UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 14, 1980

Docket Nos. 50-250
and 50-251

Dr. Robert E. Uhrig, Vice President
Advanced Systems and Technology
Florida Power and Light Company
Post Office Box 529100
Miami, Florida 33152

Dear Dr. Uhrig:

The Commission has issued the enclosed Amendment No. 55 to Facility Operating License No. DPR-31 and Amendment No. 47 to Facility Operating License No. DPR-41 for the Turkey Point Plant Unit Nos. 3 and 4, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated December 11, 1978.

These amendments incorporate new limiting conditions for operation and surveillance requirements associated with a low temperature reactor vessel overpressure protection system that has been installed in both units.

Copies of the Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 55 to DPR-31
2. Amendment No. 47 to DPR-41
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-250

TURKEY POINT NUCLEAR GENERATING UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 55
License No. DPR-31

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power and Light Company (the licensee) dated December 11, 1978, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-26 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 55 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 14, 1980

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT NUCLEAR GENERATING UNIT NO. 4

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 47
License No. DPR-41

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power and Light Company (the licensee) dated December 11, 1978, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-41 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 47 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 14, 1980

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 55 TO FACILITY OPERATING LICENSE NO. DPR-31

AMENDMENT NO. 47 TO FACILITY OPERATING LICENSE NO. DPR-41

DOCKET NOS. 50-250 AND 50-251

Revise Appendix A as follows:

Remove Pages	Insert Pages
ii	ii
iii	iii-a
	iii-b
-	3.1-1
3.1-1	3.14-1
3.14-1	4.15-1
4.15-1	B3.1-1
B3.1-1	B3.14-1
B3.14-1	B4.15-1
B4.15-1	

TABLE OF CONTENTS (Continued)

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

TABLE OF CONTENTS (Continued)

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

3.0 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR COOLANT SYSTEM

Applicability: Applies to the operating status of the Reactor Coolant System.

Objective: To specify those limiting conditions for operation of the Reactor Coolant System which must be met to assure safe reactor operation.

Specification:

1. OPERATIONAL COMPONENTS

a. Reactor Coolant Pumps

1. A minimum of ONE pump shall be in operation when the reactor is in power operation, except during low power physics tests.

2. A minimum of ONE pump, or ONE Residual Heat Removal Pump, shall be in operation during reactor coolant boron concentration reduction.

3. Reactor power shall not exceed 10% of rated power unless at least TWO reactor coolant pumps are in operation.

4. Reactor power shall not exceed 45% of rated power with only two pumps in operation unless the overtemperature ΔT trip setpoint, K_1, for two loop operation, has been set at 0.88.

5. A reactor coolant pump shall not be started when cold leg temperature is $\leq$ 275°F unless steam generator secondary water temperature is less than 50°F above the RCS temperature (including instrument error).

b. Steam Generators

1. A minimum of TWO steam generators shall be operable when the average coolant temperature is above 350F.

c. Pressurizer Safety Valves

1. ONE valve shall be operable whenever the head is on the reactor vessel except during hydrostatic tests.

2. THREE valves shall be operable when the reactor coolant average temperature is above 350F or the reactor is critical.

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

3.14 OVERPRESSURE MITIGATING SYSTEM

Applicability: Establishes operating limitations to assure that the limits of 10 CFR 50, Appendix G, are not exceeded.

Objectives: To minimize the possibility of an overpressure transient which could exceed the limits of 10 CFR 50, Appendix G.

Specification:

1. At RCS temperature less than or equal to 380°F, valves MOV-*-843 A, MOV-*-843 B, MOV-*-866 A, and MOV-*-866 B shall be closed.

2. If any of the valves in 3.14.1 are found to be open while RCS temperature is less than or equal to 380°F, perform at least one of the following within the next 8 hours:

   a. block the corresponding flow path to the reactor vessel,
   b. close the valve, or
   c. depressurize and vent the RCS through an opening with an area of at least 2.20 square inches, or
   d. verify at least one pressurizer power operated relief valve is maintained open.

