Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

September 9, 1996
3F0996-01

Mr. James Lieberman, Director
Office of Enforcement
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Subject: Notice of Violation and Proposed Imposition of Civil Penalties

References:
1. NRC Report No. 50-302/EA 95-126, dated July 10, 1996
2. NRC to FPC letter dated August 6, 1996

Dear Sir:

In Reference 1, Florida Power Corporation (FPC) received a Notification of Violation and Proposed Imposition of Civil Penalties for issues concerning the unauthorized Make-Up Tank Tests in September 1994. On July 23, 1996, FPC requested an extension to the response time for the subject letter and on July 26, 1996, the NRC granted that extension.

The purpose of this correspondence is to provide our response to the Notice of Violation and Proposed Imposition of Civil Penalties. Attachment 1 contains our responses to the Notice of Violation (NOV). The Proposed Civil Penalties were paid in full by electronic transfer payable to the Treasurer of the United States on or about September 9, 1996.

Also, as requested in Reference 2, FPC has addressed the four unauthorized tests of Unresolved Item (URI) 50-302/96-04-08 in our response to Violation I.B.

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FPC regrets that the subject violations occurred. They do not reflect the standards of performance that we both expect in nuclear plant operations. We have carefully re-examined the root causes and have taken extensive corrective action to assure that they do not occur again.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/rmb

Attachment

cc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager
Document Control Desk

ATTACHMENT 1

FLORIDA POWER CORPORATION
NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES
NRC REPORT NO. 50-302/EA 95-126

REPLY TO A NOTICE OF VIOLATION

VIOLATION 50-302/EA 95-126-I.A

I. Violations Assessed Civil Penalties

A. Technical Specification 5.6.1.1 requires, in part, that procedures be implemented covering activities as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, of February 1978. Appendix A recommends administrative procedures to cover the authorities and responsibilities for safe operation and shutdown, and operating procedures for the reactor coolant system make-up system. The licensee implemented the above Appendix A recommendations, in part, through Procedure AI-500, "Conduct of Operations," and Procedure OP-402, "Make-up and Purification System."

AI-500, Revisions (Rev.) 80, 81, and 82, Step 4.3.1.1, stated that it is the duty of every member of the Crystal River Plant work force to comply with procedures. In addition, Step 6 of Enclosure 27 stated that it is the responsibility of the Chief Nuclear Operator to ensure that plant evolutions do not violate administrative controls. Procedure OP-402, Rev. 75, Step 4.19.9, required that operators ensure that the make-up tank pressure limits of OP-103B, Curve 8, are not exceeded when adding hydrogen to the make-up tank by manually bypassing the 15 pounds per square inch gauge (psig) hydrogen regulator. Procedure OP-402, Step 4.19.8, required that operators refer to Curve 8 of OP-103B for maximum make-up tank overpressure when adding hydrogen to the make-up tank through the 15 psig hydrogen regulator. Procedure OP-103B, Curve 8, Maximum Make-up Tank Overpressure, Rev. 12, defined the acceptable make-up tank pressure versus level operating region. Procedure AR-403, "PSA-Z Annunciator Response," Annunciator H-04-06, Make-up Tank Pressure High/Low, Rev. 21, required operators to take action to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm is received.

Contrary to the above, operators failed to meet the requirements of Procedure AI-500 to comply with procedures and administrative controls related to maximum make-up tank pressure on numerous occasions during the period June 1, 1994, through September 4, 1994, as evidenced by the following examples:

(1) The limits of OP-103B, Curve 8 for acceptable make-up tank pressure were exceeded on July 23, 1994, for approximately 122 minutes continuously, from approximately 12:13 to 2:14 p.m.; on July 25, 1994, for approximately 48 minutes continuously, from approximately 10:27 to 11:14 a.m.; on July 27, 1994, for approximately 78 minutes continuously, from approximately 2:44 to

4:01 p.m.; on July 28, 1994, for approximately 184 minutes continuously, from approximately 2:26 to 5:29 p.m.; on July 30, 1994, for approximately 190 minutes continuously, from approximately 9:28 a.m. to 12:38 p.m.; on August 6, 1994, for approximately 141 minutes continuously, from approximately 9:55 a.m. to 12:15 p.m.; on August 8, 1994, for approximately 67 minutes continuously, from approximately 10:08 to 11:14 a.m.; on August 24, 1994, for approximately 87 minutes continuously, from approximately 1:24 to 2:50 p.m.; and, on September 4, 1994, for approximately 86 minutes continuously, from approximately 3:21 to 4:46 p.m.

(2) Procedure OP-402, Step 4.19.9, was not complied with on July 27, July 28, July 30, August 6, August 8, August 24, and September 4, 1994, in that the make-up tank pressure exceeded the limits of OP-103B, Curve 8, while adding hydrogen to the make-up tank by manually bypassing the 15 psig hydrogen regulator. Also, OP-402, Step 4.19.8, was not complied with on July 23, 1994, in that the make-up tank pressure exceeded the limits of OP-103B, Curve 8, while adding hydrogen to the make-up tank through the 15 psig hydrogen regulator.

(3) Procedure AR-403, Annunciator H-04-06, was not followed on July 23, July 25, July 27, July 28, July 30, August 6, August 8, August 24, and September 4, 1994, in that timely action was not taken to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm was received. (01013)

This is a Severity Level III problem (Supplement I)
Civil Penalty - $100,000

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

Florida Power Corporation (FPC) accepts the violation.

