June 15, 1993

Docket No. 50-250

Mr. J. H. Goldberg
President - Nuclear Division
Florida Power and Light Company
P. O. Box 14000
Juno Beach, Florida 33408-0420

Dear Mr. Goldberg:

SUBJECT: ISSUANCE OF AMENDMENT NO.154 TO FACILITY OPERATING LICENSE DPR-31- TURKEY POINT UNIT 3 FOR REMAINDER OF CYCLE 13 (TAC NO. M86203)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. to Facility Operating License No. DPR-31 for the Turkey Point Unit 3 in response to your application dated April 13, 1993 to change the Technical Specifications (TS) relating to the Movable In-core Detector System. This amendment permits continued power operation with the minimum number of movable in-core detector thimbles reduced from 38 to 25 thimbles and is applicable only for the remainder of Unit 3, Cycle 13 operation.

It is noted that should one of the power range neutron flux detectors (excore detectors) become inoperable, the existing TS allow continued power operation at reduced power level and reduced trip setpoint. Otherwise, the existing TS require monitoring quadrant power tilt by either the incore detectors every 12 hours, or by the thermocouples. During such operation with fewer than the minimum required 38 thimbles operable we understand that you plan to monitor quadrant power tilt by the thermocouples and not by the incore detectors.

The enclosure is the NRC staff's safety evaluation of your proposal. Notice of issuance of the amendment will be included in the Commission's biweekly Federal Register notice.

This completes our effort on TAC No. M86203.

If you have any questions regarding this matter, please contact me at (301) 504-1471.

Sincerely,

L. Raghavan, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
See next page

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Mr. J. H. Goldberg
Florida Power and Light Company

Turkey Point Plant

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-250

TURKEY POINT PLANT, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 154
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 April 13, 1993, 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-31 is hereby amended to read as follows:

   (B) <u>Technical Specifications and Environmental Protection Plan</u>

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 154, are hereby incorporated in the license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
  Specifications

Date of Issuance: June 15, 1993

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 154 TO FACILITY OPERATING LICENSE NO. DPR-31

DOCKET NO. 50-250

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 2-6	3/4 2-6
3/4 2-9	3/4 2-9
3/4 2-10	3/4 2-10
3/4 2-12	3/4 2-12
3/4 3-40	3/4 3-40
B 3/4 2-4	B 3/4 2-4
B 3/4 2-5	B 3/4 2-5
B 3/4 2-6	B 3/4 2-6

SURVEILLANCE REQUIREMENTS

4.2.2.1 If $[F_Q]^P$ as predicted by approved physics calculations is greater than $[F_Q]^L$ and P is greater than P_T* as defined in 4.2.2.2, $F_Q(Z)$ shall be evaluated by MIDS (Specification 4.2.2.2), BASE LOAD (Specification 4.2.2.3) or RADIAL BURNDOWN (Specification 4.2.2.4) to determine if F_Q is within its limit $[F_Q]^P$ = Predicted F_Q).

If $[F_Q]^P$, is less than $[F_Q]^L$ or P is less than P_T, $F_Q(Z)$ shall be evaluated to determine if $F_Q(Z)$ is within its limit as follows:

a. Using the movable incore detectors to obtain power distribution map at any THERMAL POWER greater than 5% of RATED THERMAL POWER.

b. Increasing the measured $F_Q(Z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertainties. Verifying that the requirements of Specification 3.2.2 are satisfied. For Unit 3 Cycle 13, when the number of operable movable detector thimbles (T) is less than 75% (38) of the total, the 5% F_Q measurement uncertainty shall be increased to [5 + 4(3-T/12.5)]% where T (the number of operable detector thimbles), must be greater than or equal to 50% (25) of the total number of thimbles.

c. $F_Q^M(Z) \leq F_Q^L(Z)$
Where $F_Q^M(Z)$ is the measured $F_Q(Z)$ increased by the allowance for manufacturing tolerances and measurement uncertainty and $F_Q^L(Z)$ is the F_Q limit defined in 3.2.2.

d. Measuring $F_Q^M(Z)$ according to the following schedule:

1. Prior to exceeding 75% of RATED THERMAL POWER,** after refueling,

2. At least once per 31 Effective Full Power Days.

e. With the relationship specified in Specification 4.2.2.1.c above not being satisfied:

1) Calculate the percent $F_Q^M(Z)$ exceeds its limit by the following expression:

$$\left[\left[\frac{F_Q^M(Z)}{[F_Q]^L \times K(Z)/P}\right] - 1\right] \times 100 \text{ for } P \geq 0.5$$

$$\left[\left[\frac{F_Q^M(Z)}{[F_Q]^L \times K(Z)/0.5}\right] - 1\right] \times 100 \text{ for } P < 0.5$$

---

* P_T = Reactor power level at which predicted F_Q would exceed its limit.

