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CONWAY,W.F. Florida Power & Light Co.
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SUBJECT: Supplemental application for amend to Licenses DPR-31 & DPR-41,superceding 870116 application for amend.

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L-88-160

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Proposed License Amendment
Reactor Subcritical Margin

By letter dated January 16, 1987 (FPL letter L-87-21) Florida Power & Light Company (FPL) submitted a request to amend Appendix A of Facility Operating Licenses DPR-31 and DPR-41 (Turkey Point Units 3 and 4 Technical Specification) to allow a refueling shutdown margin of 5% $\Delta k/k$ and to make other administrative changes. At the request of the NRC Licensing Project Manager for Turkey Point we are resubmitting a description of the amendment request and the basis for a no significant hazards determination to provide additional information on the basis for our proposed change.

The attached pages supersede those included with our January 16, 1987 submittal. It should be noted that the proposed change to Table 1.1 to ensure that the table is in conformance with the Standard Technical Specifications for Westinghouse plants was also included as part of our February 3, 1988 amendment request regarding the safety injection system accumulators, and can be issued with either amendment.

The revised submittal has been reviewed by the Turkey Point Plant Nuclear Safety Committee and the Florida Power & Light Company Nuclear Review Board. The conclusions reached previously remain unchanged.

Very truly yours,

W. F. Conway
Acting Group Vice President
Nuclear Energy

COW/TCG/gp

Attachments

A001
1/1

TCG17.PLA

cc: Dr. J. Nelson Grace, Regional Administrator,
Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant
Mr. Jacob Daniel Nash, Florida Department of Health and
Rehabilitative Services

STATE OF FLORIDA)
) ss.
COUNTY OF PALM BEACH)

W. F. Conway being first duly sworn, deposes and says:

That he is an Acting Group Vice President of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.

W. F. Conway

Subscribed and sworn to before me this
5 day of April, 1988.

Roberta S Economy
NOTARY PUBLIC, in and for the County of Palm Beach, State of Florida

My Commission expires: Notary Public, State of Florida
My Commission Expires June 1, 1989
Bonded Thru Troy Fain - Insurance, Inc.

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Proposed License Amendment
Reactor Subcritical Margin

DESCRIPTION OF AMENDMENT REQUEST:

Currently the Turkey Point Technical Specifications require a 1950 ppm boron concentration or higher, sufficient to maintain the reactor subcritical by 10 percent $\Delta k/k$ during refueling. Due to the large amount of excess reactivity installed at beginning of cycle for recent long fuel cycles, the required refueling boron concentration to maintain 10 percent shutdown margin is now well above 1950 ppm.

The proposed amendment modifies the technical specifications to allow a refueling shutdown margin of 5 percent $\Delta k/k$. This change will raise the associated effective multiplication factor, k_{eff}, from 0.90 to 0.95 as it appears in Table 1.1., Specification 3.10.8 and B3.10.8 of the Turkey Point Plant Technical Specifications. The requirement to maintain a boron concentration of greater than or equal to 1950 ppm is unaffected by this change.

It is our judgement the change in refueling shutdown margin is justified. Prior to 1973, the general practice in the nuclear industry was to design fresh or spent fuel storage facilities for a maximum k_{eff} of about 0.90 (approximately the k_{eff} of a single isolated fuel assembly in water). Calculations of k_{eff} were performed assuming fully flooded unborated conditions using methods then extant, without considering uncertainties in the calculated k_{eff}. At that time, it was believed that the safety margin in k_{eff} was more than sufficient to account for any uncertainties while still preventing criticality.

In August 1973, the American National Standards Institute (ANSI) issued an industry standard designated as ANSI N18.2-1973, which recommended a design basis k_{eff} of 0.95 for storage of fresh or spent fuel assuming fully flooded unborated conditions. The NRC essentially adopted the ANSI N18.2 recommendations when it issued Section 9.1.2 of the Standard Review Plan (SRP) (NUREG-75/087) in 1975. The SRP was reissued in 1980 as NUREG-0800, with little substantive change in the criteria in Section 9.1.2.

Part of the NRC (and industry) rationale for moving from the pre-1973 k_{eff} practice of 0.90 to the higher limits in SRP Section 9.1.2 is the following:

- Significant improvements have been made in calculational methods. Additionally, calculational methods are verified against experimental data that represents, as nearly as possible, the system being evaluated.

- In calculating k_{eff} in accordance with SRP Section 9.1.2, a total uncertainty factor is determined and added to the calculated k_{eff} to define the maximum possible k_{eff}.

SRP Section 9.1.2, entitled "Spent Fuel Storage," currently states that the NRC Staff will accept storage racks for spent fuel assemblies if:

> the center-to-center spacing between fuel assemblies and any strong fixed neutron absorbers in the storage racks is sufficient to maintain the array, when fully loaded and flooded with nonborated water, in a subcritical condition. A k_{eff} not greater than 0.95 for this condition is acceptable.

Further definition and clarification of the NRC position were provided in an April 14, 1978 letter transmitting the NRC "OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications," setting forth in greater detail the NRC acceptance criteria for spent fuel storage pools. Section III.1.5 of this guidance emphasizes that the "neutron multiplication factor in spent fuel pools shall be less than or equal to 0.95, <u>including all uncertainties</u>, under all conditions" (emphasis in original).

Therefore, industry, ANS and the NRC all recognize the advances in criticality calculational methods and have applied these advances to new and spent fuel pool designs.

Refueling shutdown requirements have also been adjusted to reflect the same advances. The Westinghouse Standard Technical Specification Revision 5 (Draft) also show a shutdown k_{eff} requirement of 0.95.

To support this technical specification change, Westinghouse Electric Corporation reanalyzed the "Boron Dilution During Refueling Accident" for Turkey Point.

The analysis concluded that:

1. A refueling boron concentration of 1950 ppm will provide the 5 percent $\Delta k/k$ shutdown margin;

2. An operator will have at least 30 minutes to terminate the dilution event before a return to criticality occurs.

An evaluation performed by the Turkey Point Reactor Engineering Department listed the instrumentation, alarms, and annunciators that are available to provide the control room operators indication of a dilution event, allowing sufficient time to mitigate the event. These indications are:

NUCLEAR INSTRUMENTATION SYSTEM

Source Range*:

1. Countrate meters on drawers and console.
2. Countrate strip chart recorder on console.
3. SUR indication on drawer and console.
4. Audible countrate.
5. High flux at shutdown alarm on drawers.
6. High flux at shutdown annunciator.
7. High countrate Rx trip alarm on drawers.
8. High countrate Rx trip annunciator.

FULL RANGE NUCLEAR INSTRUMENTATION

Gammametrics*:

1. Countrate meters on console.
2. Power meters on console.
3. High flux at shutdown annunciator.

The following indication is available but may not be in service.

Intermediate Range:

1. Power indication on drawers and console.
2. Power indication on strip chart on console.
3. SUR indication on drawer and console.
4. P6 alarm on drawers.
5. P6 status light VPA.
6. P6 annunciator.

In addition to the change to the refueling shutdown margin, the following two changes are being made. Table 4.18-1 is revised in order to bring it into conformance with Table 1.1. The revision constitutes an administrative change bringing the "Applicable Mode" information in line with the six modes of operation identified in Table 1.1. Table 4.18-1 presently addresses four modes of operation. Table 1.1 is changed in order to correct a typographical error. The "Average Coolant Temperature" for Mode 5 is revised to read as "less than or equal to", from "less than". The correction of this typographical error will bring Table 1.1 in conformance with the Standard Technical Specifications.

* Technical Specification 3.10.3 requires two source range instruments (both NIS Source Ranges or both Gammametrics or one of each instrument) during refueling operations.

BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a significant hazards consideration exists in 10 CFR 50.92(c). A proposed amendment to an operating license for the facility involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

Operation of Turkey Point Units 3 and 4 in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated. The effect of the proposed change would be to decrease the time to criticality in the event of a chemical and volume control system malfunction (Boron Dilution During Refueling Accident). The operation and design of the chemical and volume control system remain as described in the FSAR, therefore the probability of an inadvertent dilution occurring is not increased, and the consequences would be the same.

(2) Create the possibility of a new or different type of accident from any accident previously analyzed since neither the configuration nor mode of operation of the plant are being changed.

(3) Involve a significant reduction in a margin of safety, although the time to criticality has been reduced from previously reported values. The time to criticality in the refueling mode for a k_{eff} of 0.95, assuming a maximum dilution flow rate of 230 gpm and a minimum RCS water volume, has been calculated to be 30.7 minutes. This conservative calculation also utilized an initial boron concentration which is the minimum allowable by the current technical specifications (1950 ppm) and a critical concentration of 1450 ppm which is a value which was chosen to be bounding for future cycles. For comparison, the time to criticality in the refueling mode for a k_{eff} of 0.90 for Turkey Point Unit 4 Cycle 11 has been calculated to be approximately 58 minutes. This cycle specific calculation uses the same volume and dilution rate, however the initial boron concentration is 2238 ppm (reflecting the larger shutdown margin requirements) with a critical concentration (with uncertainties) of 1272 ppm. Evaluation of the time to criticality after initiation of the worst dilution event for a k_{eff} of 0.95 for Unit 4 Cycle 11 results in a value of 44 minutes (1950 ppm initial concentration and 1272 ppm critical concentration). Therefore, for the

Cycle 11 specific calculation, the effect of the proposed Technical Specification change is a reduction in the time to criticality of 14 minutes.

In all cases evaluated, these times are conservative since one charging pump is made inoperable by deenergizing and racking out its associated breaker prior to entering cold shutdown (Mode 5) for a refueling outage. In addition, only one charging pump is normally operating. Therefore the dilution flow rate will be realistically only 77 gpm with a maximum of 154 gpm. Recalculation of the bounding analyses using only one or two charging pumps available shows approximately 92 and 46 minutes, respectively for the time to criticality compared to the analysis for three charging pumps which produces the 30.7 minute result.

Each evaluation described above provides sufficient time for an operator to recognize and terminate an inadvertent dilution. The bounding analyses provides a minimum of 30.7 minutes which is consistent with current requirements for older nuclear plants.

In addition, the Commission has provided guidance for application of the criteria in 10 CFR 50.92 specified above by providing examples of amendments that are not likely to involve a significant hazards consideration (51 FR 7751).

The following example is applicable to the change in subcritical margin:

Example (vi): "A change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan: for example, a change resulting from the application of a small refinement of a previously used calculational model or design method."

The following example is applicable to the other proposed changes.

Example (i): "a purely administrative change to the technical specifications, for example, a change to achieve consistency throughout the technical specifications, corrections of an error, or a change in nomenclature.

The additional changes to Tables 1.1 and 4.18-1 identified in the amendment description are administrative changes for consistency and to correct a typographical error and therefore are not likely to involve a significant hazards consideration.

On the basis of the above discussion, operation of Turkey Point Units 3 and 4 in accordance with the proposed amendments would pose no threat to the public health and welfare, and would not involve a significant hazards consideration.

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. FACILITY OPERATING LICENSE NO. DPR-31

AMENDMENT NO. FACILITY OPERATING LICENSE NO. DPR-41

DOCKET NO. 50-250 AND 50-251

Revise Appendix A as follows:

Remove Pages	Insert Pages
Table 1.1	Table 1.1
3.10-4	3.10-4
Table 4.18-1	Table 4.18-1
B3.10-2	B3.10-2

TCG6/010/3