LevyCountyRAIsPEm Resource

From: Habib, Donald
Sent: Wednesday, November 25, 2015 7:47 AM
To: LevyCountyRAIsPEm Resource
Subject: RAI Letter 135 related to SRP Section 7.2, Reactor Trip System, and Section 16, Technical Specifications, for the Levy Nuclear Plant Units 1 and 2 COL application
Attachments: 2015-11-25 RAI Letter 135 for IEEE603 MCR 8399 and 8404.docx

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

November 25, 2015

Mr. Christopher M. Fallon
Vice President, Nuclear Development
Duke Energy Florida, Inc.
P.O. Box 1006 – EC12L
Charlotte, NC 28201-1006

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 135 RELATED TO STANDARD REVIEW PLAN SECTION 7.2, REACTOR TRIP SYSTEM, AND SECTION 16, TECHNICAL SPECIFICATIONS, FOR THE LEVY NUCLEAR PLANT UNITS 1 AND 2 COMBINED LICENSE APPLICATION

Dear Mr. Fallon:

By letter dated July 28, 2008, as supplemented by a letter dated September 12, 2008, Progress Energy Florida, Inc., now Duke Energy Florida, submitted its application to the U. S. Nuclear Regulatory Commission (NRC) for a combined license (COL) for two AP1000 advanced passive pressurized water reactors pursuant to 10 CFR Part 52. The NRC staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the final safety analysis report, the staff requests that the RAI response include the proposed wording changes.

C. Fallon

If you have any questions or comments concerning this matter, you may contact me at 301-415-1035.

Sincerely,

Donald Habib, Project Manager
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-029
52-030

eRAI Tracking Nos. 8399 and 8404

Enclosures:
Requests for Additional Information

C. Fallon

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Sincerely,

Donald Habib, Project Manager
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-029
52-030

eRAI Tracking Nos. 8399 and 8404

Enclosures:
Requests for Additional Information

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Request for Additional Information Letter 135, (#8399)

Issue Date: 11/25/2015
Application Title: Levy County, Units 1 and 2 - Dockets 52-029 and 52-030
Operating Company: Duke Energy Florida
Review Section: 16 - Technical Specifications
Application Section: Part 4, TS 3.3.2

QUESTIONS

16-5

10 CFR 50.36, “Technical Specifications;” 10 CFR 52.97, “Issuance of Combined Licenses;” and Section VIII.B.5.a of Appendix D, “Design Certification of AP1000 Design,” to 10 CFR Part 52 provide the regulatory basis for the following questions. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility. Subsection 52.97(a)(1) applies because the Commission must have sufficient information to find that applicable NRC regulations have been met. Section VIII.B.5.a of Appendix D to 10 CFR Part 52 applies as it relates to control of departures from generic technical specifications in a combined license application referencing the AP1000 design.

NUREG-1431, “Standard Technical Specifications Westinghouse Plants,” provides NRC guidance on format and content of technical specifications that may be used to develop plant-specific technical specifications (TS) which meet 10 CFR 50.36 requirements.

In its letter dated September 1, 2015, Duke Energy proposed a change to the design of the instrumentation for the Boron Dilution Block Function of the Protection and Monitoring System (PMS) to address a non-conformance to IEEE 603 – 1991, which is an industry standard incorporated by reference in 10 CFR 50.55a(h). The proposed PMS design change includes revising TS Subsection 3.3.2, “Engineered Safety Feature Actuation System (ESFAS) Instrumentation,” by adding a new ESFAS Interlock permissive, P-8, as Function 18.d, to permit manual blocking of the actuation logic of the Source Range Neutron Flux Doubling Function (LCO 3.3.2 Function 15.a, “Boron Dilution Block on Source Range Neutron Flux Doubling,” and Function 16.f, “Chemical Volume and Control System Makeup Isolation on Source Range Neutron Flux Doubling”) during reactor startup, and to automatically close the CVS demineralized water system isolation valves if Functions 15.a and 16.f are manually blocked below P-8. The P-8 permissive setpoint is Reactor Coolant System (RCS) average temperature (T_{avg}) ≥ 551°F, which is the minimum temperature for making the reactor critical (LCO 3.4.2, “RCS Minimum Temperature for Criticality”). Since LCO 3.4.2 does not allow making the reactor critical below 551°F, the new design automatically enables Functions 15.a and 16.f (which references 15.a) below the P-8 setpoint.

As part of this design change, the applicant proposed to revise TS Subsection 3.3.2, and the associated Bases. The staff requests clarification of the following proposed changes:

1. In TS Subsection 3.3.2, Table 3.3.2-1 (page 9 of 13), the applicant proposed to revise the Mode 3 Applicability of Function 15.a, to indicate that this Function is “not applicable for valve isolation Functions whose associated flow path is isolated” (i.e., by applying Footnote (e) to the listed Mode 3).

