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SOUTHERN COMPANY

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NL-14-1016

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant, Units 1 and 2
Response to Request for Additional Information on Plant Vogtle License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines"

References:

1. Southern Nuclear Operating Company letter, NL-12-1344, dated September 13, 2012, *License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical Specifications (RMTS) Guidelines"*

2. NEI 06-09-A, *Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical Specifications (RMTS) Guidelines*, November, 2006

3. NRC Letter dated May 16, 2013, *Vogtle Electric Generating Plant, Units 1 and 2 (VEGP) Request for Additional Information,* (TAC Nos. ME9555 and ME9556)

4. Southern Nuclear Operating Company letter, NL-13-1540, dated August 2, 2013, *Vogtle Electric Generating Plant Response to Request for Additional Information on Plant Vogtle License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical Specifications (RMTS) Guidelines"*

5. NRC Letter dated June 9, 2014, *Vogtle Electric Generating Plant, Units 1 and 2, Request for Additional Information* (TAC Nos. ME9555 and ME9556)

6. NRC Letter dated June 25, 2014, *Vogtle Electric Generating Plant, Units 1 and 2 – Corrected - Request for Additional Information,* (TAC Nos. ME9555 and ME 9556)

Ladies and Gentlemen,

By Reference 1, Southern Nuclear Operating Company (SNC) submitted a license amendment request for the Vogtle Electric Generating Plant (VEGP) Technical Specifications (TS) to permit the use of the Risk Managed Technical Specifications per Reference 2.

Per Reference 3, the NRC requested additional information (RAI) to facilitate their review. SNC provided a response to that request by Reference 4.

On April 15 and 16, 2014, the NRC visited the SNC offices in Birmingham to perform an audit of the SNC VEGP license amendment request as presented in References 1 and 4. From that audit, additional questions were generated, some of which required follow-up beyond the audit meeting. Accordingly, the NRC addressed those questions in a request for additional information per Reference 5, as amended by Reference 6. Enclosure 1 to this letter contains SNC's responses to the NRC questions, which are transcribed prior to each SNC response. Enclosure 2 and Enclosure 3 provide additional information for specific responses, as documented in Enclosure 1.

Furthermore, SNC proposes to revise the TS mark-up submitted as part of the Reference 1 letter. The changes to the Reference 1 letter are described in Enclosure 1 of this letter as well as in the response to the first NRC RAI provided by Reference 4. Upon staff agreement with the proposed changes, SNC will promptly provide the updated package to the NRC.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at 205-992-7369.

Mr. C.R. Pierce states he is Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

C. R. Pierce

C. R. Pierce
Regulatory Affairs Director

CRP/OCV

Sworn to me and subscribed before me this 17th *day of* July*, 2014*

Notary Public

My commission expires: 1/2/2018

Enclosures:
1. Response to Nuclear Regulatory Commission Questions
2. Comparison of Regulatory Guide (RG) 1.200 Revisions 1 and 2
3. Mark-Up of Technical Specifications (TS) Limiting Condition of Operation (LCO) 3.7.9

cc: Southern Nuclear Operating Company
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U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. R. E. Martin, NRR Senior Project Manager – Vogtle 1 & 2
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Vogtle Electric Generating Plant Response to Request for Additional Information on Plant Vogtle License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical Specifications (RMTS) Guidelines"

Enclosure 1

Response to Nuclear Regulatory Commission Questions

Technical Specification Review RAIs

In the LAR, SNC has requested changes that are considered a deviation from what was approved by the NRC staff in Technical Specification Task Force (TSTF) Traveler TSTF-505. Specifically, the deviations are:

- TS Limiting Condition for Operation (LCO) 3.5.5, "Seal Injection Flow," Condition A,
- TS LCO 3.7.3, "Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Regulation valves (MFRVs) and Associated Bypass Valves," Conditions A, B, C, and D, and,
- TS LCO 3.8.3, "Diesel Fuel Oil, Lube Oil, Starting Oil, and Ventilation," Condition A.

NRC Technical Specification Review Question #1

Provide a technical basis for NRC staff review for the requested change to TS LCO 3.5.5, "Seal Injection Flow," Condition A or remove the requested change from the LAR.

NRC Technical Specification Review Question #2

Provide a technical basis for NRC staff review for the requested change to TS LCO 3.7.3, "Main Feedwater Isolation Valves (MFIVs) and Main Feedwater Regulation Valves (MFRVs) and Associated Bypass Valves," Conditions A, B, C, and D or remove the requested changes from the LAR.

NRC Technical Specification Review Question #3

Provide a technical basis for NRC Staff review for the requested change to TS LCO 3.8.3, "Diesel Fuel Oil, Lube Oil, Starting Air, and Ventilation," Condition A or remove the requested changes from the LAR.

SNC Response to Technical Specifications Review Questions #1, #2, and #3

LCOs 3.5.5, 3.7.3 and 3.8.3 will be removed from the SNC VEGP Risk Informed Completion Time Program. The LAR will be revised to reflect these changes.

NRC Technical Specification Review Question #4

An oversight occurred during the NRC review of TSTF-505, Revision 1 and the "-A" was omitted from the reference to NEI 06-09, Revision 0, in the Risk Informed Completion Time Program in proposed TS Section 5.5.22. Please provided a revised TS 5.5.22, with the reference as follows: Nuclear Energy Institute, NEI 06-09, "Risk Informed Technical Specifications Initiative 4b: Risk Managed Technical Specification (RMTS)," Revision 0-A, October 2012.

SNC Response to Technical Specification Review Question #4

A revision to the LAR will be submitted to add the "-A" to the NEI 06-09 reference in the proposed addition to TS Section 5.5.22, "Risk Informed Completion Time Program."

NRC Technical Specification Review Question #5

An oversight occurred during the NRC review of TSTF-505, Revision 1, and a specific scenario was not satisfactorily addressed. SNC is requested to address the following scenario.

For this scenario, the TS system is comprised of train A and train B and performs two associated Probabilistic Risk Assessment (PRA) success criteria, called PRA function 1 and PRA function 2.

In an emergent condition, with both TS system train A and train B TS inoperable and the associated PRA success criteria considered PRA functional with train A able to perform PRA function 1 and train B able to perform function 2 (i.e., neither train by itself can perform PRA functions 1 and 2 but both trains together maintain PRA functionality), the NEI 06-09 guidelines will allow a risk informed completion time to be entered in this scenario, however there is no way to repair either train A or train B without losing PRA functionality. In this scenario, NEI 06-09 allows delaying a plant shutdown up to 30 days, depending on the system's risk significance, to repair the necessary system. This scenario was overlooked during the NRC staff's review of TSTF-505, and although the NRC staff approved NEI 06-09 and TSTF-505 it was not our intention to allow delaying plant shutdown in this type of scenario.

Please provide changes to the proposed "Risk Informed Completion Time Program," in VEGP TS 5.5.22, which prevents entry into a risk informed completion time for this specific scenario.

SNC Response to Technical Specification Review Question #5

Section 5.5.22.f will be added to prevent a RICT entry, or to exit a RICT entry already made, for the condition stated in the above question. It will state the following:

> *"A RICT entry is not permitted, or a RICT entry made shall be exited, for any condition involving a TS Loss of Function if a PRA Functionality determination that reflects the plant configuration concludes that the LCO cannot be restored without placing the TS inoperable trains in an alignment which results in a loss of functional level PRA success criteria."*

Probabilistic Risk Assessment Review RAIs

NRC Probabilistic Risk Assessment Review Question #1, Internal Events PRA Peer Review

In Enclosure 2 of the LAR (page E2-4), it is stated that, "In May 2009, the VEGP PRA internal events model Revision 4 (including internal flooding) was reviewed against the requirements of the 2007 version of the PRA standard ... as amended by RG [Regulatory Guide] 1.200, Revision 1 ...."

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.

SNC Response to Probabilistic Assessment Review Question #1

The VEGP PRA peer review conducted in May 2009 was performed using the process defined in Nuclear Energy Institute (NEI) 05-04 and it was a full-scope peer review. NEI 05-04 guidance supplants NEI 00-02 guidance for conducting a peer review. Although there is no technical impact, SNC provides the following clarification.

The VEGP License Amendment Request (LAR) made a reference to the American Society of Mechanical Engineers (ASME) RA-Sc-2007, which is not technically correct because the May 2009 peer review report references RA-Sb-2005. Both RA-Sb-2005 and RA-Sc-2007 are Addenda to ASME PRA Standard RA-S-2002. Addendum c of RA-S-2002 made only relatively minor changes to Addendum b, and these changes do not have any technical impact on the capability of the PRA. The main changes of interest between these two addenda are in Section 5 (Configuration Control), particularly sections 5.5 (Pending Changes) and 5.6 (Previous PRA Applications). In the RA-Sc-2007 addenda, additional verbiage was incorporated to provide further clarifications to a user in these two sections. Hence, the changes made in these two sections were clarification type changes. The RA-Sc-2007 addenda also added non-mandatory Appendix A to provide examples of PRA Maintenance, PRA Upgrade, and the Advisability of Peer Review, and made editorial corrections to several references in Section 4.

In February 2009, the ASME and the American Nuclear Society (ANS) approved the new, combined PRA Standard (ASME/ANS RA-Sa-2009, "Addendum to ASME/ANS RA-S-2008 - Standard for Level1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," the American Society of Mechanical Engineers and the American Nuclear Society, February, 2009). The NRC endorsed this new standard in Revision 2 of RG 1.200, which was issued in March 2009. The new standard was not generally available in time to support the VEGP peer review, so the peer review was performed against the version of the ASME PRA Standard (RA-Sb-2005) that was used in the PWR Owners Group peer reviews of internal events at power PRAs up to that point. Table E2.3 in Enclosure 2 of the VEGP LAR compares the 2007 version (RA-Sc-2007) against the 2009 version (RA-Sa-2009). Table E2.3 has been revised to make it consistent with Section 3.3 of NEI 05-04 "Process for Performing Internal Events PRA Peer Reviews Using the ASME/ANS PRA Standard," Revision 3, November 2009. The revised Table E2.3 is enclosed as Enclosure 2 to this letter. The peer review concludes that the VEGP model satisfies the guidance of RG 1.200, Revision 2. The most significant change in the PRA Standard between RA-S-2002 (and addenda) and RA-S-2008 (and addenda) was the addition of requirements for PRAs for other than internal events at power. That is, the requirements for internal events at power PRAs in RA-Sb-2009 are substantially the same as those in RA-Sb-2005 (and RA-Sc-2007).

Summary of May 2009 Peer Review:

The scope of the peer review conducted in May 2009 was a full scope PRA peer review of the VEGP internal events at power PRA to determine compliance with ASME PRA Standard (RA-Sb-2005, "Addenda to ASME RA-S-2002 Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," American Society of Mechanical Engineers, New York, NY, December 2005) and RG 1.200, Revision 1. This peer review was performed using the process defined in Nuclear Energy Institute (NEI) 05-04, "Process for Performing Follow-on PRA Peer Reviews Using the ASME PRA Standard." NEI 05-04, Revision 1 has been endorsed by Revision 1 and Revision 2 of RG 1.200. Note that, although the title of NEI 05-04 includes the phrase "Follow-on," this document provides a process appropriate for both full and partial peer reviews of internal events at power PRAs against the requirements in the PRA Standard and RG 1.200.

The peer review was conducted during the week of May 4 through May 8, 2009. It covered all nine technical elements from the ASME PRA Standard plus the configuration control element. The model that was reviewed was the "VEGP Level 1 and Level 2 PRA Model Revision 4 - at power, internal events."

The peer review team consisted of six reviewers having a full range of experience required to perform the peer review. Each reviewer was assigned a lead role for a review element. The lead reviewer was assisted by two reviewers acting in a support role. The documents were supplied in advance to the peer review team members. During the week of May 4 through May 8, 2009, the peer review team was onsite, performed the review, and provided preliminary results on May 8, 2009. A final report was issued on November 10, 2009. The following table summarizes the results of the peer review.

Table 4-1
Summary of Capability Category Assessment by PRA Element

SR	Capability Category								
	Not Met	Met	CC-I	CC-II	CC-III	CC-I/II	CC-II/III	N/A	TOTAL
Initiating Event (IE) Total		21	0	5	0	5	0	2	33
Accident Sequence Analysis (AS) Total		17	0	1	2	0	0	1	21
Success Criteria (SC) Total		10	0	1	0	0	3	0	14
Systems Analysis (SY) Total		32	0	2	0	2	3	3	42
Human Reliability (HR) Total	1	19	0	5	1	2	6	1	35
Data Analysis (DA) Total		17	0	5	2	2	4	4	34
Internal Flooding (IF) Total		39	0	2	1	3	2	3	50
Quantification (QU) Total	1	28	0	2	1	0	2	1	35
Large Early Release Frequency (LE) Total	1	17	0	15	0	0	4	5	42
Maintenance & Update/Configuration Control (MU) Total		10	0	0	0	0	0	0	10
GRAND TOTALS	3	210	0	38	7	14	24	20	316

NRC Probabilistic Assessment Review Question #2, Unreviewed Analysis Methods (UAMs)

Please identify and provide technical justification for any 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 (NFPA) 805, "Performance Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," frequently asked question (FAQ) guidance. 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 an acceptable alternative.

