m. on June 25, 1995.

At 2:33 p.m. on July 30, 1995 a 100 MWe power reduction was initiated due to step-up transformer problems (see paragraph 1.8.2.2). The power reduction was completed at 3:14 p.m. The unit was returned to 100% power at 5:57 p.m. on July 30, 1995.

At 4:30 a.m. on August 2, 1995, reactor power was reduced to 95% in anticipation of possible grid fluctuations due to the passage of Hurricane ERIN (downgraded to a Tropical Storm) near the CR-3 facility. The unit was returned to 100% reactor power at 7:55 p.m. on August 2, 1995. (see paragraph 1.1.2.5)

4.0 Exit Interview Summary

The inspection scope and findings for the resident inspection were summarized on August 4, 1995, with those persons indicated in paragraph 1. The inspection scope and findings for the regional inspection were summarized on July 28, 1995. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Type	Item Number	Status	Description and Reference
VIO	50-302/95-14-02	Open	Failure to Maintain Separation per 10 CFR 50, Appendix R for the two trains of the makeup and purification system. (paragraph 1.10.2.4)
NCV	50-302/95-14-01	Closed	Nuclear Services Closed Cycle Cooling Water Pumps 1A/1B Failure Due to Postulated Fire in Remote Shutdown Panel Room. (paragraph 1.10.2.3)
NCV	50-302/95-14-03	Closed	Failure to Follow Procedure for Installation of Control Complex Habitability Envelope Door. (paragraph 1.3.2)
URI	50-302/95-14-04	Open	Available Emergency Feedwater for Natural Circulation Cooldown. (paragraph 1.10.2.1)
LER	50-302/95-007	Closed	Inattention to Detail Causes Delay in Performance of Surveillance Resulting in Violation of Improved Technical Specifications. (paragraph 1.7.2.1)
LER	50-302/94-002	Closed	Performance of Surveillance to Check Power Distribution Breaker Alignment and Power Availability Verification Results in Entry into LCO 3.0.3. (paragraph 1.7.2.2)

Attachment 1
Resident's Inspection
(R. Butcher, T. Cooper)

1.1.0 Plant Operations (71707)

1.1.1 Inspection Scope

Throughout the inspection period, facility tours were conducted to observe operations and maintenance activities in progress. The tours included entries into the protected areas and the radiologically controlled areas of the plant. During these inspections, discussions were held with operators, health physics and instrument and controls technicians, mechanics, security personnel, engineers, supervisors, and plant management. Some operations and maintenance activity observations were conducted during backshifts. Licensee meetings were attended by the inspector to observe planning and management activities. The inspections confirmed FPC's compliance with 10 CFR, Technical Specifications, License Conditions, and Administrative Procedures.

1.1.2 Observations and Findings

1.1.2.1 Organizational changes

Mr. G. Boldt, Vice President, Nuclear Production, will be absent from the site from June 26 through August 11, 1995. In his absence, the following reporting assignment changes were directed by Mr. P. Beard, Sr. Vice President, Nuclear Operations:

- The following personnel now report to Mr. B. Hickle, Director, Nuclear Plant Operations.

  Mr. R. Widell, Director, Nuclear Operations Training

  Mr. B. Moore, Manager, Production

  Mr. H. Koon, Manager, Nuclear Outage

  Mr. P. Skramstad, Administrator, Master Schedule

- Other major reporting changes include Mr. L. Kelly, Director, Nuclear Operations Site Support, reporting to Mr. P. Beard and Mr. J. Campbell, Manager, Nuclear Plant Technical Support, who will report to Mr. P. Tanguay, Director, Nuclear Engineering and Projects.

- Mr. R. Davis, Manager, Nuclear Plant Maintenance, assumed the previous duties of Mr. B. Hickle.

1.1.2.2 A Train ECCS Outage

On July 18, 1995, at 2:00 a.m. the licensee removed the A train ECCS from service for a planned on line system outage. The main reason for this system outage was to repair leaks associated with BSP-1A, BSV-153, DHV-38, and DHV-82, perform PMs on various Limitorque operators, and other general maintenance. Also, divers inspected the A RW pit for debris. Very little marine growth or debris was found and cleaning was not required. The inspectors verified portions of the system tagout and reviewed the A ECCS train outage justification letter and determined that the outage was necessary and beneficial to the reliable operation of the plant. AI-255, System/Component Outage Preparation and Implementation, requires written justification to perform a system outage. The outage justification letter documented the primary reasons for conducting the system outage and determined that there was a safety benefit. The inspectors also reviewed the licensee's PSAM for this system outage. The NSM used a PSAM dated July 17, 1995, with the proposed system outage components taken out of service to verify the system outage was acceptable from a PRA standpoint.

The following equipment and related TS LCOs were in effect. All TS LCOs were for 72 hours.

TS	Affected Equipment	Removed	Returned
3.5.2, Cond.A	DHP-1A	7-18/2:00 a.m.	7-20/1:00 p.m.
3.6.6, Cond.A	BSP-1A	7-18/2:00 a.m.	7-20/1:00 p.m.
3.7.8, Cond.A	DCP-1A	7-18/2:00 a.m.	7-20/2:00 p.m.
3.7.9, Cond.A	RWP-2A	7-18/2:00 a.m.	7-20/5:35 p.m.
3.7.10, Cond.A	RWP-3A	7-18/2:00 a.m.	7-20/2:00 p.m.

1.1.2.3 B Intake Bus Outage

At 5:00 a.m., on July 11, 1995, the licensee removed the MTSW-3H, "B" intake bus from service for transformer replacement. This work was required due to oil breakdown, cellulose failure, and structural failure of tank supports. These transformers are non-safety and are not included in TS. The inspectors reviewed the safety benefit required by AI-255, System/Component Outage Preparation and Implementation and determined that the outage was necessary and beneficial to the reliable operation of the plant. The change out was completed at 8:30 a.m. on July 18, 1995 and the transformers were returned to service.

1.1.2.4 EGDG-1B Outage

On July 25, 1995, the EGDG-1B was removed from service at 3:00 a.m. for a scheduled system outage. TS action statement 3.8.1 Condition B was entered, which has a 72 hour restoration requirement. This outage was the third of three planned for EGDG-1B to perform inspections to account for the longer operating cycle of 24 months.

The inspectors reviewed the determination of a safety benefit, performed as part of AI-255, System/Component Outage Preparation and Implementation, prior to the beginning of the outage and observed work being performed during the performance of the outage. The licensee's determination concluded that the system outage was beneficial from a safety perspective.

The maintenance activities were completed on July 26, 1995. During the performance of SP-354B, Monthly Functional Test of the Emergency Diesel Generator, the EGDG-1B output breaker failed to close. During troubleshooting, the output breaker responded as required and no cause could be determined for the initial failure of the breaker to operate as required. Operations kept the EGDG-1B inoperable until engineering completed an analysis of the impact of the breaker condition on operability. Operations declared the EGDG-1B available for use, but inoperable at 10:00 a.m. on July 27, 1995, following a second successful completion of SP-354B.

Troubleshooting activities could not determine the problem with the breaker. The engineering evaluation was completed, which documented multiple successful tests of the breaker and outlined the requirement for the breaker to be tested additional times during August and September, 1995, by the performance of OP-707, Operation of the ES Emergency Diesel Generators. The TS action statement was exited at 4:20 p.m. on July 27, 1995. See followup EGDG functional test for Hurricane ERIN below.

1.1.2.5 Hurricane ERIN

On July 31, 1995, at 1:00 p.m., the licensee's Violent Weather Committee met to discuss what preparations should be taken due to the increase in strength and development of Tropical Storm ERIN. The licensee has a violent weather procedure, EM-220, Violent Weather, which provides guidance for violent weather preparation and recovery. The licensee initiated action to prepare for a Tropical Storm or a Hurricane Watch. At 11:00 p.m. on July 31, 1995, Tropical Storm ERIN was Upgraded to a Hurricane status.

At approximately 11:00 a.m. on August 1, 1995, Citrus County (CR-3) was included in the hurricane watch area. On August 2, 1995, at 5:00 a.m., ERIN was downgraded to a Tropical Storm. Citrus county was then placed in a Tropical Storm Warning area at that time. The licensee's emergency plan implementing procedure EM-202, Duties of the Emergency Coordinator, Emergency Classification Table for Natural Phenomena, requires entry into an emergency classification only when in a Hurricane Warning. The licensee never entered conditions requiring an emergency classification to be declared. The center of Tropical Storm ERIN passed the west coast of Florida approximately 40 miles south of CR-3 around 12:00 pm on August 2, 1995.