** During power escalation at the beginning of each cycle, power level may be increased until a power level for extended operation has been achieved and power distribution map obtained.

c) After 24 hours have elapsed, take a full core flux map to determine $F_Q^M(Z)$ unless a valid full core flux map was taken within the time period specified in 4.2.2.1d.

d) Calculate P_{BL} per 4.2.2.3b.

b. Base Load operation is permitted provided:

1. THERMAL POWER is maintained between P_T and P_{BL} or between P_T and 100% (whichever is most limiting).

2. AFD (Delta-I) is maintained within a ± 2% or ± 3% target band.

3. Full core flux maps are taken at least once per 31 effective Full Power Days.

P_{BL} and P_T are defined as:

$$P_{BL} = \frac{[F_Q]^L \times K(Z)}{F_Q^M(Z) \times W(Z)_{BL} \times U_{BL}}$$

$$P_T = [F_Q]^L / [F_Q]^P$$

where: $F_Q^M(Z)$ is the measured $F_Q(Z)$ with no allowance for manufacturing tolerances or measurement uncertainty. For the purpose of this Specification $[F_Q{}^M(Z)]$ shall be obtained between elevations bounded by 10% and 90% of the active core height. $[F_Q]^L$ is the F_Q limit. K(Z) is given in Figure 3.2-2. $W(Z)_{BL}$ is the cycle dependent function that accounts for limited power distribution transients encountered during base load operation.

The function is given in the Peaking Factor Limit Report as per Specification 6.9.1.6. U_{BL} is defined as the Base Load uncertainty factor that accounts for: manufacturing tolerance, measurement error, rod bow and any burnup and power dependent peaking factor increases. With at least 75% (38) of the detector thimbles operable, U_{BL} is 9%. For Unit 3 Cycle 13, when the number of operable movable detector thimbles (T) is less than 75% (38) of the total, U_{BL} uncertainty shall be increased to:

$$[9 + 4(3-T/12.5)]\%$$

where T (the number of operable detector thimbles), must be greater than or equal to 50% (25) of the total number of thimbles.

c. During Base Load operation, if the THERMAL POWER is decreased below P_T, then the conditions of 4.2.2.3.a shall be satisfied before re-entering Base Load operation.

d. If any of the conditions of 4.2.2.3b are not maintained, reduce THERMAL POWER to less than or equal to P_T, or, within 15 minutes initiate the Augmented Surveillance (MIDS) requirements of 4.2.2.2.

4.2.2.4 RADIAL BURNDOWN

Operation is permitted at powers above P_T if the following Radial Burndown conditions are satisfied:

a. Radial Burndown operation is restricted to use at powers between P_T and P_{RB} or P_T and 1.00 (whichever is most limiting). The maximum relative power permitted under Radial Burndown operation, P_{RB}, is equal to the minimum value of the ratio of $[F_Q^L(Z)]/[F_Q(Z)]_{RB}$ Meas.

where: $[F_Q(Z)]_{RB\ Meas.} = [F_{xy}(Z)]_{Map}$ Meas. x $F_z(Z)$ x U_{RB} and

$[F_Q^L(Z)]$ is equal to $[F_Q^L]$ x $K(Z)$.

b. A full core flux map to determine $(F_{xy}(Z)]_{Map}$ Meas. shall be taken within the time period specified in Section 4.2.2.1d.2. For the purpose of the specification, $[F_{xy}(Z)]_{Map}$ Meas. shall be obtained between the elevations bounded by 10% and 90% of the active core height.

c. The function $F_z(Z)$, provided in the Peaking Factor Limit Report (6.9.1.6), is determined analytically and accounts for the most perturbed axial power shapes which can occur under axial power distribution control. U_{RB} is defined as the Radial Burndown uncertainty factor that accounts for: manufacturing tolerance, measurement error, rod bow and any burnup and power dependent peaking factor increases. With at least 75% (38) of the detector thimbles operable, U_{RB} is 9%. For Unit 3 Cycle 13, when the number of operable movable detector thimbles (T) is less than 75% (38) of the total, U_{RB} uncertainty shall be increased to:

$[9 + 4(3-T/12.5)]\%$

where T (the number of operable detector thimbles), must be greater than or equal to 50% (25) of the total number of thimbles.

d. Radial Burndown operation may be utilized at powers between P_T and P_{RB}, or, P_T and 1.00 (whichever is most limiting) provided that the AFD (Delta-I) is within $\pm$ 5% of the target axial offset.

e. If the requirements of Section 4.2.2.4d are not maintained, then the power shall be reduced to less than or equal to P_T, or within 15 minutes Augmented Surveillance of hot channel factors shall be initiated if the power is above P_T.