3. At RCS temperature less than or equal to 275°F, two pressurizer power operated relief valves shall be operable at the low setpoint range.

   a. If one power operated relief valve is inoperable with RCS temperature less than or equal to 275°F, perform at least one of the following within 7 days:

      (1) restore operability of the power operated relief valve, or

      (2) depressurize and vent the RCS through an opening with an area of at least 2.20 square inches, or

      (3) verify at least one pressurizer power operated relief valve is maintained open.

   b. If both power operated relief valves are inoperable with RCS temperature less than or equal to 275°F, perform at least one of the following within the next 24 hours:

      (1) restore operability of at least one power operated relief valve, or

      (2) depressurize and vent the RCS through an opening with an area of at least 2.20 square inches, or

      (3) verify at least one pressurizer power operated relief valve is maintained open.

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

4.15 OVERPRESSURE MITIGATING SYSTEM

Applicability: Applies to periodic surveillance of the Overpressure Mitigating System.

Objective: To demonstrate operability of the Overpressure Mitigating System.

Specification:

1. Within 1 month prior to operation in a condition where the PORV would be required to be operable, the pressurizer power operated relief valve actuation circuitry shall be functionally tested. The functional test need not include actual valve operation.

2. While RCS temperature is less than or equal to 380°F, verify daily that valves MOV-*-843 A, MOV-*-843 B, MOV-*-866 A, and MOV-*-866 B are closed.

3. While RCS temperature is less than or equal to 275°F, verify weekly that the isolation valve for each operable pressurizer power operated relief valve is open.

4. While RCS temperature is less than or equal to 275°F, the pressurizer power operated relief valve actuation circuitry shall be functionally tested monthly. The functional test need not include actual valve operation.

5. Testing shall be in accordance with approved plant procedures.

B3.1 BASES FOR LIMITING CONDITIONS FOR OPERATION, REACTOR COOLANT SYSTEM

1. Operational Components

The specification requires that a sufficient number of reactor coolant pumps be operating to provide coast down core cooling in the event that a loss of flow occurs. The flow provided will keep DNBR well above 1.30. When the boron concentration of the Reactor Coolant System is to be reduced the process must be uniform to prevent sudden reactivity changes in the reactor. Mixing of the reactor coolant will be sufficient to maintain a uniform boron concentration if at least one reactor coolant pump or one residual heat removal pump is running while the change is taking place. The residual heat removal pump will circulate the reactor coolant system volume in approximately one half hour.

Each of the pressurizer safety valves is designed to relieve 293,330 lbs. per hr. of saturated steam at the valve set point.(1) Below 350 F and 450 psig in the Reactor Coolant System, the Residual Heat Removal System can remove decay heat and thereby control system temperature and pressure. If no residual heat were removed by any of the means available the amount of steam which could be generated at safety valve lifting pressure would be less than the capacity of a single valve. Also, two safety valves have capacity greater than the maximum surge rate resulting from complete loss of load.(2)

The 50°F limit on maximum differential between steam generator secondary water temperature and reactor coolant temperature assures that the pressure transient caused by starting a reactor coolant pump when cold leg temperature is $\leq$ 275°F can be relieved by operation of one Power Operated Relief Valve (PORV). The 50°F limit includes instrument error.

2. Pressure/Temperature Limits

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, and startup and shutdown operations. The various categories of load cycles used for design purposes are provided in

B3.14 BASES FOR LIMITING CONDITIONS OF OPERATION, OVERPRESSURE MITIGATING SYSTEM

The operability of two PORV's or an RCS vent opening of greater than or equal to 2.20 square inches ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR Part 50 when one or more of the RCS cold legs are $\leq$ 275°F. Either PORV has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either (1) the start of an idle RCS with the secondary water temperature of the steam generator $\leq$ 50°F above the RCS cold leg temperature (includes margin for instrument error) or (2) the start of a HPSI pump and its injection into a water solid RCS.