Due to the threat from Hurricane ERIN, the licensee initiated functional tests of the EGDGs to ensure operability. The A EGDG was functionally tested and had high lube oil temperature reading of approximately 190 degrees F. Expected lube oil temperature was approximately 165 degrees F. A second test was conducted and the lube oil temperature remained in the acceptable range. At 7:30 p.m. on August 1, 1995 the A EGDG was declared inoperable but still available. The B EGDG was successfully functionally tested on August 2, 1995 and was declared operable at 7:32 a.m. See paragraph 1.9.2 for the A EGDG retest.

The residents attended the licensee's Violent Weather Committee meetings and monitored the licensee's preparations. The licensee initiated the Violent Weather Committee meetings earlier than procedurally required, initiated early preparations for hurricane weather, and were very well prepared. The licensee's actions were proactive, very conservative and are considered a strength.

1.1.3 Results

Violations or deviations were not identified.

1.2.0 Surveillance Observations (61726)

1.2.1 Inspection Scope

The inspectors observed TS required surveillance testing and verified that the test procedures conformed to the requirements of the TSs; testing was performed in accordance with adequate procedures; test instrumentation was calibrated; limiting conditions for operation were met; test results met acceptance criteria requirements and were reviewed by personnel other than the individual directing the test; deficiencies were identified, as appropriate, and were properly reviewed and resolved by management personnel; and system restoration was adequate. For completed tests, the inspectors verified testing frequencies were met and tests were performed by qualified individuals.

1.2.2 Observations and Findings

The inspectors witnessed/reviewed portions of the following test activities:

- SP-354B Monthly Functional Test of the Emergency Diesel Generator EGDG-1B

- SP-907B Monthly Functional Test of 4160V ES Bus "B" Undervoltage Relaying

- SP-354A Monthly Functional Test of the Emergency Diesel Generator EGDG-1A

1.2.3 Results

The inspectors determined that the above testing activities were performed in a satisfactory manner and met the requirements of the TSs.

Violations or deviations were not identified.

1.3.0 Maintenance Observations (62703)

1.3.1 Inspection Scope

Station maintenance activities of safety-related systems and components were observed and reviewed to ascertain they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and in conformance with the TSs.

The following items were considered during this review, as appropriate: LCOs were met while components or systems were removed from service; approvals were obtained prior to initiating work; activities were accomplished using approved procedures and were inspected as applicable; procedures used were adequate to control the activity; troubleshooting activities were controlled and repair records accurately reflected the maintenance performed; functional testing and/or calibrations were performed prior to returning components or systems to service; QC records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were properly implemented; QC hold points were established and observed where required; fire prevention controls were implemented; outside contractor force activities were controlled in accordance with the approved QA program; and housekeeping was actively pursued.

1.3.2 Observations and Findings

The inspectors witnessed/reviewed portions of the following maintenance activities in progress:

WR NU 0326806 Inspect/Upgrade Valve Internals on RWV-38

WR NU 0323501 Inspect/Upgrade Valve Internals on RWV-37

WR NU 0328073	Calibrate Instrumentation DJ-8-TS, Cooling Water Outlet Alarm
WR NU 0302696	Check Thread Engagement on Upper Air Header on EGDG-1B
WR NU 0297834	Repair Leaking DJP-4, Lube Oil Keepwarm Pump on EGDG-1B
WR NU 327977	Perform Miscellaneous Maintenance on EGDG-1B

The following item was considered noteworthy.

On July 5, 1995 at 4:00 p.m. the licensee declared the installation of the seal on the 143 foot elevation control complex door leading to the turbine building to be outside its design basis. A one hour non-emergency report was made to the NRC under 10 CFR 50.72(b)(1)(ii)(B), Outside Design Basis.

This door (C508) is part of the control complex habitability envelope. This door was used to determine air in-leakage rates for double acting doors. The test configuration oriented the door with the weather strips installed on the positive pressure side of the test assembly and the steel astragel was on the negative side. The negative pressure side of the installed door is the control complex with the turbine building the positive side. The door was installed with the weather strip on the control complex side. As a result, the doors/seals were not installed in the tested configuration.

The licensee performed an operability evaluation per NOD-14, Evaluating Operability and Determining Safety Function Status, and determined that although the door seals were not installed per design, they would have adequately performed the safety function of limiting air in-leakage. PR 95-0118, Incorrect Orientation of C508 Door Seals, was initiated to document this problem and corrective actions. A wooden temporary door enclosure was constructed in order to facilitate rework of the existing door. The work was completed and the door returned to design configuration on July 18, 1995.

TS 5.6.1.1 and Reg Guide 1.33, Revision 2, February 1978, require that procedures be developed and implemented for control of modification work and maintenance which can affect the performance of safety related equipment.

The inspector verified that the design and work instructions for the replacement of the doors did require the correct configuration of the door seals. MAR 91-08-08-01 and WR NU 0312772 required that the weather strips be on the turbine building side of the door and the astragel be on the control complex side of the door. Failure to follow the instructions for the installation of the door is a violation of TS 5.6.1.1. This licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII of the NRC Enforcement Policy. This non-cited violation is identified as NCV 50-302/95-14-03: Failure to Follow Procedure for Installation of Control Complex Habitability Envelope Door.

1.3.3 Results

For those maintenance activities observed, the inspectors determined that the activities were conducted in a satisfactory manner and that the work was properly performed in accordance with approved maintenance work orders.

One non-cited violation was identified for the failure to follow procedures for the installation of a control complex habitability envelope door.

1.4.0 Plant Support (71750)

1.4.1 Inspection Scope

Radiation protection control activities were observed to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements.

In the course of the monthly activities, the inspector included a review of the licensee's physical security program.

The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital areas access controls; searching of personnel, packages, and vehicles; badge issuance and retrieval; escorting of visitors; patrols; and compensatory posts.

Fire protection activities, staffing, and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable.

1.4.2 Observations and Findings

The observations in the health physics program included:

- Entry to and exit from contaminated areas, including step-off pad conditions and disposal of contaminated clothing;
- Area postings and controls;
- Work activity within radiation, high radiation, and contaminated areas;

- RCA exiting practices;

- Proper wearing of personnel monitoring equipment, protective clothing, and respiratory equipment; and

- NRC form 3 and NOVs involving radiological working conditions were posted in accordance with 10 CFR 19.11.

Effluent and environmental monitoring was observed to determine that radiation and meteorological recorders and indicators were operable with no unexplained abnormal traces evident. Other observations verified that control room toxic monitors were operable and that plant chemistry was within TS and procedural limits.

In addition, the inspector observed the operational status of protected area lighting, protected and vital areas barrier integrity, and the security organization interface with operations and maintenance.

On July 15, 1995, the security access building was removed from service to perform renovations. Appropriate compensatory measures have been put in place, as verified by the resident inspectors and a regional inspector. An interim access station has been established as is being utilized.

On July 16, 1995, Security notified the main control room of the discovery of a small alligator at the entrance to the elevator for the Maintenance Support Building. Operations investigated and found an alligator of approximately three feet in length. The animal was removed unharmed to the surrounding swamp area south of the generating site. Security investigated and determined that the alligator had gained access through a small opening, which is within the requirements for maximum opening size.

1.4.3 Results

The implementation of the plant support program observed during this inspection period were proper and conservative.

A change in the Nuclear Chemistry and Radiation Protection areas was announced. Ms. S. Johnson's position of Manager, Nuclear Chemistry and Radiation Protection will be deleted. Mr. D. Wilder, Manager, Radiation Protection, and Mr. R. Fuller, Manager, Nuclear Chemistry, will now report directly to the Director, Nuclear Plant Operations. Ms. S. Johnson will serve as the Acting Director, Nuclear Operations Training, from September 1 through mid-December. Mr. R. Widell, Director of Nuclear Operations Training, will be in engineering training during that time period.

Violations or deviations were not identified.

1.5.0 Self Assessment (40500)

1.5.1 Inspection Scope

The licensee routinely performs Quality Program audits of plant activities as required under its QA program or as requested by management. To assess the effectiveness of these licensee audits, the inspectors examined the status, scope, findings and recommendations of the audit reports.

1.5.2 Observations and Findings

The inspectors reviewed the following audit report.

REPORT NO.	TITLE	NO. OF FINDINGS	NO. OF RECOMMENDATIONS
95-06-ISEC	Nuclear Security	0	16

No findings were identified by the licensee's audit program. Plant management is aware of the recommendations.

1.5.3 Results

Violations or deviations were not identified.

1.6.0 Onsite Engineering Evaluation (37551)

1.6.1 Inspection Scope

The inspectors performed an assessment of the onsite engineering function to determine the effectiveness of the onsite engineering staff. This includes onsite design engineers, system engineers, component engineers, shop engineers, and any onsite staff providing engineering support to enhance the plant performance.