4.2.2.5 When $F_Q(Z)$ is measured for reasons other than meeting the requirements of Specifications 4.2.2.1, 4.2.2.2, 4.2.2.3 or 4.2.2.4 an overall measured $F_Q(Z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% to account for measurement uncertainty. For Unit 3 Cycle 13, when the number of operable movable detector thimbles (T) is less than 75% (38) of the total, the 5% F_Q measurement uncertainty shall be increased to $[5 + 4(3-T/12.5)]\%$ where T (the number of operable detector thimbles), must be greater than or equal to 50% (25) of the total number of thimbles.

POWER DISTRIBUTION LIMITS

SURVEILLANCE REQUIREMENTS

4.2.3.1 The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 When a measurement of $F^N_{\Delta H}$ is taken, the measured $F^N_{\Delta H}$ shall be increased by 4% to account for measurement error. For Unit 3 Cycle 13, when the number of operable movable detector thimbles (T) is less than 75% (38) of the total, the 4% $F^N_{\Delta H}$ measurement uncertainty shall be increased to [4 + 2(3-T/12.5)]% where T (the number of operable detector thimbles), must be greater than or equal to 50% (25) of the total number of thimbles.

4.2.3.3 This corrected $F^N_{\Delta H}$ shall be determined to be within its limit through incore flux mapping:

a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and

b. At least once per 31 Effective Full Power Days.

INSTRUMENTATION

MOVABLE INCORE DETECTORS

LIMITING CONDITION FOR OPERATION

3.3.3.2 The Movable Incore Detection System shall be OPERABLE with:

a. At least 16 detector thimbles when used for recalibration and check of the Excore Neutron Flux Detection System and monitoring the QUADRANT POWER TILT RATIO *, and at least 38** detector thimbles when used for monitoring $F^N_{\Delta H}$, $F_Q(Z)$ and $F_{xy}(Z)$.

b. A minimum of two detector thimbles per core quadrant (For Unit 3 Cycle 13, a minimum of three (3) detector thimbles per quadrant whenever the number of operable detector thimbles is less than 38 where two sets of quadrants are defined: 1) quadrants formed by the vertical and horizontal axes of the core and 2) quadrants formed by the two diagonals of the core. These quadrants are defined such that the instrument locations along the axes dividing the quadrants are included in each of those adjacent quadrants as whole thimbles), and

c. Sufficient movable detectors, drive, and readout equipment to map these thimbles.

APPLICABILITY: When the Movable Incore Detection System is used for:

a. Recalibration of the Excore Neutron Flux Detection System, or

b. Monitoring the QUADRANT POWER TILT RATIO *, or

c. Measurement of $F^N_{\Delta H}$, $F_Q(Z)$ and $F_{xy}(Z)$.

ACTION:

With the Movable Incore Detection System inoperable, do not use the system for the above applicable monitoring or calibration functions. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.2 The Movable Incore Detection System shall be demonstrated OPERABLE at least once per 24 hours by normalizing each detector output when required for:

a. Recalibration of the Excore Neutron Flux Detection System, or

b. Monitoring the QUADRANT POWER TILT RATIO *, or

c. Measurement of $F^N_{\Delta H}$, $F_Q(Z)$ and $F_{xy}(Z)$.

* Exception to the 16 detector thimble requirement of monitoring the QUADRANT POWER TILT RATIO is acceptable when performing Specification 4.2.4.2 using two sets of four symmetric thimbles.

** The minimum number of operable detector thimbles is 25 (Unit 3 Cycle 13 only).

3/4.2.2 and 3/4.2.3 HEAT FLUX HOT CHANNEL FACTOR AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

The limits on heat flux hot channel factor and nuclear enthalpy rise hot channel factor ensure that: (1) the design limits on peak local power density and minimum DNBR are not exceeded and (2) in the event of a LOCA the peak fuel clad temperature will not exceed the 2200°F ECCS acceptance criteria limit. The LOCA peak fuel clad temperature limit may be sensitive to the number of steam generator tubes plugged. The current limit is valid for tube plugging levels up to 5%.