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

B4.15 BASES FOR SURVEILLANCE REQUIREMENTS, OVERPRESSURE MITIGATING SYSTEM

The specified testing of the Overpressure Mitigating System (OMS) will verify its operability. The capacity of one pressurizer Power Operated Relief Valve is sufficient to relieve potential overpressure transients when the RCS is in the low temperature overpressure protection range. Proper functioning of the OMS combined with selected administrative controls will demonstrate the integrity of the system.

Amendment No. 55, Unit 3
Amendment No. 47, Unit 4

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 55 TO FACILITY OPERATING LICENSE NO. DPR-31

AND AMENDMENT NO. 47 TO FACILITY OPERATING LICENSE NO. DPR-41

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT NUCLEAR GENERATING, UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 Introduction

By application dated December 11, 1978 the Florida Power and Light Company (FPL) requested amendments to Facility Operating License Nos. DPR-31 and DPR-41 for the Turkey Point Plant Unit Nos. 3 and 4. The application proposed amendments which incorporate new limiting conditions for operation and surveillance requirements associated with the reactor vessel overpressure mitigating system (OMS).

By letter dated October 18, 1977 (Reference 1) Florida Power and Light Company (FPL) submitted to the NRC a plant specific analysis in support of the proposed overpressure mitigating system (OMS) for Turkey Point Units 3 and 4. This information supplements documentation submitted by FPL earlier (References 4-11).

We have completed our review of all information submitted by FPL in support of the proposed overpressure mitigating system and have found that the system provides adequate protection from overpressure transients and that acceptable Technical Specification changes have been proposed.

2.0 Background

Over the last few years, incidents identified as pressure transients have occurred in pressurized water reactors. This term "pressure transients," as used in this report, refers to events during which the temperature pressure limits of the reactor vessell, as shown in the facility Technical Specifications, are exceeded. All of these incidents occurred at relatively low temperature (less than 200 degrees F) where the reactor vessel material toughness (resistance to brittle failure) is reduced.

The "Technical Report on Reactor Vessel Pressure Transients" in NUREG 0138 (Reference 2) summarizes the technical considerations relevant to this matter, discusses the safety concerns and existing safety margins of operating reactors, and describes the regulatory actions taken to resolve this issue by reducing the likelihood of future pressure transient events at operating reactors. A brief discussion is presented here.

2.1 Vessel Characteristics

Reactor vessels are constructed of high quality steel made to rigid specifications, and fabricated and inspected in accordance with the time-proven rules of the ASME Boiler and Pressure Vessel Code. Steels used are particularly tough at reactor operating conditions. However, since reactor vessel steels are less tough and could possibly fail in a brittle manner if subjected to high pressures at low temperatures, power reactors have always operated with restrictions on the pressure allowed during startup and shutdown operations.

At operating temperatures, the pressure allowed by Appendix G limits is in excess of the setpoint of currenly installed pressurizer code safety valves. However, most operating PWRs did not have pressure relief devices to prevent pressure transients during cold conditions from exceeding the Appendix G limit.

2.2 Regulatory Actions

By letter dated August 11, 1976, (Reference 3) the NRC requested that FPL begin efforts to design and install plant systems to mitigate the consequences of pressure transients at low temperatures. It was also requested that operating procedures be examined and administrative changes be made to guard against initiating overpressure events. It was felt by the staff that proper administrative controls were required to assure safe operation for the period of time prior to installation of the proposed overpressure mitigating hardware.

FPL responded (References 4 and 5) with preliminary information describing interim measures to prevent these transients along with some discussion of proposed hardware. The proposed hardware change was to install a low pressure actuation setpoint on the pressurizer air operated relief valves.

FPL participated as a member of a Westinghouse user's group which was formed to support the analysis effort required to verify the adequacy of the proposed system to prevent overpressure transients. Using input data generated by the user's group, Westinghouse performed transient analyses (Reference 10) which are used as the basis for plant specific analysis.

The NRC requested additional information concerning the proposed procedural changes and the proposed hardware changes. FPL provided the required responses (References 6 and 7). Reference 1 transmitted the plant specific analysis for Turkey Point Units 3 & 4.