1.6.2 Observations and Findings

On June 30, 1995, the design engineering personnel from the general office were permanently relocated to the site. This has the potential of improving the interface between design engineering and the site personnel.

1.6.3 Results

Violations or deviations were not identified.

1.7.0 Onsite Follow-up and In-Office Review of Written Reports of Non-routine Events and 10 CFR Part 21 Reviews (92700)

1.7.1 Inspection Scope

The Licensee Event Reports and/or 10 CFR Part 21 Reports discussed below were reviewed. The inspectors verified that reporting requirements had been met, root cause analysis was performed, corrective actions appeared appropriate, and generic applicability had been considered. Additionally, the inspectors verified the licensee had reviewed each event, corrective actions were implemented, responsibility for corrective actions not fully completed was clearly assigned, safety questions had been evaluated and resolved, and violations of regulations or TS conditions had been identified. When applicable, the criteria of 10 CFR Part 2, Appendix C, were applied.

1.7.2 Observations and Findings

1.7.2.1 (Closed) LER 50-302/95-007, Inattention to Detail Causes Delay in Performance of Surveillance Resulting in Violation of Improved Technical Specifications

The inspectors reviewed the LER and its corrective action plan. This LER was written due to the late performance of a daily surveillance. The late surveillance involved the daily heat power comparison. This test verifies that the neutron monitors are reading within two percent of the calorimetric power readings. The licensee determined, in their evaluation, that there was no safety impact as a result of the late surveillance. The surveillance was performed 30 minutes outside of the surveillance window. The performance was satisfactory, indicative of no equipment failure during the 30 minutes. The personnel involved have been counseled, the other Operations personnel have been informed of the event through an Operations Study Book entry, the surveillance procedure was revised to provide a note detailing the time at which the procedure is to be completed, and the surveillance log procedure was revised to provide completion times for other time sensitive surveillances. The inspectors verified that all of the required corrective actions have been completed. This LER is closed.

1.7.2.2 (Closed) LER 50-302/94-002, Performance of Surveillance to Check Power Distribution Breaker Alignment and Power Availability Verification Results in Entry into LCO 3.0.3

The inspectors reviewed the corrective actions for this LER, which involved an overvoltage condition on the 4160 VAC ES buses. The licensee analyzed the voltage requirements and determined that the procedural requirements that had been exceeded were over-conservative. The inspector verified the licensee's corrective actions, including revision and issuance of the surveillance procedure, with new acceptance criteria included. This LER is closed.

1.7.3 Results

Violations or deviations were not identified.

1.8.0 Plant Operations Follow-up (92901)

1.8.1 Inspection Scope

The open items addressed below were inspected to determine that adequate corrective actions have been taken, their root causes have been identified, their generic implications have been addressed, and that the licensee's procedures and practices have been appropriately modified to prevent recurrence.

1.8.2 Observations and Findings

1.8.2.1 Inoperable EGDG 1B

On June 28, 1995, at 6:50 p.m., the resident was notified by the licensee that they had declared the B EGDG inoperable at 5:20 p.m. The licensee had identified earlier in the day that there was an oil leak associated with the right angle fan drive gear. Approximately one gallon of oil had leaked out during a previous EGDG run. The breather cap was found not to have a vent screen inside the cap. The licensee entered TS 3.8.1, AC Sources-Operating, Condition B, which placed them in a 72 hour LCO. The licensee performed the required surveillance. The breather cap was modified and to prove operability, a four hour run was performed. Following the four hour EGDG run, no evidence of oil leakage was found. The EGDG was declared operable at 8:30 a.m. on June 29, 1995. The residents witnessed the post run examination of the B EGDG for evidence of leakage. The decision by the licensee to declare the B EGDG inoperable was considered a conservative and prudent call and is considered a strength.

1.8.2.2 A Phase Step-up Transformer Alarm

On July 30, 1995, at 10:47 a.m., the control room received an alarm on the A phase step-up transformer. The alarm was caused by the loss of two banks of step-up transformer cooling fans and their associated oil pumps. Each transformer has five banks of cooling fans. Each bank consists of three fans and one oil pump. Local investigation identified a tripped supply breaker in the transformer control panel. At 2:33 p.m., a 100 MW_e power reduction was initiated due to increased winding temperatures. The Relay personnel were successful in resetting the tripped breaker at 2:50 p.m. The power reduction to 787 MW_e was completed at 3:14 p.m. A power increase was initiated at 4:00 p.m. and

100% power was reached at 5:57 p.m. There have been several instances of the loss of step-up transformer cooling fans due to tripped breakers recently. The licensee is investigating breaker replacement options. The inspectors will follow the licensee's actions in regard to this problem.

1.8.2.3 Technical Support Center Ventilation

In IR 50-302/94-05, paragraph 3.a, the inspectors noted several problems with the TSC ventilation system, specifically; the need for clear directions on actions to be taken if the TSC becomes uninhabitable and the need for a review and upgrade of the TSC ventilation PM program.

The inspectors have reviewed the actions taken by the licensee, following the issuance of IR 50-302/94-05. On May 26, 1995, revision 29 to EM-102, Activation, Operation, and Staffing of the Technical Support Center and Operational Support Center, was issued which included direction to relocate minimal staffing from the TSC to the rooms adjacent to the main control room as the alternate TSC. The ventilation system is now included in a monthly monitoring program and maintenance is scheduled as indicated. No recent problems have been noted.

1.8.3 Results

Violations and deviations were not identified.

1.9.0 Maintenance Activities Follow-up (92902)

1.9.1 Inspection Scope

The item addressed below was inspected following the passage of Hurricane Erin.

1.9.2 Observation and Findings

Following the passing of Tropical Storm Erin, the decision was made to begin maintenance on DJV-67, the jacket cooling three-way temperature control valve on EGDG-1A. At 7:00 p.m. on August 2, 1995 EGDG-1A was removed from service and tagged out to allow replacement of the valve.

DJV-67 contains six "pills" which start growing at 155°F and reach full length at 170°F. This allows some of the jacket cooling water to be recirculated rather than travel through the radiator. When these "pills" stick, it results in elevated operating temperatures.

Maintenance was completed on DJV-67 at 5:00 a.m. on August 3, 1995. Restoration of the system was completed and the EGDG-1A post-maintenance test begun at 8:08 a.m. Lube oil temperatures remained normal through-out the test. EGDG-1A was declared operable at 4:10 p.m. on August 3, 1995.

1.9.3 Results

Violations and deviations were not identified.

1.10.0 Engineering Activities Follow-up (92903)

1.10.1 Inspection Scope

The open items addressed below were inspected to determine that adequate corrective actions have been taken, their root causes have been identified, their generic implications have been addressed, and that the licensee's procedures and practices have been appropriately modified to prevent recurrence.

1.10.2 Observation and Findings

1.10.2.1 Natural Circulation Cooldown

Generic Letter 81-21, Natural Circulation Cooldown, dated May 5, 1981, requested licensees to provide an assessment of the capability of their facilities, procedures, and operator training to handle a natural circulation cooldown. Specifically, GL 81-21 stated that the licensee should demonstrate (by analysis or test) that a controlled natural circulation cooldown from operating conditions to cold shutdown conditions should not result in reactor vessel voiding and that the licensee should verify that supplies of condensate grade auxiliary feedwater are sufficient to support the licensee's cooldown method. By letter dated June 6, 1986, the NRC issued an SER concluding, based on the licensee's submittals, that the licensee's responses were acceptable. The SER stated that the CR-3 condensate grade auxiliary feedwater supplies were sufficient to support a natural circulation cooldown. Specifically, the TS minimum volume of 150,000 gal. in the condensate storage tank would support a 15 hour cooldown and the condenser hotwell (100,000 gallons) and the demineralized water tank (200,000 gallons) would be sufficient to support the licensee's analyzed maximum cooldown time of 32 hours.

Subsequently, by letter dated January 15, 1987, the licensee submitted revised data regarding natural circulation cooldown criteria. The significant results of the revised analysis were as follows:

- The minimum time to cool down to 280 degrees F is about 45 hours.

- The minimum feedwater requirement for cooldown is about 350,000 gallons.

- The minimum cooldown rate for the above numbers is about 8.5 degrees F/hr.

Attachment D to the January 15, 1987 letter listed the sources of emergency feedwater at the CR-3 site. At that time, approximately 289,000 gallons were controlled by TSs. By letter dated March 25, 1988, the NRC issued another SER accepting the licensee's revised submittal data.

Again, by letter dated April 24, 1991, the licensee notified the NRC of revised data regarding natural circulation cooldown capabilities. The new data reflected the following significant changes.