REASON FOR THE VIOLATION

During the time that the evolutions described in the violation occurred, management was placing emphasis on the need to maintain dissolved hydrogen concentration in the reactor coolant system within specification. The operators operated the plant such that the make-up tank parameters were maintained close to the make-up tank operating curve. This was necessary in order to maintain reactor coolant system hydrogen concentration within specification.

This placed a burden on operators because the design of the make-up tank overpressure control system was not intended and did not allow for the fine-tuned control the operators needed to achieve. Hydrogen additions had to be performed manually using a strip chart recorder which was inaccurate for its intended use. Furthermore, control board indications did not emulate the make-up tank curve so the exact operating point could not be easily determined while hydrogen additions were being made.

Management expectations for maintaining acceptable reactor coolant system chemistry coupled with the inability to control the make-up tank overpressure within the necessary tolerances created the conditions for the violations to occur. The fact that the alarm conditions occurred indicated an insufficient questioning attitude as to alarm condition by operating crews and control room supervisor complacency. These alarm conditions were not addressed in an effective and timely manner. There was also insufficient day-to-day management presence in the control room to provide adequate oversight of these control room activities and to recognize the operator burden.

The fact that some alarm conditions were not addressed in a timely manner was also due in part to weak guidance provided for timeliness of alarm response in station administrative procedures.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

Extensive corrective actions have been taken which were aimed at the following objectives:

1. Restoring adequate operating margins for make-up tank hydrogen additions and reducing operator burden.
2. Improving the questioning attitude of operators on shift.
3. Strengthening expectations and procedures governing alarm response.
4. Strengthening management oversight of control room activities.

The following discussion addresses each of these corrective action areas and results achieved.

1. **Restoring adequate operating margins for make-up tank hydrogen additions and reducing operator burden.** The make-up tank hydrogen overpressure curve has been revised creating a separate operating alarm curve and limit curve. Sufficient operating margin is maintained between the operating curve and the limit curve allowing gas additions to the make-up tank without challenging alarm or design limits. Other changes to reduce operator burden were implemented including an increase to the make-up tank high level alarm and installation of a computer pre-alarm; both of which enhance the operators' ability to control hydrogen additions and keep them within prescribed limits. As a result of these changes, operators are now able to control make-up tank hydrogen overpressure and reactor coolant system hydrogen concentration without challenging high pressure alarms or design limits.

2. **Improving the questioning attitude of operators on shift.** Several initiatives have been taken to improve the questioning attitude exhibited by on-duty operations personnel. Most significant has been the implementation of an Event-Free Operations Program, which is reinforced through training and coaching by management. Briefly, the Event-Free Operations Program provides an integrated approach to continuous human performance improvement and safety culture (questioning attitude) enhancement. Program elements include establishment of clear expectations for human performance;

utilization of tools for human performance improvement to promote a questioning attitude emphasizing conservative decision making; encouraging thorough investigation of events; utilization of our corrective action system to identify and determine root causes of problems; and assessment of program effectiveness by using a tracking and trending system that identifies, at a precursor level, adverse trends and barriers to exemplary human performance.

Questioning attitude is promoted in the program through use of STAR, which is a self-checking technique, and by peer checking and communication protocol. Results to date have indicated a downward trend in the number of events at the station and an improvement in the questioning attitude of operators as evidenced by the number and types of precursor cards (condition reports) identified by our operators. Another indicator is the types of communications that are occurring from the control room seeking additional support, for example, from engineering or management.

3. **Strengthening expectations and procedures governing alarm response.** Alarm response expectations have been strengthened by administrative procedures and have been reinforced through training. These changes have resulted in a greater attention and promptness in response to all alarm conditions both by control board operators as well as control room supervisors. This is evidenced by operations self-assessments and by recent NRC inspections including the Integrated Performance Assessment Process (IPAP), where the use of alarm response procedures was noted as a licensee strength.

4. **Strengthening management oversight of control room activities.** Management oversight of control room activities has been enhanced in a variety of ways. An additional management position to focus solely on on-shift operations has been implemented. This position has allowed for frequent management presence in the control room and has been favorably recognized by control room operators as noted in recent assessments of operations' activities. Management oversight has also been enhanced through creation of a senior reactor operator (SRO) certified work controls position, which is fully staffed on the day shift. This allows the shift supervisor to have more direct oversight of shift activities by reducing distractions in the control room and removing many of the administrative responsibilities from control room supervision.

A mentor program has been established to increase senior management interface, involvement, and oversight of operations. Senior managers meet regularly with their assigned shift supervisor in order to communicate management expectations and learn first hand about the concerns and problems encountered by operations shift supervisors. To date, communications between shift supervisors and management has improved. Progress on the mentor program is discussed at senior staff meetings. Shift supervisor problems and concerns are receiving more direct and timely action as a result of this program.

Management oversight has also been strengthened through use of rapid and extensive follow-up to operator errors that occur on shift. This follow-up is conducted in accordance with a new operating instruction requiring a structured investigation of abnormal events. Plant management participates in the event investigation process.

A rigorous self-assessment program has been implemented in the operations department. A self-assessment using peer operators from other plants was completed in July 1996 which indicated several opportunities for improvement. These self-assessments are viewed as an extremely useful tool to improve management oversight of operating activities.