$F_Q(Z)$, Heat Flux Hot Channel Factor, is defined as the maximum local heat flux on the surface of a fuel rod at core elevation Z divided by the average fuel rod heat flux.

$F^N_{\Delta H}$ Nuclear Enthalpy Rise Hot Channel Factor, is defined as the ratio of the integral of linear power along the rod with the highest integrated power to the average rod power.

Each of these is measurable but will normally only be determined periodically as specified in Specifications 4.2.2 and 4.2.3. This periodic surveillance is sufficient to ensure that the limits are maintained provided:

a. Control rods in a single group move together with no individual rod insertion differing by more than ± 12 steps, indicated, from the group demand position;

b. Control rod groups are sequenced with overlapping groups as described in Specification 3.1.3.6;

c. The control rod insertion limits of Specifications 3.1.3.5 and 3.1.3.6 are maintained; and

d. The axial power distribution, expressed in terms of AXIAL FLUX DIFFERENCE, is maintained within the limits.

When an F_Q measurement is taken, both experimental error and manufacturing tolerance must be allowed for. Five percent* is the appropriate 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. These uncertainties only apply if the map is taken for purposes other than the determination of P_{BL} and P_{RB}.

$F^N_{\Delta H}$ will be maintained within its limits provided Conditions a. through d. above are maintained.

In the specified limit of $F^N_{\Delta H}$ there is an 8 percent allowance for uncertainties which means that normal operation of the core is expected to result in $F^N_{\Delta H} \leq 1.62/1.08$. The logic behind the larger uncertainty in this

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* For Unit 3 Cycle 13, this uncertainty was increased to accommodate a reduced number of operable detector thimbles.

HEAT FLUX HOT CHANNEL FACTOR AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

case is that (a) normal perturbations in the radial power shape (e.g., rod misalignment) affect $F^N_{\Delta H}$, 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 influence on F_Q through movement of rods, and can limit it to the desired value, he has no direct control over $F^N_{\Delta H}$ and (c) an error in the prediction for radial power shape, which may be detected during startup physics tests can be compensated for in F_Q by tighter axial control, bu compensation for $F^N_{\Delta H}$ is less readily available. When a measurement of $F^N_{\Delta H}$ 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.

The following are independent augmented surveillance methods used to ensure peaking factors are acceptable for continued operation above Threshold Power, P_T:

Base Load - This method uses the following equation to determine peaking factors:

F_{QBL} = $F_Q(Z)$ measured x 1.09* x $W(Z)_{BL}$

where: $W(Z)_{BL}$ = accounts for power shapes;

1.09* = accounts for uncertainty;

$F_Q(Z)$ = measured data;

F_{QBL} = Base load peaking factor.

The analytically determined $[F_Q]^P$ is formulated to generate limiting shapes for all load follow maneuvers consistent with control to a ±5% band about the target flux difference. For Base Load operation the severity of the shapes that need to be considered is significantly reduced relative to load follow operation;

The severity of possible shapes is small due to the restrictions imposed by Sections 4.2.2.3. To quantify the effect of the limiting transients which could occur during Base Load operation, the function $W(Z)_{BL}$ is calculated from the following relationship:

$$W(Z)_{BL} = \text{Max}\left[\frac{F_Q(Z)\,(\text{Base Load Case(s)}, 150\ \text{MWD/T})}{F_Q(Z)\quad(\text{ARO}, 150\ \text{MWD/T})},\ \frac{F_Q(Z)\,(\text{Base Case(s)}, 85\%\ \text{EOL BU})}{F_Q(Z)\ (\text{ARO}, 85\%\ \text{BOL BU})}\right]$$

Radial Burndown - This method uses the following equation to determine peaking factors.

* For Unit 3 Cycle 13, this uncertainty was increased to accommodate a reduced number of operable detector thimbles.

HEAT FLUX HOT CHANNEL FACTOR AND NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

$$F_Q(Z)_{R.B.} = F_{xy}(Z)_{measured} \times F_z(Z) \times 1.09^*$$

where: 1.09* = accounts for uncertainty

$F_z(Z)$ = accounts for axial power shapes

$F_{xy}(Z)_{measured}$ = ratio of peak power density to average power density at elevation(Z)

$F_Q(Z)_{R.B.}$ = Radial Burndown Peaking Factor.

