U.S. NUCLEAR REGULATORY COMMISSION

REGION 2

Docket No:	50-302
License No:	DPR-72
Report No:	50-302/96-11
Licensee:	Florida Power Corporation
Facility:	Crystal River 3 Nuclear Station
Location:	15760 West Power Line Street Crystal River, FL 34428-6708
Dates:	September 8 through October 5, 1996
Inspectors:	R. Butcher, Senior Resident Inspector T. Cooper, Resident Inspector B. Crowley, Reactor Inspector, paragraphs E8.1, M2.1 M. Thomas, Reactor Inspector, paragraph E8.1 F. Wright, Senior Radiation Specialist, paragraphs R1.1, R1.2, R3.1, R3.2, and R7.1
Approved by:	K. Landis, Chief, Projects Branch 3 Division of Reactor Projects

EXECUTIVE SUMMARY

Crystal River 3 Nuclear Station
NRC Inspection Report 50-302/96-11

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 4-week period of resident inspection; in addition, it includes the results of announced inspections by two reactor inspectors and one senior radiation specialist.

Operations

A major reorganization occurred effective October 1, 1996. All Directors now report directly to Mr. P. Beard, Senior Vice President, Nuclear Operations. (paragraph X4.1)

A Violation (50-302/96-11-01) was identified for inadequate work instructions to prevent the inadvertent start of the A emergency diesel generator. (paragraph O3.1)

A Non-Cited Violation (50-302/96-11-02) was identified for failure to meet Technical Specification 5.2.2.e requirements for scheduling of work in excess of 72 hours in a seven day period. (paragraph O6.1)

Maintenance

A Violation (50-302/96-11-03) was identified for personnel performing work on the reactor building sump without logging onto a clearance, as required by the approved Work Request. (paragraph M2.1)

A Violation (50-302/96-11-04) was identified for the reactor building sump not being constructed in accordance with approved construction drawings. (paragraph M2.1)

A Weakness was identified regarding the lack of coordination of the inspection effort for the reactor building sump screens. (paragraph M2.1)

Engineering

A temporary engineering reorganization was instituted in an effort to control the large engineering backlog. (paragraph E6.1)

Plant Support

A Non-Cited Violation (50-302/96-11-05) was identified regarding the failure to conduct an adequate radiation survey. (paragraph R1.1)

Licensee efforts to reduce the quantity of radioactive solid waste being generated were proactive. (paragraph R1.2)

Implementation of the new Chemistry Quality Control Manual was a good program improvement. (paragraph R3.1)

Overall chemistry analytical capabilities were good. (paragraph R3.1)

Documentation of corrective actions for controls outside limits appeared to be a weakness in the laboratory Quality Control Program. (paragraph R3.1)

Understanding of corrective action concepts was a staff weakness. (paragraph R7.1)

A Non-Cited Violation (50-302/96-11-06) was identified regarding the failure to follow sampling requirements of the Offsite Dose Calculation Manual. (paragraph R7.1)

Report Details

Summary of Plant Status

The unit began the inspection period on September 8, 1996 in Mode 5 (Tavg less than or equal to 200 degrees F). The plant was taken off line on September 2, 1996 in order to make repairs to the turbine lube oil system.

An Unusual Event was declared at 5:10 a.m. on September 19, 1996 when a coin was found in the lube oil filter housing for a right angle gearbox for a cooling fan on the A EGDG. An inspection of the plant did not turn up any other unexplained discrepancies. The Unusual Event was exited at 3:00 a.m. on September 21, 1996. See paragraph M8.1 for further details.

The unit outage was extended, in part, due to the need to resolve the potential tampering event described in IR 50-302/96-13. Additional items delaying restart include the need to resolve potential Unreviewed Safety Questions concerning emergency diesel generator loading concerns and emergency feedwater single failure vulnerabilities.

On October 4, 1996 the licensee announced that they planned to remain shutdown for an extended period of time in order to make modifications to several safety systems in order to obtain design margin for accident conditions.

I. Operations

O2 Operational Status of Facilities and Equipment

O2.1 Main Turbine Lube Oil Piping Failure

a. Inspection Scope (71707)

Following the discovery of the longitudinal crack in the LO piping inside LOT-2, as discussed in IR 50-302/96-09, the licensee made the decision to place the unit in Mode 5, Cold Shutdown, to allow repairs to be made to the system. The unit reached mode 5 at 11:38 p.m. on September 5, 1996. The residents followed the licensee's investigation into the cause of the pipe failure.

b. Observations and Findings

Thorough examination of the failed piping was conducted by the licensee. Results revealed that the failure was approximately 4-1/2 feet in length, located at the top of the piping. The failure started near the back stop for the check valve downstream of the oil adductor and rapidly propagated through the pipe. The piping failed rapidly, exhibiting signs of a large pressure surge in the piping, much higher than the system pressure could obtain. The licensee estimates that the total duration of the crack propagation was approximately 2 milliseconds. The

licensee has determined that the crack suddenly stopped growing, without having reached any changes in surface area or material. They concluded that this was the time when the pressure event decreased below the point where rapid failure was occurring.

The licensee has speculated that the cause of the failure was hydrogen ignition inside of the piping, igniting at the point where the check valve disk contacts the back stop. A possible source of hydrogen, according to the licensee, is from hydrogen introduced into the oil from the hydrogen gas to seal oil system interface that came out of solution during periods when the LO system was shut down. This hydrogen would tend to collect in the high point in the piping and could be ignited when the system is started.

After consulting with Westinghouse,the licensee installed new piping and a new arrangement of piping supports in an effort to reduce fatigue cycling of the new piping. In an attempt to prevent further occurrences of hydrogen accumulation, the licensee has drilled two 1/8 inch holes on the high point of the piping, upstream and downstream of the check valve. Since the pipe is inside of the LOT, any oil leakage will just return to the tank. The LOT was returned to operation on September 14, 1996.

c. Conclusions

The failed piping was most probably due to collection of hydrogen gas in the lube oil system. Modifications were made to prevent a recurrence.

03 Operations Procedures and Documentation

03.1 Inadvertent Emergency Diesel Generator Start

a. Inspection Scope (71707)

On September 13, 1996, EGDG-1A was tagged out for WR NU 0337713, which was written to verify the fuel rack position reading to support testing to address the EGDG-1A loading concerns. At 2:59 a.m. on September 14, 1996 during the restoration of EGDG-1A, an inadvertent emergency diesel generator start occurred. The residents reviewed the licensee's investigation of this event.

b. Observations and Findings

Normally, when tagging out the diesel, the clearance would include tripping the fuel racks. For this WR, the racks were not tripped, as this would prevent the measurements being made as part of the test. This fact was noted on the WR. The work instructions directed the mechanics to return the fuel racks to the as-found position at the completion of the test.

Clearance 96-09-10 was written to support this work. The fuel rack was not on the clearance, in accordance with the WR. The breaker control

handle, the breaker, and the starting air system were on the clearance. The tags were numbered, requiring that they be hung and pulled in a specified order.