Operating shift performance indicators have been developed and data is being gathered for trending purposes. These shift performance indicators will also provide a useful tool to focus management oversight of operating activities.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective actions noted above, principally the Event Free Operations Program, have been implemented and will continue to be implemented to avoid further violations.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-I.B

I. Violations Assessed Civil Penalties

B. 10 CFR 50.59, "Changes, Tests, and Experiments," in part, allows the licensed facility to conduct tests not described in the safety analysis report, without prior Commission approval, unless the proposed test involves an unreviewed safety question. A proposed test shall be deemed to involve an unreviewed safety question if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased. The licensee shall maintain records of tests carried out pursuant to this section, including a written safety evaluation which provides the basis for the determination that the test does not involve an unreviewed safety question.

Contrary to the above, on September 4 and 5, 1994, operators conducted tests not described in the safety analysis report, without written safety evaluations to provide a basis for a determination that the tests did not involve an unreviewed safety question. Specifically, operators conducted tests in that they performed evolutions involving make-up tank pressure and level, not required by plant conditions, to collect data. (02013)

This is a Severity Level III violation. (Supplement I)
Civil Penalty - $100,000

Unresolved Item (URI) 50-302/96-04-08, Evaluation of Evolutions as Unreviewed Safety Questions

NOTE: The response to this URI is being included under Violation 50-302/EA 95-126-I.B as requested in NRC Correspondence dated August 6, 1996.

The inspectors concluded that at least four tests, in addition to those cited in apparent violation 50-302/95-22-02, were performed without the documented safety evaluations required by 10 CFR 50.59. These tests occurred during the period from the late 1970's through July 1994. None of these tests were prescribed by written procedures.

These four tests were identified as:

1) shutting off spent fuel pool cooling pumps to gauge heatup rate
2) shutting off the reactor cavity cooling system (industrial cooling water) supply pumps to gauge reactor cavity heatup rate
3) shutting off reactor building penetration cooling fans to gauge heatup rate
4) assessing instrument air system pressure decay by shutting off the compressors during plant operation

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION AND URI

Florida Power Corporation (FPC) accepts the violation. In addition, FPC believes that the four evolutions in the URI are additional examples of this violation and are being addressed here as requested by your letter of August 5, 1996.

REASON FOR THE VIOLATION AND URI

The reason for the violation and the URI additional examples involves several factors related to management oversight and operating crew performance. In particular, management was not successful in achieving consistent adherence to procedures by operators; was not timely in responding to Shift Supervisor leadership deficiencies; and did not provide adequate oversight and sufficiently clear standards for control room activities. Collectively these factors contributed to the operating environment which existed at the time that the unauthorized tests were performed.

Crew performance further contributed to the violation through errors in judgement in the application of procedures and a lack of understanding of 10 CFR 50.59 requirements. This, coupled with a lack of leadership by some shift supervisors to assure plant operating procedures and standards were followed, reflected a lack of safety sensitivity. A contributing factor was the lack of clear administrative guidance on what constituted a test requiring a 10 CFR 50.59 evaluation. This resulted in some Shift Supervisors mistakenly expanding their latitude to operate to the point that it was outside of their authority levels. Consequently, in the absence of clear and specific instructions to the contrary, the examples identified were performed with minimal documentation and without proper approvals.

CORRECTIVE ACTIONS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED FOR THE VIOLATION AND THE URI

Comprehensive corrective actions were taken to:

1. Strengthen management expectations.
2. Strengthen on-shift leadership.
3. Provide additional training.
4. Provide for additional management oversight of control room activities.

The following discussion provides details of corrective actions taken in these areas.

1. **Strengthen management expectations.** In this area, procedure revisions were made to provide more guidance to control room personnel as to what constitutes an infrequently performed test or evolution and to provide for a higher level management approval of the checklist used to address infrequently performed tests or evolutions. This guidance includes a requirement for such tests

to have a procedure developed which in turn, requires a 10 CFR 50.59 evaluation. Procedure revisions were also made to incorporate an enhanced philosophy for shift supervisor authority. An administrative procedure was created to provide additional guidance to operations personnel for procedure use.

2. **Strengthen on-shift leadership.** Several personnel rotations were made in the Operations Department with the objective of strengthening the leadership of supervision on shift.

3. **Provide additional training.** Extensive training has been conducted and an on-going training program established to address the lessons learned from this violation. This training includes the procedure changes noted above, as well as additional emphasis on our Event Free Operations Program, which is designed to improve human performance. This training specifically addresses shift supervisor authority, avenues for resolving issues, importance of maintaining operational limits, and correct methods for performance of normal evolutions, unusual evolutions, and tests.

4. **Provide for additional management oversight of control room activities.** Actions to enhance management oversight are addressed in Violation I.A above.

The above corrective actions specifically address this violation and the URI additional examples. In addition to these, a broader program has been established aimed at improving overall operator performance. The program includes 19 actions that address the following areas:

a. Management oversight and operations support
b. Additional resources for the Operations Department
c. Improved log keeping, standards, and practices
d. A mentor program for Nuclear Shift Supervisors and targeted future Nuclear Shift Supervisors to improve communications with senior management
e. Reinforcement of Event Free Operations
f. Clarification of standards for self-checking and procedure compliance
g. Training enhancements
h. Additional rotations bringing new talent into operations and allowing licensed personnel to move into other parts of the organization
i. Individual Performance goals
j. Use of root cause, self assessments, and precursors by Operations
k. Benchmarking with other organizations
l. Improvements to Emergency Operating Procedures (EOPs)
m. Development of shift performance indicators

Results of these corrective actions have been positive. Operations personnel have demonstrated increased sensitivity to procedure use standards. Similar judgmental errors as occurred in this violation and the additional examples in

the URI have not recurred. Shift Supervisor leadership has improved. In addition, measurable progress in overall operator performance is evident in the use of STAR, peer checking, watch standing practices in the control room, and the use of the corrective action system. Progress has also been made in the control of testing activities on shift.