For Radial Burndown operation the full spectrum of possible shapes consistent with control to a ±5% Delta-I band needs to be considered in determining power capability. Accordingly, to quantify the effect of the limiting transients which could occur during Radial Burndown operation, the function $F_z(Z)$ is calculated from the following relationship:

$$F_z(Z) = [F_Q(Z)] \text{ FAC Analysis}/[F_{xy}(Z)] \text{ ARO}$$

The essence of the procedure is to maintain the xenon distribution in the core as close to the equilibrium full power condition as possible. This can be accomplished by using the boron system to position the full length control rods to produce the require indicated flux difference.

Above the power level of P_T, additional flux shape monitoring is required. In order to assure that the total power peaking factor, F_Q, is maintained at or below the limiting value, the movable incore instrumentation will be utilized. Thimbles are selected initially during startup physics tests so that the measurements are representative of the peak core power density. By limiting the core average axial power distribution, the total power peaking factor F_Q can be limited since all other components remain relatively; fixed. The remaining part of the total power peaking factor can be derived from incore measurements, i.e., an effective radial peaking factor $\overline{R}$, can be determined as the ratio of the total peaking factor resulting from a full core flux map and the axial peaking factor in a selected thimble.

The limiting value of $[F_j(Z)]_s$ is derived as follows:

$$[F_j(Z)]_s = \frac{[F_Q]^L \times [K(Z)]}{P_L\overline{R}_j\ (1 + \sigma_j)(1.03)(1.07)}$$

Where:

a) $F_j(Z)$ is the normalized axial power distribution from thimble j at elevation Z.

* For Unit 3 Cycle 13, this uncertainty was increased to accommodate a reduced number of operable detector thimbles.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO TECHNICAL SPECIFICATION CHANGE TO REDUCE THE NUMBER OF REQUIRED IN-CORE DETECTORS FOR REMAINDER OF CYCLE 13 OPERATION

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNIT 3

DOCKET NO. 50-250

1.0 INTRODUCTION

By letter dated April 13, 1993 Florida Power and Light Company (FPL) requested changes to the Technical Specifications for Turkey Point Unit 3. These changes would reduce the number of required in-core detectors necessary for continued operation for the remainder of Cycle 13 only.

The Turkey Point Unit 3 Movable Incore Detection System (MIDS) contains a total of 50 instrumentation thimbles in the core. Technical Specification 3.3.3.2 requires that at least 38 detector thimbles be operable with a minimum of two detector thimbles per quadrant when used for monitoring $F_{\Delta H}$, Fq, and Fxy. Due to the increase in incore detector thimble failures at Turkey Point Unit 3 during Cycle 13 thus far, FPL has proposed a change which will allow plant operation with the number of operable detector thimbles reduced to a minimum of 50%. To compensate for the increased uncertainty as the number of operable detector thimbles is reduced, the measurement uncertainty for $F_{\Delta H}$ and Fq will be increased whenever the number of detectors is between 38 and 25. Also the minimum number of detector thimbles per quadrant will be increased from two to three whenever the number of operable thimbles is less than 38. Two sets of quadrants are defined: 1) quadrants formed by the vertical and horizontal axes of the core and 2) quadrants formed by the two diagonals of the core.

2.0 EVALUATION

Essentially all PWR Technical Specifications contain a requirement for operability of 75% of the incore detector locations for mapping of the core power distribution. On a number of occasions, for various reasons, failures of detector thimbles in operating PWRs have approached or exceeded 25%, and relaxation of the 75% requirement has been permitted for the remainder of the affected operating cycle.

In-core detector data is used to calculate power peaking factors which are used to verify compliance with fuel performance limits. As the number of inoperable detector segments increases, the uncertainties in the power distribution calculation increase. A generic analysis of the peaking factor uncertainties with a reduced number of operable detector thimbles was performed by Westinghouse for Turkey Point Units 3 and 4 in 1987. An update was provided in 1988. In order to ensure that the analyses are applicable for Unit 3 Cycle 13, FPL performed calculations based on the operational data for Turkey Point Unit 3 Cycle 13 through March 1993.

