

JUNE 15 1979

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

REGULATORY DOCKET FILE COPY

Dear Dr. Uhrig:

In response to your applications dated May 18, 1979 (L-79-122 and L-79-124) as supplemented on May 29 and June 8, 1979, the Commission has issued the enclosed Amendment Nos. 49 and 41 to Facility Operating License Nos. DPR-31 and DPR-41 for the Turkey Point Nuclear Generating Plant, Unit Nos. 3 and 4.

The amendments consist of changes in the Technical Specifications that approve the operation of Turkey Point Unit Nos. 3 and 4 with a peaking factor of 2.10, assuming that no more than 22% of the steam generator tubes are plugged. In addition, Amendment No. 41 to License No. DPR-41 permits continued operation of Turkey Point Unit 4 for six equivalent months of operation from June 1, 1979. The application (L-79-122) requested ten equivalent months of operation, however, we preferred not to predict the steam generator performance for longer than six months at a time. We have discussed this with your staff and they have accepted this judgment. Also, for our administrative convenience, we are reissuing new pages 3 through 6 for Facility License No. DPR-41. Paragraph 3.D.1 is amended to include the new operating period and is expanded to be consistent with the requirements for Unit 3.

During our review of your proposed amendments we found that certain modifications were necessary to meet our requirements. Your staff has agreed to these modifications and they have been incorporated in these amendments.

Uhrig

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OFFICE >						
SURNAME >						
DATE >						

Dr. Robert E. Uhrig
Florida Power and Light Company - 2 -

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

Sincerely,

Original Signed By

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

Enclosures:

1. Amendment No. 49 to DPR-31
2. Amendment No. 41 to DPR-41
3. Safety Evaluation
4. Notice of Issuance

cc: w/enclosures
See next page

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Docket File 50-250
and 50-251

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

June 15, 1979

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:

In response to your applications dated May 18, 1979 (L-79-122 and L-79-124) as supplemented on May 29 and June 8, 1979, the Commission has issued the enclosed Amendment Nos. 49 and 41 to Facility Operating License Nos. DPR-31 and DPR-41 for the Turkey Point Nuclear Generating Plant, Unit Nos. 3 and 4.

The amendments consist of changes in the Technical Specifications that approve the operation of Turkey Point Unit Nos. 3 and 4 with a peaking factor of 2.10, assuming that no more than 22% of the steam generator tubes are plugged. In addition, Amendment No. 41 to License No. DPR-41 permits continued operation of Turkey Point Unit 4 for six equivalent months of operation from June 1, 1979. The application (L-79-122) requested ten equivalent months of operation, however, we preferred not to predict the steam generator performance for longer than six months at a time. We have discussed this with your staff and they have accepted this judgment. Also, for our administrative convenience, we are reissuing new pages 3 through 6 for Facility License No. DPR-41. Paragraph 3.D.1 is amended to include the new operating period and is expanded to be consistent with the requirements for Unit 3.

During our review of your proposed amendments we found that certain modifications were necessary to meet our requirements. Your staff has agreed to these modifications and they have been incorporated in these amendments.

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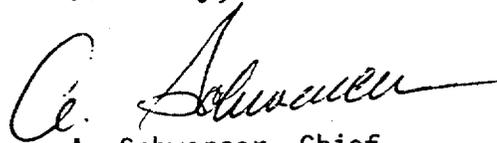
Dr. Robert E. Uhrig
Florida Power and Light Company

- 2 -

June 15, 1979

Copies of the related 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. 49 to DPR-31
2. Amendment No. 41 to DPR-41
3. Safety Evaluation
4. Notice of Issuance

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See next page

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Dr. Robert E. Uhrig
Florida Power and Light Company

- 3 -

June 15, 1979

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Dade County
Miami, Florida 33130

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Office of the Executive Legal Director
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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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 STATION UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 49
License No. DPR-31

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The applications for amendment by Florida Power and Light Company (the licensee) dated May 18, 1979 (L-79-122 and L-79-124) as supplemented May 29 and June 8, 1979, comply 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.

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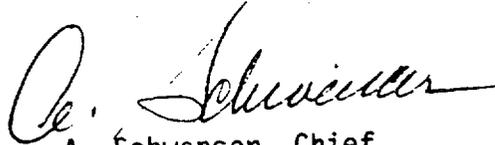
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of the Facility Operating License No. DPR-31 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 49, 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: June 15, 1979

AMENDMENT BOOKING PAGE COPY



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

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT NUCLEAR GENERATING STATION UNIT NO. 4

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 41
License No. DPR-41

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The applications for amendment by Florida Power and Light Company (the licensee) dated May 18, 1979 (L-79-122 and L-79-124) as supplemented May 29 and June 8, 1979, comply 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.

RECEIVED BY THE COMMISSION
MAY 14 1979

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraphs 3.B and 3.D.1 of the Facility Operating License No. DPR-41 are hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 41, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3.D Steam Generator Operation

1. After equivalent operation in Cycle 6 of six months from June 1, 1979, Turkey Point Unit 4 shall be brought to the cold shutdown condition and the steam generators shall be inspected unless: (1) an inspection of the steam generators is performed within this six month period as a result of the requirements in 2, 3 and 4 below, or (2) an acceptable analysis of the susceptibility for stress corrosion cracking of tubing is submitted to explicitly justify continued operation of Unit No. 4 beyond the authorized six equivalent months of operation. Any analysis justifying continued operation must be submitted at least 45 days prior to the expiration date of the authorized six equivalent months of operation. For the purpose of this requirement, equivalent operation is defined as operation with the reactor coolant at a temperature greater than 350°F. Nuclear Regulatory Commission (NRC) approval shall be obtained before resuming power operation following this inspection.
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: June 15, 1979

NUCLEAR REGULATORY COMMISSION
DOCUMENT DOCUMENT FILE COPY

ATTACHMENT TO LICENSE AMENDMENT NOS. 49 AND 41
FACILITY OPERATING LICENSE NOS. DPR-31 AND DPR-41
DOCKET NOS. 50-250 AND 50-251

Replace the following pages of the Technical Specifications contained in Appendix A of the above indicated license with the attached pages bearing the same numbers, except as otherwise indicated. The changed areas on the revised pages are reflected by a marginal line.

<u>Remove</u>	<u>Insert</u>
3.2-3	3.2-3
3.2-4	3.2-4
Fig. 3.2-3	Fig. 3.2-3
Fig. 3.2-3a	Fig. 3.2-3a*
-----	Fig. 3.2-3b*
B 3.2.4	B 3.2-4
B 3.2-6	B 3.2-6

Replace the following pages of Facility License No. DPR-41 with the attached pages as indicated. The changed area in the license is indicated by a marginal line.

<u>Remove</u>	<u>Insert</u>
3	3
4	4
5	5
-	6

*Changes in figure number only.

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reactivity insertion upon ejection greater than 0.3% k/k at rated power. Inoperable rod worth shall be determined within 4 weeks.

- b. A control rod shall be considered inoperable if
 - (a) the rod cannot be moved by the CRDM, or
 - (b) the rod is misaligned from its bank by more than 15 inches, or
 - (c) the rod drop time is not met.
- c. If a control rod cannot be moved by the drive mechanism, shutdown margin shall be increased by boron addition to compensate for the withdrawn worth of the inoperable rod.

5. CONTROL ROD POSITION INDICATION

If either the power range channel deviation alarm or the rod deviation monitor alarm are not operable rod positions shall be logged once per shift and after a load change greater than 10% of rated power. If both alarms are inoperable for two hours or more, the nuclear overpower trip shall be reset to 93% of rated power.

6. POWER DISTRIBUTION LIMITS

a. Hot channel factors:

- (1) With steam generator tube plugging >22% and ≤25%, the hot channel factors (defined in the basis) must meet the following limits at all times except during low power physics tests:

$$F_q(Z) \leq (2.03/P) \times K(Z), \text{ for } P > .5$$

$$F_q(Z) \leq (4.06) \times K(Z), \text{ for } P \leq .5$$

$$F_{\Delta H}^N \leq 1.55 [1.0 + 0.2 (1-P)]$$

Where P is the fraction of rated power at which the core is operating; K(Z) is the function given in Figure 3.2-3b; Z is the core height location of F_q .

If F_q as predicted by approved physics calculations, exceeds 2.03, the power will be limited to the rated power multiplied by the ratio of 2.03 divided by the predicted F_q , or augmented surveillance of hot channel factors shall be implemented.

- (2) With steam generator tube plugging ≤ 22%, the hot channel factors (defined in the basis) must meet the following limits at all times except during low power physics tests:

$$F_q(Z) \leq (2.10/P) \times K(Z), \text{ for } P > .5$$

$$F_q(Z) \leq (4.20) \times K(Z), \text{ for } P \leq .5$$

$$F_{\Delta H}^N \leq 1.55 [1.0 + 0.2 (1-P)]$$

Where P is the fraction of rated power at which the core is operating; K(Z) is the function given in either Figure 3.2-3 or 3.2-3a; Z is the core height location of F_q .

If F_q , as predicted by approved physics calculations, exceeds 2.03, the power will be limited to the rated power multiplied by the ratio of 2.10 divided by the predicted F_q , or augmented surveillance of hot channel factors shall be implemented.

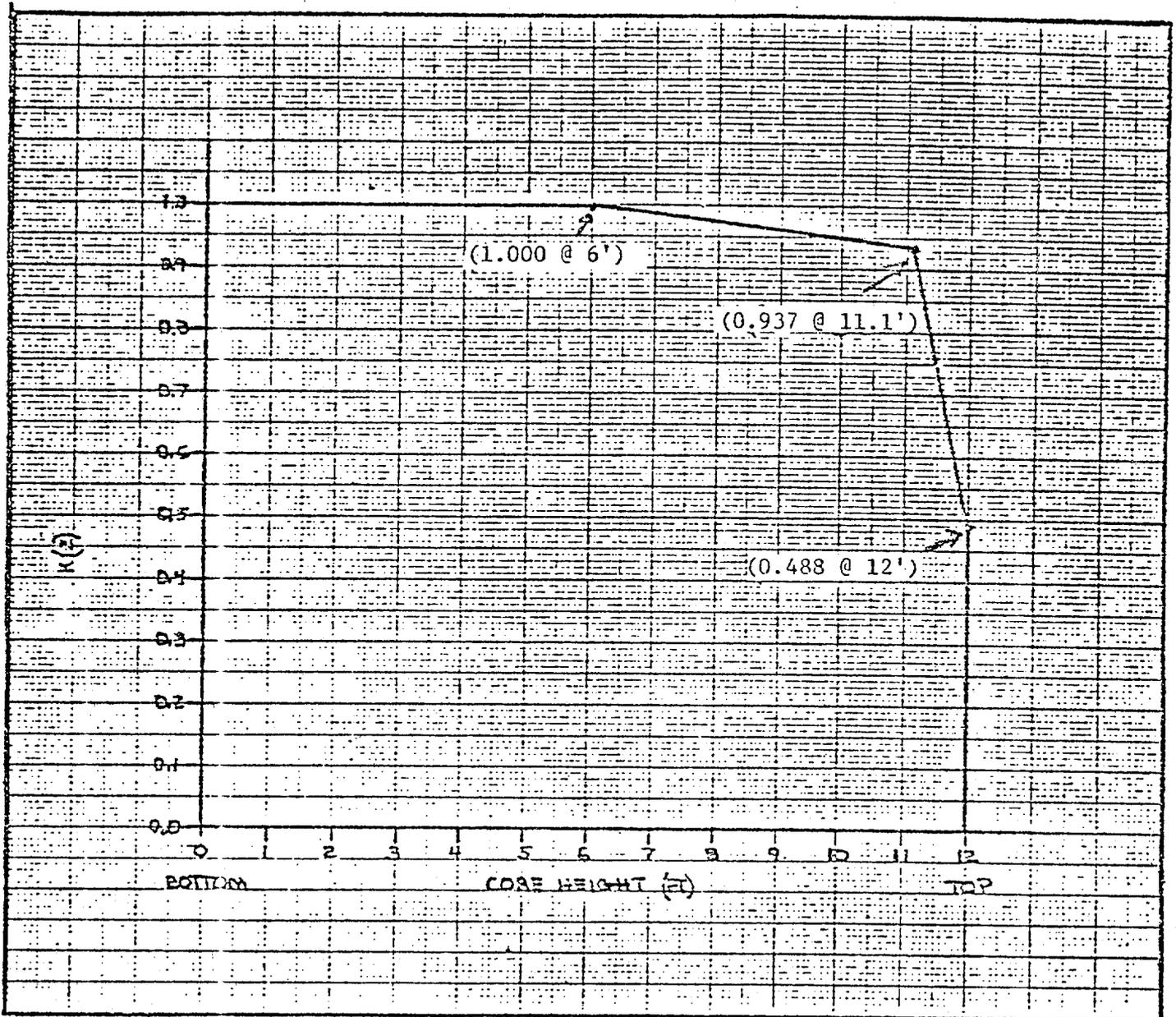
- b. Following initial loading before the reactor is operated above 75% of rated power and at regular effective full rated power monthly intervals thereafter, power distribution maps, using the movable detector system shall be made, to confirm that the hot channel factor limits of the specification are satisfied. For the purpose of this comparison,
- (1) The measurement of total peaking factor, F_q^{Meas} , shall be increased by three percent to account for manufacturing tolerances and further increased by five percent to account for measurement error.
 - (2) The measurement of the enthalpy rise hot channel factor, $F_{\Delta H}^N$, shall be increased by four percent to account for measurement error.

If either measured hot channel factor exceeds its limit specified under Item 6a, the reactor power shall be reduced so as not to exceed a fraction of the rated value equal to the ratio of the F_q or $F_{\Delta H}^N$ limit to measured value, whichever is less, and the high neutron flux trip setpoint shall be reduced by the same ratio. If subsequent in-core mapping cannot, within a 24 hour period, demonstrate that the hot channel factors are met, the reactor shall be brought to a hot shutdown condition with return to power authorized only for the purpose of physics testing. The reactor may be returned to higher power levels when measurements indicate that hot channel factors are within limits.

- c. The reference equilibrium indicated axial flux difference as a function of power level (called the target flux difference) shall be measured at least once per effective full power quarter. If the axial flux difference has not been measured in the last effective full power month, the target flux difference must be updated monthly by linear interpolation using the most recent measured value and the value predicted for the end of the cycle life.
- d. Except during physics tests or during excore calibration procedures and as modified by items 6e through 6g below, the indicated axial flux difference shall be maintained within a $\pm 5\%$ band about the target flux difference (this defines the target band on axial flux difference).
- e. If the indicated axial flux difference at a power level greater than 90% of rated power deviates

FIGURE 3.2-3

HOT CHANNEL FACTOR
 NORMALIZED OPERATING
 ENVELOPE (FOR TUBE PLUGGING
 >15% <19%)



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HOT CHANNEL FACTOR - NORMALIZED
OPERATING ENVELOPE (for
steam generator tube plugging
22% and $F_q = 2.10$)

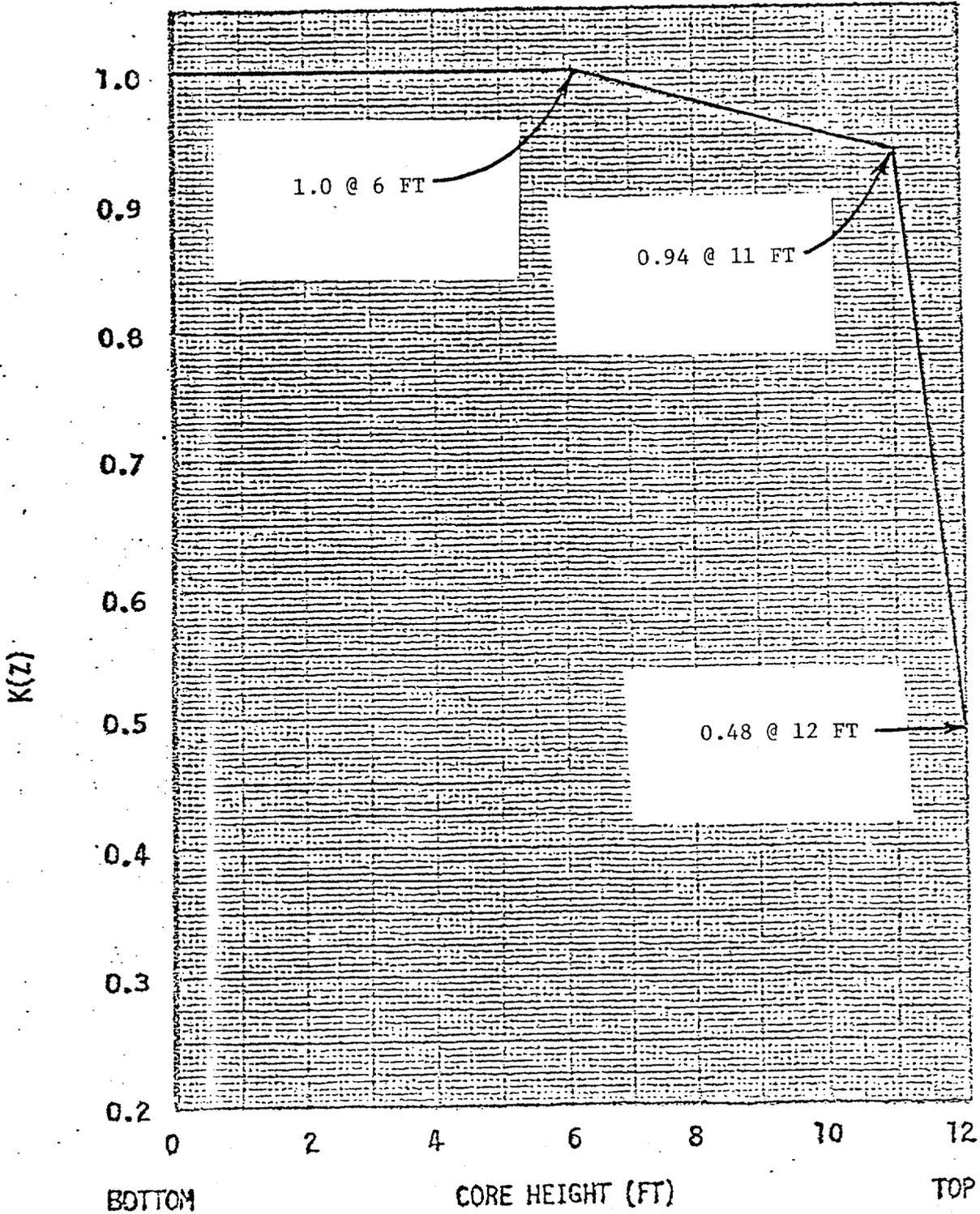


Figure 3.2-3a Amendment No. 49, Unit 3
Amendment No. 41, Unit 4

HOT CHANNEL FACTOR-NORMALIZED
OPERATING ENVELOPE (FOR STEAM
GENERATOR TUBE PLUGGING $\leq 25\%$ and $F_q=2.03$)

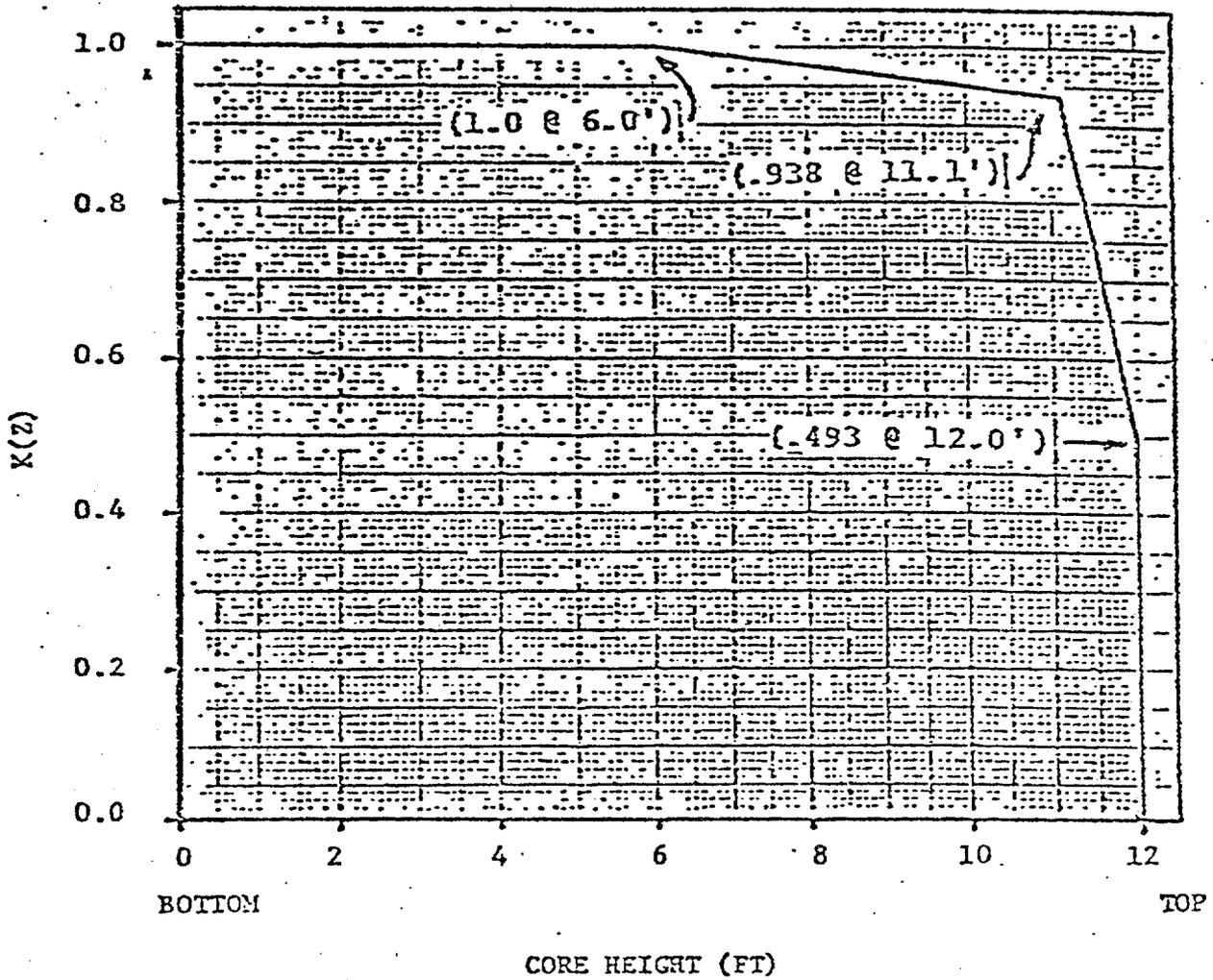


FIGURE 3.2-3b

Amendment No. 49, Unit 3
Amendment No. 41, Unit 4

An upper bound envelope as defined by the normalized peaking factor axial dependence of Figures 3.2-3, a, & b has been determined to be consistent with the technical specifications on power distribution control as given in Section 3.2.

When an F_q measurement is taken, both experimental error and manufacturing tolerance must be allowed for. Five percent is the appropriate experimental uncertainty allowance for a full core map taken with the movable incore detector flux mapping system and three percent is the appropriate allowance for manufacturing tolerance.

In the specified limit of $F_{\Delta H}^N$, there is an 8 percent allowance for uncertainties which means that normal operation of the core is expected to result in $F_{\Delta H}^N < 1.55/1.08$. The logic behind the larger uncertainty in this case is that (a) normal perturbations in the radial power shape (e.g., rod misalignment) affect $F_{\Delta H}^N$, in most cases without necessarily affecting F_q , (b) although the operator has a direct influence on F_q through movement of rods, and can limit it to the desired value, he has no direct control over $F_{\Delta H}^N$ and (c) an error in the predictions for radial power shape, which may be detected during startup physics tests can be compensated for in F_q by tighter axial control, but compensation for $F_{\Delta H}^N$ is less readily available. When a measurement of $F_{\Delta H}^N$ is taken, experimental error must be allowed for and 4% is the appropriate allowance for a full core map taken with the movable incore detector flux mapping system.

Measurements of the hot channel factors are required as part of start-up physics tests, at least once each full rated power month of operation, and whenever abnormal power distribution conditions require a reduction of core power to a level based on measured hot channel factors. The incore map taken following initial loading provides confirmation of the basic nuclear

Flux Difference ($\Delta\phi$) and a reference value which corresponds to the full design power equilibrium value of Axial Offset (Axial Offset = $\Delta\phi$ /fractional power). The reference value of flux difference varies with power level and burnup but expressed as axial offset it varies only with burnup.

The technical specifications on power distribution control assure that the F_q upper bound envelope as defined by Figures 3.2-3, a, & b is not exceeded and xenon distributions are not developed which at a later time, would cause greater local power peaking even though the flux difference is then within the limits specified by the procedure.

The target (or reference) value of flux difference is determined as follows. At any time that equilibrium xenon conditions have been established, the indicated flux difference is noted with part length⁺ rods withdrawn from the core and with the full length rod control rod bank more than 190 steps withdrawn (i.e., normal rated power operating position appropriate for the time in life. Control rods are usually withdrawn farther as burnup proceeds). This value, divided by the fraction of design power at which the core was operating is the design power value of the target flux difference. Values for all other core power levels are obtained by multiplying the design power value by the fractional power. Since the indicated equilibrium value was noted, no allowances for excore detector error are necessary and indicated deviation of $\pm 5\%$ ΔI are permitted from the indicated reference value. During periods where extensive load following is required, it may be impractical to establish the required core conditions for measuring the target flux difference every rated power month. For this reason, methods are permitted by Item 6c of Section 3.2 for updating the target flux differences. Figure B3.2-1 shows a typical construction of the target flux difference band at BOL and Figure B3.2-2 shows the typical variation of the full power value with burnup.

Strict control of the flux difference (and rod position) is not as necessary during part power operation. This is because xenon distribution control at part power is not as significant as the control at full power and allowance has been made in predicting the heat flux peaking factors for less strict control at part power. Strict control of the flux difference is not possible during certain physics tests or during the required, periodic excore calibra-

⁺Any reference to part-length rods no longer applies after the part-length rods are removed from the reactor.

- B. Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended.
 - C. Pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required.
 - D. Pursuant to the Act and 10 CFR Part 30 to receive, possess, and use at any time 100 millicuries each of any byproduct material without restriction to chemical or physical form, for sample analysis or instrument calibration;
 - E. Pursuant to the Act and 10 CFR Parts 40 and 70 to receive, possess, and use at any time 100 milligrams each of any source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration;
 - F. Pursuant to the Act and 10 CFR Parts 30 and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Turkey Point Unit Nos. 3 and 4.
3. This license shall be deemed to contain and is subject to the conditions specified in the following Commission Regulations in 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50 and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

A. Maximum Power Level

The reactor shall not be made critical until the tests described in the applicant's letter of April 3, 1973; have been satisfactorily completed. Thereafter, the applicant is authorized to operate the facility at reactor core power levels not in excess of 2200 megawatts thermal.

B. Technical Specifications

The Technical Specifications contained in Appendices A and B as revised through Amendment No. 41 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

C. This license is subject to the following conditions for the protection of the environment:

(1) The applicant shall pursue evaluations of alternatives to the proposed cooling channel system during construction, interim operation, and evaluation of the channel system. These evaluations shall include at least the following:

(a) Study of availability of groundwater or other alternative sources of surface water to use in the cooling system.

(b) Study of applicability of mechanical cooling devices, including powered spray modules and cooling towers.

(c) Study of marine environmental impacts of once-through cooling alternatives (described in Section X of the AEC Final Environmental Statement on Turkey Point Units 3 and 4, July 1972).

(2) The applicant shall take appropriate corrective action on any adverse effects determined as a result of monitoring and study programs. To the fullest extent practicable, the applicant shall utilize results of study programs in improving and modifying the operation of the facility and its cooling system so as to achieve a minimal adverse environmental impact.

D. Steam Generator Operation

(1) After equivalent operation in Cycle 6 of six months from June 1, 1979, Turkey Point Unit 4 shall be brought to the cold shutdown condition and the steam generators shall be inspected unless: (1) an inspection of the steam generators

is performed within this six month period as a result of the requirements in 2, 3 and 4 below, or (2) an acceptable analysis of the susceptibility for stress corrosion cracking of tubing is submitted to explicitly justify continued operation of Unit No. 4 beyond the authorized six equivalent months of operation. Any analysis justifying continued operation must be submitted at least 45 days prior to the expiration date of the authorized six equivalent months of operation. For the purpose of this requirement, equivalent operation is defined as operation with the reactor coolant at a temperature greater than 350°F. Nuclear Regulatory Commission (NRC) approval shall be obtained before resuming power operation following this inspection.

- (2) Reactor coolant to secondary leakage through the steam generator tubes shall be limited to 0.3 gpm per steam generator,. With a steam generator tube leakage greater than this limit, the reactor shall be brought to the cold shutdown condition within 24 hours. The leaking tube(s) shall be evaluated and plugged prior to resuming power operation.
- (3) The concentration of radioiodine in the reactor coolant shall be limited to 1.0 microcurie/gram during normal operation and to 30 microcuries/gram during power transients.
- (4) Reactor operation shall be terminated and NRC approval shall be obtained prior to resuming operation if primary to secondary leakage attributable to the denting phenomena is detected in 2 or more tubes during any 20 day period.
- (5) The Metal Impact Monitoring System (MIMS) shall be contained in operation with the capability of detecting loose objects. If the MIMS is out of service in other than cold shutdown or refueling mode of operation, this fact shall be reported to the NRC. Any abnormal indications from the MIMS shall also be reported to the NRC by telephone by the next working day and by a written evaluation within two weeks.
- (6) Following each startup from below 350°F, core barrel movement shall be evaluated using neutron noise techniques.

E. The licensee shall maintain in effect and fully implement all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.54(p). The approved security plan documents, withheld from public disclosure pursuant to 10 CFR 2.790(d), collectively titled "Turkey Point Plant Unit Nos. 3 and 4 Physical Security Plan", dated October 18, 1978, as supplemented February 20, 1979".

F. Fire Protection

The licensee may proceed with and is required to provide a schedule for and to complete the modifications identified in Paragraphs 3.1.1 through 3.1-19 of the NRC's Fire Protection Safety Evaluation, dated May 21, 1979 for the facility. These modifications are to be completed prior to December 1980. If any modifications cannot be completed on schedule the licensee shall submit a report explaining the circumstances together with a revised schedule.

In addition, the licensee shall submit the additional information identified in Sections 3.1 and 3.2 of the related Safety Evaluation in accordance with the schedule contained therein. In the event these dates for submittal cannot be met, the licensee shall submit a report, explaining the circumstances, together with a revised schedule.

The licensee is required to develop and implement the administrative controls which are consistent with the licensee's letters of August 28 and November 7, 1978 within three months from the date of this amendment.

4. This license is effective as of the date of issuance, and shall expire at midnight April 27, 2007.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed By

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:

Appendix A - Technical Specifications
Appendix B - Environmental Technical
Specifications

Date of Issuance: April 10, 1973



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NOS. 49 AND 41 TO LICENSE NOS. DPR-31 AND DPR-41
FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT NUCLEAR GENERATING STATION, UNITS 3 AND 4
DOCKET NOS. 50-250 AND 50-251

Introduction

By applications dated May 18, 1979 (L-79-122 and L-79-124), and supplemented May 29 and June 8, 1979, Florida Power and Light Company (the licensee) requested amendments to Operating License Nos. DPR-31 and DPR-41 for Turkey Point Units 3 and 4. The applications contain an accident analysis and proposed Technical Specification changes in connection with the operation of Unit Nos. 3 and 4 with 22% steam generator tubes plugged and a peaking factor of 2.10. In addition, the steam generator inspection report for Unit No. 4 required by condition 3.D.1 of the license has been submitted for review and approval. During our review of the proposed amendments we found that certain modifications were necessary to meet our requirements. These modifications were discussed with the licensee's staff and they have agreed to the modifications.

The Turkey Point 4 reload for Cycle 6 is expected to be ready for operation about June 15, 1979. Following the latest inspection, the percentage of steam generator tubes plugged in Unit 4 is about 20.6%. Approval has been granted for operation with an average of 25%, or less, of the steam generator tubes in the three steam generators in each unit plugged by amendments 38 and 31 dated October 26, 1978 (Reference 1). These amendments impose a peaking factor limit of 2.03. This limit would require derating of Unit 4 in Cycle 6. As a consequence of this derating an amendment request was submitted for operation with 22%, or less, of the steam generator tubes plugged. This would permit operation with a peaking factor limit of 2.10 and Unit 4 would not be required to operate in a derated mode for Cycle 6. Of course, when the plugging percentage exceeds 22% the lower peaking factor would again come into force and Unit 4 would again be required to operate in a derated mode as dictated by the lower peaking factor.

We have under review a request dated September 20, 1977 (Reference 2) to permit the steam generators of both Units 3 and 4 to be repaired. Our review is nearly completed. On May 14, 1979 we issued the Safety Evaluation (Reference 3). The environmental impact review is nearly complete. Before any action may be taken, a decision by the Atomic Safety and Licensing Board regarding the petitions to intervene by Mark Oncavage is required. At such time that these matters are resolved satisfactorily and NRC approval is given for the repair program to proceed, the steam generators would be returned to an unplugged state.

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I. STEAM GENERATOR TUBE INSPECTION

Discussion

The letter dated May 18, 1979 (L-79-122) submitted the results of the steam generator tube inspection performed at Turkey Point Unit 4 during the April/May 1979, refueling outage including the plugging criteria implemented for the three steam generators. Based on these inspection results, the implemented plugging criteria, and previously submitted ECCS analysis, FPI concludes that the facility can be returned to operation for at least ten (10) equivalent full power months.

Turkey Point 4 has been operating under restrictions stated in License Amendment No. 31 to Facility Operating License No. DPR-41 dated October 26, 1978, which authorized six equivalent months of operation. A ten day extension of the six month period was authorized by License Amendment No. 38 dated March 23, 1979. As one of the conditions of Amendment No. 38, the steam generators shall be inspected after six months and ten days of equivalent operation from September 22, 1978, and NRC approval shall be obtained before resuming power operation.

Inspection Program

The steam generator tube inspection performed during the latest shutdown of Unit 4 included programs to assess the conditions associated with both the "denting" and "wastage" problems. For denting, tube gauging was done in all three steam generators in order to assess the extent and pattern of tube denting. On the hot leg side, all tubes near the tube lane which were predicted to be bounded by the 15% hoop strain contour were gauged. Based on previous leaker history at Turkey Point Unit 4 and at similar units, as well as previous gauging results, the gauging program also included wedge and patch plate regions. Additionally, when a restricted tube was found close to the inspection boundary, the inspection was expanded in that area. Gauging was also performed on cold leg tubes in all three steam generators.

Measurements of the visible flow slots in all steam generators and of the support plate to wrapper annulus in steam generator B were made to assess the conditions of the support plate and to provide input to the finite element analysis of the support plate deformation.

A random eddy current inspection for tube wall thinning was conducted in accordance with Regulatory Guide 1.83 in all of the steam generators. Eddy current examinations were also performed on the U-bends of the unplugged tubes in rows two through five of steam generator A.

The following table summarizes the number of tubes included in the gauging and random eddy current inspections.

	<u>A Hot Leg</u>	<u>A Cold Leg</u>	<u>B Hot Leg</u>	<u>B Cold Leg</u>	<u>C Hot Leg</u>	<u>C Cold Leg</u>
Gauging	1293	250	1189	191	1295	239
U-Bend Rows 2-5	-	139	-	-	-	-
R.G. 1.83	147	350	166	148	146	156

Results of Inspection and Corrective Action

Results of the gauging inspection are shown below in the summary of tube restrictions:

	<u>Tubelane</u>		<u>Periphery and Wedge</u>	
	<u>Hot Leg</u>	<u>Cold Leg</u>	<u>Hot Leg</u>	<u>Cold Leg</u>
<u>SG A</u>				
.650"	64	-	2	-
.610"	22	0	5	0
.540"	2	1	0	0
<u>SG B</u>				
.650"	59	-	8	-
.610"	14	4	4	3
.540"	0	0	0	0
<u>SG C</u>				
.650"	82	-	15	-
.610"	14	1	2	0
.540"	0	0	0	0

The three tubes, all in the tubelane region, that restricted the 0.540" probe were adjacent to hard spots and were in row 4 or closer to the tubelane. No leaks were identified or occurred in the previous operating period. Tubes in the tubelane region that restrict the 0.650" probe or less lie within the 15% hoop strain boundary. The progression of tube denting in hot and cold leg wedge areas is consistent with previous experience at this and similar units.

Random eddy current testing (ECT) in accordance with Regulatory Guide 1.83 identified six tubes in steam generator A that need to be plugged. Additional tube samples were inspected in generators A and B. No tubes in generators B or C required plugging.

No apparent progression of degradation was indicated by the inspection of the U-bends in the unplugged rows 2 thru 5 tubes in steam generator A.

Only the lower tube support plate was visible in each steam generator. Measurements of the flow slots in these plates and of the support plate to wrapper annulus in steam generator B revealed no deviations from the anticipated conditions.

Plugging Criteria

The plugging criteria is the same as that implemented in August/September, 1978, and as that implemented at other units with similarly degraded steam generators with an exception in the conservative direction. The exception is that three (3) tubes, instead of two (2) tubes, beyond any tube in columns 14 to 79 which did not pass the 0.540" probe were preventively plugged and for such tubes in columns 1 to 13 and 80 to 92 near the tube lane three (3) to six (6), instead of four (4), tubes were preventively plugged. As in previously accepted plugging criteria, preventative plugging is based on the projected growth of the critical tube hoop strain contours predicted by a finite element analysis program. The same technique was used in the past to establish the extent of preventative plugging necessary for continued operation of this unit and Turkey Point Unit 3 and Surry Units 1 and 2. Tubes with greater than 40% through wall degradation were plugged.

Implementation of the plugging criteria resulted in 72, 48, and 53 tubes plugged for denting and 6, 0, and 0 tubes plugged for wall thinning in steam generators A, B, and C, respectively. Total steam generator tube plugging is approximately 20.6% which is conservatively bounded by the 22% tube plugging assumed in the ECCS analysis following in this SER.

Evaluation

The inspection program which was performed by the licensee is similar to previous programs conducted at this and other units with similar steam generator tube degradation. These programs have been determined acceptable by the NRC and because the results of the current inspection have not revealed any unexpected or new phenomenon, we have concluded that the inspection program performed was sufficient to adequately determine the condition of the Turkey Point Unit 4 steam generators.

With the exception noted, the plugging criteria implemented by the licensee is the same as that implemented in previous inspections at this and other units and has been shown to be adequate for six (6) equivalent full power months of operation.

The licensee requested that Turkey Point Unit 4 be permitted to return to power for ten (10) equivalent months of operation. Although the implemented plugging criteria was more conservative for tubes along the tube lane, we continue to have reservations about the validity of extrapolating the predictive methodology

beyond six (6) equivalent full power months. In addition, stress corrosion cracking is dependent on stress level, environment, and time. Even though the method for predicting the progression of denting and contours of hoop strain have proved effective, the relation between stress corrosion cracking and time has not been clearly established. Experience has shown that longer operating times will produce stress corrosion cracking at lower strain levels. The preventative plugging program has been shown to be effective for six (6) equivalent months of operation. Based on the above evaluation, we conclude that Turkey Point Unit 4 may be allowed to return to power for six (6) equivalent* full power months of operation. Operation of Turkey Point Unit 4 will be carefully monitored by the staff and consideration of extended operation beyond the currently authorized six (6) equivalent months will depend on the operating experience at this unit and other units with similar tube degradation.

II. OPERATION WITH 22% STEAM GENERATOR TUBES PLUGGED

Discussion

The letter dated May 18, 1979 (L-79-124) proposed a change to the Technical Specifications of Facility Operating Licenses DPR-31 and DPR-41 for Units 3 and 4 of Turkey Point Plant. The proposed change consists of specifying the new limit for total hot channel peaking factor (F_0) and adding the new hot channel normalized operating envelope corresponding to the new value of F_0 (Figure 3.2-3a in the Technical Specifications). This change permits operation of the plant with $F_0=2.10$ when the fraction of steam generator tubes plugged does not exceed 22 percent. The licensee has justified the proposed change by providing a reanalysis of ECCS using the recently modified and approved Westinghouse evaluation model (Reference 4). The licensee has also provided the values of F_0 predicted for Unit Nos. 3 & 4 by the "18 case FAC analysis" (Reference 6). Since the predicted values of F_0 are higher than the peaking factor used in LOCA analysis, the licensee has committed to either lower the maximum power limit in Unit 4 or provide augmented surveillance in order to assure that the core peaking factor does not exceed the LOCA specified limit.

Evaluation

The licensee has provided an evaluation of the performance of Emergency Core Cooling System (ECCS) for both Units 3 and 4 corresponding to the hot channel peaking factor value of $F_0=2.10$ and assuming 22 percent of steam generator tubes plugged. The evaluation was performed using the February 1978 version of the Westinghouse Evaluation Model (Reference 4) which was reviewed and approved by us (Reference 5). The submitted analysis was performed for a double ended cold leg guillotine break (DECLG) with a discharge coefficient of $C_D=0.4$. The licensee has shown in the previous submittal (Reference 7) that this break size corresponds to the highest values of peak cladding temperature and Zr-water reaction. *The licensee has also demonstrated that the break size remains unaffected by the number of the steam generator tubes plugged (Reference 8).

*For the purposes of this SER, equivalent operation is defined as operation with primary coolant temperature greater than 350°F.

The input parameters assumed in the analysis are listed below:

Core Power; 102 percent of 2200 Mwt (rated power)
Peak Linear Power; 102 percent of 11.93 kw/ft
Peaking Factor; 2.10
Accumulator Water Volume; 875 cu ft per accumulator

The results of the analysis indicate a peak cladding temperature of 2189°F, a maximum local Zr-water reaction of 8.05 percent and a total Zr-water reaction of less than 0.3 percent. All these values are below the limits specified in 10 CFR 50.46.

The licensee did not include small break analysis since neither the number of steam generator tubes plugged nor the value of peaking factor affect significantly results of this analysis.

The licensee has provided the "18 case FAC analysis" for Units 3 and 4, Cycle 6 (Reference 6) because the limiting peaking factor in the ECCS analysis was below the value for which the excore detectors could give reliable measurements. The results of this analysis have indicated that the predicted peaking factor exceeds the limiting value of F_Q used in the ECCS analysis for Unit 4 (predicted $F_Q=2.20$). The licensee is therefore required either to limit the power of Unit 4 to the rated power multiplied by the ratio of 2.10 divided by the predicted peaking factor or to implement the augmented surveillance, discussed in Reference 9, and ascertain that the peaking factor would not exceed the limiting value of 2.10 during operation in Cycle 6. Unit 3 can operate in Cycle 6 without these restrictions.

Conclusions

Based on the review of the submitted documents we conclude that the results of the ECCS analysis performed with an increased value of F_Q are conservative relative to the 10 CFR 50.46 criteria. We consider the resultant changes to the Technical Specifications acceptable for operating Units 3 and 4 with up to a maximum of 22 percent of steam generator tubes plugged.

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: June 15, 1979

REFERENCES

1. Letter from A. Schwencer, NRC, to R. E. Uhrig, FPL, transmitting Amendment Nos. 38 and 31, dated October 26, 1978.
2. "Steam Generator Repair Report - Turkey Point Units 3 and 4", Florida Power and Light Company, September 20, 1977, as supplemented on December 20, 1977, March 7, April 25, August 4 and December 15, 1978 and January 26, 1979.
3. Letter from A. Schwencer, NRC, to R. E. Uhrig, FPL, transmitting the Safety Evaluation for the Steam Generator Repair dated May 14, 1979.
4. WCAP-9220-P-A, Westinghouse ECCS Evaluation Model, February 1978 Version, February 1978.
5. NRC letter D. F. Ross, Jr., to D. B. Vassallo, "Safety Evaluation Report on Revised Westinghouse ECCS Evaluation Model", dated August 23, 1978.
6. Florida Power and Light Company letters L-79-149 and L-79-157 (R. E. Uhrig) to NRC (V. Stello), dated May 29 and June 8, 1979.
7. Florida Power and Light Company letter L-76-419 (R. E. Uhrig) to NRC (V. Stello), dated December 9, 1976, transmitting Major Reactor Coolant System Pipe Rupture (Loss of Coolant Accident) Analysis.
8. Florida Power and Light Company letter L-77-217 (R. E. Uhrig) to NRC (G. Lear), dated July 11, 1977.
9. Florida Power and Light Company letter L-78-127 (R. E. Uhrig) to NRC (V. Stello), dated April 10, 1978.

UNITED STATES NUCLEAR REGULATORY COMMISSION
DOCKET NOS. 50-250 AND 50-251
FLORIDA POWER AND LIGHT COMPANY
NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY
OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 49 and 41 to Facility Operating Licenses Nos. DPR-31 and DPR-41 issued to Florida Power and Light Company, for operation of the Turkey Point Nuclear Generating Station, Unit Nos. 3 and 4, located in Dade County, Florida. The amendments are effective as of the date of issuance.

The amendments to the operating licenses revised the Technical Specifications of Turkey Point, Unit Nos. 3 and 4 to approve operation with a peaking factor of 2.10 assuming that no more than 22 percent of the steam generator tubes are plugged. In addition, Amendment No. 41 will permit continued operation of Turkey Point Unit No. 4 for six equivalent months of operation from June 1, 1979.

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 are 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.

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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, negative declaration or 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 applications for amendment dated May 18, 1979 (L-79-122 and L-79-124) as supplemented May 29 and June 8, 1979, (2) Amendment Nos. 49 and 41 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 15th day of June, 1979.

FOR THE NUCLEAR REGULATORY COMMISSION



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