To determine the safety significance and whether an unreviewed safety question existed, the additional examples in the URI were evaluated through FPC's safety evaluation process. The safety evaluation process includes a 10 CFR 50.59 screening to determine if the Final Safety Analysis Report (FSAR) or Technical Specifications were affected and two Safety Impact questions regarding the level of safety and potential for an event as described in the Event Free Operations Program. The 10 CFR 50.59 evaluation is required if a screening question was positive. The results of the evaluation are summarized below:

1) Spent Fuel Pumps: This evolution screened out of a 50.59 but to be conservative, a 50.59 was performed. The Safety Impact questions were negative. The determination was that no unreviewed safety question existed.

2) Reactor Cavity Cooling: This evolution screened into a 50.59 based on being a "change" to the facility as described in the FSAR. The Safety Impact questions were negative. The determination was that no unreviewed safety question existed.

3) Penetration Cooling: This evolution screened into a 50.59 based on being a "change" to the facility as described in the FSAR. The Safety Impact questions were negative. The determination was that no unreviewed safety question existed.

4) Instrument Air: This evolution screened into a 50.59 based on being a "change" to the facility as described in the FSAR. The Safety Impact question indicated this would have required DNPO / PRC approval prior to performance. The determination was that no unreviewed safety question existed.

Each of the above evaluations were reviewed by the Plant Review Committee (PRC). The PRC agreed with the results of the evaluations.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

All shift crews will receive additional training on the requirements of 10 CFR 50.59 by December 31, 1996. In addition, corrective actions 3 and 4 above will continue to be implemented.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED FOR THE VIOLATION AND THE URI

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-I.C(1)

I. Violations Assessed Civil Penalties

C. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

(1) Contrary to the above, significant conditions adverse to quality were not promptly identified and corrected, and action was not taken to preclude repetition. Specifically, the licensee failed to perform an adequate review of Problem Report 94-0149, issued on May 10, 1994, that identified licensed operator concerns with the accuracy of OP-103B, Curve 8. The review failed to identify promptly the significant errors that were present in OP-103B, Curve 8 and in the calculations that were the basis for the curve. As a result, plant operations using the curve frequently were outside the design bases of the facility. (03013)

This is a Severity Level III violation (Supplement I)
Civil Penalty - $100,000

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

This violation was caused by lack of design engineering involvement in operational issues and overall ineffective consideration of fundamental operating requirements in some design activities. Complicating the ineffective review of Curve 8 was inadequate management oversight of both the operations / engineering interface and the interdisciplinary engineering interfaces necessary to ensure design details affecting plant safety were properly communicated and fully considered in operating documents.

A contributing factor to this violation was the complexity of the inputs to the Make-Up Tank (MUT) Curve 8. No one person recognized the interdependencies of the technical and operational issues which affected the calculation and weak expectations for engineering personnel did not establish and promote interdisciplinary team reviews.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

Corrective actions for the violation considered three main objectives. These objectives are:

1. Improve process controls for interdepartmental and interdisciplinary interfaces.

2. Strengthen management oversight of design activities.

3. Strengthen expectations for engineering and operations personnel.

The following discussion addresses each of the corrective actions and the results achieved.

1. **Improve processes controls for interdepartmental and interdisciplinary interfaces.** The process used by design engineers to produce calculations was revised to require joint reviews with operations and system engineering to ensure assumptions are correct and that results are reasonable and understood. Additionally, an independent, third party review of selected design calculations is performed to test the validity of the design inputs and results by using different calculational methods, codes, modeling, and/or personnel.

   Relocating all design engineering personnel to the site has resulted in enhanced communications, increased confidence in engineering by other departments, and more thorough / complete products. Significant improvement in the quality of design calculations has been noted by NRC inspectors looking at the Setpoint Calculation Program.

2. **Strengthen management oversight of design activities.** Management oversight has been strengthened through enhanced processes, personnel changes, and restructuring of some engineering disciplines.

   The implementation of an interdisciplinary Design Engineering Review Board to review design work for technical accuracy and adherence to requirements, both regulatory and functional. Further, a management single point of contact is established for important technical issues. This ensures resources are available and integrated keeping management involved at the appropriate level of detail. Finally, an Engineering Programs group has been established to provide increased focus on longer duration technical issues which require effective organizational interaction to achieve success.

3. **Strengthen expectations for engineering and operations personnel.** The engineers involved in this violation were counselled to ensure they understood the expectations and standards that are to be applied to technical reviews. These same expectations were communicated to all engineering personnel in All Hands meetings and site-wide to directors, managers, and supervisors under joint signature of the engineering director and plant manager.

   Engineering personnel are scheduled to attend the operations morning turnover meeting to ensure operational needs and concerns are promptly communicated and addressed. Operation's issues get increased attention by engineering management and are used to appropriately prioritize the day's activities.