The work was completed and the clearance released on September 14, 1996. CP-115, Nuclear Plant Tags and Tagging Orders, step 4.9.8, requires that when a tagging order is released and no restoration sequence is specified, tags are to be removed in the reverse sequence in which they were hung. The inspectors reviewed the clearance and determined that the operator would have closed the air start solenoid valves, EGV-53 and EGV-52, and then opened the air start booster isolation valve, EGV-60. With the valves EGV-53 and EGV-52 having been open, the air which normally kept the air supply valves EGV-56 and EGV-57 closed had been bled off. Following this, the operator opened EGV-35, the air isolation to the diesel. When this valve was opened, enough air was admitted to the diesel to roll it fast enough that with the fuel racks not tripped, the diesel inadvertently started.

The inspectors reviewed the work request, the clearance, and the statements by the operators. No indications exist that any personnel failed to adhere to the approved instruction that they had received.

The licensee investigated this inadvertent start. Engineering originally thought that when EGV-35 was opened, air pressure should have been adequate to close EGV-56 and EGV-57 prior to enough air being supplied to the EGDG to reach speeds where the combustion process was self sustaining. Tests conducted by the licensee determined that when the EDG is configured with the fuel racks engaged, but the starting air isolated, opening the isolation valve rapidly can cause the EDG to start, as the air reaches the EDG prior to EGV-56 and EGV-57 isolating.

TS 5.6.1.1, Procedures, states that written procedures shall be established, implemented, and maintained covering the activities in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. RG 1.33 requires that written procedures or instructions for maintenance that can affect the performance of safety-related equipment be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. CP-115, Nuclear Plant Tags and Tagging Orders, step 4.9.8, requires that when a tagging order is released and no restoration sequence is specified, tags are to be removed in the reverse sequence in which they were hung. The failure of the clearance for Work Request NU 0337713 to require tripping the fuel racks prior to opening the air supply isolation valve resulted in the inadvertent start of the A emergency diesel generator and is a violation, VIO 50-302/96-11-01, Inadequate work instructions to prevent the inadvertent start of EGDG-1A.

c. Conclusions

One violation was identified for inadequate work instructions.

O6 Operations Organization and Administration

O6.1 Operations Shift Scheduling

a. Inspection Scope (71707, 92901)

The residents followed up on several licensee identified instances where the limits for overtime were exceeded or scheduled to be exceeded.

b. Observations and Findings

The inspectors discussed the shift scheduling practices of the licensee's operations group in IR 50-302/96-08. In that report, the potential for degradation in operator performance was identified, due to the routine use of overtime, even though the inspector could identify no instances where the licensee had violated the TS restrictions on overtime.

TS 5.2.2.e, Unit Staff, requires that the amount of overtime worked by unit staff members performing safety related functions shall be limited and controlled in accordance with approved administrative procedures. Licensee procedure AI-100, Administrative Policies, Section 4.10.2, Scheduled Work Implementation, places certain administrative limitations on the scheduling of overtime:

- No work will normally be scheduled for more than 60 hours per week.
- If it becomes necessary to schedule or work more than 60 hours, but less than 72 hours, department management approval is required.
- If more than 72 hours per week needs to be scheduled or worked, it must be approved by the Director, Nuclear Plant Operations (DNPO).

On August 27, 1996, PR 96-340 was issued discussing a case where a licensed RO had discovered that he had been scheduled for and had worked greater than 72 hours in a seven day work period without the approval of the DNPO. On September 17, 1996, PR 96-383 was written, documenting two instances where a NSS review of the shift schedule for his crew had determined that there were individuals scheduled to work in excess of 72 hours in a seven day period without the approval of the DNPO.

In PR 96-340, where the operator exceeded the overtime restrictions, a violation of the TS requirements occurred. This violation was identified by the licensee. The licensee has determined that the primary cause was an erroneous schedule with contributing causes, with no formal validation process for the schedules and frequent and complicated changes made to the schedule following its issuance. The licensee has completed the validation of the current schedule and has

found no additional errors. A formal process is being incorporated into the operations procedures to prevent recurrence. This licensee identified and corrected violation is being treated as a Non-cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy and will be tracked as NCV 50-302/96-11-02, Failure to meet Technical Specification requirements for scheduling of work in excess of 72 hours in a seven day period.

c. Conclusions

One Non-Cited Violation was identified for failure to meet TS requirements for scheduling of work in excess of 72 hours in a seven day period, without the approval of the DNPO.

II. Maintenance

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Reactor Building Sump Screens

a. Inspection Scope (62707)

In IR 50-302/96-201, a question was raised by the NRC as to the capability of the decay heat system for long term plant cooldown. The DH dropline is credited for use to depressurize the RCS during certain SBLOCAs to minimize the LPI pump operation at low flow conditions. One of the outstanding questions concerned the capability of the reactor building sump screens to withstand the forces of draining the RCS to the reactor building sump through the decay heat drop line during the SBLOCA scenarios. During the outage, engineering prepared to examine the RB sump screens to establish an as found condition. The resident inspectors followed the licensee's efforts in this effort.

b. Observations and Findings

During the last refueling outage, engineering was requested to determine what back-flow velocities the RB sump would be capable of sustaining to support various design basis accident scenarios. Analysis performed at the time determined that flow velocities up to 1 ft/sec would not have any adverse effect on the RB sump. Following this analysis, concerns identified in URI 50-302/96-201-01, Long Term Plant Cooldown, with the potential need to drain the RCS to the RB sump created the need to qualify the sump for higher back-flow velocities, which could not be done with the existing sump screen configuration and design.

On September 11, 1996, the licensee conducted an inspection of the RB sump in preparation for upgrading the sump screens. During the process of removing the old sump screens, it was discovered that the screen support frame was not fabricated in accordance with the original construction drawings. The welds anchoring the vertical posts of the sump screen support frame were never installed, reducing the ability of the screen support frame to transfer load to the sump wall.

The licensee decided that before any repairs were completed to the posts, a detailed inspection would be conducted to determine if any additional discrepant conditions existed. This inspection was originally planned to be completed early on September 13, 1996.

When the inspectors arrived to attend the pre-job briefing, the RP personnel informed them that the sump clean-out, which was a prerequisite for the sump inspection, had not been completed, due to manpower and equipment problems. Engineering personnel decided to conduct the pre-job briefing, in anticipation of completion of the sump clean-out. Soon after the briefing began, a maintenance representative arrived and inquired as to the reason for maintenance being unaware of the meeting. He also requested a chance to review the work package, since his crew had not had a chance to do so. The briefing was delayed until after the review of WR NU 0337687 had been accomplished.

Approximately three hours later, the inspectors attended the second pre-job briefing, which was conducted by the maintenance representative. The meeting was well conducted, with contingency plans and expectations discussed. However, further delays in cleaning the sump prevented all but two prerequisites being accomplished at that point.

