

**Audit of Site-Specific Seismic Input/Demand and the Supporting Analyses (FSAR Section 3.7)
Summary and Disposition of Issues of the North Anna 3 Audit**

Issue Number and Origin ^{1, 2, 3}	Issue Description	Dominion Response/Action	NRC Staff Disposition ^{4,5}
<p>0910GEN01</p> <p>NRC Action #1 09/10 Mtg</p> <p>General</p>	<p>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.</p>	<p>October 1, 2015: Revise Section 5.5 of both SSSI reports to make it clear that the torsional loads from accidents and calculations plus the shear are bounded by... (to explain the numbers in Table 5.5-3).</p> <p>Based on the results from the sensitivity analyses, it was determined that licensing basis analyses provided the bounding overall responses that govern the stability, bearing pressure and lateral pressure calculations. Appendix B of RB/FB, CB & FWSC SSI analyses reports are revised to demonstrate that cracking effects on overall response are bounded. CB-RB/FB SSSI and FWSC-CB SSSI reports were revised to demonstrate that SSSI effects are also bounded.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

¹ The first number for each issue (highlighted in bold) is based on the slide number of the September 10, 2015, public meeting presentation (ADAMS Accession No. ML15267A050). Each slide was created to address NRC Staff questions (1) from the April 15, 2015, public meeting (ADAMS Accession No. ML15110A416) (Slides 6 – 58 in the 09/10 meeting presentation), (2) questions provided in advance of the 09/10 meeting (Slides 80 – 127 in the 09/10 presentation), or (3) from NRC comments on the RB/FB Complex Seismic Analysis Report (Slides 59 – 78 in the 09/10 presentation). “NRC Action #N” refers to the action item number in NRC’s list of items from the September 10, 2015, meeting. “NRC AI#N” refers to the action item number from the April 15, 2015, meeting.

² The GEN numbers are general issues.

³ Similar issues are grouped together in the table. For example, 091015S009A and 091015S009B are related issues.

⁴ Items marked CLOSED were CLOSED based on audit results.

⁵ Items marked OPEN are items to be tracked until issue is resolved.

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<p>0910GEN02</p> <p>NRC Action #2 09/10 Mtg General</p> <p>0910GEN02 Cont.</p>	<p>NRC will include spent fuel pool rack review in the audit plan for Audit-1.</p> <p>-Additional discussion on methodology. -Extent of FSAR markups.</p>	<p>October 1, 2015: 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> <p>-Describe in the fuel rack NA3 report the demonstration of the adequacy of the acceleration time histories. -Obtain plots of the response spectra 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 markups for the fuel racks and PCCS condenser with the correct report revision number.</p> <p>September 29, 2015: A draft report revision for the fuel rack seismic analysis to describe how the inputs were developed was discussed with NRC during Audit 1. A question on discrepancies in displacement values between DCD LTR and NA3 report (e.g., 66 mm versus 61 mm). PCCS Seismic Analysis Report and status of analysis of fuel stored in racks were discussed during Audit 1.</p> <p>Review of analysis from beginning to end for the racks, including the design changes was discussed during Audit1.</p> <p>SER-DMN-019, Revision 0</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
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		RB/FB Seismic Analyses Bounding Results and In-Structure Response Spectra DCD Report: NEDO-33373-A, Revision 5	
0910GEN03 NRC Action #23 09/10 Mtg General	Although not specifically requested at the meeting, the staff requests Dominion to provide a list containing the transmittal schedule of the revised seismic demand related technical reports and the corresponding FSAR section update including the issues being addressed by the revisions.	A status of reports was discussed with NRC during Audit 1.	CLOSED DOM agreed to provide a transmittal schedule for revised reports.
091015S006 September 10, 2015, Meeting Slides 6 – 8 NRC AI#1 from April 15, 2015, NRC Meeting 041501	The staff requested that Dominion justify cases with lower passing frequencies (General). This was identified on Slide 6 (33 Hz for Full Column LB) Action 1 Example: For Slide 6, the NRC asked for justification for the 83 percent 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 UB cases.	September 29, 2015: Passing frequencies have been refined. Reports, RAIs, and July FSAR markups included changes. <ul style="list-style-type: none"> • Site-specific design basis is based on envelope of responses from SSI analyses of LB, BE and UB subgrade profiles; these analyses adequately capture response of structures for frequencies up to 50 Hz as required by DC/COL-ISG-01 • Analyses of BE and UB profiles are all performed for frequencies ≥ 50 Hz and capture virtually all of input motion energy • Analyses of LB profiles are performed for frequencies ≥ 33 Hz • Comparison of results from analyses of LB, BE and UB profiles in Technical Reports show that analyses of BE and UB profiles yield bounding responses, with exception of ISRS at frequencies below ~ 25 Hz, which can be governed by responses obtained from analyses of LB profiles • Provided in Technical Reports submitted in July 2015 	OPEN The issue is tracked as a follow-up action item.

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<p>091015S009A</p> <p>September 10, 2015, Meeting Slides 9 – 11</p> <p>NRC AI#2 from April 15, NRC Meeting 041502</p>	<p>The staff questioned the ISRS results for CB basemat response because ZPA values appear to be less than the PGA.</p>	<p>September 29, 2015: Subject is addressed in Appendix B of CB SSI report. The RB/FB and FWSC reports were revised and they were reviewed by NRC in Audit 1.</p> <p>See Slides 9 – 11.</p> <p>A similar comparison for RB/FB showing the results are consistent was discussed with the NRC during Audit 1.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S009B</p> <p>September 10, 2015, Meeting Slide 11</p> <p>NRC Action #3 09/10 Mtg Slide 11 0910S11</p>	<p>NRC Action #3, Slide 11 shows that spectral acceleration at 100 Hz at the basemat top is about 0.3g whereas that of the horizontal FIRS is approximately 0.78g. Staff considers that additional justification is needed for this significant reduction of the spectral acceleration at the basemat top for the CB. Since the justification on Slides 9 & 10 is generally also applicable to other buildings, the staff requested similar comparisons for other buildings (such as RB/FB, FWSC FIRS at EI 220 ft.) to see whether similar reductions can be observed. The applicant should prepare an explanation for any differences observed for these buildings. Staff will review this issue at Audit-1.</p>	<p style="text-align: center;">See 091015S009A.</p>	<p>CLOSED</p> <p>See 091015S009A</p>
<p>091015S012A</p> <p>September 10, 2015, Meeting Slides 12 – 20 and 21 - 24</p> <p>NRC AI#3 from April 15, 2015, NRC Meeting 041503</p>	<p>The staff requested that DOM demonstrate that <u>soil separation</u> does not impact concrete fill below the FWSC. The staff also requested that DOM check whether the unreinforced concrete fill has sufficient capacity to resist the seismic shear stress, considering the vertical seismic load and buoyance force to reduce the shear capacity.</p>	<p>October 1, 2015: Refer to Issue 092815A1005 for a follow-up issue.</p> <p>September 29, 2015</p> <p>From September 10, 2015, Meeting: Explain during the audit how the variation in ground water level was considered in the evaluation. Address whether the effects of soil separation impact the FWSC structural response such as ISRS, loads,</p>	<p>CLOSED</p> <p>See 092815A1004 and 092815A1005</p>

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		<p>etc. Justify deviations from design basis results, if any.</p> <p>See Slides 12 – 24.</p> <p>Results were available for Audit 1 in report SER-DMN-034.</p>	
<p>091015S012B</p> <p>NRC AI#7 from April 15, 2015, NRC Meeting 041507</p>	<p>The staff questioned the details of anchorage of the FWSC to the concrete fill. The details will need to be evaluated.</p>	<p>October 1, 2015: Refer to Issues 092815A1004 and 092815A1005 for follow-up issues.</p> <p>There is no anchorage, but the FWSC shear keys. Please see item 091015S012A above regarding reinforcing in concrete fill construction joints.</p>	<p>CLOSED</p> <p>See 092815A1004 and 092815A1005</p>
<p>091015S012C</p> <p>NRC Action #4 09/10 Mtg Slide 12</p>	<p>NRC Action #4, Slide 12: The staff will review at Audit-1 the calculation method and results for determining the capacity of the concrete fill below the FWSC. The staff will also review whether the concrete fill below FWSC requires reinforcement.</p>	<p>October 1, 2015: Refer to Issues 092815A1004 and 092815A1005 for follow-up issues.</p> <p>Results were available for Audit 1 in report SER-DMN-034.</p>	<p>CLOSED</p> <p>See 092815A1004</p>
<p>091015S012D</p> <p>09/10 Slides 16 – 19</p> <p>091015S012D Cont.</p>	<p>Evaluation of Concrete Fill: how was groundwater variation considered in the FWSC stability analysis</p>	<p>September 29, 2015: Dominion explained during the audit how the variation in groundwater level was considered in the evaluation (also for RB/FB and CB).</p> <p>September 10, 2015, Presentation: Evaluation of concrete fill and all of the stability evaluations conservatively consider nominal groundwater level (GWL) representing upper bound GWL under conditions that exclude accident flooding conditions per SRP Section 3.8.5.</p>	<p>CLOSED</p> <p>The explanation by the applicant was acceptable.</p>
<p>091015S012E</p>	<p>Soil Separation Effects on FWSC Concrete Fill: were effects of concrete fill on structural responses such as ISRS considered</p>	<p>October 1, 2015: Refer to Issues 092815A1004 and 092815A1005 for follow-up issues</p>	<p>CLOSED</p> <p>See 092815A1005</p>

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<p>09/10 Slides 21 -24</p> <p>NRC Action #5 09/10 Mtg Slide 21 0910S21</p>	<p>NRC Item #5, Slide 21: The applicant is performing additional SSI/SSSI analysis to evaluate the effect of soil separation between concrete fill below FWSC and the surrounding soil. The staff will review these calculations during Audit-1 to evaluate the impact of soil separation on site-specific demand for the FWSC (including on the demand on the concrete fill). These analyses cases should be reflected in the FSAR and the pertinent FSAR Tables.</p>	<p>September 29, 2015: Address whether effects of concrete fill on other structural responses such as ISRS, loads, etc., besides the evaluation of concrete fill. Address whether the effects of soil separation impact the FWSC structural response such as ISRS, loads, etc. Justify deviations from design basis results, if any. Consider FSAR revisions as necessary.</p> <p>Comparisons of responses were discussed for the audit on the following:</p> <p>-Address whether effects of concrete fill on other structural responses such as ISRS, loads, etc., besides the evaluation of concrete fill. Address whether the effects of soil separation impact the FWSC structural response such as ISRS, loads, etc. Justify deviations from design basis results, if any.</p>	
<p>091015S025</p> <p>September 10, 2015, Meeting Slide 25</p> <p>NRC AI#5 from April 15, 2015, NRC Meeting 041505</p>	<p>The staff cannot distinguish the DCD line from other lines in the graphs. Graphs should be revised to use different line style and/or thickness for the DCD line to facilitate NRC review.</p>	<p>September 29, 2015: This issue was addressed in reports and July FSAR markups.</p> <ul style="list-style-type: none"> • (Slide 25 9/10) Technical Reports and July FSAR submittals show DCD lines more clearly in figures comparing site-specific graphs to standard design graphs 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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<p>091015S026A</p> <p>September 10, 2015, Meeting Slide 26</p> <p>NRC AI#6 from April 15, 2015, NRC Meeting 041506</p>	<p>The staff questioned the conclusion that the peaks in the outcrop motion TFs are numerical. Since the SHAKE TFs are smooth as shown on Slide 77, this suggests that the peaks in the TFs may be from SASSI analysis. The staff requested that DOM improve the accuracy of the TFs or justify why those numerical peaks would not impact the responses. The TFs should be provided in the relevant technical report(s) for staff's review.</p>	<p>September 29, 2015: This issue was addressed in reports, RAI, and July FSAR markups. Results were available for Audit 1 in report SER-DMN-033.</p> <ul style="list-style-type: none"> • (Slide 26 9/10) Evaluations are being documented for presenting effects of spurious peaks and other transfer function interpolation anomalies on SASSI analyses results presented in Seismic Analysis Technical Reports • Evaluations are based on results of verification analyses performed using additional frequencies • Additional runs are performed for frequencies where anomalies in transfer functions interpolation are observed • Results from verification analyses with additional frequencies are compared with results presented in reports to demonstrate the accuracy of results • Evaluations were available for Audit 1 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S026B</p> <p>NRC Action #6 09/10 Mtg Slide 26</p>	<p>NRC Action #6, Slide 26: Dominion has performed evaluations for the effects of spurious peaks in the transfer functions, and these evaluations were not documented in the submitted reports. Staff will review the documentation during Audit-1.</p>	<p>September 29, 2015: Results for review during for Audit 1 in report SER-DMN-033 were discussed.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S027</p> <p>September 10, 2015, Meeting Slide 27</p> <p>NRC AI#8 from April 15, 2015, NRC Meeting 041508</p>	<p>The staff observed that in Slide 89, the top two graphs show the UB curve going below the BE curve.</p>	<p>September 29, 2015: This issue was addressed in FWSC report submitted in July 2015. Refer to FWSC SSI report WG3-U63-ERD-S-0001.</p> <p>(Slide 27 9/10) Anomalies in plots from April 15, 2015, meeting were related to numerical precision of plotted results and were corrected in submitted reports</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S028A</p>	<p>NRC suggests that a summary table of cases, base cases, and sensitivity studies</p>	<p>September 29, 2015: A tables of cases were Included in applicable reports and in the July</p>	<p>CLOSED</p>

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<p>September 10, 2015, Meeting Slide 28</p> <p>NRC AI#9 from April 15, 2015, NRC Meeting 041509</p>	<p>(similar to the table in the SCP) be added to the FSAR to facilitate staff review.</p>	<p>FSAR markups NRC agreed that the tables in FSAR Section 3A.15 markups address this item.</p> <ul style="list-style-type: none"> • (Slide 28) FSAR Section 3A.15 was added to include tables of site-specific analysis cases for RB/FB SSI, CB SSI, FWSC SSI, CB-RB/FB SSSI, CB-FWSC SSSI, and FWSC-CB SSSI (July 2015 letter) • New Tables 3A.15-201 through 3A.15-206 provide analysis cases, including base cases and sensitivity analysis cases 	<p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S028B</p> <p>NRC Action #7 09/10 Mtg Slide 28 0910S28</p>	<p>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.</p>	<p>October 1, 2015: Dominion agreed to revise FSAR Tables 3A.15-201 through 3A.15-206 as appropriate to reflect the additional SSI/SSSI analyses performed.</p> <p>September 29, 2015: CCR package NA3-15-7012 will address FSAR markups for this issue. This action is encompassed in the commitment to update the COLA based on revisions to or new reports.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
<p>091015S029A</p> <p>September 10, 2015, Meeting Slide 29</p> <p>NRC AI#10 from April 15, 2015, NRC Meeting 041510</p>	<p>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.</p>	<p>October 1, 2015: Dominion discussed revising the 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.</p> <p>September 29, 2015: This issue was addressed in RAI 3.7.2-16 and July COLA markups. Discussed revisions to ITAAC during the audit based on this comment.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

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		<p>From September 10, 2015: Meeting Slides: Dominion to revise ITAAC to be specific regarding adjacent seismic Category I structures.</p> <ul style="list-style-type: none"> • SSSI effects of neighboring buildings on SC I structures are addressed in RAI 03.07.02-16 response, FSAR Section 3.7.2.8, "Interaction of Non-Category I Structures with Seismic Category I Structures," and COLA Part 10 ITAAC for Seismic Category II Structures (Turbine Building, Service Building, and Ancillary Diesel Building) and Radwaste Building • Buildings close to SC I structures are designed as SC II or RW-IIa (Radwaste Building) • SSI and SSSI analyses of these buildings will be performed using same methodology as SC I structures • Site-specific ITAAC will verify there is no Seismic III interaction due to SSSI effects 	
<p>091015S029B</p> <p>NRC Action #8 09/10 Mtg Slides 29 and 127</p>	<p>NRC Action #8, Slides 29 and 127: Dominion will revise the design commitments for considering SSSI effects on Cat I structures due to interaction of Cat II structures. Staff will review this issue at Audit-1.</p>	<p>September 29, 2015: During Audit 1, Dominion discussed clarifying wording in the SC II structures ITAAC.</p> <p>Dominion to revise ITAAC to be specific regarding adjacent Seismic Category I structures.</p>	<p>CLOSED</p> <p>See 091015S029A</p>
<p>091015S030</p> <p>September 10, 2015, Meeting Slide 30</p>	<p>The staff recommended that an ITAAC may be required if the structural properties of the soil profiles is impacting the SSI/SSSI responses.</p>	<p>September 29, 2015: NRC indicated during September 10, 2015, meeting that the ITAAC in the July 2015, letter is acceptable.</p> <ul style="list-style-type: none"> • ITAAC for structural fill on sides of SC I structures included in COLA markups in July 2015 letter (COLA Part 10, Section 2.4.2) 	<p>CLOSED</p> <p>This issue was not in the scope of the audit, and will be passed to the responsible staff for review (NRC action).</p>

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<p>NRC AI#11 from April 15, 2015, NRC Meeting 041511</p>		<ul style="list-style-type: none"> • Follows R-COLA side backfill ITAAC for specific parameters to verify: <ul style="list-style-type: none"> • Angle of internal friction • Equation for local effect on wall lateral pressures • Soil density 	
<p>091015S031A</p> <p>September 10, 2015, Meeting Slide 31</p> <p>NRC AI#13 from April 15, 2015, NRC Meeting 041513</p> <p>091015S031A Cont.</p>	<p>The site specific conditions V&V questions related to whether or not the problems are representative of NA3 site and soil conditions. For example, the S and P wave velocities seem too high for the NA3 site. Look at these problems. Consider what S&L did for EF3 (took an average Shear Wave Velocity and extrapolated it for the V&V problem(s)). There were also questions regarding whether or not the Day solution could be used for a meaningful comparison or if the better approach is to refine the mesh. The staff particularly reviews those V&V problems that are applicable to the NA3 conditions; therefore, increasing the shear wave velocity or decreasing the mass density to increase the passing frequency may invalidate the affected V&V problems and new V&V would be needed.</p>	<p>September 29, 2015: This issue is addressed in V&V report and RAI 3.7.2-26. See 091015S031B.</p> <p>September 10, 2015, Slide 31:</p> <ul style="list-style-type: none"> • Addressed in V&V Report (public summary report submitted) • Problems 3 and 9 are performed using subgrade shear and compression wave velocities $V_s = 3700$ m/s and $V_p = 6409$ m/s that are close to dynamic properties of Unit 3 subgrade materials • Cylinder model is re-meshed to pass frequencies up to 70 Hz • Response to RAI 03.07.02-26 addresses how NA3 site and soil conditions are represented in V&V problems 3 and 9 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S031B</p> <p>NRC Action #9 09/10 Mtg Slide 31</p>	<p>NRC Action #9, Slide 31: Staff will review the V&V report to determine that soil properties used for V&V problems are representative of the North Anna 3 site conditions.</p>	<p>See V&V report S/VTR-SAS Revision I (proprietary version).</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S032A</p> <p>September 10, 2015, Meeting Slides 32 - 37</p>	<p>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.</p>	<p>October 1, 2015: 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. 	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

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<p>NRC AI#14 from April 15, 2015, NRC Meeting 041514</p> <p>091015S032A Cont.</p>		<ul style="list-style-type: none"> • 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 (they will remain auditable documents). <p>September 29, 2015: Discussion during Audit 1 of the preliminary sensitivity study resulted in the following conclusions related to closing the NEI check actions:</p> <ul style="list-style-type: none"> • Take out the smoothed curves in the NEI check figures and corresponding discussion in the FSAR text. • Provide justification for the dips in FSAR and refer to the sensitivity study to justify the sharp dips. • Document the sensitivity study but it is not necessary to reference the document in the FSAR or submit the document to the NRC as it can remain an auditable document. • The following actions related to the NEI check can be categorized as green: 032A, 032B, 080A, 080B, 080C. <p>September 28,2015: As discussed with NRC relative to the confirmatory NEI check, a sensitivity study will be performed to confirm that the sharp dips where the envelope of the surface ARS fall below the PBSRS over limited number of frequency points do not affect the site specific design basis. For the purpose of this sensitivity study, the impact of removing the 14.8 Hz dip for the H1 direction of the partially embedded SSI</p>	
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<p align="center">091015S032A Cont.</p>		<p>analysis of CB UC_{OBE} model will be evaluated by comparing the 5 percent damped modified ISRS with the NA3 design ISRS at the key locations in the CB as specified in the DCD.</p> <p>From September 10, 2015, Meeting: FSAR Figures to be revised. See below for further detail (Item for September 10, 2015, Presentation Slides 80 – 106; NRC Staff Question #1 for 9/10 public meeting).</p> <ul style="list-style-type: none"> • Addressed in July 2015 letter COLA markups. FSAR Section 3.7.1.1.5.1.1 revised and Figures 3.7.1-295 through 3.7.1-306 added, showing that NEI check requirements are satisfied • Surface ARS corresponding to SSI input time-histories in each of LB, BE, and UB profiles is calculated • Surface ARS is enveloped and smoothed using a ±20 percent moving average window on ARS frequencies • Smoothing is performed to allow comparison with PBSRS, which is obtained using RVT • Except for negligible exceedances (less than 3%), smoothed envelope surface ARS bound PBSRS for each building's soil column 	
<p>091015S032B 09/10 Slides 32 – 37 NRC Action #10 09/10 Mtg Slides 32 and 81</p>	<p>4/15 Meeting – Action 14 - Figures Showing NEI Check: the smoothing of the curves is not justified</p> <p>NRC Action #10, Slides 32 and 81: FSAR should include the comparison of envelope of the raw ARS with PBSRS for the NEI check and justifications for acceptability of any dips of surface ARS envelop below the PBSRS.</p>	<p>September 29, 2015: See 091015S032A. FSAR Figures to be revised. See below for further detail (Item for September 10, 2015, Presentation Slides 80 – 106; NRC Staff Question #1 for September 10, 2015, public meeting.</p> <p>Related to slide 82-106 (NRC 8/31 Question 1)</p>	<p>CLOSED See 091015S032A</p>

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<p>091015S038A</p> <p>September 10, 2015, Meeting Slides 38 - 39</p> <p>NRC AI#15 from April 15, 2015, NRC Meeting</p>	<p>Staff also noted that parameters were not included to show how they compared to the earthquake seed. Are they higher or lower? Why is that acceptable? Provide comparison of the characteristic values (V/A, AD/V²) for the site-specific input time histories with those of the controlling earthquakes (see SRP Section 3.7.1) and provide justification of any inconsistencies.</p>	<p>September 29, 2015: This issue was addressed in July 2015, COLA markups. NRC reviewed calculations during Audit 1.</p> <ul style="list-style-type: none"> • Addressed in July 2015, letter COLA Markups in FSAR Section 3.7.1.1.4.2.2 and new Table 3.7.1-220. 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S038B</p> <p>09/10 Slide 38 NRC Action #11 09/10 Mtg Slide 38 091015S038B Cont.</p>	<p>4/15 Meeting Action 15 - Comparison of Parameters to Earthquake Seed: did the FSAR have a statement that this approach was conservative</p> <p>NRC Action #11, Slide 38: The staff will review in Audit-1 comparison of characteristic values for NA3 time histories and earthquake seed during the Audit-1.</p>	<p>September 29, 2015: NRC reviewed during the audit. NRC also reviewed the documentation associated with input development for SSI analyses, specifically the process followed to develop the SSI input. No further action. Audit item; NRC wants a clear conclusion in the FSAR. The text that was read aloud during the meeting appears to address NRC's expectation.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S040A</p> <p>September 10, 2015, Meeting Slide 40</p> <p>NRC AI#17 from April 15, 2015, NRC Meeting</p>	<p>Staff requests assurances that V&V are adequate for ACS-SASSI if using this for NA3 SSI results.</p>	<p>September 29, 2015: Incorporate conclusions in report into FSAR. Moved from Status Column: Report submitted 5/29/15 (Letter NA3-15-009) (Appendix I of RB/FB Seismic Analysis Report).</p> <ul style="list-style-type: none"> • Addressed in Appendix I of RB/FB Seismic Analysis Report (included in May 29, 2015, letter NA3-15-009), which demonstrates that ACS-SASSI and SASSI 2010 provide virtually identical results • Added ACS SASSI to FSAR Section 3C.7.6 as site-specific dynamic SSI analysis program used for NA3 • Discussed in revised response to RAI 03.07.02-10 in July 2015, letter 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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<p>091015S040B</p> <p>NRC Action #12 09/10 Mtg Slides 40 and 60</p>	<p>NRC Action #12, Slides 40 and 60: Staff will review V&V of ACS SASSI for application to North Anna 3 sensitivity analysis.</p>	<p>October 1, 2015: Dominion agreed to revise the FSAR to incorporate conclusions from the RB/FB SSI Report, Appendix I.</p> <p>September 29, 2015: Incorporate conclusions in report into FSAR.</p> <p>Dominion discussed ACS SASSI Product Acceptance Test and other documentation at the audit.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
<p>091015S041</p> <p>September 10, 2015, Meeting Slide 41</p> <p>NRC AI#18 from April 15, 2015, NRC Meeting</p>	<p>The NRC asked (as part of its summary of its understanding of the presentation of preliminary results) about RPV support brackets.</p> <p><u>NOTE:</u> Dominion pointed the NRC to DCD Figure 3G.1-57, "RPV Support Bracket and Vent Wall."</p> <p>[Audit 2 Item.]</p>	<p>AUDIT 2 ITEM</p> <p>September 29, 2015: This will be addressed in structural design report. Report is scheduled to be submitted to NRC in November 2015. RAI response and COLA M/U 12/2015. To be discussed during Audit 2.</p> <p>From September 10, 2015, Slide 41:</p> <ul style="list-style-type: none"> • RPV Support Brackets are shown on DCD Figure 3G.1-57 • Evaluations will be included in Containment Internal Structures Structural Design Report (November 2015) • Results will be explained in response to RAI 03.07.02-18, and COLA markups in December 2015, letter 	<p>AUDIT 2 ITEM</p> <p>This item will be handled during the subsequent audit (Audit 2).</p>

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<p>091015S042A</p> <p>September 10, 2015, Meeting Slides 42 - 43</p> <p>NRC AI#19 from April 15, 2015, NRC Meeting</p>	<p>The presentation did not include any results showing the effect of stiffness variation on FWSC seismic demand and ISRS.</p>	<p>September 29, 2015: This item was addressed in FWSC SSI report. Refer to FWSC SSI report WG3-U63-ERD-S-0001, Appendix B.</p> <p>From September 10, 2015, Slides: Addressed in Appendix B of FWSC Seismic Analysis Report and July 2015, COLA Markups, FSAR Section 3A.17.9.3, "Effect of Structural Stiffness Variations on FWSC"</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S042B</p> <p>NRC Action #13 09/10 Mtg Slide 43</p>	<p>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.</p>	<p>October 1, 2015: Dominion will revise the FWSC seismic analysis report (WG3-U63-ERD-S-0001) to reflect additional SSI/SSSI analysis being performed for soil separation.</p> <p>Refer to FWSC SSI report WG3-U63-ERD-S-0001, Appendix B, and SER-DMN-034.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
<p>091015S044</p> <p>September 10, 2015, Meeting Slide 44</p> <p>NRC AI#20 from April 15, 2015, NRC Meeting</p>	<p>Because the SSSI results are found important in some cases, the response to RAI 3.7.1-7 should be updated with the SSSI results to address the effects of backfill on the seismic responses of the CB and the FWSC.</p>	<p>September 29, 2015: RAI response was revised in July submittal. From September 10, 2015, slides:</p> <ul style="list-style-type: none"> • Revised response to RAI 03.07.01-7 in July 2015, letter provides information on consideration of structural fill in FWSC-CB SSSI analysis to capture its effects on FWSC seismic response <ul style="list-style-type: none"> • Results of SSSI analyses of the FWSC-CB combined model, which includes structural fill placed between FWSC and CB and around the concrete block supporting FWSC basemat, ensure that FWSC site-specific seismic design basis captures effects of structural fill on seismic response of FWSC 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S045</p> <p>September 10, 2015, Meeting Slide 45</p>	<p>The staff has reviewed the Reference Letter NA3-14-044R and has the following comments: (1) In FSAR Section 3.7.1, the applicant referenced Figures 2.0-201 through 2.0-204</p>	<p>September 29, 2015: Moved from Status Column: Addressed in July FSAR markup. Audit 1. Refer to revised response in July submittal.</p>	<p>CLOSED</p> <p>The information provided by the applicant was</p>

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<p>NRC AI#21 from April 15, 2015, NRC Meeting</p>	<p>for the site-specific design ground motions. However, since the FWSC is also designed for the control motion applied at Elevation 220 ft., it should also be referenced. (2) SSE design ground motions for plant design along with the OBE for plant shutdown have been defined in the FSAR Section 3.7.1. Section 3.7.4 also establishes the details of the plant shutdown OBE. However, Section 3.7.1.1.6 in the FSAR introduces another terminology "site-dependent at Grade SSE response spectra. Since the SSE ground motions for design purposes and shutdown OBE have already been defined in Section 3.7.1 and 3.7.4, the staff does not understand the purpose of this Section.</p>	<ol style="list-style-type: none"> 1. Addressed in July 2015, letter FSAR markup by including reference to the FWSC SSI input at El. 220 ft. 2. Addressed in July 2015, letter FSAR markup by clarifying a consistent terminology and adding references to Section 3.7.1.1.6 	<p>reviewed and found acceptable.</p>
<p>091015S046A September 10, 2015, Meeting Slide 46 - 54 NRC AI#22 from April 15, 2015, NRC Meeting</p>	<p>In the 8 files for strata profiles contained in Enclosure 3 of the Dominion Transmittal Reference NA3-15-003, there are many NaN (Not A Number, for example IEEE defines 0/0=NaN) entries that appear to occur at the same elevations for certain simulated profiles. The staff requests that the applicant explain (1) how the NaN entries in the strata profiles were obtained from the simulated soil profiles that do not have any NaN entries, (2) whether the strata profiles have been used in any downstream analyses, and (3) how these NaN entries were treated if they were used.</p>	<p>The text files "RB- FB_XX#_Strata_Profile_Vs.txt" and "RB-FB_XX#_Strata_Profile_Ds.txt" provide the averaged Vs and Ds values for the nonlinear strata within each profile. The notation "NaN" is used for the linear portion. The properties of the linear portion of the profiles are directly obtained from the considered BE and LOG-SD of low strain properties.</p>	<p>CLOSED The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S046B NRC Action #14 09/10 Mtg Slides 46 and 57</p>	<p>NRC Action #14, Slides 46 and 57: The staff will review in Audit-1 development of strain compatible soil profile.</p>	<p>NRC reviewed during Audit 1.</p>	<p>CLOSED The information provided by the applicant was reviewed and found acceptable.</p>

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<p>091015S055</p> <p>September 10, 2015, Meeting Slide 55 - 56</p> <p>NRC AI#23 from April 15, 2015, NRC Meeting</p>	<p>The staff can confirm how the median and LOG SD in the 8 soil profiles were calculated. However, the LF4, HF4, LF5, and HF5 data in the excel file, "RBFBS055_SC_ProfileData.xlsx" do not match the calculated values in the 8 soil profiles. Please explain how the median and log-SD columns in the excel file were calculated for the four cases (LF4, HF4, LF5, and HF5).</p>	<p>Median and logarithmic standard deviation values of strata strain compatible properties (from last two columns of files "RB-FB_XX#_Strata_Profile_Vs.txt" and "RB-FB_XX#_Strata_Profile_Ds.txt") are associated with the BE thicknesses and used in Excel file "RBFBS055_SC_ProfileData.xlsx".</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S057A</p> <p>September 10, 2015, Meeting Slides 57 - 58</p> <p>NRC AI#24 from April 15, 2015, NRC Meeting</p>	<p>The excel file "RBFBS057A_SC_ProfileData.xlsx" has only 44 soil layers, but the individual 8 soil profile files have 49 layers</p>	<p>Thickness variation of different strata is included in randomized soil profiles. Half-space ($V_s=9200$ fps) for BE profile is at 155 ft. deep which corresponds to the layer #44. Deepest realization corresponds to a half-space depth of 183 ft. (layer #49). In the text files, all layers are reported to this maximum depth, with the half-space properties (e.g. $V_s=9200$ fps) reported for layers between the bottom of each profile and layer #49. Strain compatible properties for LB, BE and UB are associated with BE thicknesses for the site, which is represented by 44 layers; therefore, 44 layers are used in the Excel file "RBFBS057A_SC_ProfileData.xlsx"</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S057B</p> <p>NRC Action #14 09/10 Mtg Slides 46 and 57</p>	<p>NRC Action #14, Slides 46 and 57: The staff will review in Audit-1 development of strain compatible soil profile.</p>	<p>The NRC reviewed during Audit 1.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S060A</p> <p>September 10, 2015, Meeting Slide 60</p>	<p>It appears that all the stiffness variation sensitivity analyses for fully embedded (FE) cases were performed using the MSM method of ACS SASSI instead of SASSI2010. Please explain the reason for not using SASSI2010 in these cases.</p>	<p>September 29, 2015: Refer to RB/FB SSI report WG3-U71-ERD-S-0001, Appendix I.</p> <p>The results of the stiffness variation effects evaluation showed the need for running additional analyses than initially planned per the Seismic Closure Plan (SCP). The</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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<p>NRC Comment #1 on RB/FB SSI Report</p> <p>091015S060A Cont.</p>		<p> durations of the ACS SASSI analyses of the large RB/FB FE models are much shorter than the SASSI2010 analyses. Therefore, ACS SASSI program, which uses the same methodology for SSI analyses as SASSI2010, was used to perform the additional analyses within the established schedule.</p> <p>Appendix I of the report provides the benchmark results for the ACS SASSI and SASSI2010 computer programs utilizing the RB/FB model with upper bound structural stiffness properties and OBE damping values for the UB full column profile using the modified subtraction method (MSM). The benchmark analysis shows that the two computer programs yield the same results.</p>	
<p>091015S060B</p> <p>NRC Action #12 09/10 Mtg Slides 40 and 60</p>	<p>NRC Action #12, Slides 40 and 60: Staff will review V&V of ACS SASSI for application to North Anna 3 sensitivity analysis.</p>	<p>Dominion discussed ACS SASSI Product Acceptance Test and other documentation during the audit.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S061</p> <p>September 10, 2015, Meeting Slide 61</p> <p>NRC Comment #2 on RB/FB SSI Report</p>	<p>For the MSM model, please identify the locations of the interaction planes and describe whether they are consistent with the identified interaction planes in the benchmarking study. Section 4.3 does not appear to include any description in this regard.</p>	<p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001). Refer to RB/FB SSI report WG3-U71-ERD-S-0001, Section 4.3.</p> <p>Section 4.3 will be revised to clarify that interaction nodes are specified at six outer surfaces of the excavated volume model and one additional horizontal plane within the excavated volume located at elevation 0.08 m. This is consistent with the location of interaction nodes identified in the MSM benchmarking report SER- DMN-011.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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		analyses of UB profiles govern the ISRS with the exception of narrow frequency intervals at frequencies lower than 25 Hz where the analyses of the BE and LB profiles can be bounding.	
<p>091015S064</p> <p>September 10, 2015, Meeting Slide 64</p> <p>NRC Comment #5 on RB/FB SSI Report</p>	<p>Page 26 of 602 indicates that differences in maximum responses obtained from PE and FE models are negligible. However, the figures cited (Figures 5.2-5) in the report indicate that the difference could be approximately 20 to 30 percent. Needs further clarification in this regard.</p>	<p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001). Refer to RB/FB SSI report WG3-U71-ERD-S-0001, Section 5.2.</p> <p>Section 5.2 of the report will be revised to clarify that the differences in maximum responses obtained from partially and fully embedded models are small and are due to differences in the energy content of the input motions used for the SSI analyses of the partial and full column profiles at structural frequencies. This was pointed out to be another indicator that the effect of the soft soil located above the Zone III rock has negligible effect on the response of the large RB/FB with shallow embedment.</p> <p>As described in Section 6.1, the site-specific seismic demands on RB/FB structures are developed as envelope of the results obtained from the SSI analyses of partially and fully embedded models. Therefore, the effects of the soft soil located above the Zone III rock on the site-specific seismic loads are included in the Unit 3 site-specific SSI analyses.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S065A</p> <p>September 10, 2015, Meeting</p>	<p>In Table 5.6-1 it appears that the partial column UB case yields the maximum eccentricity of 10.7m. However, the report in</p>	<p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001). Refer to</p>	<p>CLOSED</p> <p>The information provided by the applicant was</p>

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<p>Slide 65 NRC Comment #6 on RB/FB SSI Report</p>	<p>Page 32 of 602 (last sentence) indicates that the UB full column profile yields the maximum value. In addition, for the full column case while the BE governs, the UB case was identified as governing in Table 5.6-1. Please clarify these inconsistencies.</p>	<p>RB/FB SSI report WG3-U71-ERD-S-0001, Section 5.6, Table 5.6-1. The BE full column case yielded the maximum eccentricity. Table 5.6-1 will be revised to clarify this inconsistency.</p>	<p>reviewed and found acceptable.</p>
<p>091015S065B NRC Action #15 09/10 Mtg Slide 65</p>	<p>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.</p>	<p>October 1,: Dominion agreed to: Revise the FWSC SSI report to correct the following errors: -Section 5.5, Item 1: Change to “The <u>FWSC</u> structure and model...” -Section 5.5, Item 7: Change to “(the <u>FWSC</u> seismic weight...)” Revise the FSAR to present a summary of the methodology to calculate foundation uplift as presented in the CB and FWSC Seismic Analysis Reports. The FSAR will be revised to present a summary of the methodology to calculate foundation uplift as presented in the CB and FWSC Seismic Analysis Reports. September 20, 2015: Dominion agreed to correct errors in FWSC SSI report. Refer to Section 5.6 of CB SSI report WG3-U73-ERD-S-0001 and Section 5.5 of FWSC SSI report WG3-U63-ERD-S-0001.</p>	<p>OPEN The issue is tracked as a follow-up action item.</p>
<p>091015S066 September 10, 2015, Meeting Slide 66</p>	<p>In Section 5.3, the SRSS equations in Step 2 appear to be not consistent with the direction definitions presented in Step 1. The definitions in Step 1 should be revised.</p>	<p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001), CB SSI Report (WG3-U73-ERD-S-0001) & FWSC SSI Report (WG3-U63-ERD-S-0001). Showed the</p>	<p>CLOSED The information provided by the applicant was</p>

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<p>NRC Comment #7 on RB/FB SSI Report</p>	<p>Same problem with Section 5.4 in calculating relative floor displacements.</p>	<p>NRC the pages that address these changes during Audit 1</p> <p>Sections 5.3 and 5.4 will be revised to correct the description of the indices in the next revision of the report to state that the first index “i” indicates the direction of the input motion and the second index “j” indicates the direction of the response.</p> <p>Refer to Sections 5.3 and 5.4 of RB/FB SSI report WG3-U71-ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001.</p>	<p>reviewed and found acceptable.</p>
<p>091015S067A</p> <p>September 10, 2015, Meeting Slides 67 - 68</p> <p>NRC Comment #8 on RB/FB SSI Report</p> <p>091015S067A Cont.</p>	<p>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 percent, not much higher than the 80 percent criterion.</p>	<p>October 2, 2015: 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.</p> <p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001), CB SSI Report (WG3-U73-ERD-S-0001) & FWSC SSI Report (WG3-U63-ERD-S-0001) RB/FB SSI report WG3-U71-ERD-S-0001</p> <p>The calculations presented in the report considered two different orientations (plus and minus) of the SASSI calculated vertical spring reactions to provide the uplift of the foundation. Because the RB/FB is symmetrical with respect to XZ plane, the direction of the input motion in the Y direction (E_y) has a negligible phasing effect on the calculated uplift. The only significant eccentricity is with respect to the YZ plane.</p> <p>Because plus and minus are considered for the vertical spring reactions, in order to</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

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		<p>evaluate the phasing effects on the uplift calculations, additional calculations will be performed where the uplift will be calculated considering the following two earthquake load combinations:</p> <p align="center">(1) $R_D+R_B-Ex+Ey+Ez$ and (2) $R_D+R_B+Ex-Ey-Ez$</p> <p>where, R_D is effect of the RB/FB seismic weight, R_B is effect of the groundwater buoyancy force, and E_i is effect of the vertical spring reaction due to seismic input in the i-direction. These two cases, in addition to the following two cases already considered in the report:</p> <p align="center">(a) $R_D+R_B+Ex+Ey+Ez$ and (b) $R_D+R_B-Ex-Ey-Ez$</p> <p>are sufficient to address the effect of the RB/FB non-symmetrical configuration on the uplift of the foundation.</p> <p>The report will be revised to (a) clearly explain the methodology used to calculate the base contact area and (b) supplement the existing results based on load combinations (a) and (b) with results for load combinations (1) and (2).</p>	
<p>091015S067B NRC Action #16 09/10 Mtg Slide 67</p>	<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>October 2, 2015: Revise the RB/FB and CB SSI reports to include the alternative uplift calculation results and rationale. Add a summary statement to the FSAR.</p> <p>September 30, 2015: Dominion agreed to correct errors in the RB/FB SSI report. Refer to Section 5.6 of the RB/FB SSI report WG3-U71-ERD-S-0001.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

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<p>091015S069</p> <p>September 10, 2015, Meeting Slide 69</p> <p>NRC Comment #9 on RB/FB SSI Report</p>	<p>Table 5.4-1, row at Node 9103 shows NA3 exceeding the standard design for maximum vertical displacement, but is not identified as such in the text and the table. In addition Section 6.2 states that “The comparisons of the site-specific enveloping displacements with the corresponding standard design values show that the NA3 high frequency design motion results in displacements that are enveloped by the standard design.” This inconsistency needs to be addressed.</p>	<p>September 29, 2015: Revised RB/FB SSI Report (WG3-U71-ERD-S-0001) was in July 2015 submittal. Refer to Section 5.4 and 6.2 of the RB/FB SSI report WG3-U71-ERD-S-0001.</p> <p>The maximum vertical displacements of the roof oscillators (nodes 9101 through 9108) are enveloped for the purpose of design considerations of the safety-related components attached to the roof. The enveloping NA3 vertical displacement of the roof is 1.38 cm, which is much smaller than 4.99 cm of the standard design. The exceedance of the displacements calculated for Node 9103, which represents the high mode of out-of-plane vibration of the RB/FB roof, need not be considered in the design. The report will be revised to provide the added clarification.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S070A</p> <p>September 10, 2015, Meeting Slides 70 - 73</p> <p>NRC Comment #10 on RB/FB SSI Report</p> <p>091015S070A Cont.</p>	<p>Table 6.1-2e, "Enveloping Maximum Accelerations for Fuel," there are large differences between the two horizontal directions for NA3 but not so much so for the standard design. Also, Table 6.1-5 shows similar discrepancy to those above for maximum spring forces and displacements. Provide an explanation on these differences.</p>	<p>September 10, 2015, Meeting: No SSI report changes required. Refer to September 10, 2015, Dominion presentation.</p> <p>The comparison of the maximum accelerations in the attached pdf file shows that UB cases governed the fuel response. The results of the UB partial and full column analyses for outcrop transfer functions for horizontal responses of the fuel are provided in the attached file. They show that the fuel experiences higher NS(X) than EW(Y) accelerations because:</p> <ul style="list-style-type: none"> • Rocking response of fuel along NS direction is amplified at frequency ≈ 11Hz. • Peak responses in NS directions are at higher frequency where the intensity of the NA3 design motion is higher 	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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		<p>The comparisons of the fuel maximum acceleration results of the standard design analyses for different generic site conditions show that the response of the fuel varies significantly as function of the subgrade stiffness, embedment and ground motion. The fuel accelerations used for the standard design represent the envelope of responses of the considered generic conditions and, as such, they do not show the real differences of responses between the two horizontal directions for each generic site condition considered for the standard design. Therefore, they do not provide a comparable basis for comparison with the results of the NA3 site-specific analyses with respect to differences between the two horizontal directions for NA3 responses.</p>	
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<p>091015S070B 09/10 Slide 72</p>	<p>Fuel Racks Analysis – What is the basis for the inputs to the fuel racks analysis?</p>	<p>September 29, 2015: Refer to 0910GEN02. Sources including the bounding analysis report were provided during Audit.</p> <p>Inputs are in SER-DMN-019 report (DBR-0006780 R1).</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
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<p>091015S074A</p> <p>September 10, 2015, Meeting Slide 74</p> <p>NRC Comment #11 on RB/FB SSI Report</p>	<p>RB/FB SSI report, 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 RB/FB SSI report, Section 6.2, "Enveloping Maximum Displacements."</p>	<p>October 1, 2015: The FWSC SSI report WG3-U63-ERD-S-0001 Table 6.2-2 marks the few site-specific relative displacements that exceed the standard design values. The conclusions in the FWSC SSI report Section 6.2 <u>will be revised</u> 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.</p> <p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3- U71-ERD-S-0001). Refer to RB/FB SSI report WG3- U71-ERD-S-0001, Section 6.2 and Table 6.2-1.</p> <p>Discussed during Audit 1: The RB/FB SSI report, Table 6.2-1, marks the few site-specific relative displacements that exceed the standard design values. The conclusions in the RB/FB SSI report, Section 6.2 have been revised 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.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
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<p>091015S074B</p> <p>09/10 Slide 74</p> <p>NRC Action #17 09/10 Mtg Slide 74</p>	<p>RB/FB SSI Report: Some site-specific relative displacements exceed the standard design values</p> <p>NRC Action #17, Slide 74, DOM will explain the exceedances of the maximum relative displacements in the FSAR</p>	<p>October 1, 2015: Dominion will revise the FWSC seismic analysis report (WG3-U63-ERD-S-0001) to clarify the approach for enhancing ISRS for effects of cracking (Appendix B, Section B.5).</p> <p>September 29, 2015: Moved from Status Column: DOMINION to explain what was done with the exceedances. Refer to RB/FB SSI report WG3-U71-ERD-S-0001 Section 6.2.</p> <p>Show the bounding loads report at the audit and how is being for the ongoing structural evaluation</p>	<p>CLOSED</p> <p>See 092815A1003</p>
<p>091015S075A</p> <p>September 10, 2015, Meeting Slide 75</p> <p>NRC Comment #12 on RB/FB SSI Report</p> <p>091015S075A</p>	<p>Section 6.3 provides site specific design envelope ISRS which represent the envelope of ISRS results from site specific SSI analysis using LB, BE, and UB soil profile of RB/FB model with upper bound stiffness properties. The site-specific evaluation of the effect of structural stiffness variation is described in Appendix B. According to Appendix B, it appears that for design and qualification of the equipment, ISRS provided in Section 6.3 will be enhanced only if there is a peak exceedance as a result of the sensitivity analysis of greater than 10 percent. Staff needs further justification of the 10 percent criteria. In staff's opinion for equipment and systems seismic qualification, for all identified exceedances due to stiffness variations, the NA3 site specific design ISRS should be enhanced.</p>	<p>October 1, 2015: Closed. Refer to Issue 092815A1003 for follow-up issue.</p> <p>September 29, 2015, Refer to 092815A1003.</p> <p>September 10, 2015, Meeting: No SSI report changes required. Action: Explain in FSAR why 10 percent is acceptable. Refer to Conclusion portion of Appendix B of RB/FB SSI report WG3-U71- ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001 and the bounding report SER-DMN-019.</p> <p>The sensitivity analysis for the effects of concrete cracking that considered a 50 percent reduction in flexural and shear stiffness of all concrete elements throughout their length is very conservative. For the SSE, many concrete elements will not crack and, for most of the cracked elements, the cracking will be limited in the vicinity of the highly stressed portions of the element length. Thus, the 10 percent criterion was used to identify ISRS that are sensitive to concrete cracking and those that are not very</p>	<p>CLOSED</p> <p>See 092815A1003</p>