The engineering Event-Free Operations Program tracks performance trends and human errors. Engineering managers assess the trends and coach personnel to prevent significant events from occurring. Issues identified through this program include examples of declining attention to detail which were promptly addressed by the supervisor owning the area of concern.

Additionally, operators participated in seminars with the operations manager regarding communication strategies and methods to prevent "cockpit isolation". These philosophies have been proceduralized in the operations instructions which were developed to strengthen management expectations for operations personnel.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The above noted corrective actions establish continuing programs to preclude further violations.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-I.C(2)

I. Violations Assessed Civil Penalties

C. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

(2) Contrary to the above, significant conditions adverse to quality were not promptly identified and corrected, and action was not taken to preclude repetition. Specifically, Short Term Instruction (STI) 94-019 issued on September 9, 1994, STI-021 issued on September 11, 1994, and Revision 13 to OP-103B, "Plant Operating Curves", issued on January 30, 1995 were corrective actions once problems with the make-up tank overpressure curve were identified but were inadequate to prevent operation outside of the design basis. (04013)

This is a Severity Level III violation (Supplement I)
Civil Penalty - $100,000

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

This violation was caused by lack of design engineering participation in operational issues and ineffective consideration of operating requirements in some design activities. The failure to communicate that Curve 8 was a design basis curve and failure to consider actual control room operating practices in design activities illustrated a lack of safety and operational sensitivity. Contributing to the inaccuracy of the STIs and the revised curve were inadequate management oversight and understanding of both the operations / engineering interface and the interdisciplinary engineering interface required to ensure design details affecting plant safety were properly transferred to operating documents.

Also contributing to this violation was the complexity of the inputs to the MUT Curve 8. No one person recognized the interdependencies of the technical and operational issues which affected the calculation, and weak expectations for engineering personnel did not establish and promote interdisciplinary team reviews.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

Corrective actions for the violation considered four main objectives. These objectives are:

1. Provide an accurate, properly labelled curve with sufficient margin for operational flexibility.

2. Improve process controls for interdepartmental and interdisciplinary interfaces.

3. Strengthen management oversight of the operations and engineering interface.

4. Strengthen expectations for engineering and operations personnel.

The following discussion addresses each of the corrective actions and the results achieved.

1. **Provide an accurate, properly labelled curve with sufficient margin for operational flexibility.** On January 31, 1995, a revised STI was issued which provided sufficient margin to prevent operation outside the design basis. Since this time the MUT has not been operated outside the design basis. Subsequently, a revised, third party reviewed curve was issued in OP-103B on October 5, 1995. This curve provided additional margin and operational flexibility, and clearly delineated acceptable and unacceptable operating regions, such that operations is confident in operating the MUT within the design basis.

2. **Improve the process controls for interdepartmental and interdisciplinary interfaces.** The process dealing with procedure revisions and issuance of STIs was revised to ensure proper engineering reviews are performed. Critical operating procedures, such as Emergency Operating Procedures and Abnormal Procedures, now require system engineering, design engineering, and licensing reviews prior to issuance. Operating procedures likewise get an interdisciplinary review. The entire review process for procedures is being revised and strengthened to provide positive assurance this, and other critical reviews occur at the appropriate levels.

   Relocating all design engineering personnel to the site has resulted in enhanced communications, increased confidence in engineering by other departments, and more thorough / complete products. Significant improvement in the quality of design engineering input to procedure reviews and development has been noted. Additionally, numerous issues have been discovered and corrected in operating procedures by engineering personnel. The identification and resolution of one such issue having to do with spent fuel cooling during a full core offload prevented the plant from being operated outside the design basis of the system.

3. **Strengthen management oversight of the operations and engineering interface.** Management oversight has been strengthened through enhanced processes, additional management personnel, and restructuring of some engineering disciplines.

   A management single point of contact is established for important technical issues. This ensures resources are available and integrated keeping management involved at the appropriate level of detail.

   As discussed in violation I.A, corrective action 4, a new operations management position was established. This new position, through increased presence in the control room and oversight of plant operations, provides more focussed accountability to ensure guidance to operators is correct and properly human factored.

   A special Rapid Engineering Response team has been established to quickly address operational concerns. This multi-disciplinary team ensures immediate plant needs are either corrected in a timely manner or referred to appropriate levels of management for prioritization.

4. **Strengthen expectations for engineering and operations personnel.** As described in violation I.C (1), corrective action 3, the expectations for engineering and operations personnel have been strengthened and communicated. Results have been realized in areas such as the Emergency Operating Procedure enhancement program where several design issues have been discovered and resolved. The consequences of these discoveries have ranged from simple comments directed at improved human factoring to a forced plant shutdown until the deviation could be corrected.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective actions noted above remain in place to preclude further violations. Additionally, the procedure revision and review process will be revised by December 31, 1996 to, among other improvements, strengthen the requirement for multi-disciplinary reviews and human factors reviews of procedures.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-I.D(1)

I. Violations Assessed Civil Penalties

D. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in part, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, "Definitions," and as specified in the license application, are correctly translated into procedures and instructions.