The Westinghouse analysis used flux maps from three different three-loop reactors with incore thimble patterns identical to the Turkey Point Units. A total of seven flux maps with five separate random thimble reduction cases were used for the study. The measured peaking factors in the 35 reduced thimble maps were compared with the reference maps. The resulting uncertainties for peaking factors with only 50% of the thimbles operable were 1.043 for $F_{\Delta H}$, 1.057 for Fq and 1.054 for Fxy. These values were rounded up to 1.05 for $F_{\Delta H}$ and 1.07 for Fq and Fxy. As an additional conservatism, the peaking factor uncertainties due to the reduction of thimbles were doubled. Thus the peaking factor uncertainties for deletion of 50% of thimbles are 1.06 for $F_{\Delta H}$ and 1.09 for Fq and Fxy. These uncertainties are applied to measurements using a ramp function for maps taken with between 50% and 75% of the total number of incore detector thimbles.

The uncertainty analysis assumed the thimbles were randomly deleted. If the thimble deletion is not random, the calculated uncertainties do not apply. A computer simulation showed that when 50% of the thimbles remain after random deletion, at least three thimbles should be left in each of the eight quadrants. If less than three thimbles are left in a quadrant, then the thimble removal was probably not a random process and the peaking factor uncertainties previously calculated would not apply. Thus the restriction that at least three thimbles must be present in each of the eight quadrants was added.

To ensure that the generic analysis is applicable to Turkey Point Unit 3 Cycle 13, a calculation was performed using the four 100% power flux maps available from Cycle 13. Four subsets were generated for each flux map by randomly deleting 50% of the thimble traces. The uncertainties were evaluated in the same manner as in the generic study. The peaking factor uncertainties were lower than those obtained in the generic study. Thus it was concluded that the original analyses are applicable to Unit 3 Cycle 13.

Another safety concern relating to degradation of incore mapping ability is the ability to detect anomalous conditions in the core. One of these is inadvertent loading of a fuel assembly into an improper position. Since this is a loading problem, it is not of concern for the remainder of the operating cycle. Other anomalous conditions are conceived to produce either an axial or radial effect, which would cause either a change in quadrant tilt ratio or axial offset ratio. These are monitored by the excore detectors and would help identify problems not fully detectable with reduced incore mapping capability. Furthermore, the core exit thermocouples in the reactor provide a useful supplement to the incore detectors to detect problems.

If one of the power range neutron flux detectors (excore detectors) becomes inoperable, power operation may continue if the power level and the trip setpoint are reduced or the quadrant tilt is monitored by the incore detectors every 12 hours, or the quadrant tilt is monitored by the thermocouples. During such operation with fewer than 75% of the incore detectors operable, the licensee has indicated that the thermocouple option would be the one chosen.

Our review of the suitability of operation of the Turkey Point Unit 3 reactor for the remainder of Cycle 13 with a reduced number of movable incore thimble locations to as few as 50 percent indicated that adequate margin exists at this time in Cycle 13 and sufficiently increased uncertainty allowances have been made to ensure that Technical Specification peaking factor limits will be met. In addition, there are adequate supplemental indicators of anomalous conditions to preclude an unsafe condition from escaping detection in the absence of full incore detector mapping capability.

3.0 TECHNICAL SPECIFICATION CHANGES

Technical Specifications 4.2.2.1 and 4.2.2.5 - The change increases the measurement uncertainty for Fq when the number of operable incore detector thimbles is between 75% (38) and 50% (25) of the total number of detectors. The change in the uncertainty has been justified and is therefore acceptable.

Technical Specifications 4.2.2.3 and 4.2.2.4 - The change increases the measurement uncertainty for the base load uncertainty factor (U_{BL}) and the radial burnup uncertainty factor (U_{RB}) when the number of operable incore detector thimbles is between 75% (38) and 50% (25) of the total number of detectors. The new uncertainty has been justified and is acceptable.

Technical Specification 4.2.3.2 - The change increases the measurement uncertainty for FΔH when the number of operable incore detector thimbles is between 75% (38) and 50% (25) of the total number of detectors. The new uncertainty has been justified and the change is acceptable.

Technical Specification 3.3.3.2 - The change allows a decrease in the number of required operable incore detector thimbles to 50% (25) of the total number of thimbles consistent with an increase in peaking factor uncertainties, and increases the minimum number of thimbles required per quadrant from two to three. The proposed change has been justified and is acceptable.

4.0 STATE CONSULTATION

Based upon the written notice of the proposed amendments, the Florida State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change the surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (58 FR 28066). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

Based on the staff evaluation in Section 2.0 above, the staff concludes that the proposed Technical Specifications changes are acceptable. The licensee has agreed to use the thermocouple option if one excore detector is inoperable and there are fewer than 75% of the incore detector thimbles available. These changes are for the remainder of Cycle 13 only.

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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