



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

April 17, 2013

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
Post Office Box 1295, Bin - 038
Birmingham, AL 35201-1295

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 – REQUEST FOR
ADDITIONAL INFORMATION (TAC NOS. ME9472 and ME9473)

Dear Mr. Pierce:

By letter dated August 31, 2012 (Agencywide Documents Access and Management System Accession No. ML12248A035), Southern Nuclear Operating Company, Inc. (SNC or the licensee), submitted a license amendment request to revise the VEGP licensing basis to implement 10 CFR 50.69, risk-informed categorization and treatment of structures, system, and components. The Nuclear Regulatory Commission staff finds that additional information is needed as set forth in the Enclosure.

Please provide the additional information within thirty (30) days of the date of this letter.

Sincerely,

A handwritten signature in black ink that reads "Robert Martin".

Robert E. Martin, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 (VEGP)
SOUTHERN NUCLEAR OPERATING COMPANY (SNC)
PILOT 10 CFR 50.69 LICENSE AMMENDMENT REQUEST

1. SNC provided the Nuclear Regulatory Commission (NRC) staff a set of draft procedures under cover letter dated August 17, 2011 (Reference 1). Please confirm that these are the current procedures or provide the latest versions of these procedures.
2. Nuclear Energy Institute (NEI) 00-02 (Reference 2) provides alternative acceptable methods for several categorization tasks. For example, a peer reviewed fire probabilistic risk assessment (PRA) could be used as is internal events PRA, or all unscreened structures, systems, and components (SSCs) in a Fire-Induced Vulnerability Evaluation (FIVE) analysis could be assigned as High Safety Significant (HSS). The draft procedures also include alternative methods to perform individual tasks. When alternative methods are included in the procedures, how is one of the methods selected for use? Under what conditions can different methods be used for different systems?
3. Section 3.3.1.2 of Enclosure 1 to the license amendment request (LAR) in Reference 3, states that, "In May 2009, the VEGP PRA internal events model Revision 4 (including internal flooding) was reviewed against the requirements of [ASME RA-Sc-2007, Reference 4] as amended by RG 1.200, Revision 1...[Reference 5]"

Please summarize the peer review conducted in May 2009 and clarify if it was a full peer review where the team met the guidelines outlined in NEI 00-02 (e.g., 5 or 6 members that included the full range of experience required to perform an internal events PRA), followed the process outlined in NEI 00-02 (e.g., offsite preparation, one week onsite review, and post review documentation), and reviewed the PRA against all the elements in the ASME 2009 standard. If the review was not a full peer review, please describe the review in detail and provide all earlier Findings and Observations (F&Os) from any previous reviews.

4. Section 3.3.2.2 of Enclosure 1 to the LAR, states that, "a focused scope peer review was conducted for the Qualitative Screening, and Quantitative Screening elements that were marked as Not Reviewed by the [fire PRA] peer review team." Please summarize this focused scope review and compare it with the [focused scope] peer review guidance described in ASME/ANS RA-S1-2009, Section 1-6.2.4(d).9 (Reference 6).

5. The NRC has endorsed two methods to accomplish categorization of passive SSC functions to support implementation of 50.69, Revision 0 of American Society of Mechanical Engineers (ASME) Code Case N-660 (N-660) and WCAP-16308-NP-A (WCAP, Reference 7). The LAR refers to these methods and also refers to EPRI-TR-112657 (EPRI), an NRC endorsed methodology to risk-inform inservice inspection (RI-ISI) that is unrelated to 50.69. SNC proposes a new method which uses certain elements (i.e., paragraphs) from each of the three methods. Each endorsed method incorporates all the elements into a single process whereby some non-conservative elements are acceptable based on other conservative elements, and the safety implications of the collective evaluation is judged against the use of the results. Combining disparate elements of previously approved methods into a new method does not provide any basis for acceptability. In Table 1A in the LAR, SNC compares the SNC method to the method in the WCAP. The LAR also includes Table 1B which purports to compare the SNC method to N-660 but which includes cross-references to the WCAP in almost every row. Both Tables 1A and 1B refer extensively to the acceptability of the EPRI method to justify modifications to the WCAP and N-660 methods into SNC's proposed method. The NRC Staff does not accept this approach. The EPRI method is not mentioned in N-660 or Regulatory Guide (RG) 1.201 and it is mentioned only as applicable to RI-ISI in NEI 00-04 (Reference 8). Furthermore, it is mentioned only in one response to RAI 12 (page B-23) in the WCAP.

