FLORIDA POWER & LIGHT COMPANY

August 14, 1984
L-84-206

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactor Branch #1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Varga:

RE: TURKEY POINT UNITS 3 & 4
DOCKET NOS. 50-250 & 50-251
PROPOSED AMENDMENT TO
SPENT FUEL STORAGE FACILITY EXPANSION
ADDITIONAL INFORMATION

By letter dated July 2, 1984, the NRC requested that FPL provide additional information regarding criticality aspects of the proposed modification. The specific questions and responses are included as an attachment to this letter. As part of the response to Question No. 6 revised Technical Specification Pages 3.17-1 and B3.17-1 are submitted which delete all reference to U-235 linear loading and use only weight percent U-235 as requested.

If additional information is needed, please contact us.

Very truly yours,

for J.W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/GJK/mp

Attachment

cc: J.P. O'Reilly, Region II
Harold F. Reis, Esquire

A001
'11

ATTACHMENT
PROPOSED AMENDMENT TO
SPENT FUEL STORAGE FACILITY EXPANSION
REQUEST FOR ADDITIONAL INFORMATION

Question 1

What is the nominal case k_{eff} for Region I calculated by KENO and what are the values of the biases and uncertainties referenced in Section 3.1.4.1?

Response

The nominal case k_{eff} and uncertainties calculated by KENO are:

$k_{nominal}$ = 0.9150

B_{method} = 0.0 delta-k

B_{part} = .0025 delta-k

B_{mech} = 0.00740 delta-k

$ks_{nominal}$ = 0.00401 delta-k

ks_{method} = 0.013 delta-k

ks_{mech} = 0.00721 delta-k

Substituting these calculated values in the equation listed in Section 3.1.4.1 results in the final k_{eff} for Region I = 0.9403

Question 2

What computer codes were used to calculate the reactivity of the temporary checker board configuration in Region II. What is the nominal case k_{eff} and what are the values of the biases and uncertainties referenced in Section 3.1.4.2.2?

Response

The computer codes used to calculate the reactivity of the checkerboard configuration in Region 2 were NITAWL, XSDRNPM and Keno-IV. These are the same codes and methods which were used for the Region I analysis. The nominal case k_{eff} calculated in this case was 0.8342 with a 95/95 uncertainty level of 0.00468. Calculation of the remaining biases and uncertainties was not deemed necessary in this case since assuming conservative values for these terms will result in a final k_{eff} for the checkerboard configuration well below the required 0.95. The acceptance criteria was determined to be met for this condition and no further detailed criticality analyses were performed.

Question 3

What are the values of the biases and uncertainties referenced in Section 3.1.4.2.1 for Region II?

Response

The values of the nominal k_{eff} in biases and uncertainties are:

$k_{nominal}$ = 0.9020

B_{method} = 0.0 delta-k

B_{part} = 0.0060 delta-k

B_{mech} = 0.00072 delta-k

$ks_{nominal}$ = 0.00325 delta-k

ks_{method} = 0.013 delta-k

ks_{mech} = 0.00890 delta-k

ks_{pu} = 0.009 delta-k

ks_{bu} = 0.0114 delta-k

Substitution of these values into the equation in Section 3.1.4.2.1 results in a final k_{eff} for Region II of 0.9304.

Question 4

What constant value of rack k_{eff} (including biases and uncertainties) do Technical Specification Table 3.17-1 and Spent Fuel Storage Facility Modification and Safety Analysis Report Figure 3-3 represent?

Response

The constant value of rack k_{eff} including biases and uncertainties represented by Table 3.17-1 and Figure 3-3 is 0.9304.

Question 5

In those cases where fuel is to be placed in a checkerboard arrangement, we require the vacant spaces adjacent to the assembly being inserted to be physically blocked to prevent inadvertent assembly insertion. Please modify your design and procedures accordingly.

Response

For normal spent fuel storage FPL will not utilize the checkerboard storage configuration since sufficient Region I space is available for storage of fuel not meeting the burn-up requirements of Technical Specification Table 3.17-1. Only during the reracking process, prior to placement of the new Region I racks, will it be necessary to store fuel in a checkerboard arrangement. By providing this type of storage the amount of fuel handling, radiation exposure and economic burden are reduced during the rerack.

Fuel assembly placement will be under administrative control with verification that the adjacent cells are vacant. This control assures the proper placement of fuel assemblies when using the checkerboard storage configuration. Since the storage method is not for extended use, the concurrent misplacement of a fuel assembly and loss of soluble boron in the SFP is not considered credible. In the unlikely event of a misplaced fuel assembly, criticality would be precluded by the boron concentration (1950 ppm) in the SFP.

The use of temporary blocking devices for this limited period of time is not considered prudent since it would result in additional personnel exposure during placement, removal and decontamination of the blocking devices. Additionally, if decontamination is unsuccessful then these blocking devices would have to be disposed of as radioactive material. On this basis, FPL does not feel the use of blocking devices is justified.

Question 6

Since storage in Region II is dependent upon initial enrichment as well as burnup, we request that all references to the U-235 loading in the Technical Specifications be in terms of weight percent U-235 (enrichment) for consistency.

Response

References to the limiting linear loading of U-235 in the proposed Technical Specification (3.17 Spent Fuel Storage) and its associated bases B3.17 are amended to reflect the limits in weight percent of U-235. These amendments are attached.

Question 7

Most of the previously analyzed PWR multi-region burnup-dependent spent fuel pools have operating procedures which require fuel to be stored initially in the "safe" burnup-independent region (Region I) before determining if storage in the burnup-dependent region (Region II) is appropriate. Please comment on the advisability of this for Turkey Point

Response

The key parameter of interest relative to safe storage of spent fuel in burnup-dependent spent fuel pools is not the final assembly burnup at End-of-Cycle, but whether the measured burnup value with appropriate uncertainties is larger than the requirement for Region II. The intention for Turkey Point is to compare measured burnups with uncertainties against requirements initially 60 days prior to planned shutdown. If the assemblies which will be discharged into the spent fuel pool meet the burnup requirement, loading of fuel directly into Region II will be allowed. Independent verification of all data will be accomplished prior to any fuel movement.

Response (continued)

In the event assemblies to be discharged do not meet the burnup requirement 60 days prior to planned shutdown, the measured burnups with uncertainties would again be compared to the burnup requirement 10 days prior to the planned shutdown. This comparison will be the basis for determining storage acceptability. Again, independent verification of the comparisons between measurement with uncertainty and the burnup requirement will be completed prior to any fuel movements. Eliminating the necessity for interim storage in Region I reduces the total number of fuel shuffles and minimizes personnel exposure. Under unusual circumstances, e.g., an early outage, the fuel may have to be stored in the burnup-independent region for some short period of time.

3.17 SPENT FUEL STORAGE

Applicability: Applies to limitations on the storage of spent fuel assemblies.

Objective: To minimize the possibility of exceeding the reactivity design limits for storage of spent fuel.

Specifications:

(1) Fuel assemblies containing more than 3.5 weight percent of U-235 shall not be placed in the single region spent fuel storage racks. After installation of the two-region high density spent fuel racks, the maximum enrichmentloading for fuel assemblies in the spent fuel racks is 4.5 weight percent of U-235.

(2) The minimum boron concentration while fuel is stored in the Spent Fuel Pit shall be 1950 ppm.

(3)* Storage in Region II of the Spent Fuel Pit shall be further restricted by burnup and enrichment limits specified in Table 3.17-1.

(4)* During the re-racking operation only, fuel that does not meet the burnup requirements for normal storage in Region II may be stored in Region II in a checkerboard arrangement (i.e., no fuel stored in adjacent spaces).

---

* This Technical Specification is applicable only after installation of the new two-region high density spent fuel racks.

B3.17 BASES FOR LIMITING CONDITIONS FOR OPERATION, SPENT FUEL STORAGE

1. The spent fuel storage racks provide safe subcritical storage of fuel assemblies by providing sufficient center-to-center spacing or a combination of spacing and poison to assure k_{eff} is equal to or less than 0.95 for normal operations and postulated accidents.

2.* The spent fuel racks are divided into two regions. Region I racks have a 10.6 inch center-to-center spacing and the Region II racks have a 9.0 inch center-to-center spacing. Because of the larger center-to-center spacing and poison (B^{10}) concentration of Region I cells, the only restriction for placement of fuel is that the initial fuel assembly enrichment is equal to or less than 4.5 weight percent of U-235. The limiting value of U-235 enrichment is based upon the assumptions in the spent fuel safety analyses and assures that the limiting criteria for criticality is not exceeded. Prior to placement in Region II cell locations, strict controls are employed to evaluate burnup of the spent fuel assembly. Upon determination that the fuel assembly meets the burnup requirements of Table 3.17-1, placement in a Region II cell is authorized. These positive controls assure the fuel enrichment limits assumed in the safety analyses will not be exceeded.

---

* This Technical Specification is applicable upon .stallation of the new two-region high density spent fuel racks.