- Natural circulation cooldown will require approximately 150 hours and require approximately 735,000 gallons of water.

- The FSAR, Table 10-2, listed preferred emergency feedwater sources available at the CR site (fossil and nuclear) which totaled 1,304,000 gallons of which 990,000 gallons were controlled as TS requirements.

On July 11, 1995, the residents questioned the amount of emergency feedwater that the licensee would have available for a natural circulation cooldown to 280 degrees F (the point at which the plant could be placed on the decay heat removal system). TS 3.7.6, Emergency Feedwater (EFW) Tank, requires an EFW tank volume of 150,000 gallons. There are no other TS required volumes of water. Also, the residents could find no administrative controls to assure there would be 735,000 gallons of water available to ensure the capability to perform a natural circulation cooldown to 280 degrees F. The current FSAR (revision 20), Table 10-2, erroneously states that there are 450,000 gallons of TS controlled EFW.

The inspectors have discussed this issue with the licensee management. The licensee is reviewing the available water onsite, to assure sufficient water is available to meet natural circulation cooldown requirements. The inspectors have verified that the emergency feedwater condensate storage tank, the condensate storage tank, and the hotwell are available, along with other tanks, with sufficient water to assure that no immediate safety concerns exist.

The discrepancy between the licensee's responses to GL 81-21, FSAR Table 10-2, and the actual controlled EFW (TS or administratively) available for a natural circulation cooldown will be followed up as URI 50-302/95-14-04, Available Emergency Feedwater for Natural Circulation Cooldown.

1.10.2.2 MUV-64 Modifications

On August 22, 1984, the NRC, in a letter to the licensee, discussed the removal of the ES closure signal from the MUT isolation valve, MUV-64. In this letter, it was recognized that if operator action were not taken within five minutes of an ES actuation to establish suction from the BWST, the normally running MUP would be damaged. The letter also addresses the fact that the standby MUP also starts on an ES actuation signal and takes suction only from the BWST.

The NRC concluded that removal of the ES closure signal from MUV-64 would not cause unacceptable reactor coolant boron dilution during emergencies prior to the manual isolation of MUV-64. It was concluded that because a redundant HPI pump would be available, the licensee taking manual action to isolate MUV-64 in less than 10 minutes following an ES actuation would be acceptable.

In a letter dated August 6, 1985, the licensee notified the NRC of their intention of locking MUV-64 open, for Appendix R considerations. In addition, to ensure a continuous water supply to the pumps, a low level MUT signal (18 inches) was inserted into the open circuits of MUV-58 and MUV-73, the outlet valves from the BWST to the MUPs. An alarm was added to alert the operator that the pump suction was shifted from the MUT to the BWST.

The resident inspectors reviewed the modifications and have no immediate operability concerns. These modifications were performed with the stated purpose of protecting the MUPs from loss of suction water and subsequent damage caused by spurious ESFAS signals, as well as spurious closure signals postulated by a fire under Appendix R considerations.

1.10.2.3 SW Pumps Outside Design Basis

On July 7, 1995 at 5:00 p.m. the licensee determined that the SW pumps were subject to failure due to a postulated fire in the remote shutdown room area (fire area CC-108-102). In the process of analyzing circuitry for the Appendix R reanalysis effort, a concern was discovered regarding remote shutdown circuits in fire area CC-108-102 and compliance to existing criteria. The specific circuits of concern (SWM44 for SWP-1A and SWM47 for SWP-1B) terminated at the remote shutdown panel and should fail safe for a fire in the CC-108-102 fire area which contains the remote shutdown panel. However, the existing design would have allowed certain fire induced shorts or grounds on some of the conductors in each of the SWP cables to fail the respective pump. This event was called into the NRC Duty officer at 5:42 p.m. on July 7, 1995 under 10 CFR 50.72(b)(1)(ii)(B), Outside Design Basis. PR 95-121, SWP-1A/1B Failure Due to Fire in Fire Area CC-108-102, was written to document this problem and corrective actions taken.

The licensee's immediate short term actions were to realign the SW system to maintain the B SWP running (which would not then be affected by a fire) and to maintain an existing one hour roving fire watch. The inspectors verified that the roving fire watch was making the required hourly fire patrols. MAR 95-07-03-01, SWP-1A/1B Control Power Circuit Revision, was issued to modify the affected circuits. WR NU 0329144, Perform Electrical Modifications to SWP-1A Control Circuit, and WR NU 0329145, Perform Electrical Modifications to SWP-1B Control Circuit, were issued to perform the modifications.

SWP-1A was taken out of service at 8:10 p.m. on July 8, 1995, and MAR 95-07-03-01 was accomplished. SWP-1A was returned to service at 11:45 p.m. on July 8, 1995. TS 3.7.7, Nuclear Services Closed Cycle Cooling Water (SW) System, Condition A, was applicable while SWP-1A was out of service.

SWP-1B was taken out of service at 11:05 a.m. on July 9, 1995, and MAR 95-07-03-01 was accomplished. SWP-1B was returned to service at 2:00 p.m. on July 9, 1995. TS 3.7.7, Condition A, was applicable while SWP-1B was out of service.

10 CFR 50, Appendix R, Paragraph III.G, Fire Protection of Safe Shutdown Capability, requires that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or the emergency control station(s) is free of fire damage; and systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

By letter dated January 6, 1983, from the NRC to FPC, the NRC transmitted their safety evaluation of FPC's submittal for safe shutdown capability in the event of a fire at the plant. FPC's proposed safe shutdown capability was evaluated against the requirements of Section III.G and III.L of Appendix R. The SER, Section A, Systems required for Safe Shutdown, states that for hot shutdown and cold shutdown operations, support is provided by (among other listed systems) the nuclear service closed cycle cooling system. The shutdown systems will be monitored and controlled from the control room or the dedicated shutdown panel, local control stations, switchgear, and motor control centers. Section D of the SER states that the design of the dedicated shutdown panel provides electrical isolation from the control room by transfer switches located in the dedicated shutdown auxiliary equipment cabinets. Thus, a fire in either the dedicated shutdown room or the control room will not result in loss of control of the systems needed for safe shutdown at the other location.

However, as reported by the licensee, the circuitry for the two trains of the SW system in the remote shutdown panels did not provide electrical isolation from the control room which could have resulted in the loss of both trains of SW. The failure to provide for electrical isolation of the SW system is a violation of 10 CFR 50, Appendix R. This licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII of the NRC Enforcement Policy. This violation is Identified as NCV 50-302/95-14-01, SWP-1A/1B Failure Due to Postulated Fire in Remote Shutdown Panel Room.

1.10.2.4 Continuous Addition of H_2 to the MUT Due to a Fire

On July 7, 1995, at 5:10 p.m., the licensee determined that a fire in either of two locations within the plant could result in continuous addition of H_2 to the MUT which could lead to vortexing in the MUT. Engineering calculation M94-0053, Revision 2, noted that for Hydrogen regulator (MUV-491) settings above 17 psig there would be less than eight hours for operators to take action in isolating MUT-1 under certain scenarios. The two scenarios are:

(1) A fire in the auxiliary building on the 119 foot elevation near MUV-143 (an in-line solenoid operated valve that isolates the H_2 regulator and its bypass line from the MUT). A hot short occurs resulting in the solenoid valve opening providing a continuous supply of hydrogen to MUT-1. Due to normal RCS make-up (or make-up due to cooldown if the reactor is tripped) the level in the MUT-1 would decrease to a point where vortexing in MUT-1 causes the failure of the running MUP. The other train is still available providing one MUP for RCS make-up.

(2) The A train MUP is the running MUP aligned to MUT-1. The fire is in the 95 foot elevation of the auxiliary building. The fire causes a hot short opening MUV-143. The fire also damages the circuitry for the B train MUP thus making it unavailable. The level in the MUT decreases, even with the BWST valve opened, to a point where vortexing in the MUT damages the running A train MUP. No MUPs (which are the ES high pressure injection pumps) are then available. No operator guidance is available in the APs to mitigate this event. The shortest credible time frame to begin vortexing is slightly more than 30 minutes using design numbers.

The licensee initiated PR 95-0122, MUT-1 Vortexing and Appendix R Scenario, to document this concern and corrective actions. The NRC was notified at 5:43 p.m. on July 7, 1995 per 10 CFR 50.72(b)(1)(ii)(B), Outside Design Basis.

The engineering calculations indicate that the MUT level would have to decrease to less than zero level indication in the MUT for vortexing to occur. At an indicated level of 18 inches, the isolation valve to the BWST would automatically open, providing BWST water. However, as noted above, as the MUT level continued to decrease, the H_2 pressure in the MUT would be great enough to result in vortexing and damage to the MUPs.