Later that day, a meeting was held between the principal participants in this task: engineering, mechanical maintenance, facility services, operations, radiation protection, outage management, and shift management. At this time, management expressed a strong desire to accomplish the task before the end of the day. Engineering informed management that there were two engineers able to conduct the inspection, but they were only authorized to work up to 16 hours for the day, and if they were not allowed into the RB in time, the task would not be accomplished until the next day.

That evening, the inspectors attended another pre-job briefing, this time with a different maintenance shift. This shift had a change to the work scope provided by engineering, which necessitated changes to the prioritization of the tasks. Following the completion of the briefing, the maintenance crew determined that the clearance for the breathing air had never been second verified and that this would have to be accomplished prior to beginning work. They also noted that the WR required a clearance as part of the work request, but the maintenance technicians from the previous shift had not obtained a clearance nor signed onto any existing clearances, even though the SSOD had approved the start of the work.

The maintenance personnel discussed among themselves regarding asking permission from the SSOD to N/A the clearance requirement. The inspectors inquired on whether the Tagging order 96-09-046 on the DH system drop line was applicable to this task. The SSOD had a clearance on the DH line, which if it had been released, the workers in the sump would have been at risk. The maintenance personnel concluded that Tagging order 96-09-046 was appropriate for the work being performed, however the WR had not been added to the clearance. The licensee

maintenance technicians who had previously performed work on the RB sump had not logged onto any clearances, as required by the WR.

TS 5.6.1.1, Procedures, states that written procedures shall be established, implemented, and maintained covering the activities in Regulatory Guide (RG) 1.33, Revision 2, Appendix A, February 1978. RG 1.33 requires that written procedures or instructions for maintenance that can affect the performance of safety-related equipment be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Licensee procedure CP-113A, Work Request Initiation and Work Package Control, step 4.3.2.4, requires that the person performing the work complete the activity in accordance with the approved work instruction. Approved work instruction, WR NU 0337687 required that the work be accomplished under a clearance. Contrary to the above, on September 13, 1996, cleaning of the reactor building sump and preparation for the RB sump inspection was performed by maintenance technicians who failed to log onto a clearance. This is a violation, VIO 50-302/96-11-03, Personnel performing work on the reactor building sump without logging onto a clearance, as required by the approved work request.

The maintenance crew completed verifying the breathing air clearance and logged onto the DH clearance, Tagging order 96-09-046. Two PCs were written by the maintenance supervisor to address the previous problems with the clearances. By the time the clearances were in order, the engineers did not have enough time to accomplish the inspection without exceeding TS overtime restrictions. The inspection of the RB sump was delayed until the next day. The maintenance technicians and QC continued into the sump to take measurements for the fabrication of the new screens and to perform PTs on the existing welds. Continued problems with coordination of the inspection effort resulted in several delays and revisions to the inspection plans. This is indicative of weak management oversight and work coordination.

On September 14, 1996, the inspectors witnessed engineering's inspection of the RB sump. Additional welds were found to be missing on the support posts. Also, some of the existing welds on the post and on where the posts attach to the sump liner were noted to be of poor quality. Minor gaps in the screen support structure were noted to exceed the 1/4" maximum screen mesh criteria. Some gaps in the trash screen above the sump were noted to exceed the 1-1/2" allowable gap criteria. The licensee performed a modification to restore the gaps within the acceptance criteria.

10 CFR 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these drawings. Licensee drawing S-521-038, Reactor Building Sump Liner, Screen and Curb, Sections and Details, provided construction details for the reactor building sump screens and supports. Contrary to the above, on September 11, 1996, the licensee determined that the safety related RB sump screens and supports had not been constructed in

accordance with the approved construction drawing S-521-038. The failure of the RB sump screen components to have been constructed in accordance with the approved drawing is a violation. VIO 50-302/96-11-04. Failure to construct the reactor building sump screens and components in accordance with the approved drawing.

The licensee prepared for the fabrication of replacement screens by dedicating two welders and having them practice the welds by producing screens, from the same materials used in the final screens. The preparation and preplanning for producing the screens were well thought out. During the production of the final screens, the maintenance personnel missed the QC hold-point for the measuring of the screen sag prior to the final welds. QC inspected the sag following the welding and found it to be acceptable, successfully dispositioning the hold-points.

Repair and restoration efforts were completed on September 21, 1996. Three of the five sump screens were replaced with more rugged screens. The three replaced screens were the center screens, which would experience the highest loading during a blow-down. The applicable codes for construction of new Sump Screens and repair of existing Sump and Screen welds are as follows:

> Structural Welding (Screen Frames and repair to Sump welds) - American Welding Society (AWS) Structural Welding Code D1.1, 1984 Edition
>
> Screen to Frame Welds - AWS Structural Welding Code - Sheet Steel D1.3, 1981 Edition

In addition to observation of in-process work as detailed above, the inspectors reviewed the following completed weld records:

> Weld Traveler WT 0337756 04, including completed Weld Inspection Plan NU 0337756 for: (1) Post to Filler Plate Weld Nos. STEP 7.4, Post A, Post B, Post C, and Post D and (2) Cover Plate Welds STEP 7.5, LOC. 1, LOC. 2, LOC. 3, and LOC. 4
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> Weld Traveler WT 0337756 02, Weld Nos. Post A, Post B, Post C and Post D, including completed Weld Inspection Plan NU 0337756 for Checker Plate Support Weld Nos. STEP 7.6, CHECKER PL SUPPT, Post "A", Post "B", Post "C" and Post "D"
>
> Weld Traveler WT 0337580 01, covering various structural welding for new screens, including completed Weld Inspection Plan NU 337580 for Weld B1
>
> Weld Traveler WT 0337580 02, covering Screen to Frame Welds for new Screens, including completed Weld Inspection Plan NU 0337580

Weld Traveler WT 0337687-01, covering welding of Post to Checker Support Angle omitted welds, including completed Weld Inspection Plan NU 0337687-01

Weld Traveler WT 60008, covering repair of Post to Sump Bottom Plate welds, including: (1) Inspection Plan IP-001, (2) NDE Report IP-240, covering Liquid Penetrant (PT) examination of as found welds, and (3) NDE Reports IP-241 and IP-242, covering PT inspection after repairs

The analytical approach, design calculations, design details, and modification package for the new screens have been sent to an independent AE for an independent review. Additional actions planned to address this issue include a review of original construction records in an effort to determine how this incident could have occurred. The licensee plans to revise procedures to require a more thorough inspection of the sump and specifically identify characteristics that are critical to assuring continued sump operability. Engineering is performing an analysis to determine if the sump screen was operable in the as-found condition. This issue will still be tracked under URI 50-302/96-201-01, Long term plant cooldown following a small break LOCA assuming a single failure in the heat drop line.

c. Conclusions

For the welding activities examined, weld records were in good order and indicated good control and documentation of welding activities. However, two violations and one weakness were identified for failing to construct the reactor building sump screens and components in accordance with construction drawings, failing to follow procedure for obtaining a clearance prior to beginning reactor building sump inspection, and a weakness in management oversight and coordination of the reactor building sump inspection.