(1) Contrary to the above, the design basis was not correctly translated into drawings, procedures, and instructions. Specifically, between approximately April 1993 and September 9, 1994, make-up tank procedure limits for make-up tank pressure failed to meet the emergency core cooling system design basis in that Procedure OP-103B, Curve 8, "Maximum Make-up Tank Overpressure," Rev. 12, did not provide adequate margin to ensure that hydrogen entrainment in the high pressure make-up pumps was prevented when the make-up tank was operated within the specified pressure and level limits. (05013)

This is a Severity Level III violation (Supplement I)
Civil Penalty - $50,000

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

The reasons for this violation were similar to those for violations I.C(1) and (2). Additionally, lack of engineering ownership for the quality of the curves being used as operating guidance caused incomplete and ineffective communication of the actual bases of the curves to operations. This, in turn, caused operations to not fully understand the operational restrictions to be applied when operating the MUT. Further examples were discovered when FPC reviewed the remaining curves in the Fall of 1994. A number of these deficiencies had existed for some time. It was also noted that some of the curves were incorporated from original plant design documents and are no longer needed or used by operations.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

The broad corrective actions for this violation are the same as those described for violation I.C(1) and (2). The specific actions associated with OP-103B, Curve 8 were also described in the response to violation I.C(2).

With respect to the generic implications of this violation, the following actions have been / are being taken to address the OP-103 series of plant operating curves. This series consists of:

OP-103A, "Startup Curves"
OP-103B, "Plant Operating Curves"

OP-103C, "Cycle 10 [Cycle Specific] Reactivity Worth curves"
OP-103D, "[Control Rod] Withdrawal Limit Curves"
OP-103E, Cancelled
OP-103F, "Tank Volumes"

Corrective actions taken to address these curves are summarized below:

1. All operating curves were reviewed by operations in the Fall of 1994 to determine if and where operating practices provided little or no margin to the curve limits. The findings and recommendations were issued on December 13, 1994.

2. OP-103A was revised on July 13, 1995, to incorporate the findings from action 1 above and to improve human factoring. This revision also included an independent review by B&W Nuclear Technologies to ensure accuracy with their records.

3. OP-103B was reviewed in the Fall of 1994 by a senior reactor operator who identified that narrow operating bands on some curves increased operator burden but were achievable. Several subsequent revisions addressed improvements in the curves with the last revision made in February 1996.

4. OP-103C was revised in December 21, 1994, to address the findings of action 1 above and to improve human factoring.

5. OP-103D was revised on February 10, 1995, to address the findings of action 1 above and to improve human factoring.

6. OP-103E required no action as this procedure was cancelled in April 1993.

7. OP-103F is being addressed by a tank volume verification program addressed in the response to violation II.B.

Ownership of the above curves has been assigned to the newly formed Engineering Programs group. This group will maintain responsibility for overall quality and accuracy of the plant curves. Appropriate interdisciplinary, interdepartmental, and vendor reviews and input will be coordinated by this group.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective actions noted remain in place to preclude further violations. Additionally, a detailed action plan has been developed and contracted to Framatome to further document the design basis for each curve in OP-103A and OP-103B. The Framatome review is expected to be completed May, 1997. Future procedure revisions will be based on the outcome of this review.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-I.D(2)

I. Violations Assessed Civil Penalties

D. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in part, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, "Definitions," and as specified in the license application, are correctly translated into procedures and instructions.

(2) Contrary to the above, the design basis was not correctly translated into drawings, procedures, and instructions. Specifically, between initial operation on March 13, 1977, and February 2, 1995, except for the time period of June 1990 through April 1993, the licensee failed to correctly translate the design basis for the emergency core cooling system into the Final Safety Analysis Report, Section 6.1.2.1.2; Procedure EOP-07, "Inadequate Core Cooling;" and Procedure EOP-08, "LOCA Cooldown." The Final Safety Analysis Report, Section 6.1.2.1.2; EOP-07; and EOP-08 failed to meet the design basis in that the manual swap over from the borated water storage tank to the reactor building sump was directed to be initiated at a level of five feet or less in the borated water storage tank, which was insufficient to assure that all of the emergency core cooling system pumps would not be damaged by air entrainment from vortexing in the borated water storage tank. Additionally, the licensee had no official design calculation to support the swap over level of five feet that was incorporated into emergency operating procedures in April 1993. The official calculation, I90-0024, supported a swap over level equivalent to approximately 14 feet in the borated water storage tank. An internal engineering memorandum was inappropriately used to support the swap over level of five feet. (06013)

This is a Severity Level III violation (Supplement I)
Civil Penalty - $50,000

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

The reasons for this violation were similar to those for violations I.C(1) and (2). Specific to this violation, the lack of engineering ownership of the design basis details in Emergency Operating Procedures (EOP) caused inconsistent and inadequate design inputs to the EOP. Further, operations failed to use the proper procedure development and revision process to validate setpoints being used in the EOP. Proper validation includes teaming with design engineering to reveal potential incorrect or inadequate technical basis for setpoints and other values used in the EOP.