As an immediate corrective action, the licensee tagged closed the manual isolation valves (MUV-492 and MUV-493). With these valves closed, a hot short on MUV-143 is no longer a problem. An Operations study book entry (9507.02) dated July 10, 1995 was issued to inform operators of the concern.

Included in the operations study book entry was a section on lessons learned, which addressed adding hydrogen to the makeup tank and opening MUV-492 or MUV-493 under a clearance. The building operator must stay in the vicinity of these valves so that in the event of a fire, they can be closed.

10 CFR 50, Appendix R, Paragraph III.G, Fire Protection of Safe Shutdown Capability, requires, in part, that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or the emergency control station(s) is free of fire damage.

10 CFR 50, Appendix R Fire Study, Revision 4, dated September 10, 1993, paragraph 2.0, Safe Shutdown Systems and Components, states that reactor coolant makeup will be available immediately. Redundant flow paths from the BWST to the charging pumps and normal charging lines provide the redundant sources. Paragraph 2.3.11.2, Discussion of Required Components, states that only one makeup pump is required for shutdown following a fire.

The failure to maintain the makeup and purification system design such that a single postulated fire could not render both trains of makeup inoperable is a violation of 10 CFR 50, Appendix R. This violation will be tracked as 50-302/95-14-02: Failure to Maintain Separation per 10 CFR 50, Appendix R, for the two trains of makeup pumps in the makeup and purification system.

1.10.3 Results

One violation was identified for an Appendix R concern with the makeup and purification system. One non-cited violation was identified for an Appendix R concern with the nuclear services closed cycle cooling system. One unresolved item was identified for adequacy of available emergency feedwater for natural circulation cooldown.

Attachment 2
Regional Inspection
(R. Carrion, D. Forbes, T. Volk)

2.1.0 Chemistry and Radwaste Organization and Staffing (84750 and 86750)

2.1.1 Inspection Scope

The inspectors reviewed the licensee's chemistry and radwaste organizations to evaluate compliance with requirements.

2.1.2 Observations and Findings

Technical Specification (TS) 5.2.1 describes the licensee's organization.

The inspectors reviewed and discussed the licensee's chemistry and radwaste shipping organizations with licensee representatives. A reorganization had begun to restructure both groups. The Nuclear Chemistry and Radiation Protection Division was being divided into two separate entities, the Chemistry Division and the Radiation Protection Division, whose respective manager will report to the Director of Nuclear Plant Operations. The current manager of the combined pre-divided organization was scheduled to begin a new assignment in the Training Division. The two Chemistry and Radiation Protection Specialists responsible for the shipping of radioactive materials were scheduled to become members of the Maintenance Division and Training Division, respectively. (The technicians who prepare packages for shipping are part of the Maintenance Division. Therefore, the coordination of work assignments was expected to be enhanced by the move.) Although the Nuclear Chemistry Manager had been changed since the last inspection (Inspection 94-21), the organization was stable.

Based on observations made throughout the inspection, the inspectors concluded that the licensee's organization was in compliance with the TSs.

2.1.3 Results

No violations or deviations were identified.

2.2.0 Confirmatory Measurements (84750)

2.2.1 Inspection Scope

The inspectors performed an evaluation to ensure that the licensee effectively controls, monitors, and quantifies releases of radioactive materials in liquid, gaseous, and particulate forms to the environment.

2.2.2 Observations and Findings

Per 10 CFR 20.1501, the licensee is required to perform surveys as necessary to evaluate the extent of radiation hazards.

2.2.2.1 Gamma-Emitting Radioisotopes

To evaluate the licensee's analytical capability to make consistently accurate radioactivity measurements, seven samples were analyzed for their radionuclide concentrations by the licensee and the NRC Region II mobile laboratory, including: two different reactor coolant system (RCS) samples, a liquid sample from the Spent Fuel Pool, a liquid sample from the Shower and Laundry Sump, a gaseous sample from the surge tank, a particulate filter spiked with RCS liquid, and an NRC-spiked charcoal cartridge. The purpose of these comparative measurements was to verify the licensee's capability to accurately detect and identify gamma-emitting radionuclides and to quantify their concentrations. The licensee analyzed all samples in its Chemistry Counting Room, which was equipped with three high purity Germanium gamma spectroscopy detectors.

The inspectors reviewed calibration curves for various geometries of the three detectors. Each detector had been calibrated for sixteen geometries. The calibration curves were developed using mixed gamma sources (which typically contained Cd-109, Co-57, Ce-139, Hg-203, Sn-113, Sr-85, Cs-137, Co-60, and Y-88). The licensee used ten sources for the various geometry calibrations. The inspectors reviewed Certificates of Calibration for several of the sources used to generate the referenced calibration curves. Each source was prepared using an aliquot measured gravimetrically from a calibrated master radionuclide solution source. The calibration had been confirmed by the National Institute of Standards and Technology (NIST) in a Measurements Assurance Program as described in NRC Regulatory Guide 4.15, Rev. 1, dated February 1979. Confirmation was obtained for each gamma ray listed to within the limits stated on the certificate. The inspectors noted that all of the detectors had been calibrated within the one-year period required by Procedure CH-230, "Gamma Spectroscopy and Operating Instructions for the Chemistry Computer System."

Daily performance checks for the detectors were done using Co-57, Co-60, Cs-137, and Am-241 sources. The inspectors reviewed the control charts for the period from January 1, 1995, to July 25, 1995, for the three detectors. The Full Width Half Maximum (FWHM) data appeared to be normal, indicating trends in the accuracy and precision of the resolution of the source isotopes for each detector. Similarly, the energy plots and the peak centroid channel data for the detectors appeared to be normal, indicating biases in time for the licensee to adjust the detectors.

The inspectors concluded that the calibration curves and Certificates of Calibration were current and sufficient.

Table 1 provides a comparison of the licensee's results to the NRC's results for each sample. The table provides the criteria for assessing the agreement between the analytical results. As indicated in Table 1, all of the licensee's results compared favorably with those of the NRC.

The inspectors concluded that the licensee maintained a high capability to analyze samples of gamma-emitting radioactive material.

2.2.2.2 Sample Collection

The inspectors reviewed selected portions of Surveillance Procedure SP-730, "Explosive Gas and Storage Tank Monitoring Chemistry Surveillance Program," Revision 16, dated April 7, 1995, and Surveillance Procedure SP-702, "Reactor Coolant System Chemistry and Specific Activity Surveillance Program," Revision 13, dated October 31, 1994. The portions reviewed were adequate for the intended purpose of collecting a grab sample. The inspectors observed licensee technicians obtain samples from the tank and RCS and noted that the respective procedures were followed closely as the samples were collected. Proper sampling techniques and health physics practices were employed. The technicians took the samples directly to the Count Room for analysis.

The inspectors concluded that the licensee's technicians were competent in the collection of samples and knowledgeable of the respective procedures.

2.2.3 Results

From the observations made during this inspection, the inspectors concluded that the licensee had demonstrated that a good radiochemical analysis program has been maintained.

No violations or deviations were identified.

2.3.0 Annual Radioactive Effluent Release Report (84750)

2.3.1 Inspection Scope

The inspectors reviewed the licensee's annual documentation of effluent releases to verify that the requirements of TS are met.

2.3.2 Observations and Findings

TS 5.6.2.3 specifies that through its ODCM the licensee shall conduct a program for the control of radioactive effluents and for maintaining resultant doses to members of the public as low as reasonably achievable (ALARA), in accordance with 10 CFR 50.36a. Furthermore, TS 5.7.1.1.c and 10 CFR 50.36a(a)(2) require the licensee to submit an Annual Radiological Effluent Release Report before May 1 covering the operation of the facility during the previous year of operation. The TS also states the requirements for the content and format of the report.

The inspectors reviewed the Annual Radiological Effluent Release Report for 1994 and compared its results to those of 1991, 1992, and 1993. The data for those years are summarized below.

Crystal River Power Station
Radioactive Effluent Release Summary

		1991	1992	1993	1994
Unplanned Releases					
a.	Liquid	0	1	0	0
b.	Gaseous	1	0	0	0
Activity Released (curies)					
a.	Liquid				
1.	Fission and Activation Products	4.64E-2	2.07E+0	5.31E-1	6.26E-1
2.	Tritium	4.49E+2	3.64E+2	5.89E+2	3.29E+2
3.	Gross Alpha	< LLD	< LLD	1.47E-4	2.77E-4
4.	Volume of Waste Liquid Released (liters)	4.34E+7	3.35E+7	3.54E+7	2.89E+7
b.	Gaseous				
1.	Fission and Activation Gases	1.40E+3	7.86E+2	3.87E+2	1.17E+2
2.	Iodines	2.55E-4	6.32E-4	2.73E-4	4.80E-6
3.	Particulates	2.80E-4	8.12E-6	1.28E-5	9.58E-6
4.	Tritium	1.35E+1	1.50E+1	9.19E+0	4.19E+1

A comparison of the activity released from liquid and gaseous effluents for 1991, 1992, 1993, and 1994 found no significant changes.