Please change your passive categorization process to one of the approved methods. Alternatively, please revise Tables 1A and 1B to exclude any reference to N-660, EPRI, or the WCAP methods in the justification and, instead, provide a technical, safety-related argument for each proposed element. Also, as part of the justification for your proposed method, please include a sensitivity study identifying differences in categorization that arise because of the use of your proposed method instead of one of the approved methods.

6. How have the fire PRA SSC importance measures been included in the categorization process? Have the categorization sensitivity studies been performed using the fire PRA for the fire scenarios?
7. The NRC observed the Integrated Decisionmaking Panel (IDP) deliberation on November 29, 2011. The NRC observations are documented in, "Vogtle Electric Generating Plant, Units 1 and 2, Audit Report For The Process Being Developed To Support A License Amendment Request To Implement Risk Informed Categorization Of Systems, Structures, And Components," (ADAMs Accession number ML12061A245). One observation during the audit was the lack of clarity regarding the response to the qualitative questions described in NEI 00-04 Section 9.2.2. Specifically, several of the qualitative considerations involve a determination as to whether SSCs provides "the sole means" of accomplishing a function. During the audit it was evident that, if loosely applied, no SSC would ever be a "sole means." For example, loss of some radiation

monitoring (RM) disabled information relied upon to identify an “adverse containment condition.” Depending on the accident scenario other SSCs, such as temperature and/or pressure indicators, could provide an alternative means that would indicate an “adverse condition” and therefore it could be claimed that the RM SSCs do not provide the sole means. Such an evaluation appears not to comply with both the letter and intent of the consideration. Although some scenarios may provide alternative means, some scenarios do not. Furthermore, if the alternative means requires creative interpretation it is not clear that such means would be effective under stressful conditions during an accident unless the alternative is proceduralized and included in the training. At a minimum, any alternative means should be well documented by the IDP. Please provide example documentation of alternative means that have been credited. If any additional guidance beyond that in NEI 00-04 has been developed to provide clarity about “sole means”, please provide that guidance.

8. Please summarize the risk sensitivity study described in Chapter 8 of NEI 00-04. Please include the unreliability factor selected and the change in both the internal events and fire risk metrics upon use of the factor.
9. The LAR reported that the Peer Review identified 36 fire PRA supporting requirements that were not met or Capability Category (CC) I excluding 25 deemed to be not applicable. The LAR concludes that all SRs aside from 2 documentation Supporting Requirements (SRs) are currently being met at CC II or better, and that 2 additional SRs are satisfactorily met at CC I. Please:
 - a. Summarize the review process and the qualifications of the personnel that have reviewed your resolutions to determine the post-resolution category of each SR.
 - b. Clarify whether the peer review team or another party deemed the 25 SRs inapplicable.
 - c. Summarize the 25 SRs deemed not applicable and provide the criteria used to make that determination.
10. Regarding errors identified in the analyses, the peer review team identified a number of individual errors in the fire PRA evaluation (PRM-A1-01, IGN-B1-01, FQ-C1-02, FSS-B2-02, and FSS-C4-02). The SNC resolution for the indicated F&Os state that the errors were confirmed but isolated to those identified by the peer review. Did SNC’s review of the analyses for similar errors include all such potential errors such that there is confidence that the peer review did indeed identify the only errors in the PRA? Or was SNC’s review limited to a sample that would provide less confidence that all similar errors had been identified and fixed? Please clarify and justify the process used to review the analyses cited by each F&O listed above in which an error was identified.

11. Regarding documentation requiring modification, the peer review team identified numerous instances where PRA documentation was confusing, missing, or incomplete (ES-D1-01, CS-C2-01, CS-C2-02, PRM-B13, PRM-C1-01, FSS-A3-01, FQ-F1-01, FQ-F1-02, IGN-A7-01, HRA-B3-01, MU-C1-01, UNC-A2-02, and MU-C1-01). SNC's response was generally that the documentation has been or will be improved. Since 50.69 categorization is performed over many years, proper documentation is needed to provide confidence that PRA updates and actual categorization evaluations appropriately reflect the operation and design of the facility. Please summarize SNC's process to ensure that the documentation of the PRA is now of sufficient clarity and quality to support the long-term, continuous use of the PRA.
12. ASME RA-Sa-2009 SR IE-A5 requires a structured approach (such as a system-by-system review of initiating event potential, a Failure Modes and Effects Analysis or a fault tree) to assess and document the possibility of an initiating event arising from individual system or train failures. Support systems are within the scope of this evaluation. Initiating events resulting from multiple failures are to be included if the equipment failures result from a common cause.

F&O IE-A4-01 appears to refer to the requirements in IE-A5, not IE-A4. The F&O states that simply crediting an evaluation performed for the Individual Plant Examination (IPE) is not sufficient to demonstrate a "structured approach." Instead, the IPE evaluation should be reviewed and evaluated to determine whether it complies with ASME RA-Sc-2009. The resolution to this F&O states that an evaluation was performed during the Vogtle IPE using a "block diagram" but does not describe the methodology or whether it includes support systems and accounts for common cause failures as called for by ASME RA-Sc-2009. Please describe the structured approach that was used and an explanation of how it was reviewed and found to have met the aforementioned requirements.

13. F&O IF-C2a-01 states that "successful mitigation of ALL flood events is assumed to occur 30 minutes into any flood scenario." (emphasis in original) The response to this F&O states that the VEGP internal events flooding analysis does not credit operator actions for flood isolation/mitigation (that is, screening HEP values used were equal to 1.0) and that "screening human error probability (HEP) values in *human induced* flooding events do not make use of the results of the design-related calculations, which assume a 30 minute flow termination time." (emphasis added) The response to this F&O appears only to address human-induced flooding. Please clarify whether it is applicable to other sources of internal flooding such as pipe rupture.
14. F&O SY-B3-01 states that some systems "may be lacking common cause failure (CCF) grouping" but that these systems are non-risk significant and therefore would not impact categorization results. Assigning a CCF factor can substantively raise the failure likelihood and therefore the importance of a system. Please describe the criteria used to

classify these systems as non-risk-significant and the basis (e.g. sensitivity study) for concluding that they would remain non-risk-significant had CCF been accounted for. Please discuss the interaction between the lack of CCF factors and the sensitivity studies whereby the CCF factors are increased and decreased.

15. F&O PP-A1. The "finding description" in the LAR Table 8 indicated that the peer review team identified some potentially significant fire areas that were determined to be outside the scope of the global analysis boundary, but no specific locations were included in Table 8. SNC's response states that none of the specific locations identified in the F&O were screened. This implies that (1) the peer review team identified specific locations that were not included in Table 8 and (2) the peer review team misidentified them as missing (or screened out) but they were actually included in the fire PRA. Please identify the specific locations and clarify how these locations were dispositioned in the fire PRA.
16. F&O. FSS-A1-01 questions the justification for screening out some ignition sources. The finding reported that SNC provided an example of screening criteria as being "sources were not used given potential for fire spread." Further support for screening these sources was that they are postulated to "have no consequential impact beyond itself (loss of only the fire source.)" F&O FSS-D3-01 provides a related observation that the ignition of secondary combustibles appeared limited. Please describe how SNC's evaluation considers the spread of a fire from the ignition source to other combustibles and how suppression activities are included in this evaluation.
17. FSS-A5-01 stated that transient ignition sources did not appear to be postulated in all possible locations. SNC's response indicated that some new transient fire locations were added, but that the change in the risk was minimal because, "the consequences of the postulated transient fire are bounded by another existing fire event." This implies that all the pinch points are exposed to fixed ignition sources or that SNC did not place transients fires at pinch points.

Please summarize how transient locations were selected, and how this process is consistent with the process of locating transients under pinch points as described in NUREG/CR-6850 (Reference 9). Note that an inaccessible area is not the same as a location where fire is simply unlikely, even if highly improbable. Please include a discussion of placement of transient fires in the control room as commented on by the peer review team in F&O FSS-B2-01.

Hot work should also be assumed to occur in locations where hot work is a possibility, even if improbable (but not impossible), keeping in mind the same philosophy. Please summarize how hot work fires are located and a frequency assigned.

18. FSS-A5-02 noted that the sum of the ignition frequencies in some physical area units (PAUs) appeared to differ from that expected after dividing up the frequencies in Task 6. The resolution indicated this was addressed by resolving FSS-A1-01 for fixed and FSS-A5-01 for transient ignition sources. Does the sum of the ignition frequencies now match that expected from dividing up the frequencies in Task 6?
19. FSS-C4-01 included observations related to credit for suppression activities and severity factors. SNC's response stated that SNC's method is consistent with a method that industry had reviewed (the unreviewed analysis method). Please describe the method used. If the method has not been accepted by the NRC, please provide a sensitivity study replacing the unacceptable method with the acceptable method indicating how great an impact this assumption has on the number of SSCs that would have been assigned low safety significant (LSS) but would now be HSS. This should include the standard categorization sensitivity studies (e.g., CCF and HEP evaluations) to the extent that the results of those sensitivity studies could also change.
20. FSS-C7-01. The peer review team identified missing dependencies between suppression activities in the multi compartment analyses and the hot gas layer scenarios. The response confirmed that some dependencies were not included, but also stated these were only found (and corrected) in the multi compartment analyses. What was the resolution of the peer review findings related to the hot gas layer scenarios?
21. FSS-D4-01. The peer review team stated, in part, that "...the heat release rate for transient fires in a number of [Physical Analysis Units] PAUs is assumed to be 69kW [kilowatts], which appears to be developed from an unreviewed analysis method (no specific reference to reviewed industry documents for this value is provided)." SNC's response justified the assumption by stating that "The overall treatment was consistent with the latest industry guidance as developed by an [Electric Power Research Institute] EPRI sponsored review effort and distributed to industry." The SNC response does not specifically identify the method (was it an unreviewed analysis method (UAM) nor state whether it was previously approved by the NRC staff, so the staff presumes that it was not previously approved. Please provide a sensitivity study that replaces the non-accepted method with a method that has previously been reviewed and approved by the NRC staff, indicating how great an impact this assumption has on the number of SSCs that would change from a low safety significant (LSS) category to a high safety significant category due to this change. This should include the standard categorization sensitivity studies (e.g., CCF and HEP evaluations) to the extent that the results of those sensitivity studies could also change.
22. FSS-E3-01, UNC-A2-01, UNC-A2-02. The peer review team noted that parameter uncertainty was not propagated through the fire PRA. SNC responded that all parameters that can be propagated with SNC tools have been propagated, and that

conservative assumptions yielded conservative results so uncertainty analyses are not needed. Neither justification addresses the potential effects of uncertainty on the final safety-significance categories for SSCs and therefore are not sufficient to justify the use of CC I instead of CC II. Please meet the SR at CC II or justify the use of CC I for the categorization process.

23. FSS-G4-01. The peer review found no justification for crediting non-rated or active barriers. SNC's response simply stated that additional assessment was performed. What credit was taken for non-rated and active barriers and how was that credit developed?
24. FQ-B1-04. The peer review team noted that the probabilities of consequently failed basic events were set to 1.0 instead of set to logical TRUE. SNC's response concluded that the difference had only a minor impact on total core damage frequency (CDF)/large early release frequency (LERF). Please evaluate the potential for this simplification to affect the importance measures and therefore the safety significance of SSCs.
25. UNC-A2-01 noted that ignition frequencies from Section 10 of NUREG/CR-6850 were used. Supplement 1 states that a sensitivity analysis should be performed when using the fire ignition frequencies in the Supplement instead of the fire ignition frequencies provided in Table 6-1 of NUREG/CR-6850. Provide the sensitivity analysis of the impact on using the Supplement 1 frequencies instead of the Table 6-1 frequencies on the importance measures and therefore the safety significance of SSCs for all of those bins that are characterized by an alpha that is less than or equal to one.
26. It was recently stated at the industry fire forum that the Phenomena Identification and Ranking Table Panel being conducted for the circuit failure tests from the DESIREE-FIRE and CAROL-FIRE tests may be eliminating the credit for Control Power Transformers (CPTs) (about a factor 2 reduction) currently allowed by Tables 10-1 and 10-3 of NUREG/CR-6850, Vol. 2, as being invalid when estimating circuit failure probabilities. Please perform a sensitivity study to quantify the impact of CPT credit on SSC categorization.
27. Please identify and provide technical justification for any fire PRA methodology that has not been formally accepted by the NRC staff. The NRC staff has formally accepted methods during resolution of UAMs as well as NUREG/CR-6850 (as supplemented) or the National Fire Protection Association Standard 805, "Performance Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," frequently asked question guidance. Please evaluate the significance of the use of any method not yet accepted by the NRC Staff on the categorization process. If a position on a method has been established by the NRC, please confirm that the accepted version of the method is used per the NRC position and, if not, then provide a revised analysis and results using an accepted approach.

References:

- 1 Letter, M.J. Ajluni, SNC, to NRC, August 17, 2011, "Pilot 10 CFR 50.69 License Amendment Request Draft Risk-Informed Categorization Procedures," SNC Letter NL-11-1451, ML112300122.
2. NEI 00-02, "Probabilistic Risk Assessment (PRA) Peer Review Process Guidance," Nuclear Energy Institute, 2000.
3. Letter M. J. Ajluni, SNC, to NRC, "Vogtle Electric Generating Plant Pilot 10 CFR 50.69 License Amendment Request," August 31, 2012, SNC letter no. NL-12-0932, ML12248A035.
4. ASME RA-Sc-2007, "ASME RA-S-2002 Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications", Addenda to ASME RA-S2002, ASME, New York, NY, August 31,2007.
5. Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities", Revision 1, US Nuclear Regulatory Commission, January 2007.
- 6 ASME/ANS RA-Sa-2009, "Standard for Level1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications", Addendum A to RA-S-2008, ASME, New York, NY, American Nuclear Society, La Grange Park, Illinois, February 2009.
- 7 WCAP-16308-NP-A, Revision 0, "Pressurized Water Reactor Owners Group 10 CFR 50.69 Pilot Program -Categorization Process -Wolf Creek Generating Station," August 2009 (PA-SEE-0027)" [ML092430185 and ML092430186].
- 8 NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0, Nuclear EnergyInstitute, July 2005.
9. NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities", US Nuclear Regulatory Commission, September 2005.

April 17, 2013

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
Post Office Box 1295, Bin - 038
Birmingham, AL 35201-1295

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 – REQUEST FOR
ADDITIONAL INFORMATION (TAC NOS. ME9472, ME9473)

Dear Mr. Pierce:

By letter dated August 31, 2012 (Agencywide Documents Access and Management System Accession No. ML12248A035), Southern Nuclear Operating Company, Inc. (SNC or the licensee), submitted a license amendment request to revise the VEGP licensing basis to implement 10 CFR 50.69, risk-informed categorization and treatment of structures, system, and components. The Nuclear Regulatory Commission staff finds that additional information is needed as set forth in the Enclosure.

Please provide the additional information within thirty (30) days of the date of this letter.

Sincerely,

/RA/

Robert E. Martin, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

cc: Distribution via Listserv

DISTRIBUTION:

PUBLIC	LPL2-1R/F	SDinsmore, NRR
RidsAcraAcnw_MailCTR Resource	RidsNrrDorIDpr Resource	
RidsNrrLASFiguroa Resource	RidsNrrDorLpl2-1 Resource	
RidsNrrPMVogtle Resource	RidsRgn2MailCenter Resource	

ADAMS Accession No.: ML13102A233

***By memo dated April 9, 2013**

OFFICE	DORL/LPL2-1/PM	DORL/LPL2-1/LA	DRA/APLA/BC	DORL/LPL2-1/BC	DORL/LPL2-1/PM
NAME	RMartin	SFiguroa	HHamzehee*	RPascarelli	RMartin
DATE	04/15/13	04/15/13	04/09/13	04/17/13	04/17/13

OFFICIAL RECORD COPY