M3 Maintenance Procedures and Documentation

M3.1 Surveillance Observations (61726)

As part of the follow-up of the potential tampering event, discussed in IR 50-302/96-13, the inspectors witnessed the performance of several surveillances: SP-354A, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A; SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1B; and SP-907A, Monthly Functional Test of 4160V ES Bus A Undervoltage Relaying. No problems were observed with the performance of these surveillance tests.

M8 Miscellaneous Maintenance Issues

M8.1 Lube Oil Strainer for Gearbox on the A EDG (92902)

On September 19, 1996 at 5:10 a.m. with the plant in Mode 5, the licensee declared an Unusual Event due to evidence of possible tampering

with a lube oil strainer on a right angle gear box for the cooler fan on the A EDG. A penny was found in the bottom of the cavity for the strainer housing. Due to its size, the penny could not enter the strainer housing except through the opening where the strainer is placed. The Emergency Classification Table of Emergency Plan Implementing Procedure EM-202, Duties of the Emergency Coordinator, lists under a security threat condition of attempted sabotage that an Unusual Event be declared. As a precautionary measure, the licensee declared an Unusual Event and notified the NRC under 10 CFR 50.72(a)(1)(i). The licensee initiated Problem Report PR 96-0386, Attempted Sabotage of EDG-1A, for followup action on this event.

The plant has been off line since September 2, 1996 due to unrelated repairs to the main turbine lube oil system. The A EDG was already out of service for maintenance at the time for maintenance. The licensee placed security personnel at the two EDGs as an interim measure. This issue will be followed up by a special inspection team and will be covered in IR 50-302/96-13.

III. Engineering

E6 Engineering Organization and Administration

E6.1 Engineering Backlog Control (37551)

The licensee has determined that due to the emergent work in all engineering disciplines over the past year, the ability of the Supervisors to provide adequate management oversight within the AI-100 guidelines has been severely challenged. This emergent work, along with the large number of design basis issues, has hampered the licensee's ability to successfully reduce the increasing backlog.

To help address this issue, two temporary supervisor positions will be used to supplement the discipline supervisors in controlling the increasing trend in the backlog for the following activities:

- Reduce the existing backlog of REA's
- Assure Problem Reports, Corrective Action Plans, Notes Items and Precursor Cards are completed in a timely manner
- Coordinate and approve other documentation with the discipline supervisors to reduce the backlog
- Support initiation and control of the engineering scheduling program
- Provide coaching to the discipline supervisors

The structural design discipline supervisor will be utilized to supplement the Mechanical/Structural Engineering sections and the nuclear engineering design supervisor will supplement the Electrical/I&C Engineering sections. A senior structural engineer will be temporarily stepped up to fill the vacant structural design discipline supervisor position.

The licensee anticipates that this effort will improve the management oversight at the supervisor level, improve their effort to reduce the backlog in NED, and reduce the extensive overtime that the supervisors have been required to perform. This temporary reorganization will be evaluated by the licensee in six months to determine its effectiveness.

E8 Miscellaneous Engineering Issues

E8.1 Corrective Action Program

a. Inspection Scope (37550, 40500, 92903)

The purpose of this inspection effort was to review licensee actions in resolving and preventing conditions that degrade the quality of plant operations or safety. This included reviewing the licensee's corrective actions implemented to address the five areas of concern that were identified by the NRC.

b. Observations and Findings

As a result of previous inspections at CR-3, the NRC identified five general areas of concern where licensee performance has been and continues to be weak. The five areas of concern are:(1) Insufficient Management Oversight and Involvement; (2) Marginally Effective Engineering Organization; (3) Lack of an Understanding and Knowledge of the Crystal River 3 Design Basis; (4) Lack of Sensitivity to the Need to Comply With Regulations; and (5) Operator Performance. These five areas of concern were first discussed with Florida Power Corporation (FPC) during a Management Meeting held in the NRC Region 2 office on April 16, 1996, and during subsequent Management Meetings held at the CR-3 site on June 11, 1996, and August 28, 1996. Findings from the NRC Integrated Performance Assessment Process (IPAP) inspection (performed July 8-12 and July 18-25, 1996) were also incorporated into these five areas of concern.

The inspectors reviewed the implementation of corrective actions outlined in the licensee's Management Corrective Action Plan (MCAP) for the five areas of concern. These corrective actions were discussed in meetings with the NRC on June 11, 1996, and August 28, 1996. The inspectors reviewed the status of selected items that were listed in the licensee's MCAP to address four of the five areas of concern. Documentation and other objective evidence were reviewed to verify that the licensee had completed the specific actions to address the issues. Action items related to the following four areas of concern were reviewed:

(1) Insufficient Management Oversight and Involvement

This area also included the IPAP team findings regarding performance standards, corrective action program, and quality assurance program ineffectiveness. Licensee actions completed or in progress to address this area included initiation of Phase II

of the MCAP, establishment of a root cause team to determine the root causes of the five areas of concern and changes in the assessment process by the Quality Programs (QP) Department.

The inspectors noted that the efforts of the root cause team were still in progress. Changes in the QP assessment process included realigning audits into the four SALP areas and supplementing the audits committed to in the FSAR by assigning two or more auditors to audit continuously each of the four SALP areas. Quarterly audit reports of each SALP area were to be issued to licensee management. Interim update reports for each SALP area were being issued monthly. The new assessment process was implemented in July 1996. The inspectors reviewed the July 1996, and August 1996, monthly QP update assessment reports issued for the SALP areas and noted that QP identified a number of findings during these continuous assessments. The first quarterly audit report under the new assessment process was scheduled to be issued after September 30, 1996. In addition to the above changes in the Quality Programs organization, the licensee has also named a new Director of Quality Programs who assumed the position on October 1, 1996.

(2) Marginally Effective Engineering Organization

Licensee actions implemented to address this area included assigning the Site Vice President as acting Director of Engineering, Engineering organization restructured, 10-12 new positions and additional contractor support being added to the Engineering organization. Included in restructuring of the Engineering organization was establishment of the Rapid Response Team (RRT) group. This group was established in July 1996, to provide rapid engineering technical support to the Operations, Maintenance and Engineering organizations. The RRT consisted of personnel from Design Engineering and System Engineering with expertise in mechanical, I&C, and electrical engineering. The inspectors noted that the RRT was involved in several activities during the month of July to support the plant.

(3) Lack of an Understanding and Knowledge of the Crystal River 3 Design Basis

Licensee actions implemented to address this area included establishment of an independent design review panel to perform an independent assessment of the CR-3 design bases and the adequacy of the design basis management control processes; review of the cumulative effects of design basis issues (reported via LERs) on CR-3 operation; and identification of plant upgrades on the engineering prioritization list to increase design margins.