2.3 Design Criteria

Through this series of meetings and correspondence with PWR vendors and licensees, the staff developed a set of criteria for an acceptable overpressure mitigating system. The basic criterion is that the mitigating system will prevent reactor vessel pressures in excess of these allowed by Appendix G. Specific criteria for system performance are:

1) Operator Action: No credit can be taken for operator action for ten minutes after the operator is aware of a transient.

2) Single Failure: The system must be designed to relieve the pressure transient given a single failure in addition to the failure that initiated the pressure transient.

3) Testability: The system must be testable on a periodic basis consistent with the system's employment.

4) Seismic and IEEE 279 Criteria: Ideally, the system should meet seismic Category I and IEEE 279 criteria. The basic objective is that the system should not be vulnerable to a common failure that would both initiate a pressure transient and disable the overpressure mitigating system. Such events as loss of instrument air and loss of offsite power must be considered.

The staff also instructed the licensee to provide an alarm which monitors the position of the pressurizer relief valve isolation valves, along with the low setpoint enabling switch, to assure that the overpressure mitigating system is properly aligned for shutdown conditions.

2.4 Design Basis Events

The incidents that have occurred to date have been the result of operator errors or equipment failures. Two varieties of pressure transients can be identified: a mass input type from charging pumps, safety injection pumps, safety injection accumulators; and a heat addition type which causes thermal expansion from sources such as steam generators or decay heat.

On Westinghouse designed plants, the most common cause of the overpressure transients to date has been isolation of the letdown path. Letdown during low pressure operations is via a flowpath through the RHR system. Thus, isolation of RHR can initiate a pressure transient if a charging pump is left running. Although other transients occur with low frequency, those which result in the most rapid pressure increases were identified by the staff for analysis. The most limiting mass input transient identified by the staff is inadvertent injection by the largest safety injection pump. The most limiting thermal expansion transient is the start of a reactor coolant pump with a 50 degree F temperature difference between the water in the reactor vessel and the water in the steam generator.

Based on the historical record of overpressure transients and the imposition of more effective administrative controls, the staff believes that the limiting events identified above form an acceptable bases for analyses of the proposed overpressure mitigating system.

3.0 SYSTEM DESCRIPTION AND EVALUATION

The proposed OMS includes sensors, actuating mechanisms, alarms, and valves to prevent a reactor coolant system transient from exceeding the pressure and temperature limits included in the Turkey Point Units 3 and 4 Technical Specifications (TS).

FPL adopted the "Reference Mitigating System" developed by Westinghouse and the user's group. The licensee proposed to modify the actuation circuitry of the existing air operated pressurizer relief valves to provide a low pressure setpoint during startup and shutdown conditions. The low pressure setpoint is a constant 415 psig at temperatures below 300 degrees F. Above 300 degrees F, the setpoint increases linearly to 2335 psig at 462 degrees F. When the reactor vessel is at low temperatures, with the low pressure setpoint selected, a pressure transient is terminated below the Appendix G limit by automatic opening of these relief valves. A manual switch is used to enable and disable the low setpoint of each relief valve. An enabling alarm which monitors system pressure, the position of the enabling switch and the upstream isolation valve is provided. The system low setpoint is enabled at a pressure of 400

psig during plant heatup. We find the pressurizer relief valves with a manually enabled low pressure setpoint to be an acceptable concept for an OMS.

3.1 Air Supply

The power operated relief valves (PORVs) are spring-loaded-closed, air required to open the valves, which are supplied by a instrument air source. To assure operability of the valves upon loss of control air, a backup air supply will be provided. The backup air supply consists of a seismically mounted passive air accumualtor for each PORV. Each tank contains enough air for a minimum of ten minutes operation. Existing alarms in the control room alert the operator to loss of instrument air to the PORVs and associated accumulators. The staff finds the backup air supply to be acceptable.

3.2 Electrical Controls

The proposed overall approach to eliminating overpressure events incorporated administrative, procedural, and hardware controls with reliance upon the plant operator for the principal line of defense. Preventing administrative/procedural measures include (a) procedural precautions, (b) deenergization of essential components not required during the cold shutdown mode of operation, and (3) maintaining a nonwater-solid reactor coolant system condition whenever possible.