SNC Response to Probabilistic Assessment Review Question #2

In response to VEGP 50.69 RAI 27, SNC identified the following methods used in VEGP fire PRA that may not be consistent with those endorsed by the NRC:

- Not using 0.001 as lowest value for failure of manual suppression (using values lower than 0.001, even 0)
- Not using lower failure threshold for sensitive electronics
- Electrical cabinet heat release rate or severity factors and cabinet to cabinet fires (one method rejected, one method commented, others exist)
- The VEGP fire PRA has used alignment factor values that have not been accepted by NRC staff. Although an endorsed method has been used for alignment factor for oil pump fires, the alignment factor used by SNC for oil pump fires is slightly different than the factor accepted by the NRC staff in the NRC endorsement letter dated June 21, 2012.

SNC revised the VEGP PRA model by incorporating the following changes to remove unendorsed methods:

- 0.001 was used as the lowest value for failure of manual suppression,
- Fire modeling for sensitive electronics model was revised to be consistent with the approach in FAQ 13-004, "On Clarifications regarding Treatment of Sensitive Electronics," which was accepted on December 3, 2013 by a Letter from Hossein G. Hamzehee at NRR,
- The use of electrical cabinet heat release rate or severity factors and cabinet to cabinet fires was removed and the model was revised using the NRC approved/endorsed methods, and
- The values suggested in the NRC endorsement letter dated June 21, 2012 were used as alignment factors for oil pump fires.

SNC intends to use the revised fire PRA model that reflects the above changes to support the VEGP RICT program implementation. The PRA model used to support VEGP RICT Program will be controlled by SNC procedures to reflect the as-built, as-operated plant condition. Also, the PRA model is planned to be updated in the future as necessary for incorporating new consensus methodologies/data endorsed by the NRC.

NRC Probabilistic Assessment Review Question #3, LAR Page E2-34, F&O FSS-G4-01

Please discuss the method for assigning barrier failure probabilities of different types. If it does not follow NUREG/CR-6850, please provide the basis for it. If NUREG/CR-6850, Section 11.5.4, Table 11-3 fire barrier type failure probabilities are used, is the sum of the barrier failure probabilities used in the Fire PRA? If not, please explain how the Fire PRA will be updated to account for barriers that require summing these barrier type probabilities.

SNC Response to Probabilistic Assessment Review Question #3

In the VEGP Fire PRA, an applied barrier failure probability is based on the sum of the failure probability of each barrier element.

Reference: Appendix C of "A.W. Vogtle Electric Generating Plant Units 1 and 2 Fire Probabilistic Risk Assessment Fire Scenario Selection Report," August, 2012.

NRC Probabilistic Assessment Review Question #4, Fire Ignition Frequencies

For purposes of 4b, the Fire PRA should be updated with an NRC-accepted updated fire ignition frequency database. As such please propose an implementation item to update the Fire PRA with NRC-accepted updated fire ignition frequencies and to compare the new total baseline CDF and LERF to the RG 1.174 acceptance criteria.

Please explain the process that will be used to stay within the risk acceptance criteria in RG 1.174 when future changes or PRA updates, such as the fire ignition frequency update, may result in exceeding those risk guidelines (e.g., baseline risk acceptance criteria of 1E-4/yr (CDF) or 1E-5/yr (LERF), etc.).

SNC Response to Probabilistic Assessment Review Question #4

SNC will update the Fire PRA with NRC-accepted updated fire ignition frequencies when available and to compare the new baseline CDF and LERF from quantified sources to the RG 1.174 acceptance criteria.

The PRA update process will be controlled by SNC procedures that include maintaining the total CDF and LERF mean values from all quantified sources documented in the September 13, 2012 LAR, including impact of changes to fire ignition frequency updates, within the RG 1.174 bounds of 1E-04/yr (CDF) or 1E-05/yr (LERF).

NRC Probabilistic Assessment Review Question #5, PRA Functional: Safety Margins

The LAR states in the "Significant Hazards Considerations" section: "The proposed change permits the extension of Completion Times provided risk is assessed and managed within the

Risk Informed Completion Time Program. The proposed change implements a risk-informed configuration management program to assure that adequate margins of safety are maintained."

A TS operability determination is made before a PRA functionality determination. A structure, system, and component (SSC) which is inoperable may be found to be outside limits in the TS or applicable code performance parameter(s), according to Inspection Manual Part 9900 (now Inspection Manual Chapter 0326, Reference 16); therefore, a PRA functional SSC may have parameter(s) outside certain limits. As such the RICT program must assure that safety margins are maintained for a PRA functional condition.

Safety margins assessment includes an assessment of assumptions or inputs to a safety analysis as discussed in RG 1.177:

> Safety analysis acceptance criteria in the Final Safety Analysis Report (FSAR) are met or proposed revisions provide sufficient margin to account for analysis and data uncertainties (e.g., the proposed TS CT [Completion Time] or SF [Surveillance Frequency] change does not adversely affect any assumptions or inputs to the safety analysis, or, if such inputs are affected, justification is provided to ensure sufficient safety margin will continue to exist). For TS CT changes, an assessment should be made of the effect on the FSAR acceptance criteria assuming the plant is in the condition addressed by the proposed CT (i.e., the subject equipment is inoperable) and there are no additional failures. Such an assessment should result in the identification of all situations in which entry into the condition addressed by the proposed CT could result in failure to meet an intended safety function.

Please explain if the RICT program considers these factors related to safety margin as noted above for a PRA functionality determination.

SNC Response to Probabilistic Assessment Review Question #5

The NRC SER for NEI 06-09, Section 3.2, "Evaluation," states the following regarding impact on safety margins:

> *"The proposed change maintains sufficient safety margins. The design, operation, testing methods, and acceptance criteria for SSCs, specified in applicable codes and standards (or alternatives approved for use by the NRC) will continue to be met as described in the plant licensing basis (including the final safety analysis report and bases to TS), since these are not affected by risk-informed changes to the CTs. Similarly, there is no impact to safety analysis acceptance criteria, as described in the plant licensing basis. Thus, safety margins are maintained by the proposed methodology, and the third key safety principle of RG 1.277 is satisfied."*

RG 1.174, Section 2.1.2 Safety Margin, provides the following basis for the above NRC SER on NEI 06-09 statement:

> *"...With sufficient safety margins, the following are true:*
>
> - *Codes and standards or their alternatives approved for use by the NRC are met.*

- *Safety analysis acceptance criteria in the LB (e.g., FSAR, supporting analyses) are met or proposed revisions provide sufficient margin to account for analysis and data uncertainty."*

The above conclusions of the Safety Evaluation are applicable to the VEGP RICT Program as explained below:

1) The extended CT depends on the existing plant configuration at the time the TS component becomes inoperable and throughout the time that the component remains inoperable; entry into the extended CT will not change the plant configuration.

2) Entering the extended CT via the RICT program involves no physical changes to the inoperable component or to its redundant systems and subsystems.

3) Entry into the extended CT will not alter any existing operating, testing, or abnormal operating procedures.

4) Entry into the extended CT will not alter any FSAR acceptance criteria for the Operable and Functional redundant components and will, in fact, not alter the acceptance criteria for the inoperable component although that acceptance criteria may not be met due to the component's inoperable status.

5) The Configuration Risk Management (CRM) Program will ensure that prior to entering a RICT, adequate margins of safety are maintained by ensuring that systems and subsystems redundant to the inoperable component are available, and that the PRA success criteria are met. Margins to safety are also maintained by the implementation of Risk Management Actions (RMAs), although usually no quantitative credit will be taken for the RMAs for the RICT calculation.

In summary, entry into the CT will not change the plant equipment configuration, nor will it change plant procedures, and it will not involve physical changes to plant equipment redundant to the inoperable component. Consequently, entering an extended CT does nothing to affect the existing safety margin. Furthermore, any RMAs put in place will not increase the likelihood of an initiating event or prevent the mitigation of transients or accidents because an RMA, by definition, is meant to control and/or compensate any risk increase from extending the CT when certain cumulative risk thresholds are reached.

Finally, with regard to identifying all situations in which entry into the CT could result in failure to meet an intended safety function, those situations have already been identified as "loss of function" conditions in the SNC VEGP Risk Informed TS. Each of those conditions are identified in the SNC September 13, 2012 initial submittal and the SNC RAI response of August 2, 2013. The loss of function condition, as provided for in TSTF-505, cannot be entered voluntarily.

NRC Probabilistic Assessment Review Question #6, PRA Functionality: Success Criteria

From NEI 06-09, Section 11.1, "If a component is declared inoperable due to degraded performance parameters, but the affected parameter does not and will not impact the success criteria of the PRA model, then the component may be considered PRA functional for purposes of the RICT calculation. ..."

Since NEI 06-09 states that the methodology is consistent with RG 1.174 philosophy, success criteria used for the RICT program must be consistent with maintaining safety margin and defense in depth philosophy as described in RG 1.174.

Success criteria information could be at a detailed or a high level (e.g., parameter, component, train, system, or other). The appropriate success criteria should be considered for a PRA functionality determination when evaluating the impact on success criteria of the PRA model. For example, a PRA functionality determination may need to consider more than train-level success criteria (e.g., potentially both system and train level success criteria, and possibly other success criteria information). Please explain how your RICT program ensures the appropriate success criteria are considered in a PRA functionality determination.

SNC Response to Probabilistic Assessment Review Question #6

ASME/ANS RA-Sb-2013 defines success criteria as follows*:*

> *"Success criteria: criteria for establishing the minimum number or combinations of systems or components required to operate, or minimum levels of performance per component during a specific period of time, to ensure that the safety functions are satisfied..."*

There are two parts to this definition:

- *Part 1: Criteria for establishing the minimum number or combinations of systems or components required to operate to ensure safety functions are satisfied, or*

- *Part 2: Minimum levels of performance per component during a specific period of time to ensure safety functions are satisfied.*

The system success criteria documented in the peer reviewed PRA address the two parts, as applicable, that support the VEGP RICT Program and are summarized as part of "CRM System Guidelines" for use during PRA Functionality determinations.

CRM System Guidelines document the PRA success criteria for all the VEGP TS systems included in the scope of the VEGP RICT Program. These include the following:

- Auxiliary Feedwater (AFW) system
- Containment Cooling Units (CCU) system
- Component Cooling Water (CCW) system
- Emergency Core Cooling Systems (ECCS)
- Condensate and Feedwater system
- Containment Isolation (CI) system
- Main Steam (MS) system
- Electrical systems
- Heating, Ventilation, and Cooling (HVAC) system
- Pressurizer Pressure Relief (PPR) system

For example, the Part 1 success criteria for AFW system success criteria documented in the "CRM System Guidelines" include specific information, such as the following (this information is subject to change and is only provided to illustrate the scope of detail provided in the CRM System Guidelines):

Part 1 PRA Success Criteria:

- 1 of 2 main steam lines provides steam to the turbine driven AFW pump
- 1 of 3 AFW pumps provides 570 gpm flow to 2 of 4 SGs

Part 2 PRA Success Criteria:

- AFW inlet temperature to the steam generator = 120°F
- CST initial water mass = 2.8E+6 lb

PRA Functionality determinations are performed based on the SNC procedures that refer to the CRM System Guidelines as a reference source. The results of the PRA Functionality determinations are documented as QA records and retained for the life of the plant.

NRC Probabilistic Assessment Review Question #7, SSC Performance Levels

Per 10 CFR 50.36(c)(2) *Limiting Conditions for operation.* (i) Limiting Conditions for Operations are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

Section 3 of the TSTF-505 Model Safety Evaluation (SE) states:

> The RICT program provides the necessary administrative controls to permit extension of CTs and thereby delay reactor shutdown or remedial actions, if risk is assessed and managed within specified limits and programmatic requirements. The specified safety function or performance levels of TS required SSCs are unchanged, and the remedial actions, including the requirement to shut down the reactor, are also unchanged; only the CTs for the Required Actions are extended by the RICT Program.

Please discuss how your RICT program addresses how required SSCs performance levels are unchanged.

SNC Response to Probabilistic Assessment Review Question #7

The VEGP RICT program is consistent with the NRC-approved guidance of NEI 06-09. It does not alter the system or train Operability requirements with respect to the number of systems and trains required to be Operable. Neither does it change the stated TS performance criteria, such as flow rates, response times, stroke times, setpoints, etc. The RICT program only serves to provide a risk-informed CT based on the specific plant configuration and the CDF and LERF metrics. Furthermore, the RICT program does not change the LCO Conditions, the Required Actions, or the default Conditions should the CT be exceeded. Finally, the RICT program will include a performance monitoring program, per the requirements of RG 1.174. This program is used to ensure that use of the RICT program, for a specific SSC, does not degrade the performance of that SSC over time. The VEGP Performance Monitoring Program is described in detail in the September 13, 2012 LAR, Enclosure 9 (Reference 1).

NRC Probabilistic Assessment Review Question #8, PRA Functionality: Reliability

Section 3 of the TSTF-505 Model SE states: "The proposed RICT Program uses plant-specific operating experience for component reliability and availability data. Thus the allowances permitted by the RICT Program are directly reflective of actual component performance in conjunction with component risk significance."

In some instances a PRA functional SSC would be assigned its nominal unreliability in the PRA model for a RICT calculation. Depending on the specific situation and the degradation mechanism for the PRA functional SSC, the nominal reliability model may not be applicable. Please address the following:

a. Explain how the RICT calculation would be performed, considering PRA functionality, if an evaluation determined that the SSC's reliability may be less than nominal (e.g., an increase in the failure rate over the PRA mission time). Would it be considered as non-functional for the RICT calculation (i.e., not taking credit for PRA functionality in the RICT)?

b. If it was determined to use a nominal reliability for a PRA functional SSC, would the potential for uncertainty in the reliability be considered in the RICT program? For example, does the RICT program include performing a sensitivity analysis to identify additional Risk Management Actions (RMAs) for defense in depth?

SNC Response to Probabilistic Assessment Review Question #8

In cases where SSC degradation is the cause of inoperabilities, PRA Functionality determinations are performed (consistent with the following NEI 06-09 guidance):

> *"The PRA function may be considered in cases that involve SSC inoperabilities which, while degraded, do not involve a potential for further degrading component performance. In most cases, degrading SSCs may not be considered to be PRA functional while inoperable. For example, a pump which fails its surveillance test for required discharge pressure is declared inoperable. It cannot be considered functional for calculation of a RICT, since the cause of the degradation may be unknown, further degradation may occur, and since the safety margin established by the pump's operability requirements may no longer be met. As a counter example, a valve with a degrading stroke time may be considered PRA functional if the stroke time is not relevant to the performance of the safety function of the valve; for example, if the valve is required to close and is secured in the closed position."*

As a result, the failure probability need not be increased depending on the failure mechanism causing the degraded condition. Given an inoperable condition caused by a degraded condition, the VEGP RICT Program allows only two choices to be made in the CRM Tool:

- Either a "PRA non-functional" or "PRA functional" condition to represent the TS degraded condition.
    - If the inoperability is evaluated as a "PRA non-functional" condition, CRM Tool will treat the SSC as failed, or

- If the inoperability is evaluated as a "PRA functional" condition, CRM Tool will treat the SSC with the nominal base-case failure probability.

The rationale for using the nominal reliability for a PRA functional SSC includes the determination that the base case PRA results are still applicable, the degraded condition has been demonstrated to meet the PRA success criteria, and the SSC is considered fully available. No additional uncertainty or sensitivity analysis is planned to be performed during a RICT entry, which is consistent with the expectations of NEI 06-09 and the NRC SER on NEI 06-09. A one-time RICT uncertainty analysis has been performed and discussed in detail in the September 13, 2012 LAR, Enclosure 7, "Key Assumptions and Sources of Uncertainty."

The RICT Program implements RMAs prior to exceeding the RMAT per the guidance in NEI 06-09 as means of ensuring adequate defense-in-depth. The RMAT risk thresholds embody the significance of equipment unavailability and not equipment availability. As a result, NEI 06-09 does not require additional RMAs when PRA Functionality has been demonstrated for an inoperable TS Condition.

NRC Probabilistic Assessment Review Question #9, PRA Functionality: Process

A PRA Functionality determination may include a number of steps, both non-PRA and PRA related, which can take time to complete. For example, a TS Operability determination must be made before a PRA Functionality determination, among other steps. Describe the process to support a PRA Functionality determination and whether this process can be accomplished within short LCO completion time frames, such as those associated with a loss-of-function, in order to support a quality decision on the RICT. If there is not enough time to step through the process, consider removing the RICT program from the loss-of-function LCOs.

SNC Response to Probabilistic Assessment Review Question #9

The PRA Functional evaluation is supported by a SNC procedure that references use of CRM System Guidelines that document the PRA success criteria required for making an expedited PRA Functionality determination. A CRM System Guideline document exists for each system included in the scope of the VEGP RICT Program. The PRA Functionality determinations are supported by site and corporate PRA analysts. In addition, the CRM Tool is highly automated and is capable of calculating a RICT for the inoperable condition in a relatively short time, within minutes for most cases. Use of the CRM Tool is supported by SNC procedures, and users undergo periodic continued training.

Regarding Operability determinations, it is true that they are made before PRA Functionality determinations; however, they will not cut into the front stop CT frame available to determine PRA Functionality. The Operability determination is made for the purpose of determining the state of the component; is it Operable or not? Therefore, the declaration of Inoperability will mark the beginning of the CT for the particular LCO. In other words, a determination of Operability will not be made during the LCO CT period; that period will be entered once it has been determined that the particular component is inoperable.

In the case of a loss-of-function situation, the 1-hour provided prior to beginning the transition to Mode 3 is considered sufficient if the cause is known. However, if a timely CRM calculation cannot be performed, a RICT will not be entered.

NRC Probabilistic Assessment Review Question #10, Common Cause Failure Modeling

RG 1.177 Appendix A describes an acceptable method for treating CCF for equipment out of service for preventive maintenance or for corrective maintenance. The CCF treatment discussed on page E6-7 of the LAR does not appear to be consistent with this guidance. Provide assurance that RICT calculations will follow RG 1.177 guidance for CCF for preventive and corrective maintenance, or an acceptable alternative.

SNC Response to Probabilistic Assessment Review Question #10

The SNC RICT calculations will be performed to meet the guidance provided in NEI 06-09, which is consistent with the RG 1.177 guidance. Specifically, the treatment of CCF in the CRM Tool will be as described below:

Planned Configurations:

For planned configurations the RICT calculations will be performed consistent with NEI 06-09, Section 3.3.6, "Common Cause Failure Consideration," guidance on the treatment of CCF:

> *"For all RICT assessments of planned configurations, the treatment of common cause failures in the quantitative CRM Tools may be performed by considering only the removal of the planned equipment and not adjusting common cause failure terms."*

This approach will result in slightly shorter completion times than if RICTs were calculated using the RG 1.177 approach (i.e., it is conservative), and it will prevent deviation from the NRC's approved approach of NEI 06-09.

Emergent Configurations:

For emergent configurations, the RICT Program will abide by NEI 06-09, Section 3.3.6, "Common Cause Failure Consideration," guidance on the treatment of CCF:

> *"For RICT assessments involving unplanned or emergent conditions, the potential for common cause failure is considered during the operability determination process. This assessment is more accurately described as an 'extent of condition' assessment."*
>
> *"In addition to a determination of operability on the affected component, the operator should make a judgment with regard to whether the operability of similar or redundant components might be affected."*
>
> *"The components are considered functional in the PRA unless the operability evaluation determines otherwise."*

An "extent of condition" evaluation together with an operability evaluation will provide an assessment of the vulnerability of the operable redundant components to any common cause failure potential. The RICT determination process for an emergent configuration will be consistent with the following guidance provided in the NRC SER for NEI 06-09:

> *"**Emergent Failures.** During the time when an RICT is in effect and risk is being assessed and managed, it is possible that emergent failures of SSCs may occur, and*

these must be assessed to determine the impact on the RICT. If a failed component is one of two or more redundant components in separate trains of a system, then there is potential for a common cause failure mechanism. Licensees must continue to assess the remaining redundant components to determine there is reasonable assurance of their continued operability, and this is not changed by implementation of the RMTS. If a licensee concludes that the redundant components remain operable, then these components are functional for purposes of the RICT. However, the licensee is required to consider and implement additional risk management actions (RMAs), due to the potential for increased risks from common cause failure of similar equipment. The staff interprets TR NEI 06-09, Revision 0, as requiring consideration of such RMAs whenever the redundant components are considered to remain operable, but the licensee has not completed the extent of condition evaluations..."

In keeping with the above NRC guidance, if it is determined that redundant components remain operable, these components are considered PRA functional for purpose of RICT determinations. However, SNC will consider and implement additional RMAs, due to the potential for increased risks from common cause failure of similar equipment, whenever the redundant components are considered to remain operable but an extent of condition evaluation has not yet been completed. The consideration and implementation of additional RMAs, according to the NRC SER on NEI 06-09, is considered to be consistent with the guidance of RG 1.177 regarding the treatment of increased risks from common cause failures.

In summary, the following three outcomes are expected from an "extent of condition" evaluation, and the corresponding impacts on the RICT determination process are provided below:

- <u>Outcome 1</u> – The "extent of condition" evaluation concludes that redundant equipment is unaffected by the emergent equipment failure and is considered TS Operable.
    - The CRM Tool will reflect the redundant equipment as PRA functional. However, additional RMAs are not considered since the components are PRA functional.
- <u>Outcome 2</u> – The "extent of condition" evaluation is incomplete prior to the expiration of the TS Front Stop and the redundant equipment is considered TS Operable.
    - The CRM Tool will reflect the redundant equipment as PRA functional. However, additional RMAs are considered and implemented due to the potential for increased risks from common cause failure of similar components.
- <u>Outcome 3</u> – The "extent of condition" evaluation concludes that redundant equipment is TS Inoperable because of the emergent equipment failure.
    - The CRM Tool will reflect the redundant equipment either as PRA functional or PRA non-functional
        - PRA functional: Additional RMAs are not considered since the components are considered PRA functional.
        - PRA non-functional: This condition will result in TS LOF and if the functional level PRA success criteria are not met the RICT will be exited.

<u>NRC Probabilistic Assessment Review Question #11, SSCs Not in the PRA</u>

a. In some instances SSCs may not be in the PRA model which may have an impact on CDF and LERF, and are necessary to quantify a RICT. Examples are the SSCs noted in Table E6.1 of the LAR. In such instances, how does your RICT program consider quantification of a RICT for those SSCs?

b. In other instances, SSCs may not be in the PRA model as a result of analyses showing no impact on CDF or LERF. In such instances a RICT may not be quantifiable for the SSCs. Please address the following for TS LCOs 3.6.6, and 3.6.2.

   i. TS LCO 3.6.6 Containment Spray (CS) and Cooling Systems. Table E1.1 of the LAR (page E1-8) notes that CS is not credited in the PRA for containment heat removal. It also notes that the CS system does contribute to the draw down on the RWST which impacts CDF, but inoperability of CS has no severe risk impact and is included in the scope of the RICT program. The CS system also appears to be not modeled in the PRA due to low probability. Please explain if the impact on the RWST level is incorporated into the PRA model.

   ii. TS LCO 3.6.2 Containment Air Locks. The LCO required actions apply to restoring the air lock to operable status after verifying a door is closed. According to LAR Table E1.1 (page E1-7) the containment air locks are in the PRA model. However, it is not clear if there is an impact expected on CDF. LAR Table E1.2 (page E1-20) appears to indicate there is no impact on CDF. However, according to LAR Table E1.3 (page E1-32), and "Note 2," (page E1-41), "the calculated RICT value is less than the front-stop CT, so the RICT program cannot be entered for this instance," which appears to indicate that the impact on LERF would not allow the RICT to be applied to the TS LCO. Please explain how these observations support the inclusion of this TS LCO in the RICT program.

SNC Response to Probabilistic Assessment Review Question #11

(a) The SSCs listed in the September 13, 2012 LAR, Enclosure 6, Table E6.1, "CRMP Model Changes for Additional RICT Program SSCs," are all reflected in the CRM model. The VEGP CRM Tool is able to quantify a RICT when they are removed from service. If a SSC is not in the PRA logic model but the PRA has demonstrated that it is not needed to prevent core damage or large early release, like the ESF room cooling system, the CRM Tool will be able to quantify a 30-day back stop because a zero delta CDF/delta LERF is returned by the CRM Tool when this system is out of service.

(b) (i) The CS system is designed to provide containment atmosphere cooling to limit post-accident pressure and temperature in addition to removing iodine to reduce fission product release. Therefore, its function is synonymous with ECCS, which in "PRA functionality" space is credited for prevention and mitigation of a core damage accident. As a result, CS can be included in the scope of RICT Program.

CS is not credited in PRA for containment heat removal because it has no heat exchanger for heat sink. A realistic PRA success criterion has demonstrated that the impact of CS operation more rapidly reduces the RWST level and reduces the time available for ECCS injection, which adversely impacts CDF.

Unavailability of CS is programed in the CRM Tool to cause no change in CDF when CS is out of service (OOS),which is the lowest achievable change in CDF returned by the CRM Tool when a SSC is OOS, because it has been demonstrated that an unavailable CS will result in a CDF lower than the base case CDF (i.e., delta CDF will decrease when CS is OOS unlike most other PRA modeled SSCs where the delta CDF will increase when a SSC is OOS, assuming no other plant systems modeled in the PRA are OOS).

In the VEGP PRA model, the operation of CS initiates LERF scenarios through CS lines. If CS started to operate and then later CS pumps fail to run, it will create potential LERF pathways if isolation of the CS penetrations fails. If CS does not start, the CS penetrations will remain isolated. The start of CS would in-fact increase LERF in VEGP. Therefore, unavailability of CS is programed in the CRM Tool to cause no change in LERF (lowest achievable change in LERF when a SSC is OOS) when CS is OOS, assuming no other plant systems modeled in the PRA are OOS.

Impact on the RWST level modeled in PRA

In the VEGP PRA, accelerated depletion of RWST inventory when CS is actuated is considered through the time available for operator action to switch to ECCS recirculation. CS will actuate if containment pressure reaches the CS actuation setpoint. The increase in containment pressure after a LOCA may be lessened by containment cooling units (CCUs). In the VEGP PRA, it is conservatively assumed that CS will actuate and run without failure if the CS actuation setpoint is reached.

CS would actuate in Large and Medium LOCA cases, even if a number of CCUs are running (note: MAAP runs to support VEGP large and medium LOCA PRA modeling assumed 3 of 8 CCUs are running). CS actuation may not occur if more than 3 CCUs are running (even in large or medium LOCA cases). Therefore, the available times for operator action to switch to ECCS recirculation for large and medium LOCA cases are based on the MAAP result where CS actuated when the CS actuation setpoint is reached.

For small LOCA cases, MAAP results for VEGP PRA modeling showed that CS will not actuate if 3 of 8 CCUs are running. CS will actuate if less than 3 CCUs are running, and RWST depletion is accelerated significantly when CS pumps drain water from the RWST. For example, for a 1.6 inch diameter small LOCA break, the time to the RWST level reaching 29% (or the lo-lo level setpoint) was estimated to be approximately 3 hours when CS is actuated and approximately 6 hours when CS is not actuated. The significant difference in the available time for operator action to switch to ECCS recirculation resulted in different human error probabilities for the associated operator action. Therefore, in the VEGP PRA model, for the small LOCA case, two operator error basic events are modeled to represent the two cases described above. The condition that CS is actuated in the PRA model is represented by the failure of CCUs (3 of 8 CCUs success criteria). The human error probability for the case where CS is actuated is 2.3E-3 which is much higher than the human error probability for the case where CS is not actuated, which is 2.1E-4.

(ii) As indicated in the September 13, 2012 LAR, Enclosure 1, Table E1.2, "Unit 1/Unit 2 TS RICT Estimate Based on CDF Limit," and Table E1.3, "Unit 1/Unit 2 TS RICT

Estimate Based on LERF Limit," the values shown are meant to demonstrate the effect on CDF and LERF, respectively, for each individual condition to which the RICT Program applies. The actual RICT values during program implementation will be calculated based on the actual plant configuration and the on-record version of the PRA model available. This TS Condition is included in the scope of the VEGP RICT program because it is modeled in the PRA and is included in the scope of TSTF-505. By including this TS Condition in the scope of the VEGP RICT Program, SNC is able to calculate a longer RICT for TS inoperable conditions that are considered PRA Functional.

NRC Probabilistic Assessment Review Question #12, Variable Limits

According to TSTF-505, Rev 1, Scope Item 9 the following is assumed for the Traveler:

> The Traveler will not modify Required Actions in Conditions in which variables are not within limit unless a modeled system could be used as a surrogate in calculating a RICT (e.g., using the modeled pressurizer as a surrogate for pressurizer level).

According to the LAR, the following LCOs cite variable limits:

3.5.1 Accumulators Condition A

3.5.4 Refueling Water Storage Tank Conditions A, B, and C

3.6.3 Containment Isolation Valves Condition A

3.7.6 (Unit 1) Condensate Storage Tank (CST) Condition A

3.7.6 (Unit 2) Condensate Storage Tank (CST) Condition A

The RAI response letter dated August 2, 2013, notes on page E-11 that for the Unit 1 and Unit 2 TS LCO 3.7.6, the CST itself is the surrogate. Does this mean the CST will be unavailable in the PRA model to calculate a RICT? For the other TS LCOs above, please also discuss the surrogate and its ability to be used for a RICT calculation. Also note if the surrogate provides a conservative estimate.

SNC Response to Probabilistic Assessment Review Question #12

3.5.1 Accumulators Condition A: "Accumulator Outlet Check Valve to RCS Cold Leg" is set to be failed in the CRM Tool.

- This Surrogate provides a conservative estimate by assuming loss of Accumulator in CRM Tool resulting in a conservatively shorter RICT.

- Loss of Accumulator is the worst case surrogate for this degraded condition.

3.5.4 Refueling Water Storage Tank (RWST) Condition A: "Refueling Water Storage Tank" is set to be failed in the CRM Tool.

- This Surrogate provides a conservative estimate by assuming loss of RWST in the CRM Tool resulting in a conservatively shorter RICT.
- Loss of RWST is the worst case surrogate for this degraded condition.

3.6.3 Containment Isolation Valves Conditions A, B, and C: There are approximately 34 types of containment isolation valve groups modeled in the PRA. The degraded (valve stroke time failure) valve(s) is (are) set to fail in the CRM Tool.

- The surrogate provides a conservative estimate by assuming loss of valve(s) in the CRM Tool resulting in a conservatively shorter RICT.
- Loss of valve(s) is the worst case surrogate for this degraded condition.

3.7.6 (Unit 1) Condensate Storage Tank (CST) Condition A: "CST" is set to be failed in the CRM Tool.

- The surrogate provides a conservative estimate by assuming loss of CST in the CRM Tool resulting in a conservatively shorter RICT.
- Loss of CST is the worst case surrogate for this degraded condition.

3.7.6 (Unit 2) Condensate Storage Tank (CST) Condition A: "CST" is set to be failed in the CRM Tool.

- The surrogate provides a conservative estimate by assuming loss of CST in the CRM Tool resulting in a conservatively shorter RICT.
- Loss of CST is the worst case surrogate for this degraded condition.

NRC Probabilistic Assessment Review Question #13, Programmatic: Success Criteria Differs from Design Basis

The LAR, Enclosure 1, was provided to address the following submittal guidance:

"The comparison should justify that the scope of the PRA model, including applicable success criteria such as number of SSCs required, flow rate, etc., are consistent [with the] licensing basis assumptions (i.e., 50.46 ECCS flow rates) for each of the TS requirements, or an appropriate disposition or programmatic restriction will be provided."

Enclosure 1 identified LCOs with differences between the design basis and the PRA success criteria. For such LCOs, please address the following:

a. In a number of instances, the disposition in Table E1.1 justifies such differences as PRA success criteria representing "more realistic success criteria." Since the PRA success criteria differ in some instances from design basis success criteria, please confirm that the PRA success criteria is up-to-date, clearly and fully documented for the "4b" application to the level of detail necessary for the RICT program, and appropriate review processes are being implemented for the supporting calculations.

b. Discuss any applicable programmatic restrictions.

SNC Response to Probabilistic Assessment Review Question #13

(a) Success criteria are documented as part of the PRA documentation and included in the scope of the WOG Peer Review. PRA success criteria for each system included in the scope of the RICT Program are further documented in the "CRM System Guidelines" including flow rates, where applicable, for ease of use during PRA Functionality evaluations when a RICT is entered.

The PRA success criteria are documented in a SNC calculation, which is governed by SNC Calculation procedures. The success criteria calculations are living documents and are maintained to reflect the as-built, as-operated plant condition. SNC calculations are performed by qualified individuals and include a preparer, a reviewer, and an approver.

(b) Table E1.1 of the September 13, 2012 LAR documents the TS LCO Conditions included in the scope of the VEGP RICT Program for a comparison between the design basis and PRA success criteria. It also documents in the "Disposition Column" of Table E1.1 a satisfactory disposition where a difference was identified. Since all differences, as documented in Table E1.1, were satisfactorily resolved, no programmatic restrictions were necessary.

NRC Probabilistic Assessment Review Question #14, RMAs for Infrequently Tested SSCs

Some SSCs or SSC function(s) in the PRA model may have relatively long times between surveillances or tests. Some SSCs or SSC function(s) may be under the TSTF-425 program for surveillance test intervals which have a monitoring program requirement. For such SSCs or SSC function(s) would a check of the results of the standby SSC's monitoring program be made prior to establishing a RICT, or would defense in depth RMAs related to the SSC be a consideration, depending on the SSC and standby time between surveillances or tests, for a RICT?

SNC Response to Probabilistic Assessment Review Question #14

VEGP has implemented the Surveillance Frequency Control Program (SFCP) under TSTF-425. However, with or without the SFCP, the time between surveillances for a particular SSC, or group of SSCs, would not be a consideration when entering a RICT. This is not a requirement of the Standard Technical Specifications (STS) or of NEI 06-09.

Under the current STS, a check of surveillances, or performance of surveillances on SSCs, which may be, for example, redundant to the inoperable component, is not normally performed upon entering a TS Action statement. Neither is a check of the monitoring program for SSCs under the SFCP.

However, there are times when a LCO Action explicitly requires performance of a surveillance on another component. For example, LCO 3.8.1 Action B.1 of the VEGP STS requires performing breaker alignments for the offsite circuits per SR 3.8.1.1 when a diesel generator is discovered inoperable. In such a case, the SR would be performed regardless of whether the intent was to enter a RICT or to remain within the front stop.

Per SR 3.0.1, SRs must be met during the Modes or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the LCO. The SRs must be performed at the required TS frequency in accordance with the controlling programs. Requiring that an SR be met does not necessarily suggest that it must be performed; this holds true when entering Action statements (i.e., there is no requirement to perform SRs on SSCs that are redundant to the inoperable component unless explicitly directed by the TS RAS).

The above, notwithstanding the Bases to SR 3.0.1, states:

> *"Systems and Components are assumed to be OPERABLE when the associated SRs have been met. Nothing in this Specification, however, is to be construed as implying that systems or components are OPERABLE when:*
>
> *a. The systems or components are known to be inoperable, although still meeting the SRs; or,*
>
> *b. The requirements of the Surveillance(s) are known not to be met between required Surveillance performances."*

Accordingly, when entering an Action within its front stop, or if the intent is to use an extended CT, if either a. or b. above is the case for a redundant component (or for a support or supported system), that component should be declared inoperable and a determination for a possible loss of safety function should commence. With respect to RMAs, they may be implemented during RICTs to perform surveillances or other activities to reduce risk. However, putting RMAs in place to perform SRs only because a particular SR has a long frequency (or has not been performed for a long period of time) will not necessarily be done.

The following examples are surveillance-type activities that may be implemented as RMAs to decrease risk:

1) During a diesel generator outage, the condition of the offsite power supply, the switchyard, and the grid may be evaluated prior to entering a RICT.

2) During a safety-related battery RICT, the remaining battery capacity may be evaluated and its ability to perform its safety function protected. Additionally, the battery float voltage on the remaining batteries may be verified on a periodic basis to ensure it is over the minimum required float voltage.

<u>NRC Probabilistic Assessment Review Question #15, RMAs</u>

The EPRI Equipment Out of Service (EOOS) Tool provides insights such as the important equipment available during the RICT to help in identifying RMAs. However, other insights (e.g., important fire areas) may also be checked for potential RMAs. Please describe how your RICT program guidance considers insights, other than the EOOS tool-generated list of equipment to identify RMAs.

SNC Response to Probabilistic Assessment Review Question #15

Some maintenance activities could involve increased fire risk (performing hot work, for example). These activities are coordinated with other activities that may remove equipment from service considered important for mitigation of core damage risk. These activities require coordination between the 10 CFR 50.65(a)(4) risk assessors and individuals scheduling activities on fire protection equipment to determine if RMAs are appropriate, or if any of the work should be re-scheduled. Hot work in the 'A' ECCS room while simultaneously removing a 'B' ECCS pump from service, is an example of the type of situation requiring communication and coordination between the risk assessors in Work Controls and fire protection personnel.

Other types of RMAs include the following:

- Shift briefs
- Protecting equipment
- Minimizing activities that could cause a plant transient
- Establishing alternate plant alignments
- Staging temporary equipment

General guidance for RMA protected equipment development includes the following considerations:

- Protect the remaining train of a two train system including its power supplies and initiation/control logic.
- Protect equipment identified through a review of CRM Tool "Remain in Service" list as important to the specific plant configuration.
- Consider protecting other systems that perform the same function.
- Consider placing standby equipment in service.
- If available, stage temporary equipment, such as B.5.b equipment, and perform a shift brief on its use.

Examples of measures that are established for SSCs in TSs are provided below:

- Measures that may be established during a diesel generator (DG) RICT, so that the increased risk is reduced and to ensure adequate defense in depth, are:
    - The condition of the offsite power supply, the switchyard, and the grid is evaluated prior to entering a RICT, and RMAs are implemented; particularly during times of high grid stress conditions, such as during high demand conditions;
    - Deferral of switchyard maintenance, such as deferral of discretionary maintenance on the main, auxiliary, or startup transformers associated with the unit;
    - Deferral of maintenance that affects the reliability of the trains associated with the operable DGs;

- o Deferral of planned maintenance activities on station blackout mitigating systems, and treating those systems as protected equipment;
- o Contacting the dispatcher on a periodic basis to provide information on the DG status and the power needs of the facility.

- Measures that could be considered during the extended period that a safety related battery is inoperable for elective maintenance, so that the increased risk is reduced and to ensure adequate defense in depth, are:
  - o Consider limiting the immediate discharge of the affected battery, if possible;
  - o Consider recharging the affected battery to float voltage conditions using a spare battery charger;
  - o Evaluate the remaining battery capacity and protect its ability to perform its safety function;
  - o Periodically verify battery float voltage is equal to or greater than the minimum required float voltage for remaining batteries.

NRC Probabilistic Assessment Review Question #16, Risk Management Action Times (RMATs)

NEI 06-09 guidance notes that if an emergent condition occurs such that a RMAT is exceeded that RMAs shall be identified and implemented. Discuss how your RICT program addresses the unlikely scenario of exceeding 1E-3/yr (CDF) and 1E-4/yr (LERF) as a result of an emergent condition, how the reduction in risk will be known given that NEI 06-09 does not require RMAs to be quantified, and the immediate steps your RICT program would perform if such an event were to occur.

SNC Response to Probabilistic Assessment Review Question #16

The 1E-3/yr (CDF) and 1E-4/yr (LERF) are instantaneous limits that are monitored when a RICT is in place, and an emergent condition causes the instantaneous CDF/LERF limits to be breached. The total RICT calculated prior to a RICT entry is significantly reduced when this limit is breached. When an emergent condition exceeds1E-3/yr (CDF) and 1E-4/yr (LERF), the ICDP/ILERP will begin to accumulate at a significantly faster rate (steeper slope), the originally calculated RICT will be reduced considerably, and exit from the RICT will be realized sooner than originally anticipated if some of the OOS equipment is not returned to service (RTS). In other words, the remnant of the originally calculated RICT could be significantly shorter when instantaneous CDF and LERF limits exceed 1E-3 and 1E-4, respectively, because of an emergent condition. The point of the above discussion is to explain that there is no need to know the quantitative implication of implementing RMAs because the ICDP/ILERP limits of 1E-5/1E-6 are continuously monitored and will be reached quickly once the 1E-3/yr (CDF) and 1E-4/yr (LERF) instantaneous limits are breached.

NEI 06-09, Section 3.4.1, "Risk Management Action Incorporation in a RMTS Program," state the following regarding the need for RMA quantification:

> *"RMAs may be quantified to determine revised RICT values, but this quantification of RMAs is neither expected nor required, as omission of this RMA quantification results in conservative RICT values."*
>
> *"For evolutions where compensatory RMAs are planned in support of maintenance (e.g., temporary diesels), it may be beneficial to quantify RMAs, to determine realistic RICT values."*

SNC intends to abide by the above guidance regarding the need for quantification of RMAs.

<u>NRC Probabilistic Assessment Review Question #17, RG 1.177 Tier 2</u>

A Tier 2 assessment would be performed for each RICT prior to entry into the TS LCO. Discuss your RICT program Tier 2 requirements and implementation. Also, provide assurance that the Tier 2 results are reviewed for reasonableness.

SNC Response to Probabilistic Assessment review Question #17

RG 1.177 describes Tier 2 requirement as:

> *"The licensee should provide reasonable assurance that risk-significant plant equipment outage configurations will not occur."*

The NRC SER on NEI 06-09 states the following regarding meeting the requirements of Tier 2:

> *"TR NEI 06-09, Revision 0, does not permit high risk configurations which would exceed instantaneous CDF and LERF limits. It further requires implementation of RMAs when the actual or anticipated risk accumulation during a RICT will exceed 10 percent of the ICDP or ILERP limit. Such RMAs may include rescheduling planned activities to lower risk periods or implementing risk reduction measures. The limits established for entry into a RICT and for RMA implementation are consistent with the guidance of NUMARC 93-01 endorsed by RG 1.182 as applicable to plant maintenance activities. These TR requirements are consistent with the principle of Tier 2 to avoid risk-significant configurations."*

The VEGP RICT Program is consistent with the NRC SER on TR NEI 06-09, Revision 0 as stated below:

> The VEGP RICT Program uses CRM functionality to limit voluntary RICT entry when instantaneous limits of 1E-3/yr (CDF) and 1E-4 (LERF) are exceeded. Additionally, as required, the VEGP RICT Program uses CRM functionality to identify RMA candidates requiring RMAs and tracks the time (RMAT) from the start of the RICT (time zero) when the ICDP/LERP exceeds 1E-6/1E-7, the trigger for RMA implementation. The CRM Tool development has undergone testing and validations to ensure the calculated results have a high degree of confidence. In addition, the users will perform a qualitative review to ensure reasonableness of results.

<u>NRC Probabilistic Assessment Review Question #18, Scope of Equipment</u>

It is understood that some components or equipment may not be considered for a risk-informed completion time (RICT) calculation, i.e., not within the scope of the RICT program. Please explain if there are certain types of equipment which the licensee considers to be outside the scope of the RICT program (e.g., fire protection equipment, seismic-related equipment such as snubbers, etc.).

SNC Response to Probabilistic Assessment Review Question #18

Those SSCs modeled in the PRA are those SSCs being monitored in the Maintenance Rule program, as per 10 CFR 50.65. Equipment for which a RICT can be calculated is equipment within the TS that has a CT that includes the statement, "OR In accordance with the Risk Informed Completion Time Program." Systems that do not have this statement cannot use a RICT in lieu of the fixed TS CT. However, the plant configuration is taken into consideration for a RICT calculation, so systems that are not within the RICT Program that are modeled in the PRA will be part of the overall RICT evaluation. For example, fire detection and fire suppression equipment is not explicitly modeled in the PRA as a basic event, so they cannot be made OOS within the CRM Tool based on their actual operational status. However, their failure probabilities may be implicitly reflected in the fire CDF/LERF quantification that forms the basis of the RICT evaluation.

With respect to seismic contributions to the RICT calculation, VEGP will use a bounding approach, as described in the September 13, 2012 LAR.

<u>NRC Probabilistic Assessment Review Question #19, Scope of the Implementation and Monitoring Program</u>

The implementation and monitoring program described in Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," Revision 1, includes maintenance rule control for TS equipment affected by the TS change. Please provide assurance that the proposed TS limiting condition for operation (LCO) equipment for the RICT program is covered under the licensee's maintenance rule program.

SNC Response to Probabilistic Assessment Review Question #19

SSCs in the scope of the RICT Program that have their CT extended by entry into the RICT Program are monitored to ensure their safety performance is not degraded. The RICT Program is covered under the existing Maintenance Rule (MR) monitoring program. If MR performance criteria are exceeded for any SSC, a CR is generated with a cause determination conducted. If it is determined that the use of a RICT was the cause of a SSC performance deficiency, the Performance Monitoring procedure directs that corrective action(s) be taken. One such action may include a moratorium on future entry into pre-planned RICTs for some period of time. In addition, it should be noted that the VEGP operating history will reflect the impact of the RICT Program, which will be accounted in future VEGP PRA model updates. The post-RICT Program implementation impact on the average annual CDF/LERF will be monitored as required per NEI 06-09 to ensure the RG 1.174 CDF/LERF limits are maintained.

Also see SNC Response to Probabilistic Assessment Review Question #7.

<u>NRC Probabilistic Assessment Review Question #20, RICT for Multiple SSCs Inoperable</u>

In some of the proposed TS LCOs, multiple SSCs may be inoperable per TS; however, the applicable TS required actions require restoring a subset of the number of SSCs. An example is TS LCO 3.4.11 Required Actions F.2 and F.3. Condition F is a condition for more than one block valve inoperable. The RICT is being proposed for F.2, restore one block valve to operable status, and F.3, restore remaining block valve to operable status. Another example is TS LCO 3.7.4 Condition B, two or more required Atmospheric Relief Valve (ARV) lines inoperable. Required Action B.1 is to restore at least two ARV lines to operable status. In such cases a RICT is being requested. If a TS LCO Condition is entered due to multiple SSCs inoperable (e.g., greater than one block valve for TS LCO 3.4.11, or greater than two ARVs for TS 3.7.4), the RICT for restoring multiple SSCs is expected to be shorter than the RICT for restoring a lesser number of SSCs (e.g., at least 1 block valve, or at least two ARVs). Please clarify how a RICT will be calculated for restoration of a lesser number of SSCs than for which the LCO was entered.

SNC Response for Probabilistic Assessment Review Question #20

For the case where a RICT is being proposed initially for F.2, restore one block valve to operable status, and subsequently for F.3, restore remaining block valve to operable status, the following provides the RICT calculation steps in a chronological order.

If an initial RICT is entered for TS LCO 3.4.11 Condition F – more than one block valve inoperable, the following is applicable:

> Condition F.2 - Restore one block valve to OPERABLE status in 2 hours or in accordance with the Risk Informed Completion Time Program.

The CRM Tool will initially calculate a RICT assuming two block valves inoperable if they are PRA non-functional. This will yield a worst-case RICT (assuming for this illustration that no other equipment is OOS), i.e., the cumulative ICDP/ILERP is being accumulated at a faster rate (steep slope). If subsequently one block valve is declared operable prior to exceeding the ICP/ILERP limit of 1E-5/1E-6, the RICT will be recalculated assuming one block valve is returned to service. This will yield a longer overall RICT than the original RICT calculated for both block valves being inoperable and non-functional (assuming for this illustration that no other equipment is OOS), i.e., the cumulative ICDP/ILERP is being accumulated at a lesser rate (less steep slope).

The TS LCO Condition applicable for this case is as follows:

> Condition F.3 - Restore remaining block valve to OPERABLE status in 72 hours or in accordance with the Risk Informed Completion Time Program.

For these types of configurations, the RICT time zero does not reset, and a RICT is not exited and reentered in the CRM Tool until all overlapping OOS equipment (TS and non-TS) has been returned to service.

<u>NRC Probabilistic Assessment Review Question #21, TS LCO 3.7.2 Required Actions D.1 and E.1</u>

TS LCO 3.7.2 Required Actions D.1 and E.1 require “verification” for Main Steam Isolation Valves (MSIVs) versus “restoration.” In such a case, please explain how a RICT would be performed if a MSIV was considered PRA functional and there is no required action to “restore” to operability. Consider, for example, if PRA functionality was related to the MSIV closure status (e.g., not fully closed). Without a "restore" required action how is a time length determined for a RICT calculation?

SNC Response to Probabilistic Assessment Review Question #21

TS LCO 3.7.2 Required Actions D.1 and E.1 will be removed from the VEGP RICT Program.

NRC Probabilistic Assessment Review Question #22, TS LCO 3.7.9 Condition B Success Criteria

License Amendments No. 170 and 152 for Vogtle Units 1 and 2, respectively, revise TS 3.7.9 by changing the criteria for nuclear service cooling water (NSCW) tower three-and four-fan operation and provides a 7-day CT for one fan/spray cell being inoperable under certain conditions.

Please describe whether this will have any impact on the PRA success criteria and explain how you plan to meet the minimum performance level of the equipment. If it is determined that the PRA success criteria needs to be updated for TS LCO 3.7.9 Condition B, please explain how you plan to update the PRA success criteria.

Note that, per LAR Table E1.1 (page E1-12), the current PRA success criteria for TS LCO 3.7.9 Condition B requires: "4 of 4 fans when SI signal has actuated." (This is discussed further in Table E6.2 on page E6-5.) This seems to indicate that 4 fans are currently required to ensure the minimum performance level of the equipment in the event of a LOCA, per the PRA success criteria.

SNC Response to Probabilistic Assessment Review Question #22

In the September 13, 2012 LAR, Enclosure 1, Table E1.1, "Revised TS LCO Conditions to Corresponding PRA Functions," discusses the PRA success criteria for the TS LCO 3.7.9, "Ultimate Heat Sink." The "Disposition" column of Table E1.1 states the following:

> *"The PRA success criteria do not credit low wet bulb temperatures to reduce the number of required fans, but are based on scenario specific heat removal requirements..."*

As a result, the addition of the 7-day CT for one fan/spray cell being inoperable under certain conditions will not impact the currently documented PRA success criteria in Table E1.1. The calculated RICT for either Condition B or Condition C will be identical assuming the plant configurations are also identical.

Enclosure 3 to this letter, "Markup of TS LCO 3.7.9, 'Ultimate Heat Sink,'" reflects License Amendments No. 170 and 152 for VEGP Units 1 and 2, respectively, and shows where "In accordance with the Risk Informed Completion Time Program" applies. A change to LAR Table E1.1 will be required to agree with the current TS LCO 3.7.9, "Ultimate Heat Sink," and reflect the revision documented in Enclosure 3.

Vogtle Electric Generating Plant Response to Request for Additional information on Plant Vogtle License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical_Specifications (RMTS) Guidelines"

Enclosure 2

Comparison of Regulatory Guide (RG) 1.200 Revisions 1 and 2 Internal Events PRA Requirements

Comparison of RG 1.200, Revision 1 and Revision 2 Internal Events (including Internal Flooding) PRA Requirements

The VEGP PRA model was reviewed against the 2007 version of the PRA Standard, as amended by RG 1.200, Revision 1. RG 1.200, Revision 2 was issued in March 2009. So it would be prudent to review the VEGP PRA to the guidance of RG 1.200, Revision 2.

To ensure compliance with any new or changed RG 1.200 requirements, it is necessary to first identify the differences between the RG 1.200 Revision 1 and Revision 2 Capability Category I/II, II/III, and I/II/III requirements. A summary of the differences in these requirements is provided in the following table along with a response for each of the differences.