The inspectors reviewed the licensee's actions and determined that the independent design review panel efforts were still in progress. Plant upgrades to increase design margins have been

included in the top ten priorities for design engineering. Some of the plant upgrades included in the top ten priorities were high pressure injection, diesel generator, building spray pump, emergency feedwater initiation and control, etc.

(4) Lack of Sensitivity to the Need to Comply With Regulations

The licensee identified 19 actions to address regulatory sensitivity. Some of the actions have been completed and others were still in progress. Some of the actions implemented to address this area included reassigning responsibility for LER preparation, creating the Nuclear Safety Assessment Team, and assigning new personnel to site support.

c. Conclusions

The inspector concluded that although the licensee had implemented actions to address the MCAP (including the MCAP Phase II), these actions had not been in place long enough to assess their effectiveness in improving the licensee's performance in these areas of concern.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radiological Surveys

a. Inspection Scope (83750)

The inspectors followed up on a licensee identified problem concerning inadequate radiological survey and posting activities for a radiation area located outside the licensee's primary Radiological Control Area (RCA).

b. Observations and Findings

On September 6, 1996, a radiation survey was made on the exterior surfaces of sea-land containers located on the south side of the site. The containers were located outside the primary RCA but within the licensee's protected area, and held radioactive contaminated equipment and material used during Re-Fueling Outages (RFOs). One of the containers, number 69-1044, held contaminated ventilation equipment utilized by the site's Radiation Protection (RP) staff. The RP technician performing the September 6, 1996 radiation survey found the container had a contact dose reading of 14 mrem/hr and radiation level of 2.5 mrem/hr at 100 centimeters. The licensee posted the small area outside the sea-land container as a Radiation Control Area (RCA). The licensee identified the problem in a Problem Report and notified the Resident Inspectors of the event. A following survey of the container, made on September 9, 1996, identified a radiation level of 5.5 mrem/hr at 30 centimeters from the surface of the container, requiring a few ft^2

to be posted a radiation area. At that time, the licensee moved the sea-land container back into the primary RCA. The licensee's corrective actions on September 9, 1996, eliminated the non-conformance condition. The Radiation Protection Manager (RPM) met with the RP staff during the week of September 9, 1996 to discuss the inadequate radiation survey on the sea-land container and the needed attention to detail.

10 CFR 20.1501(a) states, in part, each licensee shall make or cause to be made, surveys that (1) may be necessary for the licensee to comply with the regulations in this part and (2) are reasonable under the circumstances to evaluate: (i) the extent of radiation levels; (ii) concentrations or quantities of radioactive material and (iii) the potential radiological hazards that could be present.

10 CFR 20.1003, defines a radiation area as an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem in one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

10 CFR 20.1902(a) states, the licensee shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "Caution Radiation Area."

The failure of the RP staff to conduct an adequate radiological survey for the detection of radiation at levels requiring the posting as a radiation area was identified as a violation of 10 CFR 1501(a). The sea-land container had been moved out of the primary RCA to the berm sometime following the RFO 10 which was completed May 17, 1996, and the radiation levels on the container should have been identified at that time. The safety significance of the violation was low in that: the affected radiation area was small (only a few square feet); outside normal traffic routes of plant workers; and the radiation dose level was low and just slightly above the levels requiring posting as a radiation area. This licensee identified and corrected violation is being treated as a Non-Cited Violation, consistent with section VII.B.1 of the NRC Enforcement Policy. This is NCV 50-302/96-11-05, Failure to conduct an adequate radiation survey.

c. Conclusions

One Non-cited Violation was identified for failure to conduct an adequate radiation survey.

No other concerns with the licensee's radiation survey programs were identified.

R1.2 Solid Radioactive Waste

a. Inspection Scope (86750)

The inspectors reviewed licensee activities associated with the licensee's solid radioactive waste program.

b. Observations and Findings

The inspectors reviewed the licensee's performance concerning the reduction of radioactive waste generation and the licensee's plans to reduce it further. To reduce radioactive waste generation and disposal, the licensee established a Radioactive Waste Reduction Task Force in 1993. The licensee had good success in reducing the volume of radioactive waste generated at the site in recent years. The licensee has also used vendor volume reduction processes to reduce the total solid radioactive waste disposal volume. The disposal volume has continued to decline in recent years with the following levels: 1992-224.2 m^3; 1993-154.1 m^3; 1994-72.3 m^3; and 1995-12.2 m^3.

The total waste generated in 1995 was 4,204 ft^3 while the total in calendar year 1996, through the inspection, was significantly higher at 7,979 ft^3. A condenser tube leak in January had produced approximately 2,200 ft^3 of the waste. An extended RFO was also a significant contributor. The licensee also reported that the volume of waste disposed of could increase in the near future, with plans to abandon some volume reduction processes and ship solid radioactive waste directly to a disposal site. The change would reduce total cost of waste disposal but would cause the disposal volume to increase. To counter the disposal volume increases the licensee was developing detailed processes to reduce the volume of radioactive waste generated. The Radioactive Waste Reduction Task Force had developed plans to identify and control items contributing to the solid radioactive waste stream. The licensee had identified approximately 50 items contributing to the solid radioactive waste. These items were sorted into 5 groups and each item was assigned to a staff member. The assigned staff member was to evaluate the use of that item and look for methods to reduce its use and to establish guidelines for it's proper use. The licensee planned to have the project completed and implemented for use prior to the next RFO Cycle.

The inspectors toured the licensee's radioactive waste storage areas and the yard outside the primary RCA boundary. No concerns with radiological controls for the areas were identified. The primary RCA boundary appeared to be adequately posted.

c. Conclusions

The licensee appeared to be taking an active approach to reducing radioactive waste and appeared to have sufficient management support and resources to accomplish the task. The licensee was proactive in searching for more effective measures to reduce solid radioactive waste.

R3 RP&C Procedures and Documentation

R3.1 Chemistry Program Reviews

a. Inspection Scope (84750)

The inspectors reviewed selected chemistry activities to determine whether the licensee was adequately controlling the quality of primary and secondary coolants to ensure long-term integrity of the reactor and secondary coolant pressure boundaries and minimize out-of-core radiation field buildup.

b. Observations and Findings

The inspectors observed chemistry personnel performing chemistry routines. The inspectors reviewed applicable procedures and observed personnel collecting and analyzing reactor coolant system samples. The inspectors found the equipment utilized was calibrated and monitored with appropriate Quality Controls (QCs). The results of the analysis were all well within acceptable ranges for the parameters being measured and the results were documented in accordance with licensee procedures.

The results of the licensee's participation in an interlaboratory cross check program was reviewed for the three previous quarters. Overall, the licensee's analytical performance during that period was good.

The inspectors reviewed the feedwater quality parameters described in Table 4-11 of the licensee's FSAR and found all parameters were well within the limits described. No concerns with chemistry parameters were identified.