In relation to the deficiency in the FSAR, inappropriate assumptions by engineering, operations, and licensing personnel caused continued use of a

setpoint for which they had an incomplete understanding of the design basis. The Borated Water Storage Tank (BWST) swapover described in the FSAR was temporarily changed to accommodate an Equipment Qualification (EQ) issue with Reactor Building flood level in the early 1990's. When the EQ issue was later resolved, personnel reverted back to the original (flawed) swapover point contained in previous procedure revisions. This value was also inappropriately added to the FSAR with the assumption that previous 10 CFR 50.59 evaluations performed for the original procedure revisions covered the change.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

The broad corrective actions for this violation were similar to those of I.C(1) and (2). Specific to this violation, a focussed EOP group was established in January of 1995, headed by a former design engineering manager who had received a senior reactor operators license. This group was dedicated to implement a detailed action plan to validate EOP steps and enhance the overall EOP series. A step-by-step safety assessment of the entire EOP series was performed in 1995, with a multi-disciplinary group including licensing, design engineering, systems engineering, training, and operations. The results of this assessment led to a comprehensive revision and revalidation of the EOPs. Additionally, the findings of the assessment were provided to the Setpoint Calculation Program to support validation of the setpoints in the EOPs.

The majority of the design basis issues raised over the last 18 months have been directly attributed to the detailed work of the EOP group. Several of the issues affected operability of plant equipment, such as the Emergency Feedwater Initiation and Control (EFIC) system. Technical Specification 3.0.3 was entered due to an invalid EFIC actuation setpoint. Another such issue resulted in a plant shutdown in February, 1996, until deficiencies with high pressure injection (HPI) indication could be corrected.

Relative to the incorrect EOP mentioned in the violation, the process of writing and revising EOPs and Abnormal Procedures (APs) has been improved in Administrative Procedure, AI-400F, "New Procedures and Procedure Change Processes for EOPs, APs, and VPs," issued on June 29, 1995. This procedure requires system engineering, design engineering, and licensing reviews and provides specific guidance on review criteria. It also proceduralizes the requirements for validation of EOP changes assuring correct technical criteria and human factors are included.

Finally, the FSAR is being reviewed as part of the industry initiative relative to maintaining accuracy of the FSAR. Some immediate enhancements have been made and others are planned for the near future. The objective of these enhancements is to more formalize the revision process, sensitize CR-3 personnel to the need for accuracy of information in the FSAR, and ensure the procedure change screening process incorporates a comprehensive review of the FSAR for applicability to 50.59 evaluations.

EOP-7 and EOP-8 have been revised to include the correct swapover point for transfer from BWST suction to the reactor building sump.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective actions noted remain in place to preclude further violations. The EOP Enhancement Plan continues with an expected EOP issuance date of March, 1997. This includes full simulator validation and operator training prior to issuance. Additionally, the actions relating to the FSAR will be completed by December 31, 1996.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-II.A

II. Violations Not Assessed a Civil Penalty

A. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in part, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, "Definitions," and as specified in the license application, are correctly translated into procedures and instructions.

Contrary to the above, the design basis was not correctly translated into drawings, procedures, and instructions. Specifically, between April 8, 1993, and March 22, 1995, Procedures EOP-07 and EOP-08 failed to meet the emergency core cooling system design basis. Specifically, during post loss-of-coolant accident operation with one low pressure injection pump and two high pressure injection pumps operating, and with the high pressure injection pump suction crosstie valve open, as directed by Procedures EOP-07 and EOP-08, the licensee's engineering calculation M90-0021, Rev. 5, dated March 22, 1995, indicated that the water inventory in the reactor building sump would not have provided adequate net positive suction head to the one low pressure injection pump. This lineup could result in the loss of the only operable low pressure injection pump. (07013)

This is a Severity Level III violation (Supplement I)

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

The reason for this violation is the same as described in violation I.D(2) above.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

The corrective steps taken for this violation are the same as described in violation I.D(2). EOP-7 and EOP-8 were revised to preclude operation of two high pressure injection pumps supplied from a single low pressure injection pump.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective action noted above will avoid further violations.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The corrective actions noted remain in place to preclude further violations. The EOP Enhancement Plan continues with an expected EOP issuance date of March, 1997. This includes full simulator validation and operator training prior to issuance.

VIOLATION 50-302/EA 95-126-II.B

II. Violations Not Assessed a Civil Penalty

B. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, conditions adverse to quality were not promptly identified and corrected, and action was not taken to preclude repetition. Specifically, the licensee failed to identify the root cause and take steps to preclude repetition of a significant condition adverse to quality related to the emergency diesel generator fuel oil tank levels initially identified in License Event Report No. 92-003, dated May 15, 1992. As of March 27, 1996, corrective actions to determine the relationship of suction point to tank level for other tanks having a Technical Specification required minimum volume including the borated water storage tank had not been implemented. A timely review of the calculation of the borated water storage tank volume could have resulted in earlier identification and correction of the inadequacy with the borated water storage tank level for manual swap over of emergency core cooling system pumps' suction from the borated water storage tank to the reactor building sump. (0801s)

This is a Severity Level IV violation (Supplement I).

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

The reason for this violation is the failure of management to effectively control a rapidly changing environment and its impact on available resources. As a result adequate resources were not available to support existing and changing workloads. The corrective action plan, which would have addressed the issues associated with this violation, was not implemented as planned due to assignment of available personnel to, what were considered at the time, more safety significant and higher priority activities.

Several activities, events, or situations during this period exacerbated the situation. They include:

a. the implementation of a change in internal philosophy to perform more work in-house (reduced the dependance upon outside contractors and architect engineering firms);

b. reduction in permanent staff due to the emerging competitive nature of our business;

c. disruption associated with the relocation of the engineering organization from the corporate offices to the site; and

d. a lack of defined plant wide priorities, the need to support several significant projects which surfaced (emergency diesel generator [EDG] modifications and calculations, equipment qualification [EQ] issues, etc.), as well as supporting major outages on an annual basis.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

The corrective actions for this violation considered the following main objectives:

1. Ensure adequate resources and organizational structure for the amount of work.

2. Focus engineering resources on resolving high priority / safety issues.

3. Lessen the complexity of engineering work by increasing design margins.

The following discussion addresses each of these corrective action areas and results achieved.

