



UNITED STATES
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March 8, 2018

Mr. James J. Hutto
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
P.O. Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: SUMMARY REPORT FOR NRC AUDIT FOR VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2, AMENDMENT REQUEST TO INCORPORATE SEISMIC PROBABILISTIC RISK ASSESSMENT INTO 10 CFR 50.69 CATEGORIZATION PROCESS (CAC NOS. MF9861 AND MF9862; EPID L-2017-LLA-0248)

Dear Mr. Hutto:

By letter dated June 22, 2017, the Southern Nuclear Operating Company (SNC, the licensee) submitted a license amendment request (LAR) regarding the Vogtle Electric Generating Plant, Units 1 and 2 (Vogtle). The proposed amendment would modify the licensing basis to implement a change to the approved implementation of the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.69, "Risk-informed categorization and treatment of structures, systems, and components for nuclear power plants." The proposed amendment would incorporate the use of the Vogtle seismic probabilistic risk assessment into the approved 10 CFR 50.69 categorization process that relied previously on a seismic margins approach.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittal and determined that a regulatory audit would assist in the timely completion of the licensing review process. The NRC staff issued the regulatory audit plan on December 4, 2017.

The NRC staff conducted the regulatory audit on December 12-13, 2017, at the SNC corporate office in Birmingham, Alabama. The results of the regulatory audit were used by the NRC staff to finalize requests for additional information, which were issued on January 5, 2018.

The audit summary report is provided as an enclosure to this letter.

J. Hutto

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If you have any questions, please contact me at (301) 415-3229 or Michael.Orenak@nrc.gov.

Sincerely,

Shawn Williams ^{for}

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

Docket Nos. 50-424 and 50-425

Enclosure:
Audit Summary Report

AUDIT SUMMARY REPORT
INCORPORATION OF SEISMIC PROBABILISTIC RISK ASSESSMENT INTO THE
10 CFR 50.69 CATEGORIZATION PROCESS
SOUTHERN NUCLEAR OPERATING COMPANY
VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2
DOCKET NOS. 50-424 AND 50-425

1.0 INTRODUCTION

By letter dated June 22, 2017 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML17173A875), the Southern Nuclear Operating Company (SNC, the licensee) submitted a license amendment request (LAR) regarding the Vogtle Electric Generating Plant, Units 1 and 2 (Vogtle). The proposed amendment would modify the licensing basis to implement a change to the approved implementation of the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.69, "Risk-informed categorization and treatment of structures, systems, and components for nuclear power plants." The proposed amendment would incorporate the use of the Vogtle seismic probabilistic risk assessment into the approved 10 CFR 50.69 categorization process that relied previously on a seismic margins approach.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the licensee's submittal and determined that a regulatory audit would assist in the timely completion of the licensing review process. The NRC staff issued the regulatory audit plan on December 4, 2017 (ADAMS Accession No. ML17319A325).

The NRC staff conducted the regulatory audit on December 12-13, 2017, at the SNC corporate office in Birmingham, Alabama.

The regulatory audit was performed consistent with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits," (ADAMS Accession No. ML082900195).

2.0 AUDIT ACTIVITIES AND OBSERVATIONS

During the regulatory audit, the licensee provided an overview presentation of the Vogtle SPRA. The overview provided useful information to the NRC staff on various technical elements that are important in the development of Vogtle SPRA such as hazard evaluation, walkdowns, human reliability analysis (HRA), and the guidance documents used to develop the SPRA.

The NRC staff and the licensee discussed each of the information needs provided to the licensee via the audit plan. The technical discussions were focused on (1) the determination of the acceptability of the internal events probabilistic risk assessment (PRA) as basis for SPRA and the SPRA for the 10 CFR 50.69 program and (2) a review of the unique aspects of using the SPRA in the risk-informed categorization process. Examples of discussions are provided in the following paragraphs.

Extensive discussions were held related to the use of Generation III Westinghouse shut down seal in the licensee's SPRA and whether the inclusion of Generation III shut down seal model would be considered a PRA upgrade requiring a focused-scope peer review. The licensee's discussion clarified the evolution of its use of different reactor coolant pump (RCP) seal leakage models in the Vogtle internal events PRA model, which forms the basis of the licensee's SPRA model. The licensee discussed their view on why changing WOG2000 RCP seal leakage model, which was peer reviewed and subsequently removed from the Vogtle internal events PRA model, to the Generation III Westinghouse shut down seal currently used in licensee's PRA models would not be considered a PRA upgrade.

The SNC staff discussed the licensee's approach for identifying the key assumptions and key sources of uncertainty in Vogtle SPRA. The licensee stated that the criteria used to identify such sources was based on the guidance in Regulatory Guide 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-informed Activities" (ADAMS Accession No. ML090410014). The licensee also provided a few examples of the implementation of the approach, such as the exceptions to general fragility correlation rule, for identifying key assumptions and key sources of uncertainties.

The NRC and SNC staff also discussed the disposition of a number of SPRA finding level Facts and Observations (F&Os). Some examples of discussions include licensee's overview of the guidance that was used for evaluation of seismic-fire interaction, licensee's changes to address the conservatism identified in fragility evaluations that can lead to incorrect categorization, and discussion of consensus approaches used for deriving structural response factor used in Vogtle SPRA. Extensive discussions were held related to HRA used in the Vogtle SPRA and how the licensee's resolution of findings related to HRA is consistent with guidance in Electric Power Research Institute (EPRI) report for external events HRA. The licensee showed examples to demonstrate the HRA performed for the SPRA. The NRC staff also examined the calculations related to an F&O about the reactor internals fragility evaluation. Finally, the SNC staff clarified what sensitivity analyses will be performed related to SPRA acceptability issues.

The licensee presented an integrated decision-making panel (IDP) report to provide an overview and discuss how the SPRA results and different SPRA sensitivity studies outlined in Sections 5 and 8 of Nuclear Energy Institute (NEI) 00-04, "10 CFR 50.69 SSC Categorization Guideline" (ADAMS Accession No. ML052910035) are performed in licensee's categorization program. The NRC and SNC staff also discussed different factors that would need to be considered to ensure that the modeling inputs in the SPRA and those used in sensitivity studies continue to remain valid after the implementation of the SPRA in the licensee's 10 CFR 50.69 program.

The SNC staff provided information related to evolution of the use of EPRI HRA Calculator in licensee's PRA and the peer-review that was performed on the use of EPRI HRA Calculator. Based on the licensee's clarification, the NRC staff suggested that some information may need to be revised, as it appeared that only one aspect of implementing EPRI HRA Calculator, namely HRA dependencies, was not peer-reviewed.

The NRC and SNC staff discussed the licensee's approach for determining the importance measures from the Vogtle SPRA where SPRA uses bins for modelling the response to various ranges of seismic accelerations. The SNC staff discussed how the overall importance measure is derived by weighting importance measures based on the core damage frequency of each bins.

3.0 CONCLUSIONS

During this regulatory audit, the NRC staff did not make any regulatory decisions regarding the proposed license amendment. The NRC staff noted that upon completion of the audit, a final request for additional information (RAIs) will be issued, and the licensee would be expected to provide the requested information on the docket. Subsequent to the regulatory audit, the NRC staff finalized and transmitted the RAIs on January 5, 2018 (ADAMS Accession No. ML17354A782). The licensee responded to the RAIs on February 6 and February 21, 2018 (ADAMS Accession Nos. ML18037B121 and ML18052B342, respectively).

4.0 AUDIT PARTICIPANTS

NRC Participants:

- Mehdi Reisi Fard, Technical Reviewer, Probabilistic Risk Assessment (PRA), NRC
- Shilp Vasavada, Technical Reviewer, PRA, NRC
- Courtney St. Peters, Technical Reviewer, PRA, NRC
- Kaihwa Hsu, Technical Reviewer, Structural Engineering, NRC

SNC Participants:

- Pamela Burns
- Parthasarathy Chandran
- Phil Grissom
- David Moore
- Vish Patel
- Faramarz Pournia
- Benny Ratnagaran
- Barry Sloane (Jensen-Hughes, contractor to SNC)

Principal Contributor: Mehdi Reisi Fard, NRR/DRA/APLB/RILIT

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ADAMS Accession No. ML18054A066

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