The inspectors reviewed the licensee's Nuclear Chemistry Quality Control Manual issued January 18, 1996. Overall, this document adequately described the licensee's QC program and should help the staff maintain and demonstrate proper analytical processes. The inspectors discussed the licensee's processes for documenting and taking corrective measures when quality control checks revealed potential problems. The inspectors inquired about the specific actions taken for specific control measurements outside their associated control limits. In some cases it was difficult to determine what actions the licensee had taken to re-check or correct non-conformance conditions due to a lack of documentation. The licensee had an electronic logbook in the lab but it did not appear to have sufficient space to permit technicians to clearly and adequately describe specific corrective measures taken. The inspectors discussed the issue with the QC coordinator. The QC manual did not provide the laboratory technician with any guidance on the proper level of documentation needed to demonstrate that a quality control problem was appropriately resolved. This problem was also identified by the Quality Assurance (QA) department in it's audit report 96-03-CREW (see paragraph R7.1), and a Problem Report was generated to address the auditors concern. The response to the Problem Report acknowledged that there was insufficient space on the action line in the

QC software to provide all the necessary detail when documenting follow up of QC problems. The Problem Report response stated that there was not enough room on the action line in the QC software to reference an instrument logbook entry on the action line, and document the corrective actions in the instrument logbook. That was discussed with the technicians in the lab. However, the licensee did not modify any written procedures to describe the desired documentation process for controls outside limits.

c. Conclusions

The inspectors found the Chemistry personnel contacted were well qualified and knowledgeable of the chemistry procedures. The licensee has taken steps to improve QC measures in the Chemistry Laboratory with the newly issued QC manual. The inspectors concluded that failure to adequately describe the corrective action documentation process in written procedures was a QC program weakness. Obtaining sufficient documentation to clearly demonstrate corrective actions for controls outside limits remained a challenge. No additional concerns were identified by the inspectors.

R3.2 Transportation of Radioactive Waste and Material

a. Inspection Scope (86750, TI 2515/133)

The inspectors reviewed the licensee's transportation procedures for compliance with applicable requirements and verified that the licensee had provided training to all radioactive waste technicians.

b. Observations and Findings

The licensee had hired a contractor to re-write the transportation procedures incorporating the revised Department of Transportation and NRC transportation regulations for the shipments of radioactive materials. The inspectors reviewed selected portions of the licensee's transportation procedures and found they adequately incorporated the regulatory changes.

c. Conclusions

The reviewed transportation procedures adequately incorporated the revised regulatory requirements for shipments of radioactive material.

R7 Quality Assurance in RP&C Activities

R7.1 Program Audits and Corrective Actions

a. Inspection Scope (83750, 84750 and 86750)

The inspectors reviewed the recently completed chemistry, environmental, radioactive waste and radiation protection audits to verify the licensee

was performing periodic assessments of the programs and to verify the licensee was correcting identified audit deficiencies.

b. Observations and Findings

The inspectors reviewed licensee audit 96-03-CREW, Audit Report of Chemistry, Radiation Protection, Environmental Monitoring and Waste, conducted during the period of February 19 through June 6, 1996. The audit report was issued August 7, 1996. The scope of the review was large and six findings and thirty-seven weaknesses were identified. The audit report format listed the audit questions and the associated auditors findings. While questions were grouped by program area, the overall assessment of a program area was left up to the reader to interpret as the audit report did not summarize the assessment by program areas. The findings were placed into the licensee's corrective action program through the generation of Problem Reports. The weaknesses were documented on Precursor Cards. Precursor Cards were written to identify weaknesses that could lead to additional problems if not corrected.

The inspectors selected several issues identified in the audit report to review and to see that corrective actions were adequate and timely to prevent recurrence. In general, issues identified in Problem Reports were being corrected. However, the inspector found that the response to Precursor Cards did not always address the identified problem and the completed corrective actions were not always documented. The Precursor Card responses also did not address corrective actions to prevent recurrence. Most of the reviewed Precursor Cards described returning a non-conformance condition back into a conformance state. The Precursor Cards did not appear to be an effective corrective action process. There also seemed to be a general lack of understanding concerning corrective action concepts among the staff beyond returning a non-conformance condition to a conformance condition.

During the review of issues identified in the licensee audit 96-03-CREW, the inspectors determined that the licensee's auditors had identified a sampling deficiency of Offsite Dose Calculation Manual (ODCM) requirements.

Technical Specification (TS) 5.6.1 states, in part, written procedures shall be established, implemented, and maintained covering the programs specified in TS 5.6.2. Section 5.6.2 states, in part, the ODCM shall be established, implemented, and maintained.

ODCM Table 2-1, "Radioactive Liquid Effluent and Process Monitoring Instrumentation," required the Decay Heat Closed Cooling Water System (DHCCWS) Monitors (RM-L5 and RM-L6) be operable in all modes. Action statement 24 permitted plant operations with no channels operable provided grab samples were collected and analyzed at least once every 24 hours.

Contrary to the above, during the period of May 15 through June 13, 1995 (Approximately 29 days) the RM-L5 monitor was out of service and the licensee failed to take the daily grab samples of DHCCWS on approximately 22 of those days.

As documented in the 96-03-CREW audit report, the auditors determined that the Chemistry Department had failed to take daily grab samples during 1995, when the monitors were out of service. The Chemistry staff had taken weekly surveys of the DHCCWS during that period. The issue was brought to the attention of the Chemistry Department during the audit, which began a review of the problem. The Chemistry staff acknowledged the weekly sampling frequency of the DHCCWS during May and June of 1995 differed from the daily requirements specified in Table 2-1 of the ODCM. The Chemistry Department reported to the auditors that the DHCCWS was not normally an operating system, and the monitors (RM-L5 and RM-L6) were not effluent monitors but process monitors. Thus, interpretation of the sampling requirements from daily to weekly had been made based on those considerations. The QA auditors expressed concern with the Chemistry Department's lack of regard for compliance with the ODCM requirements to the Chemistry Department Manager. Following that discussion the Chemistry Department initiated a Problem Report.

The inspectors discussed the issue with members of the licensee's Chemistry staff. At some point in time the Chemistry Department had interpreted the applicability of action statement 24 of Table 2.1 for RM-L5 and RM-L6 to require a daily sample when the DH CCW was operating, and a weekly sample when the system was not in operation. Since the system was not normally in operation, operations was required to start and recirculate the system for the sample collection. The inspectors asked the licensee when and how that interpretation had been determined, documented and approved. The licensee representatives reported that they did not know when the exact time that interpretation had been made or specifically who had made it. However, the licensee reported that interpretation had been used during the last two years. The licensee revised the ODCM in August 1996 to require the daily sample of the DHCCWS when the system was operating, and weekly when it was not operating. The inspector verified that the licensee had completed a formal review of the ODCM change.

The inspectors stated that the failure of the Chemistry Department to adhere to the requirements of the ODCM was a violation of the licensee's TS requirements. This licensee identified and corrected violation is being treated as a Non-Cited Violation, consistent with section VII.B1 of the NRC Enforcement Policy. This is NCV 50-302/96-11-06, Failure to follow sampling requirements of the ODCM.

c. Conclusions

The licensee's audit staff identified numerous issues for program improvements. However, the audit report format was difficult to read

and did not do a good job of reporting overall program performance. The Precursor Cards did not always result in corrective actions and documentation of completed corrective actions was sometimes poor. The staff knowledge of corrective action concepts appeared weak.

The ODCM violation was another example of the licensee's failure to instill strict adherence to the regulatory requirements, and raised concerns about the staff's ability to properly review TS program changes.

S8 Miscellaneous Security and Safeguards Issues

S8.1 Security Watch Posted For Emergency Diesel Generators (71750)

On October 3, 1996 at approximately 12:33 p.m. operators performing a surveillance in the A EGDG fan room found two pennies lying on the floor. The pennies were lying on the floor between a fire service water pipe and a tool storage box. The SSOD notified the NSM, Security, the resident inspectors, and the Acting DNPO. Upon further inspection, the ANSS found a quarter under the tool box. Security posted the EGDG rooms, took pictures of the area, and took possession of the coins. The system engineer and an SRO made a walkdown and inspection of both EGDGs and their associated equipment for any sign of tampering. Nothing unusual or abnormal was found. The location of the coins indicated that they could have been lost out of a persons pocket if they were to sit down on the tool box. Based on the investigation and evidence presented, this incident was classified as a non-malicious accidental loss of personal property and the security watch was suspended.

V. Management Meetings

X1 Exit Meeting Summary

The inspection scope and findings were summarized on October 7, 1996. 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.

X4 Management Changes

X4.1 Personnel Changes

Effective October 1, 1996, Mr. R. Yost assumed the position of Manager, Quality Assessments.

Effective September 23, 1996, Mr. D. Watson assumed the position of Manager, Nuclear Security.

Effective October 1, 1996, all Directors started reporting directly to Mr. P. Beard. Mr. G. Boldt will continue to act as the Acting Director of Engineering.

Effective October 1, 1996, Mr. P. McKee joined the Operations Department as Manager, Nuclear Plant Operations Support, reporting to Mr. R. Davis.

Effective October 1, 1996, Mr. B. Lagger was appointed Acting Manager, Radiation Protection.

Effective November 19, 1996, Mr. J. MacKinnon will replace Mr. P. McKee as Chairman of the NGRC.

PARTIAL LIST OF PERSONS CONTACTED

Licensees

K. Baker, Manager, Nuclear Configuration Management
J. Baumstark, Director, Quality Programs
P. Beard, Senior Vice President, Nuclear Operations
G. Boldt, Vice President Nuclear Production
J. Campbell, Assistant Plant Director, Maintenance and Radiation Protection
W. Conklin, Jr., Director, Nuclear Operations Materials and Controls
R. Davis, Assistant Plant Director, Operations and Chemistry
D. DeMontfort, Manager, Nuclear Operations
M. Donovan, Supervisor, Rapid Engineering Response Team
R. Fuller, Manager, Nuclear Chemistry
B. Gutherman, Manager, Nuclear Licensing
G. Halnon, Assistant Director, Nuclear Operations Site Support
B. Hickle, Director, Nuclear Plant Operations
L. Kelley, Director, Nuclear Operations Site Support
H. Koon, Manager, Nuclear Production and Nuclear Outage
K. Lancaster, Manager, Nuclear Projects
J. Maseda, Manager, Engineering Programs
P. McKee, Manager, Nuclear Plant Operations Support
R. McLaughlin, Nuclear Regulatory Specialist
W. Rossfeld, Manager, Site Nuclear Services
J. Stephenson, Manager, Radiological Emergency Planning
F. Sullivan, Manager, Nuclear Engineering Design
P. Tanguay, Director, Nuclear Engineering and Projects
J. Terry, Manager, Nuclear Plant Technical Support
D. Watson, Manager, Nuclear Security
R. Widell, Director, Nuclear Operations Training
D. Wilder, Manager, Safety Assessment Team
K. Wilson, Principle Engineer, Nuclear Operations

NRC

B. Crowley, Reactor Inspector, Region II (September 16 through 20, 1996 and September 23 through 25, 1996)
P. Harmon, Reactor Inspector, Region II (September 9 through 13, 1996)
L. Raghavan, Project Manager, NRR (September 9 through 11, 1996)
L. Stratton, Physical Security Specialist, Region II (September 23 through 25, 1996)

M. Thomas, Reactor Inspector, Region II (September 16, through 20, 1996)
F. Wright, Senior Radiation Specialist, Region II (September 9 through 13, 1996)

INSPECTION PROCEDURES USED

IP 37550: Engineering
IP 37551: Onsite Engineering
IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving and Preventing Problems
IP 61726: Surveillance Observations
IP 62707: Conduct of Maintenance
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 83750: Occupational Radiation Exposure
IP 84750: Radioactive Waste Treatment and Effluent and Environmental Monitoring
IP 86750: Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92901: Followup - Plant Operations
IP 92902: Followup - Maintenance
IP 92903: Followup - Engineering
IP TI 2515/133: Implementation of revised 49 CFR parts 100 - 179 and part 71

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

Type	Item Number	Status	Description and Reference
VIO	50-302/96-11-01	Open	Inadequate work instructions to prevent the inadvertent start of the A emergency diesel generator. (paragraph O3.1)
VIO	50-302/96-11-03	Open	Personnel performing work on the reactor building sump without logging onto a clearance, as required by the approved Work Request. (paragraph M2.1)
VIO	50-302/96-11-04	Open	Reactor building sump not being constructed in accordance with approved construction drawings. (paragraph M2.1)

Closed

Type	Item Number	Status	Description and Reference
NCV	50-302/96-11-02	Closed	Failure to meet Technical Specification 5.2.2.e requirements for scheduling of work in excess of 72 hours in a seven day period. (paragraph O6.1)
NCV	50-302/96-11-05	Closed	Failure to conduct an adequate radiation survey. (paragraph R1.1)
NCV	50-302/96-11-06	Closed	Failure to follow sampling requirements of the Offsite Dose Calculation Manual. (paragraph R7.1)

Discussed

Type	Item Number	Status	Description and Reference
URI	50-302/96-201-01	Open	Long term plant cooldown following a small break LOCA assuming a single failure in the heat drop line. (paragraph M2.1)