1. **Ensure adequate resources and organizational structure for the amount of work.** In hindsight, it has become apparent that the staff reductions and reduced dependency on the use of contractor / architect-engineering resources were implemented too quickly. The reduction in use of external engineering resources was implemented prior to attaining the required level of expertise and tools in-house to support the plant's needs. In addition, when several significant technical issues surfaced, management was slow to increase engineering resources commensurate with the developing need due to emerging competitive pressures. As a result, workload and backlog of engineering activities grew and caused daily support of the plant to decline. To address this issue, engineering resources have been and are continuing to be expanded. Design engineers have been hired with architect engineering backgrounds and there is increased use of specialty contractors for specific projects. The Requests for Engineering Assistance and the modification backlogs have continued to decrease. The full design staff has been relocated to the plant site increasing contact time with other departments and ability to verify field construction details. The achievement of improved response to plant concerns was reinforced by comments in the recent IPAP report. The report stated that operators felt they were now getting adequate support from the engineering departments.

2. **Focus engineering resources on resolving high priority / safety issues.** The engineering department has been reorganized and management changed to better focus engineering personnel on short

and long term issues. A multi-disciplinary Rapid Engineering Response Team has been developed to quickly resolve short term issues. Long duration programmatic issues, such as tank volumes, are assigned to a newly formed Engineering Programs Group. Work in this area will be accomplished both in-house and through outside contractors as necessary to ensure schedules are met. The design and system engineering managers, engineering programs manager, and the modifications and projects manager meet on a regular basis with senior management to review and adjust the engineering priority list. This list serves to focus plant resources on both mandatory projects and discretionary projects which have a high benefit to the plant. These efforts resulted in successful start-up from a highly complex, technical outage which addressed many design basis issues.

3. **Lessen the complexity of engineering work by increasing design margins.** Self-assessments and NRC inspections have indicated several key weaknesses exist in the original plant design which are consuming available engineering resources. In these cases, engineers must work-around low design margins which delay response to and resolution of the problem. To reduce this impact, the following commitment has been made by management: Modifications will be made to the plant where and when possible to increase selected key design margins consistent with the B&W peer group. Presently, CR-3 is shutdown due to a turbine lube oil issue. The commitment to increase design margins will result in added outage scope so that a better designed reactor building sump screen can be installed. This philosophy will carry forward to future outages as well.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The corrective actions noted above remain in place to preclude future violations of a similar nature. Additionally, an action plan has been / is being implemented to complete the review and preparation of calculations for the remainder of the plant's safety related tanks. This plan reflects prioritization of the tanks, from an operation's perspective, such that those that are most important to the continued safe operation of the plant are addressed first. An Issue Manager has been assigned to this activity and is monitoring its progress.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.

VIOLATION 50-302/EA 95-126-II.C

II. Violations Not Assessed a Civil Penalty

C. Crystal River Facility Operating License No. DPR-72, Paragraph 2.C.(9), Fire Protection, required that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility.

Final Safety Analysis Report, Section 9.8 stated that the fire protection program has been formulated in accordance with specific fire protection governing documents listed in Final Safety Analysis Report Table 9-18. Table 9-18 included the Fire Protection Plan.

The Fire Protection Plan, Table 6.1.a, Rev. 11, Water Supply Operability Requirements, Compensatory Measures and Reports, required that at all times there be two separate water supplies, each with a minimum water volume of 345,000 gallons. Table 6.1.b, Water Supply Surveillance Requirements, stated: verify minimum required water volume of 345,000 gallons in each fire water tank, which is implemented by Procedure SP-300, "Control Room Log Readings," Rev. 131.

The Fire Protection Plan, Section 7.8 stated, in part, that in the case of significant conditions adverse to fire protection, the cause of the condition is determined, analyzed, and prompt corrective actions are taken to preclude recurrence.

Technical Specification 5.6.1.1.C required that written procedures shall be established, implemented, and maintained covering the Fire Protection Program.

Contrary to the above, the licensee failed to establish an adequate procedure to verify the minimum required water volume of 345,000 gallons in each of two fire water storage tanks. Specifically, Procedure SP-300 required that the water level in the tank be verified to be 35 feet, which, under worst case conditions verified a volume of water less than required by the Fire Protection Plan as well as the Enhanced Design Basis Document. In addition, prompt corrective actions for Licensee Event Report No. 92-003, dated August 1, 1991, would have revealed this condition adverse to fire protection. (09014)

This is a Severity Level IV violation (Supplement I).

ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

FPC accepts the violation.

REASON FOR THE VIOLATION

The reasons for this violation are the same as those which contributed to several of the previously described issues. Specifically, there was inadequate operations and engineering interface during the development of both operation's procedures and engineering's calculations to ensure that design

details affecting plant safety were properly considered in operating documents. This was another example of past insensitivity of design engineering for operational considerations.

CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

The corrective actions for this violation are the same as for the previous violations.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Corrective actions discussed for previous violations remain in place to preclude further violations.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved.