

Audit 1
Action Item List

AI Number from Source	AI/Question Description	Impacted Report	Follow-up Action	Status	Comments
091015S006	<p>The staff requested that GEH justify cases with lower passing frequencies (General). This was identified on slide 6 (33 Hz for Full Column LB)</p> <p>Action 1 Example: For Slide 6, the NRC asked for justification for the 83% captured motion energy for the RB/FB full column LB 33 Hz cases to ensure that, had the LB soil column cases been refined such that their passing frequencies were not lower than 50 Hz, the responses from these refined LB cases are still bounded by the BE and UP cases.</p>	CB-FWSC SSSI Report	<p>Refer to similar Item 091015S063.</p> <p>CB-FWSC SSSI report will also be revised to further justify the use of cut-off frequencies < 50 Hz for FWSC-CB SSSI analyses by providing references to figures and tables.</p> <p>Revise CB-FWSC SSSI report to address the issue of missing reference to specific figures.</p>	Open with Dominion	
091015S028B	NRC Action #7, Slide 28: FSAR Tables 3A.15-201 through 3A.15-206 should be updated as appropriate to reflect the additional SSI/SSSI analyses performed.	FSAR 3A.15	Revise FSAR Tables 3A.15-201 through 3A.15-206 to add the additional analyses of FWSC cracked model for BE case and SSI and SSSI analyses performed for the FWSC concrete fill soil separation study.	Open with Dominion	

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091015S029A	Since the FWSC-CB SSSI effects are impacting the responses, the staff questioned whether there are any other neighboring buildings that could contribute to the SSSI effects of the CB and FWSC in the x-direction (perpendicular to the two buildings). As such, please justify why the potential effect of SSSI on other Category I structures (RB/FB) considering the structures aligned in another direction (e.g., RB/FB-TB) will not be important.	COLA Part 10	Revise ITAAC for Seismic Category II Structures (Turbine Building, Service Building, and Ancillary Diesel Building) and Radwaste Building to be specific regarding adjacent Seismic Category I structures.	Open with Dominion	

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091015S032A	Staff requested the Figures showing the NEI check was met by comparing PBSRS with the envelope of surface response spectra obtained from final SSI input time-histories at the surface of the LB, BE, and UB soil columns.	FSAR 3.7.1	<p>Revise FSAR Sections 3.7.1.1.5.1.1 and 3.7.1.1.5.1.2, and Figures 3.7.1-295 through 3.7.1-306 as follows:</p> <ul style="list-style-type: none"> • Take out the smoothed curves in the NEI check figures and replace with figures showing raw ARS. • Provide corresponding discussion in the FSAR text justifying specific dips in in RB/FB and CB ARS. For CB ARS, refer to the sensitivity study performed to justify dip at ~14hz is inconsequential. • Formally document the sensitivity study but it is not necessary to reference the documents in the FSAR or submit the documents to the NRC as they can remain auditable documents. 	Open with Dominion	
091015S040B	NRC Action #12, Slides 40 and 60: Staff will review V&V of ACS SASSI for application to North Anna 3 sensitivity analysis. Same as 091015S060B.	FSAR Section 3.7.2 or 3A	Revise FSAR to incorporate conclusions from the RB/FB SSI report, Appendix I.	Open with Dominion	

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091015S042B	NRC Action #13, Slide 43: Dominion will revise the FWSC seismic analysis report to include results from two additional sensitivity analyses on FWSC. The report should also reflect additional SSI/SSSI analysis being performed for soil separation.	FWSC Seismic Analysis Report	Revise the FWSC seismic analysis report (WG3-U63-ERD-S-0001) to refer to FWSC concrete block separation study calculations additional SSI/SSSI analysis being performed for soil separation.	Open with Dominion	
091015S063	Discussion on the last paragraph of Page 17 of 602 is not clear without any reference to specific Figures. Please as an example, discuss with reference to specific Figures in the report.	FWSC Seismic Analysis Report, RB/FB Seismic Analysis Report, CB Seismic Analysis Report	RB/FB, FWSC and CB reports revised to include references. (CB-RB/FB SSSI is being revised as noted in Item 091015S006.)	Open with Dominion	

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091015S065B	NRC Action #15, Slide 65: Dominion is revising CB and FWSC seismic analysis reports to clarify the method of determining the potential uplift and contact ratio of the foundation mat. The staff will review this issue during Audit-1.	FWSC Seismic Analysis Report, FSAR Section 3.7.2 or 3A	<p>Revise the FWSC SSI report to correct the following errors:</p> <ul style="list-style-type: none"> -Section 5.5, Item 1: Change to "The FWSC structure and model..." -Section 5.5, Item 7: Change to "(the FWSC seismic weight...)" <p>Revise the FSAR to present a summary of the methodology to calculate foundation uplift as presented in the RB/FB, CB and FWSC Seismic Analysis Reports (including any alternative methods for uplift calculation).</p>	Open with Dominion	

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091015S067A	According to the guidance in SRP Acceptance Criteria 3.7.2.II.4, uplift for non-symmetric structures may be more affected by the phasing between the three directions of input motions. The RB/FB building is not a symmetric building. The procedure discussed in Section 5.6, "Base Reactions and Contact Pressures," does not explicitly indicate whether and how the phasing of the input motions is considered in the uplift analysis. Therefore, technical justification should be provided if the effect of different phasing of the input motions is not considered in the calculation of the foundation uplift. If the non-symmetric conditions need to be addressed, then the effect of in-phase and out-of-phase input motions can be considered in the SSI analyses by using plus and minus 1.0 times the magnitude of the input motions. This is especially important as the calculated contact ratio is 84%, not much higher than the 80% criterion.	RB/FB Seismic Analysis Report, CB Seismic Analysis Report, FSAR Section 3.7.2 or 3A	Revise the RB/FB & CB SSI reports to include the results and methodology used for alternative rigid foundation uplift calculations. Add a summary statement to the FSAR.	Open with Dominion	

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091015S067B	<p>NRC Action #16, Slide 67: Dominion is performing uplift calculation for RB/FB to address effect of excitation direction and the RB/FB seismic analysis report will be revised. Staff will review this issue during Audit-1.</p> <p>Item 1 equation in Section 5.6 of RB/FB report S(z) is correct and will not be revised because calculations were performed considering two different directions of the vertical earthquake not the absolute value (please refer to results in Table 5.6-1). Since the RB/FB is not symmetrical, the approach used for the RB/FB differs from the one used for the symmetrical CB and FWSC.</p>	RB/FB Seismic Analysis Report, CB Seismic Analysis Report, FSAR Section 3.7.2 or 3A	Revise the RB/FB & CB SSI reports to include the results and methodology used for alternative rigid foundation uplift calculations. Add a summary statement to the FSAR.	Open with Dominion	
091015S074A	Table 6.2-1 shows that the maximum relative displacements for NA3 are larger than those for the standard design at a few locations but have not been identified as exceedance. This contradicts with the conclusion drawn in Section 6.2, "Enveloping Maximum Displacements."	FWSC Seismic Analysis Report	Revise the conclusions in the FWSC SSI report, Section 6.2, to note that there are a few exceedances of the relative displacements and such exceedances will be considered in the NA3 site-specific design evaluation.	Open with Dominion	

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091015S107A	Discussion of NEI Check for the CB in FSAR markup on page 3-25 did not include the basis of acceptability (as provided in the response to RAI 03.07.02-11) of defining the CB control motion at the CB basemat instead of the bottom of the concrete fill below the CB basemat. This basis should be included in the FSAR Section 3.7.1.	FSAR 3.7.1, FSAR Section 3.7.2 or 3A	Revise FSAR Section 3.7.1 to describe comparison presented in response to RAI 03.07.02-11 that demonstrates why SSI analysis at CB basemat Elevation 241 ft is acceptable. Refer to CCR package NA3-15-7012.	Open with Dominion	

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091015S108A	<p>In FSAR 3.7.1.1.6 markup on page 38 of 623, the site-dependent SSE at-grade response spectra is defined as envelope of the PBSRS for the RB/FB, CB, and the RG 1.60 spectra normalized to 0.1g PGA. The reference site-dependent OBE at-grade response spectra for OBE exceedance check is then defined as one-third of the site-dependent SSE at-grade response spectra. Per the 10 CFR Part 50, Appendix S, no explicit analysis for the OBE is needed if the OBE is defined as one-third of the SSE.</p> <p>The staff further reviewed this issue. For the site-dependent at grade SSE described in FSAR markup Section 3.7.1.1.6 to be acceptable for establishing the reference OBE without an explicit OBE analysis, the individual PBSRS calculated for each of the Category I structures (RB/FB, CB, and FWSC) should envelope the site-dependent SSE at-grade response spectra. Therefore, defining the site-dependent SSE at-grade response spectra as envelope of the PBSRS calculated for the RB/FB and CB, and the RG 1.60 spectra normalized to 0.1g PGA may be less conservative for the purpose of defining the site-dependent at-grade OBE level earthquake for plant shutdown. As such, the applicant is requested to provide further justification.</p>	FSAR 3.7.1	Revise FSAR Sections 3.7.1, 3.7.1.1 and 3.7.1.1.6, associated Tables 3.7.1-216 and 3.7.1-217, and associated Figures 3.7.1-265, 3.7.1-266 and 3.7.1-267 to incorporate clarifier "manifestation" where Site-Dependent SSE at Grade is described.	Open with Dominion	
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091015S116B	NRC 8/31 Question 4 regarding July 2015 letter and markups [Basis for Damping Values in FSAR Table 3A.13.2-201]. NRC Action #20, Slide 116: NRC will review damping values comparing with those values with DCD model during the audit. The basis should be included in the FSAR.	FSAR 3A.13	Revise FSAR Section 3A.13.2 as follows: "Table 3A.13.2-201 provides the damping values used for the site-specific SSI analyses. The damping values are based on RG 1.61, DCD Table 3.7-1, and the DCD model." Refer to CCR package NA3-15-7012.	Open with Dominion	

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091015S117D	Question 5 regarding July 2015 letter and markups [Approach and criteria for enhancing site-specific seismic demand]: were evaluations performed for the SSSI effects on soil bearing pressure, lateral pressure, and stability.	FWSC Stability Analysis Report, RB/FB Stability Analysis Report, CB-Stability Analysis Report, FSAR 3.8, FSAR 3.7	<p>As described below: revise the RB/FB, CB & FWSC technical reports on stability to be consistent with the results of the updated SSI/SSSI reports justifying the consideration of licensing basis demands for stability, and soil bearing and lateral pressure calculations. Revise FSAR sections 3.7 and 3.8 accordingly. CB Stability report Section 3 to be revised as follows (use this as example for RB/FB & FWSC stability reports, as required):</p> <p>“As shown in Appendix B of Reference 2-i, the seismic response analyses of the models representing full (uncracked concrete) stiffness properties of the CB reinforced concrete structure provide conservative seismic load demands for the NA3 rock site with high frequency design motion and bound the effects of concrete cracking as described in Appendix B of Reference 2-i and SSSI as described in Reference 2-k.”</p> <p>Make sure that design basis in FSAR Section 2.5.4 and 3.7- 3.8 regarding soil bearing pressures are consistent.</p>	Open with Dominion	

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091015S123A	The last sentence on Page 31 second paragraph of the CB/FWSC SSSI report (WG3-U73-ERD-S-0002, rev.3) states that the SSSI effects on the FWS roof out-of-plane loads are enveloped by the corresponding load used for standard design. However, this statement does not appear to be consistent with the Table 6.4-1 entries. In Table 6.4-1, the equivalent standard design acceleration is shown as 1.74g while the flexible mode SSSI and NA3 Site-specific equivalent SSSI accelerations of the roof are shown as 3.98g and 2.30g, respectively. Please address this issue.	FSAR Section 3.7.2 or 3A	<p>Revise FSAR to describe changes similar to those described in the bullets below.</p> <ul style="list-style-type: none"> • Last sentence in Section 6.4 of CB-FWSC SSSI report was revised to correctly state that SSSI effects amplify the seismic load demand on FWS roof and that this site-specific demand is larger than the corresponding load considered in the standard design • As shown in Table 6.2-1 of FWSC Seismic Analysis report, results of FWSC-CB SSSI analyses defined enveloping out-of-plane demand on FWS roof used for site-specific evaluation of FWSC structures 	Open with Dominion	

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091015S124A	<p>In the CB and RB/FB SSSI report (WG3-U73-ERD-S-0005), the staff noted (on page 22 of 76) that SSSI of the RB/FB has significant effect on the CB torsional response, and the report discussed how this effect is bounded by the standalone SSI analysis of the CB. The staff also noted (on page 23 of 76) that SSSI of the RB/FB has significant effect on the lateral pressures on the CB west wall facing the RB/FB, and report stated that only significant exceedance that can be observed at the bottom level of the basement has no effects on the CB below-grade wall design. These bases should be reflected in the FSAR markup section 3A.17.11.</p> <p>In addition, FSAR section 3A.17.11 markup discusses the SSSI effect of the RB/FB on the CB. On page 372 of 623 of the FSAR markup, it is stated that the site-specific SSSI evaluations show that the SSSI between the CB and the RB/FB have small effects on the seismic response of the CB. However, the FSAR does not discuss how these effects are being considered in the site-specific demand and ISRS. The FSAR should include how these effects are being addressed in the site-specific seismic demand evaluation.</p>	FSAR 3A.17	<p>Revise FSAR Section 3A.17.11 to explain how exceedances are addressed. FSAR changes will be made to address exceedances in CB response due to RB/FB SSSI effects (similar to how Issue Number 006 will be addressed). This will include an explanation on how these exceedances are addressed in site-specific evaluations. The FSAR change will pull together and summarize information from various reports as per the request from the NRC.</p> <p>Refer to Issue 0910GEN01 for providing further information regarding justification of torsional demand exceedances.</p> <p>Refer to issue 092815A1003.</p>	Open with Dominion	

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091015S125	In the CB and RB/FB SSSI report (WG3-U73-ERD-S-0005), the report (on Page 21 of 76) identified that the vertical ISRS response considering the SSSI effect could exceed by 5% at a frequency of 25 Hz and by 25% at 50 Hz. The report also stated that these exceedances can be neglected because they are either bounded by the standard design or occur at high frequencies where they could be offset if the effect of incoherency of the ground motion is considered. The staff agrees with the basis that potential exceedances would be addressed when bounded by the standard design. However, the staff needs additional technical justification for using the effect of incoherence in offsetting the SSSI effect. In addition this justification should be included in the FSAR. Alternatively, the applicant can incorporate these exceedances in the site-specific design basis ISRS as appropriate.	FSAR Section 3.7.2 or 3A, FSAR 3A.17	<p>Revise the FSAR (CCR package NA3-15-7012) for already revised CB-RB/FB SSSI Report and the CB Seismic Analysis Report that address exceedances. Incoherency will not be used as justification.</p> <p>Revise FSAR 3A.17.11, to note that ISRS exceedances due to RB/FB SSSI effects are included in CB site-specific ISRS.</p> <p>Similar to above (091015S124B).</p> <p>Refer to issue 092815A1003.</p>	Open with Dominion	

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091015S126	The access tunnel between the RB/FB and CB has been modeled for the SSSI analysis between the CB and RB/FB. Page 14 of 76 of the CB-RB/FB SSSI report (WG3-U73-ERD-S-0005) describes that there are seismic gaps between the access tunnel and the adjacent buildings. FSAR section 3.7.2.8 markup does not identify the seismic gap requirement between the access tunnel and the adjacent Category I buildings. It also appears that the detailed site-specific design of the access tunnel is not complete. Per DCD Rev 10 Page 3.7-28, this tunnel is classified as seismic Category II. However, no site-specific ITAAC has been provided for this tunnel. As such, how the design commitments for this tunnel are to be tracked.	COLA Part 10	Add ITAAC to COLA for design of SC II Access Tunnel.	Open with Dominion	

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0910GEN01	For the stability, soil bearing pressure, and lateral soil wall pressure evaluations of the plant structures, where the enveloping of the sensitivity analysis cases with the results of the site specific design basis was not considered, Dominion should have available the technical basis for not enveloping or not scaling the results accordingly. The sensitivity analysis cases refer to both the cracked vs uncracked cases and SSSI vs SSI cases.	CB-FWSC SSSI Report, CB-RB/FB SSSI Analysis Report	Revise the RB/FB – CB SSSI Report and the CB-FWSC SSSI Report, Section 5.5 to make it clear that the calculated and accidental torsional loads plus the shear are bounded by licensing basis analysis (explain how the numbers in Table 5.5-3 were calculated).	Open with Dominion	

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0910GEN02	<p>NRC will include spent fuel pool rack review in the audit plan for Audit-1.</p> <p>Review of analysis from beginning to end for the racks, including the design changes.</p> <p>SER-DMN-019, Rev.0</p> <p>RB/FB Seismic Analyses Bounding Results and In-Structure Response Spectra</p> <p>DCD Report: NEDO-33373-A Rev 5</p>	North Anna 3 Fuel Rack Seismic Analysis	<p>Dominion agreed to the following actions related to the fuel storage racks, PCCS condenser, and fuel stored in racks site-specific seismic analyses. The NRC will confirm these actions through the electronic reading room or in Audit 2:</p> <ul style="list-style-type: none"> -Describe in the fuel rack NA3 report the demonstration of the adequacy of the acceleration time histories. -Obtain plots of the response spectra of the acceleration time histories for comparison to the response spectra determined for NA3 fuel rack seismic analysis report (plots can be included in supporting documents – i.e., ENSA document – and not in the NA3 fuel rack report). -Complete and document the NA3 seismic analysis report for the fuel stored in the racks and demonstrate structural adequacy. -Update the NA3 seismic analysis technical reports for fuel racks and PCCS condenser. -Revise FSAR for the fuel racks and PCCS condenser summarizing the evaluations performed and include the correct report revision number. 	Open with Dominion	

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092815A1002	Revise COLA Part 10 as necessary to include the 220' elevation for the FWSC SSI Input Response Spectra in the definition of the SSE. Other parts of the COLA (e.g., Part 7) also will be reviewed to determine if other changes need to be made.	COLA Part 10, COLA Part 7	Revise COLA Part 10 as necessary to include the 220' elevation for the FWSC SSI Input Response Spectra in the definition of the SSE. Other parts of the COLA (e.g., Part 7) also will be reviewed to determine if other changes need to be made.	Open with Dominion	
092815A1003	09/29/2015: Revise FSAR to describe the methodology used to address exceedances in sensitivity studies, including acceptance criteria. These sensitivity studies refer to stiffness variations, SSSI analyses, and soil separation. Also describe use of scaling if SSSI analyses of FWSC-CB and CB-RB/FB yield results that exceed ISRS from FWSC and CB SSI analyses, and describe use of scaling if SSSI analyses of FWSC-CB yield results that exceed load demands from FWSC SSI analyses.	FWSC Seismic Analysis Report, FSAR Section 3.7.2 or 3A	<p>Revise the FSAR as described in the issue description. Revise the FWSC seismic analysis report (WG3-U63-ERD-S-0001) to further clarify the approach for enhancing ISRS for effects of cracking (Appendix B, Section B.5). As required, revise other technical reports to reflect the methodology in the issue description.</p> <p>Note: The following issues were closed to this issue:</p> <p>091015S075A, 091015S117A, 091015S117B, 091015S117C, 091015S124A, 091015S124B, and 091015S125.</p>	Open with Dominion	

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092815A1004	<p>Technical Report SER-DMN-034: Shear capacity of concrete fill under FWSC:</p> <p>NRC requested technical basis for using ACI-207.1R-18 versus ACI-318.</p>	SER-DMN-034 (Effects of Soil Separation of FWSC)	<p>Revise SER-DMN-034 to provide a further explanation regarding the code governing the design and construction of concrete fill (has to be done as part of audit 2).</p> <p>Change the SER-DMN-034 report title to add "and effects of separation between concrete fill and surrounding soil."</p>	Open with Dominion	
092815A1005	<p>Technical Report SER-DMN-034: Soil Separation: NRC requested additional explanation and basis to describe exceedances in FWSC responses due to separation between the concrete fill and the surrounding soil. NRC also asked how these will be documented.</p>	FWSC Seismic Analysis Report, SER-DMN-034 (Effects of Soil Separation of FWSC)	<p>Revise SER-DMN-034 to state that the exceedances due to concrete fill soil separation will be addressed (including ISRS and other seismic demands). Provide the criteria and approach for enhancing the ISRS to bound exceedances due to soil separation following the approach described in Appendix B of FWSC SSI report (WG3-U63-ERD-S-0001). Also include the conclusions of the FWSC soil separation study and provide reference to SER-DMN-034 in WG3-U63-ERD-S-0001.</p>	Open with Dominion	

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092815A1006	CB-FWSC SSSI Report and CB-RB/FB SSSI Report editorial changes.	CB-FWSC SSSI Report	<p>Revise the CB-FWSC SSSI Report:</p> <ul style="list-style-type: none"> -On page 18, 2nd to last paragraph (starting with “the max aspect ratio”), add a reference to App. C to end of last sentence. -On Page 16, in last paragraph of Section 4.2, add a reference to Figures 6.3-1 through 6.3-12. -Provide explanation and basis in Conclusion Section to describe exceedances describe in Section 5.6. <p>Page 32 of the CB-FWSC SSSI Report states that the site-specific design of the CB design envelops the SSSI effects of the FWSC on the CB seismic response. However, there are some exceedances of SSSI effects such as EW/Vertical accelerations in Fig. 5.2-1 and Torsion in Fig 5.2-2. Revise the FSAR to address these inconsistencies</p>	Open with Dominion	

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092815A1007	For Report SER-DMN-032: Expand the scope of document to state that all SSSI and sensitivity effects are captured. The NRC will review this in Audit 2.	SER-DMN-032 (NA3 Seismic SSI Analyses Results for CB and FWSC Structural Evaluation)	Revise SER-DMN-032 to expand the scope of document to state that all SSSI and sensitivity effects are captured. The NRC will review this in Audit 2.	Open with Dominion	