   In the “Applicable Safety Analyses, LCO, and Applicability” section of the Bases for TS Subsection 3.3.2 (page B 3.3.2-37), the applicant proposed to revise the description of Function 15 as follows (Added text shown in bold face, removed text is lined out.)

The block of boron dilution is accomplished by closing the CVS **makeup line isolation** ~~suction~~ valves **or closing the CVS** ~~to~~ demineralized water **system isolation** ~~storage tanks~~ valves~~, and aligning the boric acid tank to the CVS makeup pumps~~. This Function is actuated by Source Range Neutron Flux Doubling and Reactor Trip.

The discussion of LCO 3.3.2 Function 15.b, which references Function 18.b, "ESFAS Interlocks, Reactor Trip, P-4," is also revised, in part, as follows. The applicant is requested to respond as to whether the clarifications as indicated by the blue colored added text and the lined out text are correct or to provide alternative clarification as to the paragraph below.

A P-4 signal initiates isolation of RCS makeup from the CVS ~~Demineralized Water Makeup is also isolated~~ **(CVS demineralized water system, by closing the demineralized water system isolation valves**~~,~~ **and aligning the CVS makeup pump suction to the boric acid tank.** ~~**aligned to the CVS makeup pumps)**~~ **Unborated water source makeup isolation is initiated** by all the Functions that initiate a Reactor Trip.

The staff noted that the applicants changes to the TS Bases do not appear to reflect the proposed change to Table 3.3.2-1 (page 9 of 13), and the PMS design as described in FSAR (DCD Tier 2) Chapter 7. The applicant is requested to update the Bases to accurately reflect the proposed design change or explain why an update is not needed.

2. In TS Subsection 3.3.2, Table 3.3.2-1 (page 10 of 13), the applicant proposed adding a new ESFAS Interlock permissive, P-8, as Function 18.d, to permit manual blocking of the actuation logic of the Source Range Neutron Flux Doubling Function (LCO 3.3.2 Functions 15.a and 16.f) during reactor startup. Function 18.d, "ESFAS Interlocks, Reactor Coolant Average Temperature, P-8," is applicable in Modes 2, 3, 4 and 5, and requires 4 operable channels. Actions table Condition J ("One or two interlock channels inoperable") specifies action requirements for P-8.

   The staff noted that the required actions and associated completion times for Condition J are appropriate for a typical instrumentation Function that has 4 channels of sensor input and a 2-out-of 4 coincidence logic scheme. The staff could not identify which logic scheme is used (e.g., 1-out-of-4 or 2-out-of-4) to initiate closure of the demineralized water system isolation valves as shown in the revised DCD Figure 7.2-1 Sheet 3 of 21, and therefore could not determine if Condition J is the correct assignment for the new P-8 ESFAS interlock Function.

   The applicant is requested to provide the missing details concerning the logic for actuation of the boron dilution block, in FSAR Chapter 7, and, if needed, to revise TS Subsection 3.3.2 and associated Bases accordingly.

3. In the "Applicable Safety Analyses, LCO, and Applicability" section of the Bases for TS Subsection 3.3.2 (page B 3.3.2-42), the applicant proposed to add a discussion of the new P-8 ESFAS interlock Function as follows; the applicant is requested to respond as to whether the **blue** additions and lined out deletions in the paragraph below are correct or to provide alternative clarifications:

   The P-8 interlock is provided to permit a manual block of or to reset a manual block of the automatic Source Range Neutron Flux Doubling actuation of the Boron Dilution Block (Function 15.a).

The **automatic Source Range Neutron Flux Doubling actuation of the** Boron Dilution Block **Function** may be manually blocked **(disabled)** to permit plant startup and normal power operation when above the P-8 reactor coolant average temperature **setpoint**.

The **manual block to disable the automatic Source Range Neutron Flux Doubling actuation of the** Boron Dilution Block **Function** is automatically reset upon decreas**ing** ~~e of the~~ reactor coolant average temperature to below **the** P-8 **setpoint**.

Once ~~the~~ reactor coolant average temperature is below P-8, the Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function may **also** be manually blocked to prevent inadvertent actuation during refueling operations and post-refueling control rod testing.

When **the Source Range Neutron Flux Doubling actuation of** the Boron Dilution Block is manually blocked below P-8 during shutdown conditions, the CVS demineralized water system isolation valves ~~are~~ **will** automatically **close** ~~closed~~ to prevent inadvertent boron dilution.

The P-8 interlock is required to be OPERABLE in MODES 2, 3, 4 and 5. This Function is not applicable in MODES 3, 4 and 5, if the demineralized water makeup flow path is isolated. In MODE 6 a dilution event is precluded by the requirement in LCO 3.9.2 to close, lock and secure at least one valve in each unborated water source flow path.

For improved clarity of the second, third, and fifth paragraphs of the above discussion, the applicant is requested to include the phrase “Source Range Neutron Flux Doubling actuation of the Boron Dilution Block Function” in place of just “Boron Dilution Block” or to provide an alternative clarification. The applicant is requested to use Function titles that are consistent with the PMS design description in FSAR Chapter 7 (Figure 7.2-1 Sheet 3 of 21).

4. In the “Applicable Safety Analyses, LCO, and Applicability” section of the Bases for TS Subsection 3.3.1 (page B 3.3.1-23), the staff noted the following discussion for Function 16.a, “Reactor Trip System Interlocks, Intermediate Range Neutron Flux, P-6,” as follows:

   a. Intermediate Range Neutron Flux, P-6

      The Intermediate Range Neutron Flux, P-6 interlock is actuated when the respective PMS Intermediate Range Neutron Flux channel increases to approximately one decade above the channel lower range limit. The LCO requirement for the P-6 interlock ensures that the following Functions are performed:

      (1) on increasing power, the P-6 interlock allows the manual block of the respective PMS Source Range, Neutron Flux reactor trip. This prevents a premature block of the source range trip and allows the operator to ensure that the intermediate range is OPERABLE prior to leaving the source range. When the source range trip is blocked, the high voltage to the detectors is also removed.

(2) on decreasing power, the P-6 interlock automatically energizes the PMS source range detectors and enables the PMS Source Range Neutron Flux reactor trip.

(3) on increasing power, the P-6 interlock provides a backup block signal to the source range neutron flux doubling circuit. Normally, this Function is manually blocked by the main control room operator during the reactor startup.

The LCO requires four channels of Intermediate Range Neutron Flux, P-6 interlock to be OPERABLE in MODE 2 when below the P-6 interlock setpoint.

In MODE 2, when below the P-6 interlock setpoint, the P-6 interlock must be OPERABLE. Above the P-6 interlock setpoint, the PMS Source Range Neutron Flux reactor trip will be blocked; and this Function will no longer be necessary. In MODES 3, 4, 5, and 6, the P-6 interlock does not have to be OPERABLE because the PMS Source Range is providing core protection.

In the above discussion, Item a.(3) appears to be relevant to Function 18.c for ESFAS Interlocks in TS Subsection 3.3.2, “ESFAS Instrumentation,” and this information should be included in the TS Bases B 3.3.2. Further, the staff noted that the proposed design change affects the ESFAS Interlock P-6 signal to the logic of the source range neutron flux doubling circuit. However, a change to the Bases discussion for P-6 (Function 18.c) was not proposed as part of this submittal. The applicant is requested to clarify this discussion in the TS Bases B 3.3.2 regarding this logic change to P-6 including relevant information contained in Item a.(3) above.

Request for Additional Information Letter 135 (#8404)

Issue Date: 11/25/2015
Application Title: Levy County, Units 1 and 2 - Dockets 52-029 and 52-030
Operating Company: Duke Energy Florida
Review Section: 07.02 - Reactor Trip System

QUESTIONS

07.02-1

Clarify how the single failure criterion is met in the revised logic. Also provide additional clarifications on how automatic functions are implemented in the revised logic.

10 CFR 50.55a(h)(3) states "Applications filed on or after May 13, 1999, for construction permits and operating licenses under this part, and for design approvals, design certifications, and combined licenses under part 52 of this chapter, must meet the requirements for safety systems in IEEE Std. 603–1991 and the correction sheet dated January 30, 1995." IEEE Std. 603-1991, Clause 5.1 requires that all safety systems shall meet the single failure criterion.

10 CFR 52.47(a)(2) requires, in part, that the description of the structures, systems, and components shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. The guidance of SRP Appendix 7.1-C, "Guidance for Evaluation of Conformance to IEEE Std. 603", Section 4, "Safety System Designation", states that the information provided for the design basis items, taken alone and in combination, should have one and only one interpretation. The applicant is requested to provide responses to the following questions raised on the Exemption Request and Design Change Description for Departure from AP1000 DCD Revision 19 to Address Compliance with IEEE 603-1991:

1. The revised Figure 7.2-1 (Sheet 3 of 21) in the submitted change package shows that there are separate momentary controls for each applicable division for the "FLUX DOUBLING BLOCK CONTROL". Clarify whether or how the single failure criterion is met for the newly added actuation signal sent to "CLOSE DWS ISOLATION VALVES".

2. It is not clear whether the "reset" function mentioned in Bullet 3 on Page 2 of 13 in the submitted change package is automatic or not. If it is an automatic action, clarify where and how the pre-condition "if CVS valves 136A and 136B are opened" is implemented in the revised logic Figure 7.2-1 (Sheet 3 of 21).

3. There are two "CLOSE DWS ISOLATION VALVES" functional blocks (one is existing and the other is new) shown on the revised Figure 7.2-1 (Sheet 3 of 21). The newly added Note 5 states that the new "CLOSE DWS ISOLATION VALVES" functional block is not part of the ESF actuation function. Provide clarification on what differences exist between the above two functional blocks and why the new "CLOSE DWS ISOLATION VALVES" functional block is not an ESF actuation function.