LIST OF ACRONYMS USED

ac - Alternating Current
ADI - Absolute Drift Indications
AE - Architect Engineer
AHD - Air Handling Vent and Cooling Damper
AHV - Air Handling Vent and Cooling Valve
AI - Administrative Instruction
ALARA - As Low as Reasonably Achievable
ANSI - American National Standards Institute
ANSS - Assistant Nuclear Shift Supervisor
APC - Alternate Plugging Criteria
ASME - American Society of Mechanical Engineers
ASV - Auxiliary Steam Valve
AWS - American Welding Society
B&PV - Boiler and Pressure Vessel
B&W - Babcock & Wilcox
BS - Building Spray
BSP - Building Spray Pump
BVT - Below Voltage Threshold
BWST - Borated Water Storage Tank
CAL - Confirmatory Action Letter
CCTV - Closed Circuit Television
CCW - Component Cooling Water
CFR - Code of Federal Regulations

CFT - Core Flood Tank
CFV - Core Flood Valve
CP - Compliance Procedure
CREVS - Control Room Emergency Ventilation System
CR3 - Crystal River Unit 3
CST - Condensate Storage Tank
dc - Direct Current
DC - Decay Heat Closed Cycle Cooling
DCHE - DC Heat Exchanger
DEV - Deviation
DFP - Diesel Fuel Pump
DH - Decay Heat
DHCCWS - Decay Heat Closed Cooling Water System
DHHE - Decay Heat Heat Exchanger
DHP - Decay Heat Pump
DHR - Decay Heat Removal
DHV - Decay Heat Valve
DNPO - Director, Nuclear Plant Operations
dp - Differential Pressure
EA - Enforcement Action
ECCS - Emergency Core Cooling System(s)
EDBD - Enhanced Design Basis Document
EDG - Emergency Diesel Generators
EEI - Escalation Enforcement Item
EFIC - Emergency Feedwater Initiation and Control
EFP - Emergency Feedwater Pump
EFT - Emergency Feedwater Tank
EFW - Emergency Feedwater
EFV - Emergency Feedwater Valve
EM - Emergency Plan Implementing Procedure
EOP - Emergency Operating Procedure
EP - Emergency Preparedness
ES - Engineered Safeguards
ESF - Engineered Safeguards Feature
ESAS - Engineered Safety Actuation System
ET - Eddy Current Test
EVS - Emergency Ventilation System
F - Fahrenheit
FPC - Florida Power Corporation
FSAR - Final Safety Analysis Report
FWP - Feedwater Pump
FWV - Feedwater Valve
GL - Generic Letter
gpm - Gallons Per Minute
HELB - High Energy Line Break
HP - Health Physics
HPI - High Pressure Injection
in. Hg - Inches of Mercury
I&C - Instrumentation and Control
ICC - Inadequate Core Cooling
ICS - Integrated Control System
IEEE - Institute of Electrical and Electronics Engineers

IFI - Inspection Followup Item
INPO - Institute of Nuclear Power Operations
IP - Inspection Procedure
IPAP - Integrated Performance Assessment Process
IR - Inspection Report
ISA - Instrument Society of America
ISI - Inservice Inspection
ISO - Isometric Drawing
IST - Inservice Test
ITS - Improved Technical Specification
JCO - Justification for Continued Operation
JPM - Job Performance Measure
Kv - Kilovolt
Kw - Kilowatt
LCO - Limiting Condition for Operation
LER - Licensee Event Report
LOCA - Loss of Coolant Accident
LOOP - Loss of Offsite Power
LPI - Low Pressure Injection
LTE - Lower Tube End
LTS - Lower Tube Sheet
MAR - Modification Approval Record
MCAP - Management Corrective Action Plan
MCB - Main Control Board
MCC - Motor Control Center
MFW - Main Feedwater
MOV - Motor Operated Valve
MOVATS - Motor Operated Valve Analysis and Test System
MP - Maintenance Procedure
MRP - Management Review Panel
MSV - Main Steam Valve
MT - Magnetic Particle Testing
MU - Make Up
MUP - Make-up Pump
MUT - Make-up Tank
MUV - Make-up Valve
MW - Megawatt
NCV - Non-cited Violation
NDE - Nondestructive Examination
NED - Nuclear Engineering Design
NEP - Nuclear Engineering Procedure
NGRC - Nuclear General Review Committee
NOD - Nuclear Operations Department
NOV - Notice of Violation
NPSH - Net Positive Suction Head
NQI - Non-Quantifiable Indication
NRC - Nuclear Regulatory Commission
NRR - Office of Nuclear Reactor Regulation
NSM - Nuclear Shift Manager
NSSS - Nuclear Steam System Supplier
NUREG - NRC technical report designation
OCR - Operability Concerns Resolution

ODCM - Off-Site Dose Calculation Manual
OP - Operating Procedure
OSB - Operations Study Book
OTSG - Once Through Steam Generator
PM - Preventive Maintenance
PORV - Power Operated Relief Valve
ppb - Parts Per Billion
PR - Problem Report
PRC - Plant Review Committee
PSI - Preservice Inspection
psig - pounds per square inch gauge
PT - Liquid Penetrant
PTLR - Pressure and Temperature Limits Report
QC - Quality Control
QA - Quality Assurance
QAP - Quality Assurance Procedure
QC - Quality Control
QP - Quality Programs
RB - Reactor Building
RC - Reactor Coolant
RCA - Radiation Control Area
RCP - Reactor Coolant Pump
RCPPM - Reactor Coolant Pump Power Monitor
RCS - Reactor Coolant System
REA - Request for Engineering Assistance
RFO - Refueling Outage
RG - Regulatory Guide
RM - Radiation Monitor
RO - Reactor Operator
RP - Radiation Protection
RPC - Rotating Pancake Coil
RP&C - Radiological Protection and Chemistry
RPM - Radiation Protection Manager
RRT - Rapid Response Team
RT - Radiographic Inspection
RW - Nuclear Services and Decay Heat Seawater
RWP - Nuclear Services and Decay Heat Seawater Pump
RWV - Nuclear Services and Decay Heat Seawater Valve
SALP - Systematic Assessment of Licensee Performance
SAT - Systems Approach to Training
SBLOCA - Small Break Loss of Coolant Accident
SDT - Station Drain Tank
SER - Safety Evaluation Report
SFPD - Safety Function Determination Program
SG - Steam Generator
SOER - Significant Operating Event Report
SP - Surveillance Procedure
SR - Surveillance Requirement
SSOD - Shift Supervisor on Duty
STI - Short Term Instruction
SW - Nuclear Services Closed Cycle Cooling System
SWHE - SW Heat Exchanger

SWP - SW System Pump
SWV - SW System Valve
T_c - Cold Leg Temperature
TI - Temporary Instruction
TMAR - Temporary Modification Approval Record
TMI - Three Mile Island
TS - Technical Specification
TSC - Technical Support Center
TSCR - Technical Specification Change Request
TW - Through Wall
UAf - A measure of heat exchanger effectiveness
UHS - Ultimate Heat Sink
URI - Unresolved Item
USAS - United States of America Standards
UT - Ultrasonic Test
VIO - Violation
VOTES - Valve Operation Test and Evaluation System
Vpp - Volts point-to-point
WR - Work Request