The basic design criteria that were applied in determining the adequacy of the electrical, instrumentation, and control aspects of the low temperature overpressure protection system are those listed in 2.3 above.

In addition to complying with these criteria, the licensee has agreed to provide a variety of alarms to alert the operator to (a) manually enable the pressure protection system during cooldown, (b) indicate the occurrence of a pressure transient, and (c) indicate closure of either power operated relief valve (PORV) isolation valve which ensures a complete pathway from the pressurizer to the pressurizer relief tank.

3.2.1 System Electrical and Control Description

The OMS design for Turkey Point, Units 3 and 4 uses pressurizer PORVs with a variable low pressure setpoint as the pressure relief mechanism (Reference 1). The variable low setpoint is energized and deenergized by two switches, one for each PORV, on the main control board. The

variable low pressure setpoint is derived from reactor coolant system (RCS) wide range temperature using redundant transmitters. The reactor coolant pressure signal is obtained from redundant wide range pressure transmitters. Below an RCS temperature of 300°F, the setpoint is a constant 415 psig. Above 300°F, the setpoint increases linearly from 415 psig at 300°F to 2335 psig at 462°F.

Various alarms are included in the OMS. On decreasing pressure, an alarm and annunciator will activate at 390 psig. This alarm alerts the operator to energize the OMS. The alarm will not clear unless (a) the low pressure setpoint is energized, (b) the PORV mode selector switch is in AUTO, and (c) the motor oeprated valves (MOVs) upstream of the PORVs are indicated open. This assures proper alignment of the OMS. On increasing pressure an alarm and annunciator will actuate at 400 psig. This alarm will inform the operator that RCS pressure is approaching the PORV low setpoint. Action can then be taken to remedy the cause of increasing pressure, or, if part of a normal heatup, to deenergize the OMS by placing the two NDTT control switches to the "Normal" position. Should pressure continue to increase to the PORV setpoint, an alarm and annunciator will inform the operator that the PORVs have received a signal to open from the OMS.

The PORVs are spring-loaded closed and require air to open. The air is presently supplied by instrument air. A redundant supply of air to the valves is included in the OMS. Redundant accumulators, one dedicated to each PORV, will be added to the present air source. Each accumulator will be sized to ensure a minimum of ten minutes operation of the OMS. Redundant check valves will be provided for each accumulator to prohibit backfeeding the instrument air system. Existing alarms in the control room will alert the operator to a loss of instrument air to the PORVs and associated accumulators.

3.2.1.1 Channel Separability

The OMS has two channels, one to control each PORV, that provide complete redundancy an are independent except for the use of common alarms and annunciators (as established by the single failure analysis reported in Reference 8) which are isolated so that a failure in the circuitry will not incapacitate either channel. Either one of the two PORVs provides the relief capacity needed

to protect the vessel against a low-temperature overpressurization event; the other PORV provides redundant capacity. The OMS setpoints and RCS pressure signals are derived from redundant temperature and pressure transmitters. Each channel has its own ENABLE/DISABLE swich installed on the main control board. The installation of the OMS is in accordance with the separation criteria used in the design of the Turkey Point Plant. Each of the two channels uses an independent power supply from the transmitters to the solenoid valves controlling the air to the PROVs. As discussed in the system description, the OMS has separate backup air supplies for each PORV. These design features are in compliance with the single failure design criterion.

3.2.1.2 Isolation Valve and Setpoint Alarms

As described in Paragraph 3.2.1, various alarms are included in the OMS. Clearing of these alarms ensures proper alignment of the OMS. The alarms provided meet the OMS design criterion.

3.2.1.3 Operator Action

The OMS is designed to perform its intended function for at least ten minutes without operator action. The most restrictive condition is the continued operation of a safety injection pump with an assumed loss of instrument air. The redundant sources of air to the PORVs are sized to ensure a minimum of ten minutes of operation after the loss of instrument air, and existing alarms alert the operator to this loss. The system meets the design criterion for operator action.

3.2.1.4 IEEE 279 Criteria

The OMS meets the intent of IEEE 279, is designed against single failure, and has two channels that are electrically separate and meet the physical separation requirements used in the design of the electrical system for the Turkey Point Plant. In addition, periodic testing of the OMS prior to the need for its operation is included to enhance system reliability. The compliance of the design with the IEEE 279 design criteria is adequate.

3.2.1.5 Testability

Testability of the OMS is provided and the cooldown procedures include verification of OMS operability prior to solid-system, low-temperature operation. Testing will be accomplished by (a) closing the PORV isolation valves, (b) enabling the OMS, and (c) inputting a signal below 300°F (test done with RCS pressure above 415 psig). In this manner, OMS circuits as well as PORV operability will be verified. In addition, the associated instrumentation will be surveilled for calibration and proper operation using the same methods followed for safety-related instrumentation. These provisions and procedures for testability are adequate.

3.2.2 Pressure Transient Reporting and Recording Requirements

The staff position on a pressure transient which causes the overpressure protection system to function, thereby indicating the occurrence of a serious pressure transient, is that it is a 30-day reportable event. In addition, pressure and temperature instrumentation are required to provide a permanent record of the pressure transient. The response times of the temperature/pressure recorders shall be compatible with a pressure transient increasing at a rate of approximately 100 psi per second. This instrumentation shall be operable whenever the OMS is enabled.

3 2.3 Disabling of Components Not Required During Cold Shutdown

Except as required for brief intervals by operating procedures or Technical Specifications, the staff position requires that essential components not required during cold shutdown that could produce an overpresssurization event be disabled or isolated from the RCS during cold shutdown, and that the controls to disable or isolate these components be incorporated in the Technical Specifications. In particular, the safety injection accumulators and the high pressure safety injection pumps are included in the components to be disabled or isolated. Valves and breakers used to disable essential equipment during cold shutdown must be tagged or locked to prevent inadvertent changes of state.

3.3. Testability

Testability is provided. FPL has stated that verification of operability is possible prior to solid system, low temperature operation by use of the remotely operated isolation valve, enable/disable switch and normal electronics surveillance methodology. Testing requirements will be incorporated in the Technical Specifications as discussed in Section 4.2 of this evaluation.

3.4 Appendix G

The Appendix G curve submitted by FPL for purposes of overpressure transient analysis is based on five effective full power years irradiation. The zero degree heatup curve is allowed since most pressure transients occur during isothermal metal conditions. The Appendix G limit at 100 degrees F according to this curve is 510 psig. The staff finds that use of this curve is acceptable as a basis for overpressure mitigating system performance.

3.5 Setpoint Analysis

The one loop version of the LOFTRAN (Reference 12 WCAP 7907) code was used to perform the mass input analyses. The four loop version was used for the heat input analysis. Both versions require some input modeling and initialization changes. LOFTRAN is currently under review by the staff and is judged to be an acceptable code for treating problems of this type.

The results of this analysis are provided in terms of PORV setpoint overshoot. The predicted maximum transient pressure is simply the sum of the overshoot magnitude and the setpoint magnitude. The PORV setpoint is adjusted so that given the setpoint overshoot, the resultant pressure is still below that allowed by Appendix G limits.

FPL presented the following Turkey Point Units 3 & 4 plant characteristics to determine the pressure reached for the design basis pressure transients:

SI Pump Flowrate @ 500 psig	82.7 lb/sec
RCS Volume	9343 ft^3
S G Heat Transfer area	44,430 ft^2
Relief Valve setpoint	415 psig

Westinghouse identified certain assumptions and input parameters as conservative with respect to the analysis. Some of these are listed here.

1) One PORV was assumed to fail.

2) The RCS was assumed to be rigid with respect to expansion.

3) Conservative heat transfer coefficients were assumed for the steam generator.

The staff agrees that these are conservative assumptions.