For 1994, Crystal River liquid and gaseous effluents were maintained well within TS, 10 CFR 20, and 10 CFR 50 effluent limitations.

Discussions with cognizant licensee personnel determined that the licensee has had no unplanned releases to date (July 28) in 1995.

The licensee's Offsite Dose Calculation Manual (ODCM), Rev. 18, specifies the method to calculate the annual maximum individual total dose from radioactive effluents.

The inspectors reviewed the licensee's assessment of radiation doses to the maximum-exposed member of the public from radioactive materials in gaseous and liquid effluents released during 1994 as reported in the Annual Radioactive Effluent Release Report. The table below summarizes the annual dose assessments due to gaseous and liquid effluents for 1994.

Crystal River Power Station
Cumulative Estimated Doses from Effluents

Dose Pathway	1994	Annual Limit	Percent of Annual Limit
Airborne			
Gamma Air Dose (mrad)	4.1E-3	10	0.041
Beta Air Dose (mrad)	1.1E-2	20	0.055
Max Organ Dose (Thyroid) (mrem)	5.6E-2	15	0.375
Liquid			
Total Body Dose (mrem)	2.3E-2	3	0.760
Max Organ Dose (GI-LLI) (mrem)	8.0E-1	10	8.04

The release of radioactive material to the environment from Crystal River for the year was a small fraction of the 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits. As can be seen from the data presented above, the maximum annual dose contribution to the maximum-exposed individual from the radionuclides in liquid and gaseous effluent released to unrestricted areas was approximately eight per cent of the limits specified in the ODCM.

Based on the data, the inspectors concluded that the licensee's radwaste systems were effectively utilized and operating within their design criteria to make effluent releases that were as low as reasonably achievable (ALARA).

A revision to the ODCM was made during 1994 to implement changes resulting from the revision of 10 CFR Part 20 and to accommodate material removed from the plant's TSs.

No changes were made to the Process Control Program (PCP) in 1994.

No changes were made to monitoring locations as a result of information collected during the annual Land Use Census.

No significant changes were made to the Radwaste Treatment System during the reviewed reporting period.

No effluent radiation monitor instrumentation was out of service for more than thirty days in 1994.

The report also included the results of solid radwaste shipments. The following table summarizes solid radwaste shipments for burial or disposal for the previous four years. These shipments typically include spent resins, filter sludge, dry compressible waste, and contaminated equipment.

Crystal River Power Station
Solid Radwaste Shipments

	1991	1992	1993	1994
Number of Waste Disposal Shipments	36	22	25	32
Volume (cubic meters) (Prior to processing)	715.7	642.3	499.1	531.1
Disposal Volume (cubic Meters)	94.5	139.0	154.1	NR*
Activity (curies)	238.6	330.1	889.2	835.5

NR* = Not Reported in the report.

For solid radwaste, the inspectors noted that the number and volume of the shipments had remained relatively constant for the period reviewed.

The inspectors concluded that the Radioactive Effluent Release Report was complete and satisfied TS requirements.

2.3.3 Results

No violations or deviations were identified.

2.4.0 Radiological Environmental Monitoring Program (84750)

2.4.1 Inspection Scope

The inspectors performed an evaluation to ensure that radiological environmental monitoring programs are effectively implemented.

2.4.2 Observations and Findings

TS 5.6.2.3 specifies that through its ODCM the licensee shall conduct a Radiological Environmental Monitoring Program (REMP) to monitor radiation and radionuclides in the environs. The REMP shall provide representative measurements of radioactivity in the highest potential exposure pathways and verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. Accumulation of radioactivity in the environment can thereby be measured and trends assessed to: determine whether the radioactivity resulted from plant operations; project the potential dose to off-site populations based on the cumulative measurements of any plant-originated radioactivity; and detect unanticipated pathways for the transport of radionuclides through the environment.

Samples were collected by personnel from the Florida Department of Health and Rehabilitative Services (DHRS), Office of Radiological Control and analyzed at the DHRS Environmental Radiation Control Laboratory in Orlando, Florida.

2.4.2.1 1994 Annual Radiological Environmental Operating Report

TS 5.7.1.1.b requires that the Annual Radiological Environmental Operating Report be submitted by May 15 of the following calendar year of the Report and identifies format and content requirements for the Report.

The inspectors reviewed the Report for calendar year 1994 to verify compliance with the TSs. The Report had been submitted in compliance with the TS May 12, 1995, and the format and contents were as prescribed by the TS.

Over 400 samples of four different pathways (airborne, waterborne, ingestion, and direct radiation) from indicator stations were collected, analyzed, and compared to approximately 100 control samples during the year. Detectable radioactivity attributable to plant activities was identified in five per cent of the measurements. All detectable radionuclides in the environmental samples were less than reportable levels, as defined in the TSs.

More specifically, the report yielded the following:

<u>Airborne</u>

The average gross beta concentration for 260 indicator air particulate samples for 1994 was 1.8E-2 pCi/m^3, while the average for 52 samples collected at the control location was 1.7E-2 pCi/m^3. This was little changed from the historic average of the recent past (1989-1993). The airborne concentrations of gross beta activity in 1994 were indicative of natural background and did not indicate any abnormal activities originating from the nuclear operations of the plant.

No gamma activity from man-made isotopes was detected in the quarterly composite filter samples from either the indicator or control locations.

Based on the analyses of air cartridges, the concentrations of iodine-131 were less than the LLD for all indicator and control locations.

Direct Radiation

The 116 thermoluminescent dosimeters (TLDs) placed at 29 indicator locations to monitor ambient beta-gamma radiation in the plant environs determined the average annual dose rate to be 54 mrem/year while the 4 TLDs at the control location determined the average annual dose rate to be 46 mrem/year. These results were consistent with those of previous years and showed no significant change.

Waterborne

None of the 12 drinking water samples taken contained detectable tritium or gamma activity in 1994. These results were consistent with those of previous years.

None of the seawater samples contained detectable gamma activity in 1994. However, H-3 was detected in 9 (of 24) indicator location samples at an average concentration of 2.31E+2 pCi/l, while 5 (of 12) samples collected at the control locations showed an average concentration of 1.52E+2 pCi/l.

Two samples of groundwater were collected and analyzed for gamma-emitting radionuclides and tritium in 1994. Concentrations of these radioisotopes were less than their respective LLDs.

Eight samples of shoreline sediment were analyzed for gamma-emitting radionuclides of plant origin. Cs-137 was detected in 3 (of 6) indicator samples at an average concentration of 6.8E+1 pCi/kg and Co-58 and Co-60 were detected in 6 (of 6) indicator samples at average concentrations of 8.6E+1 pCi/kg and 3.0E+2 pCi/kg, respectively. Concentrations of these radioisotopes were less than their respective LLDs for the control location.

Ingestion

Sample analysis for man-made gamma-emitting radionuclides in eight carnivorous fish samples revealed no detectable activity in 1994.

Sample analysis for man-made gamma-emitting radionuclides in eight oyster samples revealed detectable activity from Co-58 in one (of four) indicator sample, at a concentration of 7.0E+1 pCi/kg, and from Ag-110m in three indicator samples, with concentrations ranging from 2.3E+2 pCi/kg to 1.9E+3 pCi/kg. These results were consistent with those of previous years. Concentrations of these radioisotopes were less than their respective LLDs at the control location.

Sample analysis for man-made gamma-emitting radionuclides in broadleaf vegetation samples determined that 6 (of 24) indicator samples contained Cs-137, at an average concentration of 4.5E+1 pCi/kg, while all (12 of 12) control samples contained Cs-137, at an average concentration of 6.4E+1 pCi/kg. The disparity between the concentrations was attributed to the difference in the species sampled. The plants at the control location concentrate cesium (from atmospheric weapons testing fallout) to a greater degree than those at the indicator locations. These results were consistent with those of previous years.

Crops sampled in 1994 included oranges and watermelon. Only the orange sample contained man-made gamma-emitting radionuclides of a detectable concentration, 1.4E+1 pCi/kg. This result was consistent with results of previous years and not attributed to plant operations.

Overall, the radiological environmental data indicated that plant operations in 1994 had no significant impact on the environment or public health and safety. The maximum radiation dose attributed to plant operations in 1994 to any off-site member of the public was well within the limits established by 10 CFR 50, Appendix I.

The inspectors concluded that the report was complete and complied with TS requirements.

2.4.2.2 Analytical Comparison of 1994 Report

The NRC contracts with the Radiological and Environmental Sciences Laboratory (RESL) to analyze samples split between the State of Florida and the NRC. The NRC compares the RESL results to those of the State of Florida (as reported in the licensee's Annual Radiological Environmental Operating Report) for confirmation of analysis.

The inspectors selected analytical results for eight gross beta air particulate filter split samples from Sample Station C-46 (specifically, the four samples collected in February, three samples collected in May, and the sample collected on June 6) for comparison of results. After adjusting for the different units used by the different laboratories to report the results, the inspectors determined that the reported results compared favorably. Typical values for gross beta in the air particulates were reported by the licensee to be 0.020 pCi/m^3, consistent with the results of previous years. The inspectors discussed the comparison with the Manager of Nuclear Chemistry and Radiation Protection.

The inspectors concluded that the results of the analyses of environmental samples by the State of Florida compared favorably to those of RESL, which served to independently verify the results.

2.4.3 Results

The inspectors concluded that the licensee had an effective program in place to monitor radiological effluents, air particulates, etc. due to plant operations and that the Report was in compliance with the TSs. In 1994, plant operations caused no observable impact to the environment and virtually no dose to the general public from those effluents.

No violations or deviations were identified.

2.5.0 Information Notice (IN) 94-81: Accuracy of Bioassay and Environmental Sampling Results (84750)

2.5.1 Inspection Scope

The inspectors evaluated the licensee's actions in response to IN 94-81, to determine that adequate corrective actions, if any, were taken.

2.5.2 Observations and Findings

IN 94-81 raises questions about the reliability of sample results and analyses performed by a bioassay and environmental contractor. The IN urges licensees who may have used the services of the identified contractor within the last few years to consider how the results were used and whether potentially-inaccurate results would have any safety significance. Furthermore, if inaccurate results could cause significant safety concerns, the licensee is urged to consider what actions would be appropriate to confirm their sample results.

The inspector discussed the IN with cognizant licensee personnel. The licensee had not used the services of the identified contractor and noted that the quarterly analysis of beta-emitting radioisotopes, specifically Fe-55, Sr-89, and Sr-90 (and Y-90) were done by a different contractor, whose performance was satisfactory.

The inspector concluded that the concerns presented in the IN were not an issue at Crystal River.

2.5.3 Results

No violations or deviations were identified.

2.6.0 Radwaste Processing and Transportation (86750)

2.6.1 Inspection Scope

The inspectors performed an inspection of the licensee's radwaste program to determine whether the licensee properly processes, packages, stores, and ships radioactive materials and to provide for identification of potential public health and safety problems resulting from the processing, packaging, and shipment of low-level radioactive waste for disposal and from the transportation of other radioactive materials.

2.6.2 Observations and Findings

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

Pursuant to these requirements, the inspectors reviewed the licensee's activities affiliated with these requirements to determine whether the licensee effectively processes, packages, stores, and ships radioactive materials.

The licensee's program for the processing (including separation and compaction) and packaging of radioactive materials, including solid radwaste, was conducted by qualified technicians of the Maintenance Department. The licensee's program for the transportation of radioactive material was conducted by a Chemistry and Radiation Protection Specialist who was responsible for coordinating the loading of shipments and preparing the shipping documentation. (By August 21, the reorganization plan would be completely implemented and the responsible Chemistry and Radiation Protection Specialist would be part of the Maintenance Department. This would ease coordination efforts for the packaging and loading of radioactive materials shipments because all affected parties would then be in the same functional work unit.)

2.6.2.1 Radwaste Shipping Documentation

The inspectors reviewed shipping logs for late 1994 and 1995 to date. The licensee did not classify shipments into any particular category, but kept a chronological log of all shipments of radioactive materials, including items such as laundered protective clothing, contaminated outage equipment, material to be processed prior to final disposal, radioactive material destined for final disposal, etc. The inspectors also reviewed the radioactive material shipment documentation packages for 94-101 (dewatered filters in a High Integrity Container (HIC) to the disposal facility), 94-102 (a HIC containing dewatered bead resin and charcoal and a source to the disposal facility), 95-07 (a limited quantity, excepted package of resin samples for analysis), and 95-15 (a limited quantity, excepted package of yearly samples for analysis) for completeness and compliance with the regulations. The packages documented the respective shipment and included items such as unique shipment and shipping container numbers, content and volume, total activity, analytical summary and breakdown of isotopes with a half-life greater than five years. The radiation and contamination survey results were within the limits specified.

The inspectors concluded that the licensee's documentation for the shipping of radioactive materials was adequate to satisfy regulatory requirements.

2.6.2.2 Volume Reduction Initiatives

The licensee continued to focus attention on reducing the volume of radwaste generation. A project had been undertaken by the licensee to assess each waste stream with the idea to optimize its contribution to plant operations, including disposal costs. Six waste streams were identified including: Dry Active Waste (DAW), primary resin, secondary resin, processing resin, primary plant filters, and tank/sump sludge. The assessment of each stream was done by a team composed of responsible shop personnel, typically from Operations, Engineering, Health Physics, Nuclear Facility Services, Planning, Cost Controls, and/or Chem/Rad. The goal of each team was to optimize the performance of each system and waste stream by investigating alternative technologies, materials, and/or procedures. Each team made recommendations to management and, upon approval, they were instituted. Some of the recommendations included: do not remove primary plant filters from service until the delta P across the filter is 25 psi (to assure that the filter is fully loaded); temporarily replace the coconut shell carbon media by a clay/coal absorber in the waste processing system (because the absorber has much better oil and organic removal properties); restrictive practices (such as establishing smaller work areas which may become contaminated, not using tape in conjunction with protective clothing and gloves, and stationing a "waste watch" person at the entrance to the Radiation Control Area (RCA) to monitor all materials being taken into the RCA to assure that only essential materials enter); and the use of recyclable bags and carriers for carrying equipment/material into the RCA (to avoid the potential of contaminating any packaging). The goal of the program was to make all plant personnel more sensitive to the issue and to complete their work while generating less radwaste than previously for a given task. The licensee hoped to make a radwaste volume goal of less than forty cubic meters in 1995.

The inspectors concluded that the licensee was continuing to make a determined effort to further reduce its volume of radwaste.

2.6.3 Results

No violations or deviations were identified.

TABLE 1

COMPARISON OF NRC AND CRYSTAL RIVER ANALYTICAL RESULTS
JULY 25 - 26, 1995

Type of Sample: Reactor Coolant System (RCS) of July 25, 1995
NRC Geometry: 50 ml Bottle on Shelf 1
Crystal River Geometry: 20 ml Scintillation Bottle on Shelf 1

Radionuclide	Licensee's Value (μCi/ml)	NRC Value (μCi/ml)	Resolution	Ratio	Comparison
ok					
Detector No. 1					
Na-24	3.99 E-3	(4.02 +/- 0.12)E-3	34	0.99	Agree
Co-58	3.13 E-4	(2.63 +/- 0.29)E-4	9	1.19	Agree
I-131	2.61 E-3	(2.76 +/- 0.08)E-3	35	0.95	Agree
I-133	3.04 E-2	(3.14 +/- 0.03)E-2	105	0.97	Agree
I-135	5.81 E-2	(5.93 +/- 0.09)E-2	66	0.98	Agree
Cs-134	5.42 E-4	(5.21 +/- 0.53)E-4	10	1.04	Agree
Cs-137	7.55 E-4	(6.48 +/- 0.83)E-4	8	1.17	Agree

Type of Sample: Reactor Coolant System (RCS) of July 26, 1995
NRC Geometry: 50 ml Bottle on Shelf 1
Crystal River Geometry: 20 ml Scintillation Bottle on Shelf 1

Radionuclide	Licensee's Value (μCi/ml)	NRC Value (μCi/ml)	Resolution	Ratio	Comparison
Detector No. 2					
Na-24	3.86 E-3	(3.91 +/- 0.15)E-3	26	0.98	Agree
Co-58	1.05 E-3	(1.10 +/- 0.09)E-3	12	0.95	Agree
Nb-95	1.36 E-3	(1.69 +/- 0.25)E-3	7	0.80	Agree
Ru-106	3.87 E-2	(4.10 +/- 0.14)E-2	29	0.94	Agree
Te-132	1.88 E-4	(2.98 +/- 0.68)E-4	4	0.63	Agree
I-131	2.43 E-3	(2.83 +/- 0.12)E-3	24	0.86	Agree
I-133	3.05 E-2	(3.04 +/- 0.04)E-2	76	1.00	Agree
I-135	5.50 E-2	(5.88 +/- 0.07)E-2	84	0.94	Agree
Cs-137	5.97 E-4	(6.41 +/- 2.86)E-4	2	0.93	Agree
Ce-139	1.10 E-3	(1.11 +/- 0.06)E-3	19	0.99	Agree