NEI 05-04, Revision 3, “Process for Performing Internal Events PRA Peer Reviews Using the ASME/ANS PRA Standard,” provides guidance on performing a gap assessment between Addendum B of the ASME/ANS PRA Standard and RG 1.200, Revision 1, and RG 1.200, Revision 2. Section 3.3 of NEI 05-04 identifies those changes to SRs that would require a re-evaluation of the PRA against the PRA Standard requirements. These SRs are included in Table E2.3 below. Note that differences considered typographical, editorial, or providing additional descriptions of the SRs were not considered technically significant and were excluded.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
SRs Requiring Gap Assessment Evaluation per NEI 05-04, Revision 3			
HR-D6: CC-I/II/III: PROVIDE an assessment of the uncertainty in the HEPs consistent with the quantification approach. USE mean values when providing point estimates of HEPs.	HR-D6: CC-I/II/III: **CHARACTERIZE** the uncertainty in the estimates of the HEPs consistent with the quantification approach, and **PROVIDE mean values for use in the quantification** of the PRA results.	The revised wording in the 2009 PRA Standard provides additional description for the SR.	The VEGP internal events PRA provides mean values of HEPs with associated uncertainty parameters. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
HR-G3: CC-I: USE an approach that takes the following into account: *(a)* the complexity of the response ... The ASEP Approach is an acceptable approach. CC-II/III: When estimating HEPs EVALUATE the impact of the following plant-specific and scenario-specific performance shaping factors: ... *(d)* degree of clarity of the meaning of the cues/indications. ...	HR-G3: CC-I: USE an approach that takes the following into account: *(a)* the complexity of **detection, diagnosis, decision-making and executing** the **required** response ;;; The ASEP Approach [2-6] is an acceptable approach. CC-II/III: When estimating HEPs EVALUATE the impact of the following plant-specific and scenario-specific performance shaping factors: ... *(d)* degree of clarity of **cues/indications in supporting the detection, diagnosis, and decision-making give the plant-specific and scenario-specific context of the event.** ...	The revised wording in the 2009 PRA Standard provides additional description for the SR.	The VEGP internal events PRA uses the HRA Calculator which takes into account plant-specific shaping factors related to the cues for event detection, and diagnosis, decision-making. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
DA-D8 (new SR): CC-I/II/III: **For each SSC for which repair is to be modeled, ESTIMATE, based on the data collected in DA-C14, the probability of failure to repair the SSC in time to prevent core damage as a function of the accident sequence in which the SSC failure appears.**	DA-**D9**: CC-I/II/III: For each SSC for which repair is to be modeled, ESTIMATE, based on the data collected in DA-**C15**, the probability of failure to repair the SSC in time to prevent core damage as a function of the accident sequence in which the SSC failure appears.	The additional SR was added as part of the RG 1.200 Revision 1 clarifications to the 2007 standard and was subsequently renumbered by RG 1.200 Revision 2.	DA-D8 from RG 1.200 Revision 1 was considered in the VEGP peer review. The VEGP internal events PRA does not include any SSCs for which repair is modeled.
QU-A2a: CC-I/II/III: PROVIDE estimates of the individual sequences in a manner consistent with the estimation of total CDF …	QU-**A2**: CC-I/II/III: PROVIDE estimates of the individual sequences in a manner consistent with the estimation of total CDF **(and LERF)** …	The LERF requirement was added by RG 1.200 Revision 2. The updated SR explicitly requires consideration of LERF.	Section 10.3.2 of the internal events PRA calculation presents estimates for individual LERF sequence cutsets.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
QU-A2b: CC-I: ESTIMATE the point estimate CDF from internal events. CC-II: ESTIMATE the mean CDF from internal events, accounting for the "state-of-knowledge" correlation between event probabilities [Note (1)]. CC-III: CALCULATE the mean CDF from internal events by propagating the uncertainty distributions, ensuring that the "state-of-knowledge" correlation between event probabilities is taken into account.	QU-**A3**: CC-I: ESTIMATE the point estimate CDF **(and LERF)**. CC-II: ESTIMATE the mean CDF **(and LERF)**, accounting for the state-of-knowledge correlation between event probabilities [Note (1)]. CC-III: CALCULATE the mean CDF **(and LERF)** by propagating the uncertainty distributions, ensuring that the state-of-knowledge correlation between event probabilities is taken into account.	The phrase, "from internal events," was deleted from the 2009 version of the PRA Standard. The LERF requirement was added by RG 1.200 Revision 2. The SR explicitly requires consideration of LERF. However, per the note in 2007 SR LE-E4 and LE-F3, LERF was addressed in applicable requirements of Table 4.5.8, which includes all QU SRs. Thus, the peer review using the 2007 version of the PRA Standard addressed these LERF requirements.	The peer review based on the 2007 version of the PRA Standard addressed these LERF requirements. Section 10.3.2 of the internal events PRA calculation presents the mean CDF and LERF results.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
QU-B5: CC-I/II/III: Fault tree linking and some other modeling approaches may result in circular logic that must be broken before the model is solved. BREAK the circular logic appropriately. Guidance for breaking logic loops is provided in NUREG/CR-2728 [Note (1)]. When resolving circular logic, AVOID introducing unnecessary conservatisms or non-conservatisms.	QU-B5: CC-I/II/III: Fault tree linking and some other modeling approaches may result in circular logic that must be broken before the model is solved. BREAK the circular logic appropriately. Guidance for breaking logic loops is provided in NUREG/CR-2728 **[2-13]**. When resolving circular logic, **DO NOT introduce** unnecessary conservatisms or non-conservatisms.	The revised wording in the 2009 PRA Standard provides less ambiguous wording for the SR.	The VEGP internal events PRA logic loops were broken according to the guidance provided without the introduction of unnecessary conservatisms or non-conservatisms. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
<u>QU-B6:</u> <u>CC-I/II/III:</u> ACCOUNT for system successes in addition to system failures in the evaluation of accident sequences to the extent needed for realistic estimation of CDF. This accounting may be accomplished by using numerical quantification of success probability, complementary logic, or a delete term approximation and includes the treatment of transfers among event trees where the "successes" may not be transferred between event trees.	<u>QU-B6:</u> <u>CC-I/II/III:</u> ACCOUNT for system successes in addition to system failures in the evaluation of accident sequences to the extent needed for realistic estimation of CDF **or LERF**. This accounting may be accomplished by using numerical quantification of success probability, complementary logic, or a delete term approximation and includes the treatment of transfers among event trees where the "successes" may not be transferred between event trees.	The LERF requirement was added by RG 1.200 Revision 2. The SR explicitly requires consideration of LERF. However, per the note in 2007 SR LE-E4 and LE-F3, LERF was addressed in applicable requirements of Table 4.5.8, which includes all QU SRs. Thus, the peer review using the 2007 version of the PRA Standard addressed these LERF requirements.	The peer review based on the 2007 version of the PRA Standard addressed these LERF requirements. The Level 2 PRA event trees presented in Section 9.2 of the internal events PRA calculation explicitly account for system successes.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
<u>QU-E3:</u> <u>CC-I:</u> ESTIMATE the uncertainty interval of the CDF results. Provide a basis for the estimate consistent with the characterization parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15). <u>CC-II:</u> ESTIMATE the uncertainty interval of the CDF results. ESTIMATE the uncertainty intervals associated with parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15), taking into account the state-of-knowledge correlation. <u>CC-III:</u> PROPAGATE parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15)....(no change)	<u>QU-E3:</u> <u>CC-I:</u> ESTIMATE the uncertainty interval of the CDF **(and LERF)** results. Provide a basis for the estimate consistent with the characterization parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15). <u>CC-II:</u> ESTIMATE the uncertainty interval of the CDF **(and LERF)** results. ESTIMATE the uncertainty intervals associated with parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15), taking into account the state-of-knowledge correlation. <u>CC-III:</u> PROPAGATE parameter uncertainties (DA-D3, HR-D6, HR-G8, IE-C15)....(no change)	The LERF requirement was added by RG 1.200 Revision 2. The SR explicitly requires consideration of LERF. However, per the Note in 2007 SR LE-E4 and LE-F3, LERF was addressed in applicable requirements of Table 4.5.8, which includes all QU SRs. Thus, the peer review using the 2007 version of the PRA Standard addressed these LERF requirements.	The peer review based on the 2007 version of the PRA Standard addressed these LERF requirements. Section 10.4 of the internal events PRA calculation presents the uncertainty intervals for both CDF and LERF, with consideration of the state-of-knowledge correlation.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
QU-E4: CC-I: PROVIDE an assessment of the impact of the model uncertainties and assumptions on the results of the PRA. CC-II: EVALUATE the sensitivity of the results to model uncertainties and key assumptions using sensitivity analyses [Note (1)]. CC-III: EVALUATE the sensitivity of the results to uncertain model boundary conditions and other assumptions using sensitivity analyses except where such sources of uncertainty have been adequately treated in the quantitative uncertainty analysis [Note (1)].	QU-E4: **CC-I/II/III:** For each source of model uncertainty and related assumption identified in QU-E1 and QU-E2, respectively, IDENTIFY how the PRA model is affected (e.g., introduction of a new basic event, changes to basic event probabilities, change in success criterion, introduction of a new initiating event).	Separate requirements for CC-I, II, and III were collapsed into a single requirement for CC-I/II/III in the 2009 version of the PRA Standard. The reference to Note 1 was deleted by RG 1.200 Revision 2. The updated SR assigns the same requirement to all three CCs. Meeting CC-II in the 2007 version of the PRA Standard assures that the new SR is met.	No action, CC-II met for 2007 version of the PRA Standard.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F1: CC-I/II/III: DOCUMENT the internal flooding analysis in a manner that facilitates PRA applications, upgrades, and peer review.	**IFPP-B1**: CC-I/II/III: DOCUMENT the internal **flood plant partitioning** in a manner that facilitates PRA applications, upgrades, and peer review. **IFSO-B1**: CC-I/II/III: DOCUMENT the internal flood **sources** in a manner that facilitates PRA applications, upgrades, and peer review. **IFSN-B1**: CC-I/II/III: DOCUMENT the internal flood **scenarios** in a manner that facilitates PRA applications, upgrades, and peer review. **IFEV-B1**: CC-I/II/III: DOCUMENT the internal flood-**induced initiating events** in a manner that facilitates PRA applications, upgrades, and peer review.	The 2009 PRA Standard divides the SR for documentation that facilitates applications, upgrades, and review into separate SRs for each of the internal flooding elements (plant partitioning, flood sources, flood scenarios, initiating events, and quantification).	The VEGP internal flooding report adequately documents each of the elements of the internal flooding analysis. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F1: CC-I/II/III: DOCUMENT the internal flooding analysis in a manner that facilitates PRA applications, upgrades, and peer review.	**IFQU-B1:** CC-I/II/III: DOCUMENT the internal flood **accident sequences and quantification** in a manner that facilitates PRA applications, upgrades, and peer review.	See above	See above
IF-F2: CC-I/II/III: DOCUMENT the process used to identify ... flood areas, ... For example, this documentation typically includes ... *(b)* flood areas used in the analysis and the reason for eliminating areas from further analysis ...	**IFPP-B2:** CC-I/II/III: DOCUMENT the process used to identify flood areas. For example, this documentation typically includes *(a)* flood areas used in the analysis and the reason for eliminating areas from further analysis ***(b)* any walkdowns performed in support of the plant partitioning**	The requirement to document walkdowns performed in support of plant partitioning was added to the 2009 version of the PRA Standard. The updated SR cites examples of acceptable documentation of the process to identify flood sources. Since documentation of walkdowns was not in the 2007 version of the PRA Standard, it was not reviewed as part of the peer review conducted using that version of the PRA Standard.	Section 5 and Appendix A of the internal flooding PRA document the walkdowns performed to validate information related to flood areas, flood sources, SSCs, mitigation and other flood related features in the flood areas.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F2: CC-I/II/III: DOCUMENT the process used to identify applicable flood sources. For example, this documentation typically includes *(a)* flood sources identified in the analysis, rules used to screen out these sources, and the resulting list of sources to be further examined ... *(f)* screening criteria used in the analysis ... *(j)* calculations or other analyses used to support or refine the flooding evaluation ...	**IFSO-B2:** CC-I/II/III: DOCUMENT the process used to identify applicable flood sources. For example, this documentation typically includes *(a)* flood sources identified in the analysis, rules used to screen out these sources, and the resulting list of sources to be further examined *(b)*screening criteria used in the analysis *(c)* calculations or other analyses used to support or refine the flooding evaluation ***(d)* any walkdowns performed in support of the identification or screening of flood sources**	The requirement to document walkdowns performed in support of the identification or screening of flood sources was added to 2009 version of the PRA Standard. The updated SR cites examples of acceptable documentation of the process to identify flood sources. Since documentation of walkdowns was not in the 2007 version of the PRA Standard, it was not reviewed as part of the peer review conducted using that version of the PRA Standard.	The internal flooding PRA documents the walkdowns performed to validate information related to flood areas, flood sources, SSCs, mitigation and other flood related features in the flood areas.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F2: CC-I/II/III: DOCUMENT the process used to identify applicable flood scenarios. For example, this documentation typically includes … *(c)* propagation pathways … … *(d)* accident mitigating features and barriers credited … … *(e)* assumptions or calculations used in the determination of … flood-induced effects on equipment operability … *(f)* screening criteria used in the analysis *(g)* flooding scenarios considered, screened, and retained *(h)* description of how the internal event analysis models were modified … … *(j)* calculations or other analyses used to support or refine the flooding evaluation …	**IFSN-B2:** CC-I/II/III: DOCUMENT the process used to identify applicable flood scenarios. For example, this documentation typically includes *(a)* propagation pathways … *(b)* accident mitigating features and barriers credited … *(c)* assumptions or calculations used in the determination of … flood-induced effects on equipment operability *(d)* screening criteria used in the analysis *(e)* flooding scenarios considered, screened, and retained *(f)* description of how the internal event analysis models were modified … *(g)* calculations or other analyses used to support or refine the flooding evaluation ***(h)* any walkdowns performed in support of the identification or screening of flood scenarios**	The requirement to document walkdowns performed in support of the identification or screening of flood scenarios was added to 2009 version of the PRA Standard. The updated SR cites examples of acceptable documentation of the process to identify flood scenarios. Since documentation of walkdowns was not in the 2007 version of the PRA Standard, it was not reviewed as part of the peer review conducted using that version of the PRA Standard.	The internal flooding PRA documents the walkdowns performed to validate information related to flood areas, flood sources, SSCs, mitigation and other flood related features in the flood areas.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F2: CC-I/II/III: DOCUMENT the process used... internal flood model development. For example, this documentation typically includes ... *(f)* screening criteria used in the analysis *(i)* flood frequencies, component unreliabilities/unavailabilities, and HEPs used in the analysis (i.e., the data values unique to the flooding analysis) ... *(j)* calculations or other analyses used to support or refine the flooding evaluation ...	**IFEV-B2**: CC-I/II/III: DOCUMENT the process used to identify applicable **flood-induced initiating events**. For example, this documentation typically includes *(a)* flood frequencies, component unreliabilities/unavailabilities, and HEPs used in the analysis (i.e., the data values unique to the flooding analysis) *(b)* calculations or other analyses used to support or refine the flooding evaluation *(c)* screening criteria used in the analysis ...	The 2009 PRA Standard divides the SR for typical items included in the internal flooding analysis process documentation into separate SRs for each of the internal flooding elements (plant partitioning, flood sources, flood scenarios, initiating events, and quantification). While most elements (PP, SO, SN, QU) included additional requirements to document walkdowns, the EV element included no change in requirements.	The VEGP internal flooding report adequately documents each of the elements of the internal flooding analysis. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F2: CC-I/II/III: DOCUMENT the process used to define the applicable internal flood accident sequences and their associated quantification. For example, this documentation typically includes: ... *(j)* calculations or other analyses used to support or refine the flooding evaluation ... *(f)* screening criteria used in the analysis ... *(i)* flooding scenarios considered, screened, and retained ... *(k)* results of the internal flood analysis, consistent with the quantification requirements provided in HLR-QU-D	**IFQU-B2**: CC-I/II/III: DOCUMENT the process used to define the applicable internal flood accident sequences and their associated quantification. For example, this documentation typically includes: *(a)* calculations or other analyses used to support or refine the flooding evaluation *(b)* screening criteria used in the analysis *(c)* flooding scenarios considered, screened, and retained *(d)* results of the internal flood analysis, consistent with the quantification requirements provided in HLR-QU-D ***(e)* any walkdowns performed in support of internal flood accident sequence quantification**	The requirement to document walkdowns performed in support of internal flood accident sequence quantification was added in 2009 version of the PRA Standard. The updated SR cites examples of acceptable documentation of the process to identify flood related features considered in flood sequence quantification. Since documentation of walkdowns was not in the 2007 version of the PRA Standard, it was not reviewed as part of the peer review conducted using that version of the PRA Standard.	The internal flooding PRA documents the walkdowns performed to validate information related to flood areas, flood sources, SSCs, mitigation and other flood related features in the flood areas that are considered in flood sequence definition.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F3: CC-I/II/III: DOCUMENT the assumptions and sources of uncertainty associated with the internal flooding analysis.	**IFPP-B3:** CC-I/II/III: DOCUMENT sources of model uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2)** associated with the internal **flood plant partitioning**. **IFSO-B3:** CC-I/II/III: DOCUMENT sources of model uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2)** associated with the internal **flood sources**. **IFSN-B3:** CC-I/II/III: DOCUMENT sources of model uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2)** associated with the internal flood **scenarios**.	The 2009 PRA Standard divides the SR for documentation of assumptions and sources of uncertainty into separate SRs for each of the internal flooding elements (plant partitioning, flood sources, flood scenarios, initiating events, and quantification).	The VEGP internal flooding report did not include documentation of sources of model uncertainty for the internal flooding analysis. However, as part of this License Amendment Request, identification and documentation of the sources of model uncertainty in all elements of the VEGP internal events Level 1 and Level 2 PRA (including internal flooding) was performed.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-F3: CC-I/II/III: DOCUMENT the assumptions and sources of uncertainty associated with the internal flooding analysis.	**IFEV-B3**: CC-I/II/III: Document sources of model uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2)** associated with the internal **flood-induced initiating events**. **IFQU-B3**: CC-I/II/III: DOCUMENT sources of model uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2)** associated with the internal **flood accident sequences and quantification**.	The 2009 PRA Standard divides the SR for documentation of assumptions and sources of uncertainty into separate SRs for each of the internal flooding elements (plant partitioning, flood sources, flood scenarios, initiating events, and quantification).	The VEGP internal flooding report did not include documentation of sources of model uncertainty for the internal flooding analysis. However, as part of this License Amendment Request, identification and documentation of the sources of model uncertainty in all elements of the VEGP internal events Level 1 and Level 2 PRA (including internal flooding) was performed.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-C3: CC-I: For the SSCs identified in IF-C2c, …(no change) … CC- II: INCLUDE failure by submergence and spray in the identification process. ASSESS qualitatively the impact of flood-induced mechanisms that are not formally addressed (e.g., using the mechanisms listed under Capability Category III of this requirement), by using conservative assumptions. CC-III: For the SSCs identified in IF-C2c, …(no change)	**IFSN-A6:** CC-I: For the SSCs identified in **IFSN-A5**, …(no change) … CC- II: **For the SSCs identified in IFSN-A5, IDENTIFY the susceptibility of each SSC in a flood area to flood-induced failure mechanisms.** INCLUDE failure by submergence and spray in the identification process. ASSESS qualitatively the impact of flood-induced mechanisms that are not formally addressed (e.g., using the mechanisms listed under Capability Category III of this requirement), by using conservative assumptions. CC-III: For the SSCs identified in **IFSN-A5**, …(no change)	The clarifications to the 2007 PRA Standard provided in RG 1.200, Revision 1 included the separation of CC-I and C-II. The revised wording in the 2009 PRA Standard provides additional description for the SR.	The VEGP internal flooding report met the combined CC-I/II be describing the mechanisms considered, including submergence and spray; thereby meeting CC-II. However, there was not sufficient consideration of humidity, condensation, temperature, etc. to merit CC-III.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
SRs that May Require Re-evaluation per NEI 05-04, Revision 3			
IE-D3 (*also AS-C3, SC-C3, SY-C3, HR-I3, DA-E3, LE-G4*): CC-I/II/III: DOCUMENT the key assumptions and key sources uncertainty associated with the *initiating event analysis (also accident sequence analysis, development of success criteria, systems analysis, human reliability analysis, data analysis, and LERF analysis, including results and important insights from sensitivity studies.)*	IE-D3 (*also AS-C3, SC-C3, SY-C3, HR-I3, DA-E3, LE-G4*): CC-I/II/III: DOCUMENT the sources of **model** uncertainty and **related** assumptions **(as identified in QU-E1 and QU-E2** ***or LE-F3*****)** associated with the *initiating event analysis (also accident sequence analysis, development of success criteria, systems analysis, human reliability analysis, data analysis, and LERF analysis, including results and important insights from sensitivity studies.)*	The NRC recommended wording changes on "key" assumptions and sources of uncertainty were reflected in the 2009 PRA Standard. Since the wording changes were not in the 2007 version of the PRA standard, the wording changes were not directly considered during the peer review conducted using the 2007 PRA Standard.	The Recovery Analysis and Uncertainty Analysis for the VEGP Level 1 and Level 2 Model (Chapter 10) included documentation on the sources of modeling uncertainty. In addition, as part of this License Amendment Request, an assessment and characterization of the sources of model uncertainty in the VEGP internal events Level 1 and Level 2 PRA was performed according to the guidance in NUREG-1855 and EPRI TR-1016737.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
<u>QU-E1:</u> <u>CC I/II/II:</u> IDENTIFY **key** sources of model uncertainty.	<u>QU-E1:</u> <u>CC I/II/II:</u> IDENTIFY sources of model uncertainty.	The NRC recommended wording changes on "key" assumptions and sources of uncertainty were reflected in the 2009 PRA Standard. Since the wording changes were not in the 2007 version of the PRA standard, the wording changes were not directly considered during the peer review conducted using the 2007 PRA Standard.	The Recovery Analysis and Uncertainty Analysis for the VEGP Level 1 and Level 2 Model (Chapter 10) included documentation on the sources of modeling uncertainty. In addition, as part of this License Amendment Request, an assessment and characterization of the sources of model uncertainty in the VEGP internal events Level 1 and Level 2 PRA was performed according to the guidance in NUREG-1855 and EPRI TR-1016737.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
QU-E2: CC I/II/II: IDENTIFY **key** assumptions made in the development of the PRA model.	QU-E2: CC I/II/II: IDENTIFY assumptions made in the development of the PRA model.	The NRC recommended wording changes on "key" assumptions and sources of uncertainty were reflected in the 2009 PRA Standard. Since the wording changes were not in the 2007 version of the PRA standard, the wording changes were not directly considered during the peer review conducted using the 2007 PRA Standard.	The Recovery Analysis and Uncertainty Analysis for the VEGP Level 1 and Level 2 Model (Chapter 10) included documentation on the sources of modeling uncertainty. In addition, as part of this License Amendment Request, an assessment and characterization of the sources of model uncertainty in the VEGP internal events Level 1 and Level 2 PRA was performed according to the guidance in NUREG-1855 and EPRI TR-1016737.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
QU-F4: CC I/II/II: DOCUMENT **key** assumptions and **key** sources of uncertainty, **such as: possible optimistic or conservative success criteria, suitability of the reliability data, possible modeling uncertainties (modeling limitations due to the method selected), degree of completeness in the selection of initiating events, possible spatial dependencies, etc.**	QU-F4: CC I/II/II: DOCUMENT the **characterization of the sources of model** uncertainty and **related** assumptions **(as identified in QU-E4).**	The NRC recommended wording changes on "key" assumptions and sources of uncertainty were reflected in the 2009 PRA Standard. Since the wording changes were not in the 2007 version of the PRA standard, the wording changes were not directly considered during the peer review conducted using the 2007 PRA Standard.	The Recovery Analysis and Uncertainty Analysis for the VEGP Level 1 and Level 2 Model (Chapter 10) included documentation on the sources of modeling uncertainty. In addition, as part of this License Amendment Request, an assessment and characterization of the sources of model uncertainty in the VEGP internal events Level 1 and Level 2 PRA was performed according to the guidance in NUREG-1855 and EPRI TR-1016737.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
LE-D6: C I: PERFORM containment isolation analysis in a conservative manner…(unchanged) C II: PERFORM containment isolation analysis in a realistic manner for the significant accident progression sequences resulting in a large early release. USE conservative or a combination of conservative or realistic treatment for the **non-significant** accident progression sequences …(unchanged) CC III: PERFORM containment isolation analysis in a realistic manner…(unchanged)	LE-**D7**: C I: PERFORM containment isolation analysis in a conservative manner…(unchanged) C II: PERFORM containment isolation analysis in a realistic manner for the significant accident progression sequences resulting in a large early release. USE conservative or a combination of conservative or realistic treatment for the **nonsignificant** accident progression sequences …(unchanged) CC III: PERFORM containment isolation analysis in a realistic manner…(unchanged)	The SR wording and numbering changes were incorporated in the 2009 version of the PRA Standard. The difference is considered editorial only.	The peer review based on the 2007 version of the PRA Standard addressed these LERF requirements and is not affected by the wording change.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IE-A4a CC II and CC III: When performing the systematic evaluation required in IE-A4, INCLUDE initiating events resulting from multiple failures, if the equipment failures result from a common cause, and from system alignments resulting from preventive and corrective maintenance..	IE-**A6** CC II and CC III: When performing the systematic evaluation required in IE-**A5**, INCLUDE initiating events resulting from multiple failures, if the equipment failures result from a common cause, **or** from system alignments resulting from preventive and corrective maintenance.	The wording change is a reduction in requirements, and does not need to be re-assessed unless the SR was not met in the peer review.	This SR was met……

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IE-B3: C I: GROUP initiating events only when the following is true: (items (a) and (b) unchanged) C II: GROUP initiating events only when the following is true: (items (a) and (b) unchanged) DO NOT SUBSUME events into a group unless (items (1) and (2) unchanged) C III: GROUP initiating events only when the following is true: (items (a) and (b) unchanged)	IE-B3: C I: GROUP initiating events only when the following **can be ensured**: (items (a) and (b) unchanged) C II: GROUP initiating events only when the following **can be ensured:** (items (a) and (b) unchanged) DO NOT SUBSUME **scenarios** into a group unless (items (1) and (2) unchanged) C III: GROUP initiating events only when the following **can be ensured**: (items (a) and (b) unchanged)	The revised wording in the 2009 PRA Standard provides less ambiguous wording for the SR.	The VEGP internal events PRA grouping of initiating events was found to be appropriate. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
<u>AS-A10</u> <u>CC II:</u> In constructing the accident sequence models, INCLUDE, for each modeled initiating event, sufficient detail that ~~**significant**~~ differences in requirements on systems and required operator ~~**responses**~~ interactions **(e.g., systems initiations or valve alignments)** are captured. Where diverse systems and/ or operator actions provide a similar function, if choosing one over another changes the requirements for operator intervention or the need for other systems, MODEL each separately.	<u>AS-A10</u> <u>CC II:</u> In constructing the accident sequence models, INCLUDE, for each modeled initiating event, sufficient detail that differences in requirements on systems and required operator interactions (e.g., systems initiations or valve **alignment**) are captured. Where diverse systems and/ or operator actions provide a similar function, if choosing one over another changes the requirements for operator intervention or the need for other systems, MODEL each separately.	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently also included in the 2009 PRA Standard.	The VEGP internal events PRA accident sequence construction was assigned CC III by the peer review team for this SR. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.
<u>HR-E2:</u> <u>CC I/II/III:</u> IDENTIFY *(a)* **those actions** required to initiate … (not changed) *(b)* **those actions** performed by the control room staff either in response to procedural direction or as skill-of-the-craft to **diagnose and then recover**…(not changed).	<u>HR-E2:</u> <u>CC I/II/III:</u> IDENTIFY **those actions** *(a)* required to initiate … (not changed) *(b)* performed by the control room staff either in response to procedural direction or as skill-of-the-craft to diagnose and then recover …(not changed).	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently also included in the 2009 PRA Standard to remove ambiguity.	The VEGP human reliability analysis includes both the cognitive (diagnosis) and execution portions of control room actions. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
<u>DA-C14</u> <u>C I/II/III:</u> For each SSC for which repair is to be modeled (see SY-A22), IDENTIFY instances of plant-**specific experience and, when that is insufficient to estimate failure to repair consistent with DA-D8**…(not changed)	<u>DA-**C15**</u> <u>C I/II/III:</u> For each SSC for which repair is to be modeled (see SY-A22), IDENTIFY instances of plant-specific experience and, when that is insufficient to estimate failure to repair consistent with DA-**D9**…(not changed)	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently also included in the renumbered SR in RG 1.200 Revision 2.	The VEGP internal events PRA does not include any SSCs for which repair is modeled. The SR is judged to be not applicable
<u>DA-D1:</u> <u>CC II and III:</u> …USE a Bayes update process ~~or equivalent statistical process that assigns that assigns appropriate weight to the statistical significance of the generic and plant specific evidence and provides an appropriate characterization of the uncertainty~~. CHOOSE…	<u>DA-D1:</u> <u>CC II and III:</u> …USE a Bayes update process. CHOOSE…	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently also included in the 2009 PRA Standard to remove ambiguity.	Parameter estimates for most failure data in the VEGP internal events PRA were based on a Bayesian update process. A few estimates were based on published generic data only. The revised SR does not change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-B1: CC-I/II/III: For each flood area, IDENTIFY the potential sources of flooding [Note (1)]. INCLUDE: (a) equipment (e.g., piping, valves, pumps) located in the area that are connected to fluid systems (e.g., circulating water system, service water system, fire protection system, component cooling water system, feedwater system, condensate and steam systems) ...	**IFSO-A1:** CC-I/II/III: For each flood area, IDENTIFY the potential sources of flooding [Note (1)]. INCLUDE (a) equipment (e.g., piping, valves, pumps) located in the area that are connected to fluid systems (e.g., circulating water system, service water system, fire protection system, component cooling water system, feedwater system, condensate and steam systems, **and reactor coolant system**) ...	The requirement to include the fire protection system in Item (a) as a potential flooding source was added by RG 1.200 Revision 1. This requirement was addressed in the peer review, which used the 2007 version of the PRA Standard amended by RG 1.200 Revision 1. The requirement to include the reactor coolant system in Item (a) as a potential flooding source was added to the 2009 version of the PRA Standard. Thus, it was not reviewed as part of the peer review conducted using that version of the PRA Standard.	Potential flood sources identified in Section 5 of the internal flooding PRA reviewed as part of 2009 peer review against 2007 version of the PRA standard amended by RG 1.200, Revision 1 include RCS-connected systems - chemical and volume control system (CVCS), containment spray (CS), residual heat removal (RHR), reactor coolant system drain tank (RCSDT), safety injection (SI), and reactor water makeup system (RMWS). As outlined in the Plant Vogtle Internal Flooding notebook, the Containment Building (and RCS components therein) is not included in the scope of the internal flooding analysis.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-B3 CC I/II/III: For each source and its identified failure mechanism, IDENTIFY the characteristic of release and the capacity of the source. INCLUDE: ... (b) **range of** flow rates ~~of water~~ ...	**IFSO-A5** CC I/II/III: For each source and its identified failure mechanism, IDENTIFY the characteristic of release and the capacity of the source. INCLUDE: ... (b) **range of** flow rates ...	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently also included in the re-numbered SR in the 2009 PRA Standard.	Flood calculations for the VEGP internal flooding analysis consider a range of flow rates. The revised SR does not change the conclusion of the peer review for this SR.
IF-C3b: C II: IDENTIFY inter-area propagation through the normal flow path from one area to another via drain lines; and areas connected via back flow through drain lines involving failed check valves, pipe and cable penetrations (including cable trays), doors, stairwells, hatchways, and HVAC ducts. INCLUDE potential for structural failure (e.g., of doors or walls) due to flooding loads**, and the potential for barrier unavailability, including maintenance activities.**	**IFSN-A8** C II: IDENTIFY inter-area propagation through the normal flow path from one area to another via drain lines; and areas connected via **backflow** through drain lines involving failed check valves, pipe and cable penetrations (including cable trays), doors, stairwells, hatchways, and HVAC ducts. INCLUDE potential for structural failure (e.g., of doors or walls) due to flooding loads.	The clarifications to the 2007 PRA Standard were provided in RG 1.200, Revision 1 and were subsequently removed from CC II for the re-numbered SR in the 2009 PRA Standard.	Flood calculations for the VEGP internal flooding analysis consider drain lines and other pathways not directly related to room opening. The revised SR requires a reduced scope of word and does not change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
IF-D3: CC II: ... AVOID subsuming scenarios into a group unless ...	**IFEV-A2** CC II: ... **DO NOT SUBSUME** scenarios into a group unless ...	The revised wording in the 2009 PRA Standard provides less ambiguous wording for the SR.	The VEGP internal flooding analysis grouping (and some consequential subsuming) was found to be appropriate. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.
IF-E6a: CC I/II/III: INCLUDE, in the quantification, the combined effects of failures caused by flooding and those coincident with the flooding due to **causes** independent ~~causes~~ of **the flooding** including ~~equipment failures,~~ unavailability due to maintenance, **common-cause failures,** and other credible causes.	**IFQU-A8** CC I/II/III: INCLUDE, in the quantification, the combined effects of failures caused by flooding and those coincident with the flooding due to independent causes including **equipment failures**, unavailability due to maintenance, common-cause failures, and other credible causes.	RG 1.200 Revision 2 removed the phrase "due to causes independent of the flooding" which did not change the intent of the requirement.	The VEGP internal flooding quantification was performed using the same basic events for other non-flooding failures as used in the internal events model. The revised SR does not require a revised or additional scope of work or change the conclusion of the peer review for this SR.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
SRs Not Requiring Re-evaluation per NEI 05-04, Revision 3			
IE-C10: CC-I/II/III: ... An example of an acceptable generic data sources is NUREG/CR-5750 [Note 1].	IE-**C12**: CC-I/II/III: ... An example of an acceptable generic data sources is **NUREG/CR-6928** [Note 1].	The sentences were clarifications provided in RG 1.200 Revision 1 and Revision 2, respectively. The updated SR cites a more recent example of an acceptable generic data source.	NUREG/CR-6928 is used as the source for generic data priors in Revision 4 of the VEGP internal events PRA. Per NEI 05-0, Revision 3, this SR does not require re-evaluation.
DA-C1: CC-I/II/III: ... Examples of parameter estimates and associated sources include: *(a)* component failure rates and probabilities: NUREG/CR-4639 [Note (1)], NUREG/CR-4550 [Note (2)], NUREG-1715 [Note 7]	DA-C1: CC-I/II/III: ... Examples of parameter estimates and associated sources include *(a)* component failure rates and probabilities: NUREG/CR-4639 **[2-7]**, NUREG/CR-4550 **[2-3]**, NUREG-1715 **[2-21]**, **NUREG/CR-6928 [2-20]**	Reference NUREG-1715 was added by RG 1.200 Revision 1; References NUREG-1715 and NUREG/CR-6928 were included in the 2009 version of the PRA Standard. The updated SR cites more recent examples of acceptable generic data sources.	NUREG/CR-6928 is used as the source for generic data priors in Revision 4 of the VEGP internal events PRA. Per NEI 05-0, Revision 3, this SR does not require re-evaluation.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
LE-F2: CC-I: PROVIDE a qualitative assessment of the key sources of uncertainty. Examples: *(a)* Identify bounding assumptions. *(b)* Identify conservative treatment of phenomena. CC-II: PROVIDE uncertainty analysis that identifies the key sources of uncertainty and includes sensitivity studies for the significant contributors to LERF. CC-III: PROVIDE uncertainty analysis that identifies the key sources of uncertainty and includes sensitivity studies.	LE-**F3**: **CC-I/II/III:** IDENTIFY and CHARACTERIZE the LERF sources of model uncertainty and related assumptions, in a manner consistent with the applicable requirements of Tables 2-2.7-2(d) and 2-2.7-2(e).	Separate requirements for CC-I, II, and III were collapsed into a single requirement for CC-I/II/III in the 2009 version of the PRA Standard. The difference was not included in NEI 05-04, Revision 3. The updated SR assigns the same requirement to all three CCs. Meeting CC-II in the 2007 version of the PRA Standard assures that the new SR is met.	No action, CC-II met for 2007 version of the PRA Standard.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
LE-G2: C-I/II/III: DOCUMENT the process used to identify plant damage states and accident progression contributors, define accident progression sequences, evaluate accident progression analyses of containment capability, and quantify and review the LERF results. For example, this documentation typically includes ... *(h)* The model integration process including the results of the quantification **including uncertainty and sensitivity analyses, as appropriate for the level of detail of the analysis.**	LE-G2: C-I/II/III: DOCUMENT the process used to identify plant damage states and accident progression contributors, define accident progression sequences, evaluate accident progression analyses of containment capability, and quantify and review the LERF results. For example, this documentation typically includes ... *(h)* The model integration process including the results of the quantification.	RG 1.200 Revision 2 removed the phrase "including uncertainty and sensitivity analyses, as appropriate for the level of detail of the analysis," which is a reduction in the requirement.	No action, This SR was met for 2007 version of the PRA Standard.

Table E2.3: Comparison of RG 1.200 Revision 1 and Revision 2 SRs Applicable to CC-I/II, CC-II/III, and CC-I/II/III			
SR in 2007 PRA Standard as Amended by RG 1.200, Revision 1	**SR in 2009 PRA Standard as Amended by RG 1.200, Revision 2**	**Description of Change**	**Resolution**
SRs Not Addressed in NEI 05-04, Revision 3			
SY-B15: CC-I/II/III: ... (h) harsh environments induced by containment venting, **or** failure that may occur prior to the onset of core damage.	SY-**B14**: CC-I/II/III: ... (h) harsh environments induced by containment venting, **failure of the containment venting ducts, or failure of the containment boundary** that may occur prior to the onset of core damage	The sentences were provided in the 2007 and 2009 versions of the PRA Standard, respectively. The difference was not included in NEI 05-04, Revision 3. The updated SR explicitly requires consideration of containment venting ducts and failure of the containment boundary prior to core damage.	As noted in Table 9.2-1 of the internal events PRA calculation, failure of the containment boundary due to venting is not applicable to the VEGP large, dry, subatmospheric containment.

Vogtle Electric Generating Plant Response to Request for Additional Information on Plant Vogtle License Amendment Request to Revise Technical Specifications to Implement NEI 06-09, Revision 0, "Risk Informed Technical Specifications Initiative 4b, Risk Managed Technical Specifications (RMTS) Guidelines"

Enclosure 3

Mark-Up of Technical Specifications (TS)
Limiting Condition of Operation (LCO) 3.7.9

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE. The fans/spray cells shall be as specified in Figure 3.7.9-1.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Nuclear Service Cooling Water (NSCW) basins with water temperature and/or water level not within limits.	A.1	Restore water temperature(s) and water level(s) to within limits.	72 hours
B. One NSCW cooling tower with one required fan/spray cell inoperable when operating in four fan/spray cell required region of Figure 3.7.9-1.	B.1	Restore fan to OPERABLE status.	7 days
C. One NSCW cooling tower with one or more required fans/spray cells inoperable for reasons other than Condition B.	C.1	Restore fan(s)/spray cell(s) to OPERABLE status.	72 hours

(continued)

<u>OR</u>

In accordance with the Risk Informed Completion Time Program