3.5.1 Mass Input Case

The inadvertent start of a safety injection pump with the plant in a cold shutdown condition was selected as the limiting mass input case. For this transient, a relief valve opening time of 2.0 seconds was used. FPL has verified that this time is conservative.

Westinghouse provided the licensee with a series of curves based on the LOFTRAN analysis of a generic plant design which indicates PORV setpoint overshoot for this transient as a function of system volume, relief valve opening time and relief valve setpoint. These sensitivity analyses were then applied to the Turkey Point Units 3 & 4 plant parameters to obtain a conservative estimate of the PORV setpoint overshoot. The staff finds this method of analysis to be acceptable.

Using the Westinghouse methodology, the Turkey Point Units 3 & 4 PORV setpoint overshoot was determined to be 78 psi. With a relief valve setpoint of 415 psig, a final pressure of 493 psig is reached for the worst case mass input transient. Since the five EFPY Appendix G limit at temperatures above 100 degrees F is above 510 psig, the staff concluded that the system performance was acceptable with a 415 psig low pressure relief valve setpoint.

3.5.2 Heat Input Case

Inadvertent startup of a reactor coolant pump with a primary to secondary temperature differential across the steam generator of 50 degrees F, and with the plant in a water solid condition, was selected as the limiting heat input case. For the heat input case, Westinghouse provided the licensee with a series of curves based on the LOFTRAN analysis of a generic plant design to determine the PORV setpoint overshoot as a function of RCS volume, steam generator UA and initial RCS temperature. For this transient, a relief valve opening time of three seconds was assumed.

The calculated final pressure for the heat input transient for a fixed ΔT of 50 degrees depends on the initial RCS temperature and is given here:

RCS Temperature	Maximum Pressure
100	437
140	456
180	478
250	520

In all these cases, for the given RCS temperature, the Appendix G limits are not exceeded.

The staff finds that the analyses of the limiting mass input and heat input cases show a maximum pressure transient below that allowed by Appendix G limits and is therefore acceptable.

3.6 Implementation Schedule

FPL installed the OMS in each unit in two phases. Phase one included installation of the low pressure setpoint circuitry and pressure sensitive alarms. Phase two included MOV interlocks and the backup air supply.

4.0 Administrative Controls

To supplement the hardware modifications and to limit the magnitude of postulated pressure transients to within the bounds of the analysis provided by the licensee, a defense in depth approach is adopted using procedural and administrative controls. Those specific conditions required to assure that the plant is operated within the bounds of the analysis are spelled out in the Technical Specifications.

4.1 Procedures

A number of provisions to prevent the initiation of pressure transients are contained in the Turkey Point operating procedures. An effort has been made to minimize unnecessary RCP starts while the plant is in a water solid condition. However, when a RCP start is required, procedures will require the operator to verify that 1) if RCS temperature is above 212 degrees F the steam pressure in the secondary side must be below the saturation pressure corresponding to the RCS temperature and 2) if RCS temperature is below 212 degrees F, that no significant vapor flow from the atmospheric dump valves will exist and that the recorded temperature difference between the hot leg and cold leg of each loop is less than 20 degrees F. Phase two installation will include a thermocouple for measuring steam generator shell-side temperature prior to starting a reactor coolant pump.

In addition, to preclude inadvertent safety injection the high pressure safety injection isolation valves and the safety injection accumulator valves are to be closed and de-energized by procedures below 1000 psig.

The staff finds that the procedural and administrative controls described are acceptable. However, the staff determined that certain procedural and administrative controls should be included in the Technical Specifications. These are listed in the following section. The licensee has agreed to these controls.

4.2 Technical Specifications

To assure operation of the overpressure mitigating system, the licensee has submitted for staff review, Technical Specifications to be incorporated into the license for Turkey Point Units 3 & 4. These specifications are consistent with the intent of the statements listed below. The licensee has assured that the Technical Specifications proposed are compatible with other license requirements.

1. Both PORVs must be operable whenever the RCS tempeature is less than the minimum pressurization temperature, except one PORV may be inoperable for seven days. If these conditions are not met, the primary system must be depressurized and vented to the atmosphere or to the pressurizer relief tank within eight hours.

2. Operability of the overpressure mitigation system requires that the low pressure setpoint will be selected, the upstream isolation valves open and the backup air supply charged.

3. No more than one high head SI pump injection valve may be energized at RCS temperatures below 380 degrees F, unless the vessel head is removed.

4. A reactor coolant pump may be started (or jogged) only if there is a steam bubble in the pressurizer, or the SG/RCS temperature is less than 50 degrees F.

5. The overpressure mitigating system must be tested on a periodic basis consistent with the need for its use.

6. When the plant is in a cold shutdown condition the safety injection accumulators shall be isolated from the RCS by verifying that the accumulator isolation valves are in the closed position and power to the valve operators is removed.

5.0 Summary

The adminsitrative controls and hardware changes proposed by Florida Power and Light Company provide protection for Turkey Point Units 3 and 4 from pressure transients at low temperatures by reducing the probability of initiation of a transient and by limiting the pressure of such a transient to below the limits set by Appendix G. The staff finds that the overpressure mitigating system meets the criteria established by the NRC and is acceptable as a long term solution to the problem of overpressure transients. Also, any future revisions of Appendix G limits for Turkey Point Units 3 and 4 must be considered and the overpressure mitigating system setpoint adjusted accordingly with corresponding adjustments in the license.

The electrical, instrumentation, and control aspects of the Turkey Point Units 3 and 4 OMS design are adequate on the basis that: (a) the proposed control circuitry meets IEEE Std. 279, (b) the system is redundant and meets the single failure criterion, (c) the design requires no operator action for ten minutes after the operator receives an overpressure action alarm, (d) the system is testable on a periodic basis, and (e) the proposed changes to the Technical Specifications are in agreement with the recommended changes described in 4.2 above.

We find the licensee's proposed system acceptable. Additionally, the licensee's proposed Technical Specifications are in agreement with the recommended changes described in Section 4.2 of this SER.

Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: March 14, 1980

REFERENCES

1. Florida Power and Light Company letter (Uhrig) to NRC (Lear) dated October 18, 1977.
2. "Staff Discussion of Fifteen Technical Issues listed in Attachment G November 3, 1976 Memorandum from Director NRR to NRR Staff." NUREG-0138, November 1976.
3. NRC letter (Lear) to FPL (Uhrig) dated August 11, 1976.
4. FPL letter (Uhrig) to NRC (Lear) dated October 15, 1976.
5. FPL letter (Uhrig) to NRC (Lear) dated December 10, 1976.
6. FPL letter (Uhrig) to NRC (Lear) dated March 1, 1977.
7. FPL letter (Uhrig) to NRC (Lear) dated March 16, 1977.
8. FPL letter (Uhrig) to NRC (Lear) dated March 31, 1977.
9. FPL letter (Uhrig) to NRC (Lear) dated April 21, 1977.
10. "Pressure Mitigating System Transient Analysis Results" prepared by Westinghouse for the Westinghouse user's group on reactor coolant system overpressurization, dated July 1977.
11. FPL letter (Uhrig) to NRC (Lear) dated January 3, 1978.
12. Loftran Code Description, WCAP-7907, October 1972.

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-250 AND 50-251

FLORIDA POWER AND LIGHT OMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 55 to Facility Operating License No. DPR-31, and Amendment No. 47 to Facility Operating License No. DPR-41 issued to Florida Power and Light Company (the licensee), which revised Technical Specifications for operation of Turkey Point Nuclear Generating, Unit Nos. 3 and 4 (the facilities) located in Dade County, Florida. The amendments are effective as of the date of issuance.

The amendments incorporate new limiting conditions for operation and surveillance requirements associated with a low temperature reactor vessel overpressure protection system that has been installed in both units.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the application for amendments dated December 11, 1978, (2) Amendment Nos. 55 and 47 to License Nos. DPR-31 and DPR-41, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the Environmental and Urban Affairs Library, Florida International University, Miami, Florida 33199. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 14th day of March, 1980.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors