

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

March 15, 2017

Mr. C. R. Pierce Regulatory Affairs Director Southern Nuclear Operating Co., Inc. P.O. Box 1295, Bin 038 Birmingham, AL 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION (CAC NOS. MF8844 AND MF8845)

Dear Mr. Pierce:

By letter dated November 15, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16320A540), the Southern Nuclear Operating Company, Inc., (SNC) submitted an amendment request to revise the Joseph M. Farley Nuclear Plant, Unit 1 and Unit 2, Technical Specifications. Specifically, the proposed change is a request to revise TS 5.5.17 "Containment Leakage Rate Testing Program."

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed as discussed in the Enclosure. We request that SNC respond within 60 days of the date of this letter. Please note that the NRC staff's review is continuing and further requests for information may be developed.

Sincerely,

Show Williams >

Shawn Williams, Project Manager Plant Licensing Branch, II-1 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket Nos. 50-348, 50-364

Enclosure: Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

DOCKET NOS. 50-348 AND 50-364

By letter dated November 15, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16320A540), the Southern Nuclear Operating Company, Inc., (SNC) submitted an amendment request to revise the Joseph M. Farley Nuclear Plant, Unit 1 and Unit 2, (FNP) Technical Specifications (TSs). Specifically, the proposed change is a request to revise TS 5.5.17 "Containment Leakage Rate Testing Program."

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing the submittal and has determined that additional information is needed to complete its review.

<u>RAI No. 1</u>:

Regarding Attachment 1, Table 5-7: "Farley Unit 1 Annual Dose as a Function of Accident Class; Characteristic of Conditions for ILRT [Integrated Leak Rate Test] Required 1/10", please validate the value for Accident Class 1.

Under EPRI Methodology, Table 5-7 has a value of 9.63E-06/ year (yr), however, NRC staff calculated a value of 9.37E-6/yr, by taking the corresponding Class 1 value from Table 5-5 of 1.01E-5/yr and subtracting both Accident Class 3a and 3b and multiplying the result by 3.333:

NRC Calculation: Class 1 value from Table 5-5 – (3a value from Table 5-5 + 3b value from Table 5-5) * 3.333

1.01E-5/yr - (1.74E-7/yr + 4.36E-8/yr) * 3.333 = should be 9.37E-6/yr instead of 9.63E-6/yr

It appears that SNC may have only subtracted Class 3a instead of 3a and 3b.

This same calculation was made in Class 1 on Table 5-7 for both Electric Power Research Institute (EPRI) Methodology and EPRI Methodology Plus Corrosion.

These results appear to be carried forward in Tables 5-8, 5-9, 5-10 and carried through in subsequent calculations.

- Table 5-8 value of 1.02E-5/yr for Accident Class 1 Frequency (for both EPRI and EPRI Corrosion). NRC estimates 1.00E-5/yr.
- Table 5-9 value of 9.26E-6/yr for Accident Class 1 Frequency (for both EPRI and EPRI Corrosion). NRC estimates 9.01E-6/yr.

Enclosure

 Table 5-10 value of 9.89E-6/yr for Accident Class 1 Frequency (for both EPRI and EPRI Corrosion). NRC estimates 9.70E-6/yr.

Please validate the results in submittal dated November 15, 2016, and, if correct as originally provided, provide sufficient detail on how the values were obtained. If an error was made, please re-calculate and re-submit with the revised values.

The NRC staff notes that when the revised calculated values are corrected for the apparent error described above, the results in Section 5.5 Step 5 to values for \triangle CCFP for both units appear to exceed the threshold for "small" increases as per Regulatory Guide (RG) 1.174. For instance instead of the change in CCFP of 0.92% for extending the test interval to fifteen years from the original three in ten years for FNP Unit 1 and Unit 2; NRC staff calculates values of 2.06% for Unit 1 and 2.07% for Unit 2, in excess of the acceptance maximum of 1.5%. (NRC staff also calculated exceedances for the change from three in ten years to ten years for both units, albeit by lesser amounts). For instance:

Unit 1

NRC calculation: CCFP_{3 Unit 1} = [1 – (1.01E-5/yr + 1.74E-7/yr)/1.91E-5/yr] * 100% = 46.2% SNC calculation: $CCFP_{3 \text{ Unit } 1} = 46.02\%$ NRC calculation: CCFP_{10 Unit 1} = [1 – (9.37E-6/yr + 5.81E-7/yr)/1.91E-5] * 100% = 47.9% SNC calculation: CCFP_{10 Unit 1} = 46.56% NRC calculation: CCFP_{15 Unit 1} = [1 – (9.01E-6/yr + 8.72E-7/yr)/1.91E-5] * 100% = 48.26% SNC calculation: CCFP_{15 Unit 1} = 46.94% NRC calculation: $\triangle CCFP_{Unit 1} = CCFP_{15} - CCFP_3 = 48.26\% - 46.2\% = 2.06\%$ NRC calculation: △CCFP_{Unit 1} = CCFP₁₅ – CCFP₁₀ = 48.26% - 47.9% = 0.36% NRC calculation: △CCFP_{Unit 1} = CCFP₁₀ - CCFP₃ = 47.9% - 46.2% = 1.7% Unit 2 NRC calculation: CCFP_{3 Unit 2} = [1 – (1.07E-5/yr + 1.60E-7/yr)/1.75E-5/yr] * 100% = 37.94% SNC calculation: CCFP_{3 Unit 2} = 38.02% NRC calculation: CCFP_{10 Unit 2} = [1 – (1.00E-5/yr + 5.32E-7/yr)/1.75E-5] * 100% = 39.82% SNC calculation: CCFP_{10 Unit 2} = 38.55% NRC calculation: CCFP_{15 Unit 2} = [1 - (9.70E-6/yr + 7.99E-7/yr)/1.75E-5] * 100% = 40.01% SNC calculation: CCFP_{15 Unit 2} = 38.93% NRC calculation: △CCFP_{Unit 2} = CCFP₁₅ – CCFP₃ = 40.01% - 37.94% = 2.07% NRC calculation: △CCFP_{Unit 2} = CCFP₁₅ - CCFP₁₀ = 40.01% - 39.82% = 0.19% NRC calculation: $\triangle CCFP_{\text{Unit 2}} = CCFP_{10} - CCFP_3 = 39.82\% - 37.94\% = 1.88\%$

Therefore, when recalculating for the apparent error as described above, explain and provide justification for exceeding any acceptance thresholds.

RAI No. 2:

In Section 4.2.4, Population Dose Estimate Methodology, FNP was compared with a reference plant, Surry. Explain if the weather conditions around the two sites (Surry vs FNP) are sufficiently comparable to render this scaling approach conservative based on power level, leakage, and population. Please provide justification.

RAI No. 3:

Please address the following questions associated with Section A.2.5, "Assessment of PRA [Probabilistic Risk Assessment] model Technical Adequacy":

- a. In Table 1, "Resolution of the Farley PRA Peer Review F&Os [Fact and Observations] Associated with the 17 Not Met SRs"; the peer review finding for F&O HR-G7-01 & 02 addresses the licensee's treatment of dependency between multiple human actions. Please indicate if a specific floor value was defined (*e.g.* via post-processing) to ensure scenarios (cutsets) containing multiple human failure events/human error probabilities (HFEs/HEPs) did not result in joint HEPs (JHEPs) within the scenario (cutset) below a minimum threshold, that being 1E-6 for internal events. If any cutsets resulted in joint HEPs lower than 1E-6, provide a sensitivity evaluation of imposing such a minimum value and address whether this affects the conclusions drawn in the application.
- b. Confirm that the response to a similar request for additional information (RAI) under National Fire Protection Association Standard (NFPA)-805 specific to the fire PRA, where use of a floor value of 1.0E-5 for any JHEP combinations with values less than 1.0E-5 was cited, remains valid and applicable for this ILRT application. This was RAI PRA 26e answered by RAI response letter dated October 30, 2013 (ADAMS accession number ML13305A105).

RAI No. 4:

The submittal did not include the complete list of Internal and External PRA Peer Review F&Os/ Findings and dispositions/resolutions. NRC staff recognizes that Table 1 of Appendix A included 17 of the "SR (Supporting Requirement) Not Met" findings and dispositions/resolutions after the peer review.

Normally the NRC expects all PRA F&Os to be submitted for License Amendment Requests. To the extent that the PRA Peer Review F&Os and resolutions/dispositions from the FNP NFPA-805 submittal dated September 25, 2012, remain applicable for this ILRT application we will treat these as part of the submittal. However, if there have been any changes in the dispositions/resolutions, including ones resulting from the processing of the NFPA-805 submittal, that could affect this ILRT submittal, or any self-assessments or peer reviews that have generated new Findings since the NFPA-805 submittal, provide these for review. Include their dispositions/resolutions. If none, please confirm.

RAI No. 5:

In Section 6.3 "Potential Impact from External Events Contribution", Table 6-2 provides core damage frequency (CDF) and large early release frequency (LERF) values for Fire Events from the FNP Fire PRA (FPRA) that credits pending modifications for NFPA 805 that will be implemented by the end of 2017. State if the fire CDFs (and LERFs) reflect changes to FPRA methods made since the safety evaluation (SE) was issued for NFPA 805 including the following:

a. New guidance on the credit taken for very early warning fire detection system (VEWFDS) is available in NUREG-2180, "Determining the Effectiveness, Limitations, and Operator Response for Very Early Warning Fire Detection Systems in Nuclear Facilities, (Delores-VEWFIRE)" which is now available as a final report at Agencywide Documents Access and Management System (ADAMS) Accession No. ML16343A058. The methodology in NUREG-2180 is acceptable to the NRC because it is currently the best available guidance. The guidance provided in frequently asked question (FAQ) 08-0046, "Closure of National Fire Protection Association 805 Frequently Asked Question 08-0046 Incipient Fire Detection Systems" (ADAMS Accession No. ML16253A111), has been retired and alternative approaches for staff evaluation are necessary to complete the safety evaluation.

If the Fire PRA credits the future (or current) installation of VEWFDS, explain how credit (e.g., approach, methods, data, and assumptions) taken for the proposed VEWFDS is consistent with the guidance in NUREG-2180 or bounds the metrics in this that would be obtained had the guidance in NUREG-2180 been applied. If credit taken for VEWFDS in the FPRA is not consistent with or bounded by NUREG-2180 provide:

- 1) The risk metrics that would be obtained had the guidance of NUREG-2180 been applied, or that would be obtained had an alternative method been used, along with a description and justification for the alternative method. Development and use of an alternative proposal may extend the time required to complete the review. The new risk results can be generated from a sensitivity study type evaluation insofar as formal incorporation of the new method into the PRA model of record is not required.
- 2) Explain how any increases in the risk metrics are consistent with the acceptance criteria for this application.
- b. Changes (generally increases) in fire ignition frequencies and non-suppression probabilities from NUREG-2169. For example, the frequency of fires in the Main Control Board is now twice as high as in the original NUREG/CR-6850 and six times higher than in its Supplement 1. The mean time to suppress a welding fire is nearly twice as long as in both the original NUREG/CR-6850 and its Supplement 1.
- c. Possible increases in spurious operation probabilities from NUREG/CR-7150, Vol. 2. For example, intra-cable spurious operation for an ungrounded AC, with individual control power transformers, single-break control circuit for a solenoid-operated valve has a probability of 0.64, slightly higher than the value of 0.6 from NUREG/CR-6850.

RAI No. 6

In the application for NFPA 805, an F&O related SR IE-A10 cited the need to address the probability of dam failure using newer techniques, possibly with inclusion of loss of the SW pond dam to the model. The resolution cited a sensitivity evaluation for which the estimated CDF and LERF were approximately 1E-5/yr and 1E-7/yr, respectively, for each unit. Table 6-2 of Attachment 1 for the Permanent ILRT Interval Extension Risk Impact Assessment cites "screened out" for "Other External Risk," which presumably would include this dam failure. Address whether this dam failure analysis has been updated or not. If updated, discuss whether the "screened out" citation still applies. If not, revise Table 6-2 to include the results of the cited sensitivity evaluation and address the effect on risk and delta-risk metrics.

RAI No. 7

In Section 6.3 "Potential Impact from External Events Contribution", Table 6-2 provides CDF and LERF values for Seismic Events from the FNP FPRA. As cited in the SE for NFPA 805 transition (ADAMS Accession No. ML14308A048), Farley used an average of the CDF values (1.73E-5/yr per unit) from the "Safety/Risk Assessment Results for GI-199" (ADAMS Accession No. ML100270582).

NRC Staff results show that if using 1.73E-5/yr per unit, the CDF totals on Table 6-2 would calculate to 1.03E-4/yr and 1.08E-4/yr, respectively. Both would minimally exceed the RG 1.174 Region II threshold of 1.00E-4/yr. NRC Staff notes that an increase in each LERF would also occur based on the seismic LERFs of 2.02E-7/yr and 2.60E-7/yr for Units 1 and 2, respectively, as cited in the NFPA-805 SE.

- 1) Perform a complete recalculation of Table 6-2 and subsequent calculations in Sections 6 and 7 using the values cited in the NFPA-805 SE and address all the issues identified in the preceding RAIs (RAI No. 1, 3, 5, and 6).
- 2) Confirm that any increases in the risk metrics as a result of the recalculation in part 1) above does not change the justification for exceeding the acceptance criteria for this application.

With respect to Table 6-2, the application stated, "the value for Total Internal and External events CDF slightly exceeds a value of 1.0E-04[/yr]. This value is expected to fall below 1.0E-04[/yr] when the Farley Internal Events PRAs for Unit 1 and Unit 2 credit the Generation III RCP shutdown seals which are already installed. Crediting the Generation III RCP seals is expected to reduce Internal Events CDF to the mid 1.0E-06/yr range on both units."

Justify the expectation of a reduction in internal events CDF after crediting the Generation III RCP seals to the mid 1.0E-6/yr range on both units by using a bounding quantification.

RAI No. 8

The following items need additional clarification:

- a. Section 4.2.1 of Attachment 1 lists CDF values of 1.91E-05/yr for Unit 1 and 1.75E-05/yr for Unit 2. State if these values are for Internal Events only.
- b. In Section 5.1 of Attachment 1, there appears to be an error in Class 3b Frequency for Unit 1. The calculation shown on page 29, has a value of 3.52E-07/yr for Class 2; however, Table 5-2 provides a value of 3.52E-08 for EPRI Class 2. Confirm the correct value. If not correct, state if any results change.
- c. In Appendix A, Section A.2.2 "Parts of the PRA" refers to reference 34 and reference 37. However, Section 3 "Parts of the PRA" contains the same statement with different references (reference 17 and reference 10). Please clarify which references are correct.
- In Section A.2.5 "Assessment of PRA model Technical Adequacy", it is stated that an independent peer review was conducted in 2001 and refers to reference number 31. However, in your references section, reference 31 is NEI 05-04, Rev 2, dated November 2008. Please clarify.

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DATE: MARCH 15, 2017.

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