Table 1

Type of Sample: Liquid Sample from the Spent Fuel Pool
NRC Geometry: 1000 ml Marinelli on Detector Face
Crystal River Geometry: 250 ml Marinelli on Shelf 1

Radio-nuclide	Licensee's Value (μCi)	NRC Value (μCi)	Reso-lution	Ratio	Compar-ison
Detector No. 1					
Co-60	6.19 E-6	(6.80 +/- 0.53)E-6	13	0.91	Agree
Sb-125	8.87 E-5	(8.50 +/- 0.37)E-5	23	1.04	Agree
Cs-134	1.38 E-4	(1.38 +/- 0.02)E-4	69	1.00	Agree
Cs-137	5.76 E-4	(5.87 +/- 0.05)E-4	117	0.98	Agree

Type of Sample: Liquid Sample from the Laundry and Shower Sump
NRC Geometry: 1000 ml Marinelli on Detector Face
Crystal River Geometry: 1000 ml Bottle on Shelf 1

Radio-nuclide	Licensee's Value (μCi)	NRC Value (μCi)	Reso-lution	Ratio	Compar-ison
Detector No. 3					
Cs-137	4.98 E-7	(7.02 +/- 1.40)E-7	5	0.71	Agree

Type of Sample: Face-Loaded Charcoal Cartridge (NRC Spike)
NRC Geometry: Charcoal Cartridge on Shelf 1
Crystal River Geometry: Charcoal Cartridge on Shelf 1

Radio-nuclide	Licensee's Value (μCi)	NRC Value (μCi)	Reso-lution	Ratio	Compar-ison
Detector No. 1					
Co-57	1.72 E-2	(1.76 +/- 0.02)E-2	88	0.98	Agree
Co-60	1.63 E-1	(1.70 +/- 0.01)E-1	170	0.96	Agree
Y-88	4.01 E-2	(4.13 +/- 0.07)E-2	59	0.97	Agree
Cd-109	5.74 E-1	(5.87 +/- 0.06)E-1	98	0.98	Agree
Sn-113	2.34 E-2	(2.51 +/- 0.06)E-2	42	0.93	Agree
Cs-137	1.56 E-1	(1.56 +/- 0.01)E-1	156	1.00	Agree
Cs-139	8.97 E-3	(9.17 +/- 0.16)E-3	57	0.98	Agree
Hg-203	6.87 E-4	(8.05 +/- 1.88)E-4	4	0.85	Agree

Table 1

Type of Sample: Particulate Filter Spiked With RCS Liquid
NRC Geometry: Particulate Filter on Shelf 1 (Petri Dish)
Crystal River Geometry: Particulate Filter on Shelf 1 (Petri Dish)

Radio nuclide	Licensee's Value (μCi)	NRC Value (μCi)	Reso- lution	Ratio	Compar- ison
Detector No. 2					
Na-24	1.81 E-4	(2.36 +/- 0.74)E-4	3	0.77	Agree
Co-58	8.47 E-5	(5.69 +/- 3.05)E-5	2	1.49	Agree
I-131	1.98 E-4	(1.94 +/- 0.34)E-4	6	1.02	Agree
I-132	2.81 E-3	(4.87 +/- 0.64)E-3	8	0.58	Agree
I-133	2.06 E-3	(2.36 +/- 0.13)E-3	18	0.87	Agree
I-135	3.77 E-3	(4.58 +/- 0.54)E-3	8	0.82	Agree

Type of Sample: Gas from the Surge (Makeup) Tank
NRC Geometry: 1260 cc Gas Marinelli on Detector Face
Crystal River Geometry: 1230 cc Gas Marinelli on Detector Face

Detector No. 3					
Ar-41	4.10 E-3	(5.66 +/- 0.24)E-3	24	0.72	Agree
Kr-85m	2.32 E-2	(2.81 +/- 0.06)E-2	47	0.83	Agree
Kr-88	3.80 E-2	(4.52 +/- 0.12)E-2	38	0.84	Agree
Xe-133	7.44 E-1	(7.14 +/- 0.24)E-1	30	1.04	Agree
Xe-133m	1.53 E-2	(1.63 +/- 0.08)E-2	20	0.94	Agree
Xe-135	3.56 E-1	(3.58 +/- 0.08)E-1	45	0.99	Agree

CRITERIA FOR COMPARISONS OF ANALYTICAL MEASUREMENTS

This attachment provides criteria for the comparison of results of analytical radioactivity measurements. These criteria are based on empirical relationships which combine prior experience in comparing radioactivity emission, and the accuracy needs of this program.

In these criteria, the "Comparison Ratio Limits"[1] denoting agreement or disagreement between licensee and NRC results are variable. This variability is a function of the ratio of the NRC's analytical value relative to its associated statistical and analytical uncertainty, referred to in this program as "Resolution".[2]

For comparison purposes, a ratio between the licensee's analytical value and the NRC's analytical value is computed for each radionuclide present in a given sample. The computed ratios are then evaluated for agreement of disagreement bases on "Resolution." The corresponding values for "Resolution" and the "Comparison Ratio Limits" are listed in the Table below. Ratio values which are either above or below the "Comparison Ratio Limits" are considered to be in disagreement, while ratio values within or encompassed by the "Comparison Ratio Limits" are considered to be in agreement.

TABLE

NRC Confirmatory Measurements Acceptance Criteria
Resolution vs. Comparison Ratio Limits

Resolution	Comparison Ratio Limits for Agreement
< 4	0.40 - 2.5
4 - 7	0.50 - 2.0
8 - 15	0.60 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
> 200	0.85 - 1.18

[1]Comparison Ratio = $\frac{\text{Licensee Value}}{\text{NRC Reference Value}}$

[2]Resolution = $\frac{\text{NRC Reference Value}}{\text{Associated Uncertainty}}$

Acronyms and Abbreviations

ALARA - As Low as Reasonably Achievable
BWST - Borated Water Storage Tank
B&W - Babcock & Wilcox
CCTV - Closed Circuit Television
CFR - Code of Federal Regulations
Ci - Curie
DEV - Deviation
DHRS - Department of Health and Rehabilitative Control
DOT - Department of Transportation
ECCS - Emergency Core Cooling System(s)
EDG - Emergency Diesel Generators
EFP - Emergency Feedwater Pump
F - Fahrenheit
FWHM - Full Width Half Maximum
FPC - Florida Power Corporation
FSAR - Final Safety Analysis Report
g - Gram
GI - Gastrointestinal
gpm - Gallons per minute
HIC - High Integrity Container
HP - Health Physics
I&C - Instrumentation and Control
ICC - Inadequate Core Cooling
ICS - Integrated Control System
IFI - Inspection Followup Item
IN - Information Notice
ISI - Inservice Inspection
IST - Inservice Test
kg - Kilogram
kV - Kilovolt
l - Liter
LCO - Limiting Condition for Operation
LER - Licensee Event Report
LLD - Lower Limit of Detection
LLI - Lower Large Intestine
m - Meter
MAR - Modification Approval Record
ml - Milliliter
MOV - Motor Operated Valve
MP - Maintenance Procedure
mRad - MilliRad
mRem - MilliRem
MUP - Make-up Pump
MW - Megawatt
MW_e - Megawatts Electric
NIST - National Institute of Standards and Technology
NOV - Notice of Violation
ODCM - Off-site Dose Calculation Manual
pCi - Pico-Curie (1.0E-12 Ci)

PCP - Process Control Program
PM - Preventive Maintenance
PORV - Power Operated Relief Valve
PR - Problem Report
psig - pounds per square inch gauge
QC - Quality Control
QA - Quality Assurance
RCA - Radiation Control Area
RCP - Reactor Coolant Pump
RCS - Reactor Coolant System
REMP - Radiological Environmental Monitoring Program
RESL - Radiological and Environmental Sciences Laboratory
RO - Reactor Operator
RP - Radiation Protection
RW - Nuclear Services and Decay Heat Sea Water
RWP - Radiation Work Permit
SG - Steam Generator
SP - Surveillance Procedure
STI - Short Term Instruction
SW - Nuclear Services Closed Cycle Cooling System
TLD - Thermoluminescent Dosimetry
TS - Technical Specification
URI - Unresolved Item
VIO - Violation
WR - Work Request