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Vogtle Electric Generating Plant Units 1 & 2
Response to Supplemental Information Needed for Acceptance of Systematic Risk-Informed
Assessment of Debris Technical Report

Ladies and Gentlemen:

By letter dated April 21, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17116A096), Southern Nuclear Operating Company (SNC) submitted a technical report for approval for Vogtle Electric Generating Plant, Units 1 and 2. In addition, the letter provided a supplemental response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors" (ADAMS Accession No. ML042360586) that supersedes previous responses. The technical report contains a risk-informed methodology to evaluate debris effects, except for vessel fiber limits.

By letter dated June 26, 2017, (ADAMS Accession No. ML17166A433), the Nuclear Regulatory Commission (NRC) staff requested information regarding the seismic probabilistic risk assessment peer review. The Enclosure provides the SNC response to the NRC request. In addition, the NRC staff asked SNC to confirm the scope of the requested technical report review. To clarify, SNC requests NRC review and approval of Enclosures 1 – 5 from the April 21, 2017 technical report. While SNC's intent is that the Enclosures can be separated for review by the appropriate NRC branch, they are intertwined such that NRC approval of all five is necessary for SNC's final resolution of Generic Letter (GL) 2004-02.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at 205.992.7369.

Mr. J. J. Hutto 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,

J. J. Hutto
Regulatory Affairs Director

JJH/RMJ

Sworn to and subscribed before me this 11 *day of* July, *2017.*

Notary Public

My commission expires: 9.8.2018

MICHELLE L GRAVES
Notary Public
Alabama State at Large

Enclosure: SNC Response to NRC Request Regarding Risk-Informed Methodology

cc: Regional Administrator, Region II
NRR Project Manager – Vogtle 1 & 2
Senior Resident Inspector – Vogtle 1 & 2
State of Georgia Environmental Protection Division
RType: CVC7000

Vogtle Electric Generating Plant Units 1 & 2
Response to Supplemental Information Needed for Acceptance of Systematic Risk-Informed Assessment of Debris Technical Report

Enclosure

SNC Response to NRC Request Regarding Risk-Informed Methodology

NRC Information Request:

Regulatory Guide 1.200, Rev. 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" (ADAMS Accession No. ML090410014) describes an approach for determining whether the technical adequacy of a PRA is sufficient to provide confidence in the results; it also describes information the NRC staff expects to be included in risk-informed submittals. As discussed in the guide, a risk informed submittal should contain discussions concerning peer review. If the peer review is not performed against the established standards, then information needs to be included in the submittal demonstrating that the different criteria used are consistent with the established standards. The risk-informed methodology described in the technical report should include the following:

- Description demonstrating that the criteria in ASME/ANS RA-Sb-2013 (Addendum B), which is not an established endorsed standard, are consistent with the ASME/ANS RA-Sa-2009 (Addendum A), which is an established endorsed standard, for the seismic probabilistic risk assessment peer review facts and observations.

- If the different criteria are not consistent with the established endorsed standard, an explanation demonstrating that the analogous Addendum A supporting requirements have been met.

<u>SNC Response</u>:

Regulatory Guide 1.200, Revision 2.0 endorses ASME/ANS RA-Sa-2009 (Addendum A) but, as noted in an NRC letter to ASME, does not endorse PRA Standard ASME/ANS RA-Sb-2013 (Addendum B). The Vogtle Electric Generating Plant, Units 1 and 2 (Vogtle) Seismic Probabilistic Risk Assessment (SPRA) peer review was performed using the SPRA requirements in Addendum B.

Because the peer review was not performed against the NRC endorsed standard, information demonstrating that any different criteria used are consistent with the NRC endorsed standard is provided here. The following discussion addresses the differences relative to establishing the technical capability of the Vogtle SPRA.

The ASME/ANS PRA Standard Part 5 requirements for at-power seismic PRA (in all versions of the PRA Standard) are organized into the following three major technical elements:

- Seismic hazard analysis (technical element SHA)
- Seismic fragility analysis (technical element SFR), and
- Seismic plant-response modeling (technical element SPR)

Each technical element contains several high level requirements (HLR) and associated supporting requirements (SR). The following three tables (Table 1 for SHA, Table 2 for SFR and Table 3 for SPR) provide SR by SR comparisons between Addendum A and Addendum B of the ASME/ANS PRA Standard. Differences between SR wordings are denoted in the following tables using bold type. Changes in the HLRs between Addendum A and Addendum B are denoted using strikethrough text. The comparison assessment focuses on capability category II (CCII); as such, SR text not related to CCII is not included in the following

tables. This comparison assessment is performed by SR and not by HLR; peer reviewers assess technical quality by reviewing SRs (HLRs are not assigned technical capabilities). The following assessment conclusion categories are used in the SR comparison assessment:

- **Addendum B Assessment Equates to Addendum A**: This conclusion category is used when the SR wording of Addendum A and Addendum B are the same or effectively the same (i.e., re-wording that is for clarity and consistency and not intended to change the intent). This conclusion category is also used in cases where the wording differences are related to moving the requirements to another SR. In certain SRs the qualifier for a specific capability category range is assigned to indicate the focus on capability category II when there are differences in other capability categories. A peer reviewer using Addendum A or Addendum B would come to the same technical capability assessment on these topics.

- **Addendum B Envelopes Addendum A**: This conclusion category is used when the SR wording of Addendum A and Addendum B are different and the requirements of Addendum B envelope that of Addendum A (i.e., if the analysis meets Addendum B CCII then by definition it meets Addendum A CCII or higher). A peer reviewer using Addendum B would assess a technical capability on these topics that would be equal to or greater than what would be determined if Addendum A were used in the review.

- **Vogtle Conforms to Addendum A**: This conclusion category is used when the SR wording of Addendum A and Addendum B are different, or some of the requirements of Addendum A no longer exist in Addendum B, yet the analysis performed and documented in the Vogtle analysis conforms to the requirements of Addendum A as well as Addendum B.

- **Vogtle Conforms to Accepted Current Practices**: This conclusion category is used when the SR wording of Addendum A and Addendum B are different; or some of the requirements of Addendum A no longer exist in Addendum B because they were removed from the Standard as confusing or judged too specific “how-to”. For the one SR where this conclusion category applies, Vogtle does not follow some of the specifics of the Addendum A SR requirements but Vogtle does conform to accepted current practices.

While the Vogtle SPRA was peer reviewed against the ASME/ANS RA-Sb-2013 (Addendum B) requirements, the tables that follow demonstrate that most of the supporting requirements in Addendum B are consistent with the supporting requirements in ASME/ANS RA-Sa-2009 (Addendum A). For the few supporting requirements where differences are noted in the tables, the Vogtle SPRA model and documentation meet the analogous Addendum A supporting requirements. Therefore, the Vogtle SPRA meets the technical adequacy requirements of Regulatory Guide 1.200, Revision 2 and is of sufficient quality and level of detail to support the risk informed approach for GSI-191.

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
HLR-SHA-A: The frequency of earthquakes at the site shall be based on a site-specific probabilistic seismic hazard analysis (existing or new) that reflects the composite distribution of the informed technical community. The level of analysis shall be determined based on the intended application and on site-specific complexity.					
SHA-A1	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	In performing the probabilistic seismic hazard analysis (PSHA), BASE it on, and MAKE it consist of, the collection and evaluation of available information and data, evaluation of the uncertainties in each element of the PSHA, and a defined process and documentation to make the PSHA traceable.		**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A	Identical to Addendum A		
SHA-A2	ASME/ANS RA-Sa–2009	As the parameter to characterize both hazard and fragilities, USE the spectral accelerations, or the average spectral acceleration over a selected band of frequencies, or peak ground acceleration.		<not printed here; not focus of this assessment>	**Addendum B CC1-III Assessment Equates to Addendum A CCI-II** In response to EPRI 2011 comment, Addendum B removed the CCIII requirements. The Addendum B SR equates to Addendum A CCI-II.
	ASME/ANS RA-Sb–2013	Identical to Addendum A for CC I/II			
SHA-A3	ASME/ANS RA-Sa–2009	**In the selection of frequencies to determine spectral accelerations or average spectral acceleration, CAPTURE** the frequencies of those structures, systems, or components, **or a combination thereof** that are significant in the PRA results and insights.			**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs, and also made minor changes in wordings. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**If spectral acceleration or average spectral acceleration over a band of frequencies is used, INCLUDE** the response frequencies of SSCs that are significant in the PRA results and insights.			

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SHA-A4	ASME/ANS RA-Sa–2009	In developing the probabilistic seismic hazard analysis results, whether they are characterized by spectral accelerations, peak ground accelerations, or both, EXTEND them to large-enough values (consistent with the physical data and interpretations) so that the truncation does not produce unstable final numerical results, such as core damage frequency, and the delineation and ranking of seismic-initiated sequences are not affected.			**Addendum B Assessment Equates to Addendum A** Addendum B added the phrase "for use in accident sequence quantification". This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	In developing the probabilistic seismic hazard analysis results **for use in accident sequence quantification,** whether they are characterized by spectral accelerations, peak ground accelerations, or both, EXTEND them to large-enough values (consistent with the physical data and interpretations) so that the truncation does not produce unstable final numerical results, such as core damage frequency, and the delineation and ranking of seismic-initiated sequences are not affected.			
SHA-A5	ASME/ANS RA-Sa–2009	SPECIFY a lower-bound magnitude (or probabilistically defined characterization of magnitudes based on a damage parameter) for use in the hazard analysis, such that earthquakes of magnitude less than this value are not expected to cause significant damage to the engineered structures or equipment.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
HLR-SHA-B: To provide inputs to the probabilistic seismic hazard analysis, a comprehensive up-to-date database including geological, seismological, and geophysical data; local site topography; and surficial geologic and geotechnical site properties shall be compiled. A catalog of historical, instrumental, and paleoseismicity information shall also be compiled.					
SHA-B1	ASME/ANS RA-Sa–2009	In performing the probabilistic seismic hazard analysis (PSHA), **BASE it on** available or developed geological, seismological, geophysical, and geotechnical data that reflect the current state of the knowledge and that are used by experts/analysts to develop		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs. This wording edit does not change the

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
		interpretations and inputs to the PSHA.			capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	In performing the probabilistic seismic hazard analysis (PSHA), **USE** available or developed geological, seismological, geophysical, and geotechnical data that reflect the current state of the knowledge and that are used by experts/analysts to develop interpretations and inputs to the PSHA.		<not printed here; not focus of this assessment>	
SHA-B2	ASME/ANS RA-Sa–2009	ENSURE that the database and information used are adequate to characterize all credible seismic sources that may contribute significantly to the frequency of occurrence of vibratory ground motion at the site, considering regional attenuation of ground motions and local site effects. If the existing probabilistic seismic hazard analysis (PSHA) studies are to be used in the seismic PRA, ENSURE that any new data or interpretations that could affect the PSHA are adequately incorporated in the existing data and analysis.		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B for CCI and CCII.
	ASME/ANS RA-Sb–2013	Identical to Addendum A		<not printed here; not focus of this assessment>	
SHA-B3	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	As a part of data collection, COMPILE a catalog of historically reported, geologically identified, and instrumentally recorded earthquakes. USE reference [5-30]		**Vogtle Conforms to Addendum A** A catalog of historically reported, geologically identified, and instrumentally recorded

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
			requirements or equivalent.		earthquakes for the entire CEUS was compiled by the 2012 CEUS SSC report. Following a SSHAC Level 3 process, the CEUS SSC report is a robust evaluation of available information on historical seismicity, paleoseismic data on large-magnitude recurrence rates, and state-of-the-knowledge of earthquake seismic sources as considered in the informed technical community. The 2012 CEUS SSC catalog followed a SSHAC Level 3 process and is applicable for risk informed applications. Compiling a new catalog will not be as rigorous as the SSHAC Level 3 process. The Addenda B SR requirement is appropriate for CC-II. The 2012 CEUS SSC report used an earthquake catalog which extended through 2008. Recent earthquake activity in the vicinity of the Vogtle site was assessed for its impact on hazard. The study was based on a temporal update of the earthquake catalog from 2009 through February 2016. The assessment concluded that the 2012 CEUS SSC report seismicity parameters are appropriate for evaluation of seismic hazard at Vogtle. Based on this, the Vogtle PSHA that was performed conforms to Addendum A.
	ASME/ANS RA-Sb–2013	INCLUDE an appropriate existing catalog of historically reported earthquakes, instrumentally recorded earthquakes, and earthquakes reported through geological investigations. USE reference [5-30] requirements or equivalent.		<not printed here; not focus of this assessment>	
HLR-SHA-C: To account for the frequency of occurrence of seismic ground motions in the site region, the probabilistic seismic hazard analysis shall examine all credible sources of potentially damaging earthquakes.					

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SHA-C1	ASME/ANS RA-Sa–2009	In the probabilistic seismic hazard analysis, **EXAMINE all potential** sources of earthquakes **that affect the probabilistic hazard at the site. BASE the identification and characterization of seismic sources on** regional and site geological and geophysical data, historical and instrumental seismicity data, the regional stress field, and geological evidence of prehistoric earthquakes.			**Addendum B Assessment Envelopes Addendum A** Addendum B added additional clarifications and requirements into the text of this SR, and also Addendum B changed action verbs to be consistent with accepted verb usage across SRs. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	In the probabilistic seismic hazard analysis, **EVALUATE sources** of earthquakes that h**ave the potential to contribute significantly to the probabilistic hazard at the site. IDENTIFY and CHARACTERIZE** sei**smic sources taking into account previous compilations of seismic sources, based on** regional and site geological and geophysical data, historical and instrumental seismicity data, and geological evidence of prehistoric earthquakes.			
SHA-C2	ASME/ANS RA-Sa–2009	ENSURE that any expert elicitation process used to characterize the seismic sources is compatible with the level of analysis discussed in Requirement HA-A, and **FOLLOW** a structured approach.			**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	ENSURE that any expert elicitation process used to characterize the seismic sources is compatible with the level of analysis discussed in Requirement HLR-SHA-A, and **USE** a structured approach.			
SHA-C3	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	The seismic sources are characterized by **source location** and geometry, maximum earthquake magnitude, and earthquake recurrence. INCLUDE the aleatory and epistemic uncertainties explicitly in these characterizations.		**Vogtle Conforms to Addendum A** Addenda B added additional clarification into the text of this SR, and also added a clause "where significant" at the end. The Addenda B SR requirement is appropriate for CC-II. Under the SSHAC Level 3 process the aleatory and epistemic uncertainties in

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	The seismic sources are characterized by **alternative source representation** and source geometry, maximum earthquake magnitude, and earthquake recurrence. INCLUDE the aleatory and epistemic uncertainties explicitly in these characterizations, **where significant.**		seismic sources are characterized for source location and geometry, magnitude, and activity rate. Logic trees to account for the epistemic uncertainty were developed as part of the SSHAC Level 3 methodology implemented in the CEUS SSC report. The aleatory uncertainty was also accounted for in the PSHA framework of the Vogtle PSHA. For seismic sources representing repeated large magnitude earthquakes (RLMEs), uncertainties in location and geometry, magnitude model, activity rate, and maximum magnitude were explicitly included in the characterization. For background sources, uncertainty in geometry was represented with alternative sets of area sources, uncertainties in recurrence rates were represented with alternative rates, and uncertainties in maximum magnitude were represented with distributions of values. These uncertainties were documented in the 2012 CEUS SSC report and were included in the Vogtle PSHA. Based on this, the Vogtle PSHA that was performed conforms to Addendum A.
SHA-C4	ASME/ANS RA-Sa–2009	If an existing probabilistic seismic hazard analysis study is used, **SHOW** that any seismic sources that **were previously unknown** or uncharacterized are not significant, or INCLUDE them in a **revision** of the hazard estimates.			**Addendum B Assessment Equates to Addendum A** Addendum B added additional clarifications and modified the sentence structure to highlight the seismic source model aspect of the PSHA. In addition, Addendum B changed action verbs to be consistent with accepted
	ASME/ANS RA-Sb–2013	If an existing seismic source model is used, **DEMONSTRATE** that any new seismic sources that **have been identified** or were uncharacterized **when the existing models were developed** are not			

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
		significant, or INCLUDE them in the **update** of the hazard estimates.			verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
HLR-SHA-D: The probabilistic seismic hazard analysis shall examine mechanisms influencing vibratory ground motion that can occur at a site given the occurrence of an earthquake of a certain type (e.g., strike slip, normal, reverse) and magnitude, and at a certain location. Uncertainties shall be addressed in characterizing the ground motion propagation.					
SHA-D1	ASME/ANS RA-Sa–2009	**ACCOUNT in the probabilistic seismic hazard analysis for** (a) credible mechanisms governing estimates of vibratory ground motion that can occur at a site (b) **regional and site-specific geological, geophysical, and geotechnical data and** historical and instrumental seismicity data (including strong motion data) (c) current attenuation models in the ground motion estimates			**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs. In addition, Addendum B modified item (b) by removing requirements that were redundant with SHA-B1. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**In the vibratory ground motion analysis, INCLUDE** (a) credible mechanisms governing estimates of vibratory ground motion that can occur at a site (b) **available** historical and instrumental seismicity data (including strong motion data) (c) current attenuation models for the ground motion estimates			
SHA-D2	ASME/ANS RA-Sa–2009	ENSURE that any expert elicitation process used to characterize the ground motion is compatible with the level of analysis discussed in Requirement SHA-A, and **FOLLOW** a structured approach.			**Addendum B Assessment Envelopes Addendum A** Addendum B added additional requirements into the text of this SR, and also Addendum B changed action verbs to be consistent with accepted verb usage across SRs. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	ENSURE that any expert elicitation process used to characterize the ground motion **or any other elements of the ground motion analysis** is compatible with the level of analysis discussed in Requirement HLR-SHA-A, and **USE** a structured approach.			
SHA-D3	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**ADDRESS** both the aleatory and epistemic uncertainties in the ground motion characterization in accordance with the level of analysis identified for Requirement SHA-A.		**Addendum B Assessment Envelopes Addendum A** Addendum B changed action verbs to be

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**INCLUDE** both the aleatory and epistemic uncertainties **separately** in the ground motion characterization in accordance with the level of analysis identified for Requirement HLR-SHA-A.		consistent with accepted verb usage across SRs, and also Addendum B added additional requirement on handling aleatory and epistemic uncertainties separately. The Addendum B SR wording envelopes that of Addendum A.
SHA-D4	ASME/ANS RA-Sa–2009	If an existing **probabilistic seismic hazard analysis study** is used, **SHOW** that **any ground motion models or** new information that were previously unused or unknown are not significant, or INCLUDE them in a **revision** of the hazard estimates.			**Addendum B Assessment Equates to Addendum A** Addendum B added additional clarifications and modified the sentence structure to highlight the ground motion model aspect of the PSHA. In addition, Addendum B changed action verbs to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	If existing **ground motion models** are used, **DEMONSTRATE** that new information not previously used or which was unknown when the existing models were developed would not significantly affect the PSHA results, or INCLUDE it in the **update** of the hazard estimates.			
HLR-SHA-E: The probabilistic seismic hazard analysis shall account for the effects of local site response.					
SHA-E1	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**ACCOUNT in the probabilistic seismic hazard analysis for** the effects of site topography, surficial geologic deposits, and site geotechnical properties on ground motions at the site.		**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**In the probabilistic seismic hazard analysis, INCLUDE** the effects of site topography, surficial geologic deposits, and site geotechnical properties on ground motions at the site.		
SHA-E2	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**ADDRESS** both the aleatory and epistemic uncertainties in the local site response analysis.		**Addendum B Assessment Equates to Addendum A**

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**INCLUDE** both the aleatory and epistemic uncertainties in the local site response analysis.		Addendum B changed action verbs to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
HLR-SHA-F: Uncertainties in each step of the hazard analysis shall be propagated and displayed in the final quantification of hazard estimates for the site. *Addendum A only:* The results shall include fractile hazard curves, median and mean hazard curves, and uniform hazard response spectra. For certain applications, the probabilistic seismic hazard analysis shall include seismic source deaggregation and magnitude-distance deaggregation					
SHA-F1	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	In the final quantification of the seismic hazard, INCLUDE **and DISPLAY the propagation of both aleatory and epistemic uncertainties.**		**Addendum B Assessment Equates to Addendum A** In response to NRC 2012 comment on Addendum B ballot that said the wording of this SR was vague, Addendum B revised the wording to be clear that CCI is Mean only and that CCII-III is a family of hazard curves. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	In the final quantification of the seismic hazard, INCLUDE **uncertainties through a family of hazard curves.**		
SHA-F2	ASME/ANS RA-Sa–2009	In the probabilistic seismic hazard analysis, INCLUDE appropriate sensitivity studies and inter mediate results to identify factors that are important to the site hazard and that make the analysis traceable.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SHA-F3	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**DEVELOP** the following results as a part of the quantification process, compatible with needs for the level of analysis determined in (HLR-SHA-A): (a) fractile and mean hazard curves for each ground motion parameter considered in the probabilistic seismic hazard analysis (b) fractile and mean uniform hazard response spectrum	<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across SRs, and also Addendum B added additional clarification on the phrase "quantification process" by modifying it to "hazard quantification process". This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**CALCULATE** the following results as a part of the **hazard** quantification process, compatible with needs for the level of analysis determined in Requirement HLR-SHA-A: …	<not printed here; not focus of this assessment>	
HLR-SHA-G: Addendum A: For further use in the seismic PRA, the spectral shape shall be based on a site-specific evaluation taking into account the					

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
contributions of deaggregated magnitude-distance results of the probabilistic seismic hazard analysis. Broad-band, smooth spectral shapes, such as those presented in NUREG/CR-0098 [5-5] (for lower seismicity sites such as most of those east of the U.S. Rocky Mountains) are also acceptable if they are shown to be appropriate for the site. The use of existing uniform hazard response spectra (UHSs) is acceptable unless evidence comes to light that would challenge these uniform hazard spectral shapes. Reg Guide 1.200 Rev2 Clarification: For further use in the seismic PRA, the spectral shape shall be based on a site-specific evaluation taking into account the contributions of deaggregated magnitude-distance results of the probabilistic seismic hazard analysis. ~~Broad-band, smooth spectral shapes, ... that would challenge these uniform hazard spectral shapes.~~ Addendum B: For further use in the seismic PRA, the spectral shape shall be based on a site-specific evaluation taking into account results of the probabilistic seismic hazard analysis.					
SHA-G1	ASME/ANSRA-Sa–2009	<not printed here; not focus of this assessment>	**BASE** the **response** spectral shape used in the seismic PRA **on site-specific evaluations performed for the probabilistic seismic hazard analysis. REFLECT or BOUND the site-specific considerations.**	<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B deleted the last sentence of this SR to make the language more concise and remove redundancy. In addition, Addendum B changed the action verb to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
	ASME/ANSRA-Sb–2013	<not printed here; not focus of this assessment>	**ENSURE that** the spectral shape used in the seismic PRA **uses site-specific evaluations performed for the PSHA.**	<not printed here; not focus of this assessment>	
HLR-SHA-H: When use is made of an existing study for probabilistic seismic hazard analysis purposes, it shall be confirmed that the basic data and interpretations are still valid in light of established current information [*Addendum A only:* the study meets the requirements outlined in A through G above, and the study is suitable for the intended application.] Reg Guide 1.200 Rev 2 Clarification: ~~When use ... for the intended application.~~ **It shall be confirmed that basic data and interpretations**					

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
from an existing study are valid.					
SHA-H1	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**Use of existing studies allowed.**	<not printed here; not focus of this assessment>	**Addendum B Assessment Envelopes Addendum A** Addendum B added additional clarifications and requirements into the text of this SR. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	**CONFIRM that the basic data and interpretations for any existing studies used remain valid in light of established current information, consistent with the Requirements HLR-SHA-A through HLR-SHA-G, and DESCRIBE the bases and methodology used.**			
HLR-SHA-I: A screening analysis shall be performed to assess whether, in addition to the vibratory ground motion, other seismic hazards, such as fault displacement, landslide, soil liquefaction, or soil settlement, need to be included in the seismic PRA [*Addendum A only:* for the specific application. If so, the seismic PRA shall address the effect of these hazards through assessment of the frequency of hazard occurrence or the magnitude of hazard consequences, or both.] Reg Guide 1.200 Rev 2 Clarification: ~~A screening analysis ... or the magnitude of hazard consequences, or both.~~ **The hazard analysis shall include hazards other than vibratory ground motion if necessary.**					
SHA-I1	ASME/ANS RA-Sa–2009	**(There are no supporting requirements here.)**			**Addendum B Assessment Envelopes Addendum A** There are no supporting requirements for HLR-SHA-I in Addendum A. Since the HLRs only say “do something” and the SRs establish what needs to be done, the addition of SRs in Addendum B establishes new requirements beyond Addendum A.
	ASME/ANS RA-Sb–2013	**DOCUMENT the bases and methodology used for any screening out of the seismic hazards other than vibratory ground motion.**			
SHA-I2	ASME/ANS RA-Sa–2009	**no SHA-I2 in Addendum A**			**Addendum B Assessment Envelopes Addendum A** There are no supporting requirements for HLR-SHA-I in Addendum A. Since the HLRs only say “do something” and the SRs establish what needs to be done, the addition of SRs in Addendum B establishes new
	ASME/ANS RA-Sb–2013	**For those hazards not screened out, INCLUDE their effect through assessment of the frequency of hazard occurrence and the magnitude of hazard consequences.**			

Table 1: Comparison of Supporting Requirements of Addendum A and Addendum B for SHA					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
					requirements beyond Addendum A.
HLR-SHA-J: Documentation of the probabilistic seismic hazard analysis shall be consistent with the applicable supporting requirements					
SHA-J1	ASME/ANS RA-Sa–2009	DOCUMENT the probabilistic seismic hazard analysis in a manner that facilitates PRA applications, upgrades, and peer review.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SHA-J2	ASME/ANS RA-Sa–2009	DOCUMENT the process used in the probabilistic seismic hazard analysis. For example, this documentation is typically consistent with reference [5-28] and includes a description of: (a) the specific methods used for source characterization and ground motion characterization, (b) the scientific interpretations that are the basis for the inputs and results, and (c) if an existing PSHA is used, documentation to ensure that it is adequate to meet the spirit of the requirements herein.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SHA-J3	ASME/ANS RA-Sa–2009	DOCUMENT the sources of model uncertainty and related assumptions associated with the probabilistic seismic hazard analysis.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
HLR-SFR-A: Addendum A: The seismic-fragility evaluation shall be performed to estimate seismic fragilities of SSCs whose failure may contribute to core damage or large early release, or both. Addendum B: The seismic-fragility evaluation shall be performed to estimate plant-specific, realistic seismic fragilities of structures, or systems, or components, or a combination thereof whose failure may contribute to core damage or large early release, or both.					
SFR-A1	ASME/ANS RA-Sa–2009	**DEVELOP** seismic fragilities for all those structures, systems, or components, **or a combination thereof** identified by the systems analysis (see Requirement SPR-D1).			**Addendum B Assessment Equates to Addendum A** The changes from Addendum A to Addendum B for this SR included the replacement of "DEVELOP" with "CALCULATE." The change implements a more precise action verb. These wording edits do not change capability category requirements of this SR. The elimination of the phrase “a combination thereof” does not change the requirements, since it is redundant to other SRs requiring consideration of seismic correlation.
	ASME/ANS RA-Sb–2013	**CALCULATE** seismic fragilities for SSCs identified by the systems analysis (see Requirement SPR-D1).			
SFR-A2	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**BASE** the seismic fragilities on plant-specific data, and ENSURE that they are realistic (median with uncertainties). Generic data (e.g., fragility test data, generic seismic qualification test data, and earthquake experience data)	<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** The changes from Addendum A to Addendum B involve the replacement of "BASE" with the more precise action verb "CALCULATE" and the replacement of "conservative" with "applicable" in the last sentence with respect to the use of generic fragility data. The latter change precludes confusion due to a contradiction, as the requirement states first that realistic fragilities

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
			MAY be used for screening of certain structures, systems, or components, or a combination thereof and for calculating their seismic fragilities by applying the requirements under (HLR-SFR-F), which permits use of such generic data under specified conditions. However, DEMONSTRATE that any use of such generic data is **conservative.**		are required but then the use of generic data is to be conservative. In the context of the requirement, the use of "applicable" is correct and does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**CALCULATE** the seismic fragilities based on plant-specific data, and ENSURE that they are realistic (median with uncertainties). Generic data (e.g., fragility test data, generic seismic qualification test data, and earthquake experience data) may be used for screening	<not printed here; not focus of this assessment>	

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
			of certain SSCs and for calculating their seismic fragilities by applying the Requirement HLR-SFR-F, which permits use of such generic data under specified conditions. However, DEMONSTRATE that any use of such generic data is **applicable.**		
HLR-SFR-B: If screening of high-seismic-capacity components is performed, the basis for the screening shall be fully described.					
SFR-B1	ASME/ANSRA-Sa–2009	If screening of high-seismic-capacity components is performed, DESCRIBE **fully** the basis for screening and supporting documents. For example, it is acceptable to apply guidance given in EPRI NP-6041-SL, Rev. 1, and NUREG/CR-4334 to screen out components with high seismic capacity. **However, CHOOSE** the screening level high enough that the contribution to core damage frequency and large early release frequency from the screened-out components is not significant.	<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B removes the sentence citing NP-6041-SL and NUREG/CR-4334 as examples of screening bases and replaces the action verb "CHOOSE" with the more precise verb "SELECT." These wording edits are non-substantive and do not change capability category requirements of this SR.

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	If screening of high-seismic-capacity components is performed, DESCRIBE the basis for screening and the supporting documents **and SELECT** the screening level high enough that the contribution to core damage frequency and large early release frequency from the screened-out components is not significant.		<not printed here; not focus of this assessment>	
SFR-B2	ASME/ANS RA-Sa–2009	**ASSESS and DOCUMENT the applicability of the screening criteria given in EPRI NP-6041-SL, Rev. 1 [5-3] and NUREG/CR-4334 [5-4] for the specific plant and specific equipment.**			**Addendum B Assessment Equates to Addendum A** Addendum B deleted this SR. The clarifying non-mandatory footnote for SFR-B1, which remains unchanged from Addendum A to Addendum B, reiterates that NP-6041-SL and NUREG/CR-4334 "may be used" and are not mandatory. SFR-B2 in Addendum A states the applicability of NP-6041-SL and NUREG/CR-4334 shall be assessed and documented. However, if NP-6041-SL and NUREG/CR-4334 are applied for screening, SFR-B1 in both Addendum A and Addendum B state that the basis for use shall be described and documentation is addressed under SFR-G2. Therefore, SFR-B2 is redundant and its removal does not change the requirements of the standard.
	ASME/ANS RA-Sb–2013	**No SFR-B2 in Addendum B**			
HLR-SFR-C: The seismic-fragility evaluation shall be based on seismic response that the SSCs experience at their failure levels					

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SFR-C1	ASME/ANSRA-Sa–2009	ESTIMATE the seismic responses that the components experience at their failure levels **on a realistic basis** using site-specific earthquake response spectra in three orthogonal directions, anchored to a ground motion parameter such as peak ground acceleration or average spectral acceleration over a given frequency band. ENSURE that the spectral shape used **reflects or** bounds the site-specific conditions.		<not printed here; not focus of this assessment>	**Addendum B Assessment Envelopes Addendum A** The two changes from Addendum A to Addendum B involve the deletion of "site-specific" prior to "earthquake response spectra" in the first sentence and deletion of "reflects" in the last sentence. Removal of "site-specific" prior to earthquake response spectra is inconsequential as bounding by site-specific conditions by definition renders the earthquake response spectra site-specific. Removal of "reflects" renders Addendum B as more precise since the properties must "bound" site-specific conditions and not merely "reflect."
	ASME/ANSRA-Sb–2013	ESTIMATE the seismic responses that the components experience at their failure levels using input earthquake response spectra in three orthogonal directions, anchored to a ground motion parameter such as peak ground acceleration or average spectral acceleration over a given frequency band, and ENSURE that the spectral shape used bounds the site-specific conditions.		<not printed here; not focus of this assessment>	
SFR-C2	ASME/ANSRA-Sa–2009	If probabilistic response analysis is performed to obtain **realistic** structural loads and floor response spectra, ENSURE that the number of simulations done (e.g., Monte Carlo simulation and Latin Hypercube Sampling) is large enough to obtain stable median and 85% nonexceedance responses. **ACCOUNT for** the entire spectrum of input ground motion levels displayed in the seismic hazard curves.		<not printed here; not focus of this assessment>	**Addendum B Assessment Envelopes Addendum A** The changes from Addendum A to Addendum B are to implement the approved action verb "ACCOUNT" to the more precise verb "INCLUDE" and to eliminate "realistic" in the first sentence prior to "structural loads and floor response spectra." The qualifier

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	If probabilistic response analysis is performed to obtain structural loads and floor response spectra, ENSURE that the number of simulations done (e.g., Monte Carlo simulation and Latin Hypercube Sampling) is large enough to obtain stable median and 85% nonexceedance responses. **INCLUDE** the entire spectrum of input ground motion levels displayed in the seismic hazard curves.		<not printed here; not focus of this assessment>	realistic is removed to avoid confusion as it is unnecessary in the context of applying probabilistic response analysis to determine structural loads and response spectra.
SFR-C3	ASME/ANS RA-Sa–2009	If scaling of existing design response analysis is used, JUSTIFY it based on the adequacy of structural models, foundation characteristics, and similarity of input ground motion.		<not printed here; not focus of this assessment>	**Vogtle Conforms to Addendum A** The change from Addendum A to Addendum B involved the deletion of the word "design" from "existing design response analysis." However, Plant Vogtle did not perform scaling of any existing response analysis, and therefore the change is irrelevant and Vogtle conforms to Addendum A.
	ASME/ANS RA-Sb–2013	If scaling of existing response analysis is used, JUSTIFY it based on the adequacy of structural models, foundation characteristics, and similarity of input ground motion.		<not printed here; not focus of this assessment>	
SFR-C4	ASME/ANS RA-Sa–2009	When the design response analysis models are judged not to be realistic and state of the art, or when the design input ground motion is significantly different from the site-specific input motion, PERFORM new analysis to obtain realistic structural loads and floor response spectra.		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Similar to SFR-C3, Addendum B in SFR-C4 eliminates "design" from "existing design response analysis" in the first sentence and adds the "for use in the seismic PRA" to the last sentence. The judgement of existing response analysis models as unrealistic and not state of the art as stated in Addendum B would include the judgement of existing design response analyses; therefore this change is non-substantive. The addition of "for use in the seismic PRA" is for clarification
	ASME/ANS RA-Sb–2013	When the existing response analysis models are judged not to be realistic and state of the art, or when the design input ground motion is significantly different from the site-specific input motion, PERFORM new analysis to obtain realistic structural loads and floor response spectra for use in the seismic PRA.		<not printed here; not focus of this assessment>	

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
					and also non-substantive.
SFR-C5	ASME/ANS RA-Sa–2009	If median-centered response analysis is performed, ESTIMATE the median response (i.e., structural loads and floor response spectra) and variability in the response using established methods.		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A		<not printed here; not focus of this assessment>	
SFR-C6	ASME/ANS RA-Sa–2009	When soil-structure interaction (SSI) analysis is conducted, ENSURE that it is median centered using median properties, at soil strain levels corresponding to the input ground motions that **dominate** the seismically induced core damage frequency. ACCOUNT for the uncertainties in the SSI analysis **by varying the low strain soil shear modulus between the median value times (1 + Cv) and the median value divided by (1 + Cv), where Cv is a factor that accounts for uncertainties in the SSI analysis and soil properties. If adequate soil investigation data are available, ESTABLISH the mean and standard deviation of the low strain shear modulus for every soil layer. Then ESTABLISH the value of Cv so that it will cover the mean plus or minus one standard deviation for every layer. The**		<not printed here; not focus of this assessment>	**Vogtle Conforms to Accepted Current Practices** The changes in SFR-C6 involved the replacement of "ACCOUNT for" with the more precise action verb "INCLUDE", the non-substantive replacement of "dominate" with "contribute most" for PRA standard consistency, and the removal of how to perform SSI uncertainty analysis. The SSI uncertainty analysis method presented in Addendum A is derived from ASCE 4-98 (as indicated by the non-mandatory Note 5). Section 3.3.1.7 of ASCE 4-98 states that the use of (1 + Cv) to vary low strain soil shear moduli is an acceptable method *in lieu of probabilistic evaluation,* which Section C.3.3.1.7 further states is the

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
		minimum value of Cv is 0-5. When insufficient data are available to address uncertainties in soil properties, ENSURE that Cv is taken as no less than 1.0.			preferred approach. Plant Vogtle accounted for uncertainties in the SSI analysis by applying strain-compatible soil properties derived from probabilistic evaluation via the PSHA. Use of the ASCE 4-98 alternate approach using (1 + Cv) would render overly conservative and unrealistic response analysis results, which would invalidate other SRs. Therefore, the Addendum B assessment is considered appropriate.
	ASME/ANS RA-Sb–2013	When soil-structure interaction (SSI) analysis is conducted, ENSURE that it is median centered using median properties, at soil strain levels corresponding to the input ground motions that **contribute most** to the seismically induced core damage frequency. INCLUDE the uncertainties in the SSI analysis.		<not printed here; not focus of this assessment>	
HLR-SFR-D: The seismic-fragility evaluation shall be performed for critical failure modes of SSCs such as structural failure modes and functional failure modes identified through the review of plant design documents, supplemented as needed by earthquake experience data, fragility test data, generic qualification test data, and a walkdown.					
SFR-D1	ASME/ANS RA-Sa–2009	IDENTIFY realistic failure modes of structures and equipment that interfere with the operability of equipment during or after the earthquake through a review of the plant design documents and the walkdown.			**Addendum B Assessment Envelopes Addendum A** The change from Addendum A to Addendum

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	IDENTIFY realistic failure modes of structures **(e.g., sliding, overturning, yielding, and excessive drift)**, equipment **(e.g., anchorage failure, impact with adjacent equipment or structures, bracing failure, and functional failure), and soil (e.g., liquefaction, slope instability, and excessive differential settlement)** that interfere with the operability of equipment during or after the earthquake, through a review of the plant design documents and the walkdown.			B involved the move of example failure modes from SFR-D2 to SFR-D1.
SFR-D2	ASME/ANS RA-Sa–2009	**EXAMINE** all relevant failure modes of structures **(e.g., sliding, overturning, yielding, and excessive drift),** equipment **(e.g., anchorage failure, impact with adjacent equipment or structures, bracing failure, and functional failure), and soil (i.e., liquefaction, slope instability, and excessive differential settlement),** and EVALUATE fragilities for critical failure modes.			**Addendum B Assessment Envelopes Addendum A** The changes from Addendum A to Addendum B for this SR involved the aforementioned move of example failure modes to SFR-D1 and change in wording from "EXAMINE all relevant failure modes of structures..." to "EVALUATE relevant failure modes identified in SFR-D1." The latter change implements a more precise action verb in addition to providing more specificity for the evaluation of failure modes.
	ASME/ANS RA-Sb–2013	**EVALUATE all relevant failure modes identified in Requirement SFR-D1,** and EVALUATE fragilities for critical failure modes.			
HLR-SFR-E: The seismic-fragility evaluation shall incorporate the findings of a detailed walkdown of the plant focusing on the anchorage, lateral seismic support, and potential systems interactions.					
SFR-E1	ASME/ANS RA-Sa–2009	CONDUCT a detailed walkdown of the plant, focusing on equipment anchorage, lateral seismic support, spatial interactions, and potential systems interactions (both structural and functional interactions).			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SFR-E2	ASME/ANSRA-Sa–2009	DOCUMENT the walkdown procedures, walkdown team composition and its members' qualifications, walkdown observations, and conclusions.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANSRA-Sb–2013	Identical to Addendum A			
SFR-E3	ASME/ANSRA-Sa–2009	If components are screened out during or following the walkdown, DOCUMENT **anchorage calculations and PROVIDE the basis justifying such a screening.**			**Addendum B Assessment Envelopes Addendum A** The change implemented from Addendum A to Addendum B involves increased requirement to not only document anchorage screening but all screening (e.g. including functional or component structure).
	ASME/ANSRA-Sb–2013	If components are screened out during or following the walkdown, DOCUMENT **the basis, including any anchorage calculations that justify such a screening.**			
SFR-E4	ASME/ANSRA-Sa–2009	During the walkdown, **FOCUS** on the potential for seismically induced fire and flooding.			**Addendum B Assessment Envelopes Addendum A** The change from Addendum A to Addendum B involved changing "FOCUS" into the more precise action verb "EVALUATE" in addition to adding specific criteria pertaining to NUREG-1407.
	ASME/ANSRA-Sb–2013	During the walkdown, **EVALUATE** the potential for seismically induced fire and flooding **by focusing on the issues described in NUREG-1407 [5-7].**			
SFR-E5	ASME/ANSRA-Sa–2009	During the walkdown, **EXAMINE** potential sources of interaction (e.g., II/I issues, impact between cabinets, masonry walls, flammable and combustion sources, flooding, and spray) and consequences of such interactions on equipment contained in the systems model.			**Addendum B Assessment Equates to Addendum A** The change from Addendum A to Addendum B for this SR involved the replacement of "EXAMINE" with "EVALUATE." The action verb change was made to be consistent with accepted verb usage across SRs. These wording edits do not change capability category requirements of this SR..
	ASME/ANSRA-Sb–2013	During the walkdown, **EVALUATE** potential sources of interaction (e.g., II/I issues, impact between cabinets, masonry walls, flammable and combustion sources, flooding, and spray) and consequences of such interactions on equipment contained in the systems model.			

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
HLR-SFR-F: The calculation of seismic-fragility parameters such as median capacity and variabilities shall be based on plant-specific data or, if necessary, on earthquake experience data, fragility test data, and generic qualification test data. Use of such generic data shall be justified.					
SFR-F1	ASME/ANS RA-Sa–2009	**BASE** component seismic-fragility parameters such as median capacity and variabilities (logarithmic standard deviations reflecting randomness and uncertainty) on plant-specific data **supplemented as appropriate by** earthquake experience data, fragility test data, and generic qualification test data.		<not printed here; not focus of this assessment>	**Addendum B Assessment Envelopes Addendum A** Addendum B changes the action verb from "BASE" to the more precise and restrictive verb "CALCULATE" in keeping with the approved action verb list and adds more specificity to the use of sources beyond plant-specific data, including the provision to justify the appropriateness of generic fragility data.
	ASME/ANS RA-Sb–2013	**CALCULATE** component seismic-fragility parameters such as median capacity and variabilities (logarithmic standard deviations reflecting randomness and uncertainty) **based** on plant-specific data **or, if necessary, on** earthquake experience data, fragility test data, and generic qualification test data. ***Exception*: JUSTIFY the use of generic fragility for any SSC as being appropriate for the plant.**		<not printed here; not focus of this assessment>	
SFR-F2	ASME/ANS RA-Sa–2009	For all structures, or systems, or components, or a combination thereof (SSCs) that appear in the dominant accident cut sets, ENSURE that they have site-specific fragility parameters that are derived based on plant-specific information, such as anchoring and installation of the component or structure and plant-specific material test data. *Exception*: JUSTIFY the use of generic fragility for any SSC as being appropriate for the plant.		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B changes the use of "dominant accident cut sets" in Addendum A to "significant accident sequences." This wording edit is for consistency with the convention used elsewhere in the PRA standard to be “software neutral” and does not change the capability category

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
	ASME/ANS RA-Sb–2013	For all SSCs that appear in the significant accident sequences, ENSURE that they have site-specific fragility parameters that are derived based on plant-specific information, such as anchoring and installation of the component or structure and plant-specific material test data. Exception: JUSTIFY the use of generic fragility for any SSC as being appropriate for the plant.		<not printed here; not focus of this assessment>	requirements of this SR.
SFR-F3	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**DEVELOP** seismic fragilities for relays identified to be essential and that are included in the systems-analysis model.		**Addendum B Assessment Equates to Addendum A** The change from Addendum A to Addendum B for this SR was the replacement of "DEVELOP" with "CALCULATE." The action verb change was made to be consistent with accepted verb usage across SRs. These wording edits do not change capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**CALCULATE** seismic fragilities for relays identified to be essential and that are included in the systems-analysis model.		
SFR-F4	ASME/ANS RA-Sa–2009	**DEVELOP** seismic fragilities for structures, or systems, or components, or a combination thereof that are identified in the systems model as playing a role in the large early release frequency part of the seismic PRA. (See Requirements SPR-A1 and SPR-A3.)			**Addendum B Assessment Equates to Addendum A** The changes from Addendum A to Addendum B for this SR included the replacement of "DEVELOP" with "CALCULATE." The action verb change was made to be consistent with accepted verb usage across SRs. Also, SSC abbreviation used instead. These wording edits do not change capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**CALCULATE** seismic fragilities for SSCs that are identified in the systems model as playing a role in the large early release frequency part of the seismic PRA. (See Requirements SPR-A1 and SPR-A3.)			

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
HLR-SFR-G: Documentation of the seismic-fragility evaluation shall be consistent with the applicable supporting requirements.					
SFR-G1	ASME/ANS RA-Sa–2009	DOCUMENT the seismic fragility analysis in a manner that facilitates PRA applications, upgrades, and peer review.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SFR-G2	ASME/ANS RA-Sa–2009	DOCUMENT the process used in the seismic-fragility analysis. For example, this typically includes a description of (a) The methodologies used to quantify the seismic fragilities of structures, or systems, or components, or a combination thereof, together with key assumptions (b) The seismic fragilities of structures, or systems, or components, or a combination thereof (SSC) fragility values that includes the method of seismic qualification, the dominant failure mode(s), the source of information, and the location of the component (c) The fragility parameter values (i.e., median acceleration capacity, Br and Bu) and the technical bases for them for each analyzed SSC, and (d) the different elements of seismic-fragility analysis, such as (1) the seismic response analysis (2) the screening steps (3) the walkdown (4) the review of design documents (5) the identification of critical failure modes for each SSC, and (6) the calculation of fragility parameter values for each SSC modeled			**Addendum B Assessment Equates to Addendum A** The only change in this SR is related to use of "structures, systems, and components" versus its acronym "SSC." This change is considered editorial and does not change the capability category requirements of this SR.

Table 2: Comparison of Supporting Requirements of Addendum A and Addendum B for SFR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	DOCUMENT the process used in the seismic-fragility analysis. For example, this typically includes a description of (a) the methodologies used to quantify the seismic fragilities of SSCs, together with key assumptions (b) the SSC fragility values that includes the method of seismic qualification, the dominant failure mode(s), the source of information, and the location of the component (c) the fragility parameter values (i.e., median acceleration capacity, Br and Bu) and the technical bases for them for each analyzed SSC, and (d) the different elements of seismic-fragility analysis, such as (1) the seismic response analysis (2) the screening steps (3) the walkdown (4) the review of design documents (5) the identification of critical failure modes for each SSC, and (6) the calculation of fragility parameter values for each SSC modeled			
SFR-G3	ASME/ANS RA-Sa–2009	**DOCUMENT the sources of model uncertainty and related assumptions associated with the seismic fragility analysis.**			**Vogtle Conforms to Addendum A** Addendum B deleted this SR. However, the Plant Vogtle 1&2 SPRA documentation describes in detail the sources of model uncertainty and related assumptions associated with the seismic fragility analysis. Therefore, the Vogtle SPRA conforms to Addendum A.
	ASME/ANS RA-Sb–2013	**Deleted.**			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
HLR-SPR-A: The seismic-PRA systems model shall include seismic-caused initiating events and other failures including seismic-induced SSC failures, non–seismic-induced unavailabilities, and human errors, that give rise to significant accident sequences and/or significant accident progression sequences.					
SPR-A1	ASME/ANS RA-Sa–2009	ENSURE that earthquake-caused initiating events that give rise to significant accident sequences and/or significant accident progression sequences are included in the seismic-PRA system model using a systematic process.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. A minor clarification (i.e., very low magnitude earthquakes can be excluded from the quantification process) was added in Addendum B to the clarifying non-mandatory footnote for this SR; this footnote adjustment does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SPR-A2	ASME/ANS RA-Sa–2009	In the initiating-event selection process, DEVELOP a hierarchy to ensure that every earthquake greater than a certain defined size produces a plant shutdown within the systems model.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. A minor clarification (i.e., event ordering by consequence severity) was added in Addendum B to the clarifying non-mandatory footnote for this SR; this footnote adjustment does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SPR-A3	ASME/ANS RA-Sa–2009	USE **the event trees and fault trees** from the internal-event at-power PRA model as the basis for the seismic **event trees**.			**Addendum B Assessment Equates to Addendum A**

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	USE **the accident sequences and the systems logic model** from the at-power, internal-event PRA model as the basis for the seismic-**PRA model**.			Some of the terms in this SR were changed in Addendum B so that they would not be less specific to a certain type of PRA modeling software. These term clarifications do not change the capability category requirements of this SR.
SPR-A4 (Add. B)	ASME/ANS RA-Sb–2013	**This supporting requirement is new to Addendum B and not included in Addendum A.** Under special circumstances based on the judgment of the analyst, DEVELOP an ad hoc systems model tailored especially to the seismic-PRA configurations or issues being modeled, instead of starting with the internal-events model and adapting it, as in Requirement SPR-A3. If this approach is used, ENSURE that the resulting model is consistent with the internal-events systems model regarding plant response and the cause-effect relationships of the failures.			**Addendum B Assessment Equates to Addendum A** Addendum B added this SR to recognize that some utilities may build a separate stand-alone SPRA as opposed to adding seismic aspects into an existing internal events PRA (as described by SPR-A3). This new SR ensures that the technical capability of the base modeling would be consistent with the internal events technical capability requirements. For Vogtle, this specific SR is not applicable because the Vogtle 1&2 SPRA is built upon the internal events PRA per SR SPR-A3 and thus the Vogtle SPRA conforms to Addendum A.
SPR-A4 (Add. A) SPR-A5 (Add. B)	ASME/ANS RA-Sa–2009	**SPR-A4 of Addendum A:** ENSURE that the PRA systems models reflect earthquake-caused failures and nonseismically induced unavailabilities and human errors that give rise to significant accident sequences or significant accident progression sequences.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. Miscellaneous edits were made in Addendum B to the clarifying non-mandatory footnote for this SR; this footnote adjustment does not change the capability category requirements
	ASME/ANS RA-Sb–2013	**SPR-A5 of Addendum B is identical to SPR-A4 of Addendum A. There is no change in the supporting requirement from Addendum A to Addendum B, except that the insertion of a new SPR-A4 in Addendum B changes the number for this**			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
		requirement.			of this SR.
HLR-SPR-B: The seismic-PRA systems model shall be adapted to incorporate seismic-analysis aspects that are different from corresponding aspects found in the at-power, internal-events PRA systems model.					
SPR-B1	ASME/ANS RA-Sa–2009	In each of the following aspects of the seismic-PRA systems-analysis work, SATISFY the corresponding requirements in Part 2, except where they are not applicable or where this Part includes additional requirements. **DEVELOP a defined** basis to support the claimed nonapplicability of any exceptions. The aspects governed by this requirement are (a) initiating-event analysis (b) accident-sequence analysis (c) success-criteria analysis (d) systems analysis (e) data analysis (f) human-reliability analysis (g) use of expert judgment **When the Part 2 requirements are used, FOLLOW the Capability Category designations in Part 2, and for consistency USE the same Capability Category in this analysis.**			**Vogtle Conforms to Addendum A** Addendum B removed the last sentence of this SR in response to an EPRI 2011 comment on the Addendum B ballot. The last sentence was removed in Addendum B because it was determined to be confusing as wells as inappropriate specificity to require all new aspects in the SPRA to meet the exact same CCs of Part 2 SRs. In addition, Addendum B changed the action verb to be consistent with accepted verb usage across SRs. The Addendum B SR requirement clarifications are appropriate. Regardless, the Plant Vogtle 1&2 SPRA builds upon the internal events PRA and uses the same

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
	ASME/ANS RA-Sb–2013	In each of the following aspects of the seismic-PRA systems-analysis work, SATISFY the corresponding requirements in Part 2, except where they are not applicable or where this Part includes additional requirements. **SPECIFY** a basis to support the claimed nonapplicability of any exceptions. The aspects governed by this requirement are (a) initiating-event analysis (b) accident-sequence analysis (c) success-criteria analysis (d) systems analysis (e) data analysis (f) human-reliability analysis (g) use of expert judgment			general methodologies as used for Part 2 where applicable; therefore, the Vogtle SPRA conforms to Addendum A.
SPR-B2	ASME/ANS RA-Sa–2009	**In the human reliability analysis (HRA) aspect, EXAMINE additional post earthquake stresses that can increase the likelihood of human errors or inattention, compared to the likelihood assigned in the internal-events HRA when the same activities are undertaken in no earthquake accident sequences. Whether or not increases in error probabilities are used, JUSTIFY the basis for this decision about what error rates to use.**			**Addendum B Assessment Envelopes Addendum A** In response to an EPRI 2011 comment on the Addendum B ballot, Addendum B added CCI-II and CCIII capability differentiation as well as the requirement to include the seismic HEP impacts on the internal events based HEPs, not simply to Examine them. It also expanded on the considerations to emphasize PSFs beyond just stress. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	**INCLUDE the following seismic impacts on performance-shaping factors (PSFs) for the control room and ex-control room post-initiator actions as appropriate to the human reliability analysis (HRA) methodology used:** **(a) additional post-earthquake workload and stress that can increase the likelihood of human errors or inattention**		<not printed here; not focus of this assessment>	

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
		(b) seismic failures that impact access **(c) cue availability**			
SPR-B3 (Add. A) SPR-B4a (Add. B)	ASME/ANS RA-Sa–2009	**SPR-B3 of Addendum A:** **If any screening is performed, PERFORM it using defined criteria that are documented in the PRA.**			**Addendum B Assessment Equates to Addendum A** Addendum B changed the sentence structure to correct awkward wording and to use accepted verb. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**SPR-B4a of Addendum B:** **If screening out on the basis of seismic capacity is performed in the systems model, SPECIFY the screening criterion.**			
SPR-B4 (Add. A) SPR-B3 (Add. B)	ASME/ANS RA-Sa–2009	**SPR-B4 of Addendum A:** PERFORM an analysis of seismic-caused dependencies and correlations in a way so that any screening of SSCs appropriately accounts for those **dependencies and** correlations. USE bounding or generic correlation values and PROVIDE the basis for such use.		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B deleted the phrase "dependencies and" because they are redundant to the "correlation" term so as to avoid reviewer potential confusion. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**SPR-B3 of Addendum B:** PERFORM an analysis of seismic-caused dependencies and correlations in a way so that any screening of SSCs appropriately accounts for those correlations. USE bounding or generic correlation values and PROVIDE the basis for such use.		<not printed here; not focus of this assessment>	
SPR-B5 (Add. A)	ASME/ANS RA-Sa–2009	**SPR-B5 of Addendum A:** ENSURE that any screening of human-error basic events and non–seismic-failure basic events does not significantly affect the PRA's results.			**Addendum B Assessment Equates to Addendum A** Addendum B deleted this SR because it is redundant to SR SPR-A5, which already requires modeling of operator actions that contribute to significant accident sequences.
	ASME/ANS RA-Sb–2013	**No SR of Addendum B directly matches with SPR-B5 of Addendum A**			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
					Also, it is redundant in part to SR SPR-E3, which requires validation that any screening does not impact the results. Finally, Vogtle did not screen out any human-error or non-seismic events that were in the FPIE model and would propagate through seismic accident sequences, and so conforms to Addendum A.
SPR-B4b	ASME/ANS RA-Sa–2009	**Not included in Addendum A.**			**Addendum B Assessment Envelopes Addendum A** This SR is new for Addendum B to ensure that recoveries added to the SPRA (i.e., not already included in the internal events PRA) are assessed for appropriateness. Addendum B envelopes Addendum A with respect to this SR.
	ASME/ANS RA-Sb–2013	**SPR-B4b of Addendum B:** If post-earthquake recovery actions are included in the systems model, INCLUDE them on a documented basis.			
SPR-B6 (Add. A) SPR-B4 (Add. B)	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	SPR-B6 of Addendum A: **EXAMINE** the effects of the chatter of relays and similar devices.		**Addendum B Assessment Envelopes Addendum A** In response to an EPRI 2011 comment on the Addendum B ballot, Addendum B added the requirement to include the effects of relay chatter in the model, not simply to examine them. The differentiation for "low ruggedness relays" is deleted in Addendum B because the issue of chatter fragility is addressed in SFR SRs. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	**SPR-B4 of Addendum B:** **INCLUDE** the effects of the chatter of relays and similar devices in the systems model.			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SPR-B7 (Add. A) SPR-B5 (Add. B)	ASME/ANS RA-Sa–2009	**SPR-B7 of Addendum A:** In the systems-analysis models, for each basic event that represents a seismically caused failure, INCLUDE the complementary "success" state where applicable to a particular SSC.			**Addendum B Assessment Equates to Addendum A** Addendum B revised the wording of this SR to include a capability category distinction to explicitly model fragility complements for risk significant fragilities for CCI-II and for all modeled fragilities for CCIII. The Vogtle 1&2 SPRA uses the SPRA CAFTA suite of codes with the ACUBE module addressing the fragility complement modeling and so meets the intent of both Addenda A and B since the quantification accounts mathematically for the success states.
	ASME/ANS RA-Sb–2013	**SPR-B5 of Addendum B:** **In the systems-analysis models, for each basic event that represents a significant seismically caused failure, INCLUDE the complementary "success" state where applicable to a particular SSC, and SPECIFY the criteria used for the term "significant" in this activity.**		<not printed here; not focus of this assessment>	
SPR-B8 (Add. A) SPR-B6 (Add. B)	ASME/ANS RA-Sa–2009	**SPR-B8 of Addendum A:** **EXAMINE** the possibility that a large earthquake can cause damage that blocks personnel access to safety equipment or controls, thereby inhibiting operator actions that might otherwise be credited.			**Addendum B Assessment Equates to Addendum A** Addendum B changed the action verb to be consistent with accepted verb usage across SRs. This wording edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	**SPR-B6 of Addendum B:** **EVALUATE** the possibility that a large earthquake can cause damage that blocks personnel access to safety equipment or controls, thereby inhibiting operator actions that might otherwise be credited.			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SPR-B9 (Add. A) SPR-B7 (Add. B)	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	**SPR-B9 of Addendum A: EXAMINE the likelihood that system recoveries modeled in the internal-events PRA may be more complex or even not possible after a large earthquake, and ADJUST the recovery models accordingly.**		**Addendum B CCII Assessment Equates to Addendum A CCII-III** In response to an EPRI 2011 comment on the Addendum B ballot, Addendum B added three capability differentiations. CCII requirements are effectively the same for Addendum A and Addendum B. The Addendum B SR adds the clarification that generic and/or conservative recovery values are acceptable. The Addendum B SR CCII wording effectively equates to Addendum A CCII-III given the state of practice at the time (i.e., detailed plant-specific system recovery probability calculations were not typical practice at the time of Addendum A).
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	**SPR-B7 of Addendum B: EVALUATE the likelihood that system recoveries modeled in the internal-events PRA may be more complex or even not possible after a large earthquake, and ADJUST the recovery models accordingly. It is acceptable to use generic or conservative recovery values.**	<not printed here; not focus of this assessment>	
SPR-B10 (Add. A) SPR-B8	ASME/ANS RA-Sa–2009	**SPR-B10 of Addendum A: EXAMINE the effect of including an earthquake-caused "small-small loss-of-coolant accident" as an additional fault within each sequence in the seismic-PRA model.**			**Addendum B Assessment Envelopes Addendum A** Addendum B added differentiation of

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
(Add. B)	ASME/ANS RA-Sb–2013	**SPR-B8 of Addendum B:** **ASSUME the existence of an earthquake-caused "very small loss-of-coolant accident" in the seismic-PRA accident sequences and system modeling, unless it is demonstrated that such a LOCA can be excluded, based on a walkdown or on another examination of the possible sources of such a LOCA.**		<not printed here; not focus of this assessment>	capability requirements to this SR that require modeling incorporation into the SPRA (if the topic requires it for a specific plant) whereas the EXAMINE verb in Addendum A did not require incorporation into the SPRA (i.e., it could be done as a sensitivity study). The Addendum B SR wording envelopes that of Addendum A.
SPR-B11 (Add. A) SPR-B9 (Add. B)	ASME/ANS RA-Sa–2009	**SPR-B11 of Addendum A:** **In the seismic PRA walkdown, INCLUDE the potential for seismically induced fires and flooding following the guidance given in NUREG-1407.**			**Addendum B Assessment Envelopes Addendum A** In response to an EPRI 2011 comment on the Addendum B ballot, Addendum B added the requirement to include risk significant scenarios into the SPRA models as opposed to only including them in the walkdown. Reference to NUREG-1407 was removed in Addendum B because this SR refers to SFR-E4 for input and SFR-E4 already includes the reference to NUREG-1407. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	**SPR-B9 of Addendum B:** **If the seismic PRA walkdown (see Requirement SFR-E4) identifies the potential for seismically induced fires and flooding, INCLUDE potential significant contributions to accident sequences in the systems model.**			
HLR-SPR-C: The seismic-PRA systems model shall reflect the as-built and as-operated plant being analyzed.					
SPR-C1	ASME/ANS RA-Sa–2009	To ensure that the systems-analysis model reflects the as-built, as-operated plant, JUSTIFY any conservatisms or other distortions **introduced by demonstrating that the seismic-PRA's validity for applications is maintained.**			**Addendum B Assessment Equates to Addendum A** Addendum B changed the last clause of this

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
	ASME/ANS RA-Sb–2013	To ensure that the systems-analysis model reflects the as-built, as-operated plant, JUSTIFY any conservatisms or other distortions **that do not adequately reflect the as-built, as-operated plant.**			SR because the wording was awkward. This wording refinement does not change the capability category requirements of this SR.
HLR-SPR-D: The list of SSCs selected for seismic-fragility analysis shall include the SSCs that participate in accident sequences included in the seismic-PRA systems model.					
SPR-D1	ASME/ANS RA-Sa–2009	USE the seismic PRA systems model as the basis for developing the seismic equipment list, **which is the list of all SSCs to be considered by the subsequent seismic-fragility evaluation task.**			**Addendum B Assessment Envelopes Addendum A** Addendum B added additional clarifications and requirements into the text of this SR. The Addendum B SR wording envelopes that of Addendum A.
	ASME/ANS RA-Sb–2013	USE the PRA systems model as the basis for developing the seismic equipment list **to support the fragility analysis of 5-2.2. INCLUDE structures and passive components that may not be present in the internal-events model but that require consideration in the seismic PRA. SUPPLEMENT the list based on the review of industry seismic-PRA seismic equipment lists (SELs), if available.**			
HLR-SPR-E: The analysis to quantify core damage frequency and large early release frequency shall appropriately integrate the seismic hazard, the seismic fragilities, and the systems-analysis aspects					
SPR-E1	ASME/ANS RA-Sa–2009	In the quantification of core damage frequency and large early release frequency, PERFORM the integration using the seismic hazard, fragility, and systems analyses.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. Minor edits were made in Addendum B to the clarifying non-mandatory footnote for this SR; this footnote adjustment does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SPR-E2	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	In quantifying core damage frequency and large early release frequency, PERFORM the quantification on a cut-set-by-cut set or accident-sequence-by-accident-sequence basis (or for defined groups of these), as well as on a comprehensive/integrated basis.		**Addendum B Assessment Envelopes Addendum A** Addendum B revised this SR to back-reference to Part 2 requirements for the accident sequence quantification. This edit was made for consistency across the Std Parts to refer back to Part 2 SRs where applicable. The wording edit in Addendum B to this SR expands the capability category requirements beyond the requirements of Addendum A by incorporating many more SRs.
	ASME/ANS RA-Sb–2013	PERFORM seismic-sequence quantification **in accordance with the applicable requirements described in 2-2.7.**			
SPR-E3	ASME/ANS RA-Sa–2009	**In the analysis,** USE the quantification process to **ensure that any** screening of SSCs **does not affect the results, taking into account the various uncertainties.**			**Addendum B Assessment Equates to Addendum A** In addition to minor wording changes, Addendum B revised this SR to remove the clause regarding consideration of uncertainties. The use of the phrase "confirm and support" allows for the analyst to determine the best way to validate the screening, whereas Addendum A went beyond "what to do" into "how to do it." The end result is the same.
	ASME/ANS RA-Sb–2013	USE the quantification process **to confirm and support the** screening of SSCs (refer to Requirement SFR-B1).			
SPR-E4	ASME/ANS RA-Sa–2009	In the integration/quantification analysis, **ACCOUNT for** all significant dependencies and correlations that affect the results. It is acceptable to use generic correlation values. If used, **PROVIDE** the basis for such		<not printed here; not focus of this assessment>	**Addendum B Assessment Equates to Addendum A** Addendum B changed action verbs to be consistent with accepted verb usage across

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
		use.			SRs, and also deleted the redundant "dependencies" term. These wording edits do not change capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	In the integration/quantification analysis, **INCLUDE** the significant correlations that affect the results. It is acceptable to use generic correlation values. If used, **SPECIFY** the basis for such use.		<not printed here; not focus of this assessment>	
SPR-E5	ASME/ANS RA-Sa–2009	<not printed here; not focus of this assessment>	Identical to Addendum B CCII except Addendum A uses ACCOUNT verb.		**Addendum B CCII Assessment Equates to Addendum A CCII-III** Addendum B changed action verbs to be consistent with accepted verb usage across SRs. Three Capability Category distinctions are instituted for Addendum B (Addendum B CCII corresponds to Addendum A CCII-III). These edits do not change the CCII capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	<not printed here; not focus of this assessment>	In the integration/quantification analysis, **INCLUDE** in the uncertainties in core damage frequency and large early release frequency results that arise from each of the several inputs (the seismic hazard, the seismic fragilities, and the systems-analysis aspects).	<not printed here; not focus of this assessment>	

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SPR-E6 (Add. A)	ASME/ANS RA-Sa–2009	PERFORM appropriate sensitivity studies to illuminate the sensitivity of the core damage frequency and large early release frequency results to the assumptions used about dependencies and correlations.			**Addendum B Assessment Envelopes Addendum A** In response to an EPRI 2011 comment on the Addendum B ballot, Addendum B deleted this SR because performance of sensitivity studies is already addressed by another SR through the new back-reference to meeting the Part 2 quantification requirements (see SPR-E2), which includes the requirement to conduct appropriate sensitivity studies to address sources of uncertainty. This new back-reference implies requirements well beyond just sensitivity to correlations, and so the Addendum B approach envelopes Addendum A, even with this deletion. The Vogtle 1&2 SPRA documentation includes a sensitivity case related to seismic fragility correlation modeling.
	ASME/ANS RA-Sb–2013	Deleted in Addendum B			
SPR-E6 (Add. B)	ASME/ANS RA-Sa–2009	New Requirement in Addendum B.			**Addendum B Assessment Envelopes Addendum A** Addendum B added this SR to back-reference to Part 2 requirements for the LERF analysis. This new SR was added for consistency across the Std Parts to refer back to Part 2 SRs where applicable. The
	ASME/ANS RA-Sb–2013	In the analysis of LERF, SATISFY the LERF requirements in 2-2.8, where applicable. Note 6 - Those aspects of LERF analysis that are common to internal-events PRA and seismic PRA are referred to here. Also, the discussion of LERF analysis in the last four paragraphs of 5-1.3 is			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR					
SR	**Standard Rev.**	**Capability Category I**	**Capability Category II**	**Capability Category III**	**Basis for Assessment (CC-II Focus)**
		broadly applicable and should be referred to as background information.			Addendum B SR wording envelopes that of Addendum A given that Addendum A did not specifically cite this LERF back-referencing to Part 2.
HLR-SPR-F: The seismic-PRA analysis shall be documented in a manner that facilitates applying the PRA and updating it, and that enables peer review.					
SPR-F1	ASME/ANS RA-Sa–2009	DOCUMENT the seismic plant response analysis and quantification in a manner that facilitates PRA applications, upgrades, and peer review.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. Addendum B edited the non-mandatory footnote for this SR. This footnote edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	Identical to Addendum A			
SPR-F2	ASME/ANS RA-Sa–2009	DOCUMENT the process used in the seismic plant response analysis and quantification. For example, this documentation typically includes a description of: (a) the specific adaptations made in the internal events PRA model to produce the seismic-PRA model, and their motivation, and (b) the major outputs of a seismic PRA, such as mean core damage frequency (CDF), mean large early release frequency (LERF), uncertainty distributions on CDF and LERF, results of sensitivity studies, significant risk contributors, and so on, are examples of the PRA results that are generally documented.			**Addendum B Assessment Equates to Addendum A** Addendum B moved the non-mandatory list of examples to the associated non-mandatory footnote. This edit does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	DOCUMENT the process used in the seismic plant response analysis and quantification.			

Table 3: Comparison of Supporting Requirements of Addendum A and Addendum B for SPR

SR	Standard Rev.	Capability Category I	Capability Category II	Capability Category III	Basis for Assessment (CC-II Focus)
SPR-F3	ASME/ANS RA-Sa–2009	DOCUMENT the sources of model uncertainty and related assumptions associated with the seismic plant response model development.			**Addendum B Assessment Equates to Addendum A** The wording for this SR is the same for Addendum A and Addendum B. Addendum A had a missing non-mandatory footnote (not all uncertainties need to be assigned a numerical distribution in the documentation) that was re-inserted in Addendum B. This footnote does not change the capability category requirements of this SR.
	ASME/ANS RA-Sb–2013	Identical to Addendum A.			