NRR-DMPSPEm Resource

From: Wentzel, Michael
Sent: Monday, October 22, 2018 2:59 PM
To: Snyder, Mike
Cc: Frehafer, Ken; Mack, Jarrett
Subject: St. Lucie Plant, Unit No. 2, Request for Additional Information Regarding License Amendment Request to Reduce the Number of Control Element Assemblies (EPID L-2018-0181)

Dear Mr. Snyder:

By application dated June 29, 2018 (Agencywide Documents Access and Management System Accession No. ML18180A094), as supplemented by letter dated August 17, 2018 (Agencywide Documents Access and Management System Accession No. ML18229A050), Florida Power & Light Company (FPL, the licensee) submitted a license amendment request (LAR) for St. Lucie Plant, Unit No. 2 (St. Lucie 2). The proposed amendment would revise the Technical Specifications (TS) to reduce the total number of control element assemblies (CEAs).

The NRC's Reactor Systems Branch (SRXB) staff is reviewing the application and has identified areas where it needs additional information to support its review. The NRC staff's request for additional information (RAI) is provided below. As discussed with the licensee's staff on call on October 22, 2018, the NRC staff requests your response to the RAI within 30 days of the date of this email.

If you have any questions, please contact me at (301) 415-6459 or michael.wentzel@nrc.gov.

Sincerely,

Michael Wentzel, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO

REDUCE THE NUMBER OF CONTROL ELEMENT ASSEMBLIES

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT, UNIT NO. 2

DOCKET NO. 50-389

SRXB-RAI-1: Shutdown Margin

Regulatory Basis – Appendix A, "General Design Criteria [GDC] for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations*, Part 50; GDC-25, "Protection System Requirements for Reactivity Control

Malfunctions;" GDC-26, "Reactivity Control System Redundancy and Capability;" and GDC-27, "Combined Reactivity Control Systems Capability."

GDC-25 requires, in part, that the protection system shall be designed to assure that the specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems.

GDC-26 requires, in part, that two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core sub critical under cold conditions.

GDC-27 requires, in part, that the reactivity control systems shall be designed to have a combined capability, in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that the capability to cool the core is maintained.

The current St. Lucie 2 design bases that satisfy these design criteria are to provide the amount of reactivity available from insertion of withdrawn CEAs under all power operating conditions, even when the highest worth CEA fails to insert, at least one percent shutdown margin after cooldown to hot zero power, and any additional shutdown reactivity requirements assumed in the safety analyses.

Request

As stated in the LAR, a calculation specific to St. Lucie 2 was performed to evaluate the impact of the removal of the four 4-element CEAs on the total worth of reactivity systems and the subsequent available shutdown margin. Provide the following information related to the calculation:

(1) Brief description including computer codes for the approved methodology to perform the calculation,
(2) Summary of the calculation assumptions and conditions, e.g. the highest worth CEA fails to insert etc.,
(3) Calculation results on the shutdown margin showing the difference between "With" and "Without" four 4-element CEAs,
(4) Based on (3), a justification for the removal of four 4-element CEAs by taking into account the calculation uncertainties (e.g. uncertainties applied to Updated Final Safety Analysis Report (UFSAR) Table 4.3.6) and the compensatory measure, if required, for the reduction in the shutdown margin due to the removal of four 4-element CEAs.

SRXB-RAI-2: Steam Line Break Analysis

Regulatory Basis – GDC-10, "Reactor Design," GDC-15, "Reactor Coolant System Design," GDC-20, "Protection System Function," and GDC-26.

GDC-10 requires, in part, that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

GDC-15 requires, in part, that the reactor coolant system and associated auxiliary, control, and protection systems be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences.

GDC-20 requires, in part, that the protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, and (2) to sense accident conditions and initiate the operation of systems and components important to safety.

GDC-26 requires, in part, that two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core sub critical under cold conditions.

The current St. Lucie 2 design bases that satisfy these design criteria are to provide the amount of reactivity available from insertion of withdrawn CEAs under all power operating conditions, even when the highest worth CEA fails to insert, at least one percent shutdown margin after cooldown to hot zero power, and any additional shutdown reactivity requirements assumed in the safety analyses.

Request

As stated in the LAR, a calculation specific to St. Lucie 2 was performed to evaluate the impact of the removal of the four 4-element CEAs on the steam line break analysis. Provide the following information related to the calculation:

(1) Brief description including computer codes for the approved methodology to perform the calculation,
(2) Summary of the calculation assumptions and conditions, e.g. the highest worth CEA fails to insert etc.,
(3) Calculation results on the total reactivity balance for the rated thermal power and associated fuel peaking factors showing the difference between “With” and “Without” four 4-element CEAs,
(4) Based on (3), a justification for the removal of four 4-element CEAs by taking into account the calculation uncertainties.

SRXB-RAI-3: Core Bypass Flow

Regulatory Basis – GDC-10

GDC-10 requires, in part, that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

Request

Clarify the following information as described in LAR:

(1) The design bypass flow fraction of total core flow at rated core flow conditions that is used in the current St. Lucie 2 UFSAR Chapter 15 safety analysis,
(2) The new bypass flow (fraction of rated core flow) after removal of the four 4-element CEAs,
(3) The bypass flow fraction (of rated core flow) assumed in the fuel vendor’s reload analysis,
(4) The measured current total bypass flow fraction (of rated core flow) at rated core flow conditions.

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Mail Envelope Properties (Michael.Wentzel@nrc.gov20181022145900)

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Created By: Michael.Wentzel@nrc.gov

Recipients:
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Tracking Status: None
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Tracking Status: None

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Options
Priority: Standard
Return Notification: No
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