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Cont.		sensitive. Analysis that accurately considers the extent of cracked elements in the structure for the SSI analysis is not practical due to the very large effort required to perform such an analysis.	
<p>091015S075B</p> <p>09/10 Slide 75</p>	<p>RB/FB SSI Report: NRC Comment 12 [10% criteria in sensitivity analysis]: why is the 10 percent criteria for evaluating exceedances acceptable</p>	<p>October 1, 2015: Refer to Issue 092815A1003 for follow-up issue.</p> <p>September 29, 2015: Refer to 092815A1003.</p> <p>September 10, 2015: Meeting: Explain in FSAR and report why 10 percent is acceptable for ISRS. Report, but not FSAR markup, available at audit. Refer to Appendix B of RB/FB SSI report WG3-U71-ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001.</p> <p>NRC agreed 10 percent is acceptable for ISRS. Refer to slide 118.</p>	<p>CLOSED</p> <p>See 092815A1003</p>
<p>091015S076</p> <p>September 10, 2015, Meeting Slide 76</p> <p>NRC Comment #13 on RB/FB SSI Report</p>	<p>Appendix D (Page 381) states that, "RCCVA and RFBFW are the maximum acceleration and vertical rigid mode mass of the RCCV LMSM." It should be corrected as "RCCVA and RCCVW are the maximum acceleration and vertical rigid mode mass of the RCCV LMSM."</p>	<p>September 10, 2015, Meeting: Revise: RB/FB SSI Report (WG3-U71-ERD-S-0001). Refer to Appendix D of RB/FB SSI report WG3-U71-ERD-S-0001. The typo will be corrected in the next revision of the report.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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<p>091015S077</p> <p>September 10, 2015, Meeting Slide 77</p> <p>NRC Comment #14 on RB/FB SSI Report</p>	<p>As shown in Table D.3-3, there is no rigid mass for D/F. Why is that?</p>	<p>September 10, 2015, Meeting: No SSI report changes required. The rigid mass for D/F is conservatively designed to the flexible mode acceleration that is applied to the total mass. This is consistent with the standard design methodology.</p>	<p>CLOSED</p> <p>The explanation by the applicant was acceptable.</p>
<p>091015S078A</p> <p>September 10, 2015, Meeting Slide 78</p> <p>NRC Comment #15 on RB/FB SSI Report</p>	<p>It seems the second peak in the Appendix I, Figure I-1 is a numerical anomaly in both ACS SASSI and SASSI 2010. Please explain how the results of the analysis would be affected.</p>	<p>September 10, 2015, Meeting: No SSI report changes required. Report is being prepared to document results for NRC review in Audit 1. Refer to SER-DMN-033 report. As noted in Section 5.1, the anomalies in transfer function interpolation, as the one noted in Figure I-1, were investigated by adding frequencies of analyses. The results obtained using additional frequencies of analyses were compared with those obtained using the original set of frequencies listed in Table 4.2 to show that the differences in computed maximum responses and ARS are negligibly small.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>
<p>091015S078B</p> <p>09/10 Slide 78</p>	<p>RB/FB SSI Report: NRC Comment 15 [Apparent numeric anomalies in ACS SASSI and SASSI 2010]</p>	<p>September 10, 2015, Meeting: Report made available at Audit to show additional frequencies used to investigate anomalous peaks.</p> <p>Refer to SER-DMN-033 report.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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<p>091015S 080A</p> <p>September 10, 2015, Presentation Slides 80 - 106</p> <p>NRC Staff Question #1 for 9/10 public meeting</p> <p>091015S 080A</p>	<p>In response to Action Item Number 14 of Dominion NA3 COLA update meeting with NRC April 15, 2015, in the FSAR Markup on pages 3-21 and 3-25, it was indicated that the NEI check is based on comparison between PBSRS and the ± 20 percent smoothed envelope of surface ARS obtained from the three SSI analysis soil profiles (LB, BE, and UB). The basis of smoothening the spectra appears to be that the PBSRS are smooth spectra obtained from the RVT approach and therefore, for comparison purposes, smoothening of the raw ARS obtained from the individual surface time histories is acceptable. However, it appears that irrespective of the method used (i.e., RVT or time domain approach) the PBSRS would be a smooth curve since 60 random profiles are used to generate the PBSRS. However, the deterministic SSI analysis is performed for only three profiles. The objective of the NEI approach is to ensure that the three SSI deterministic seismic input used for the SSI analysis would be sufficient to envelope the PBSRS. NEI guidance did not specify smoothening the individual ARS in making the NEI check. Instead of modifying the input time histories, another acceptable approach per the NEI guidance is to select additional soil columns (in addition to the three soil columns already developed for SSI analysis) from the set of soil columns used to generate the FIRS so that the envelope ARS with the additional soil columns will bound the surface PBSRS. As such for the RB/FB, CB, and the FWSC, the applicant is requested to provide comparisons of the envelope of the raw ARS (obtained from the three SSI profiles) with</p>	<p>September 29, 2015: Refer to 091015S032A.</p> <p>From September 10, 2015, Meeting: The use of 20 percent was not considered an acceptable basis. Include a basis in FSAR for NEI confirmatory check. Justify in the FSAR the dips below PBSRS. Replace FSAR Figures 3.7.-295 through 3.7.1-306, included in July COLA markup submittal (Letter NA3-15-18) with figures showing raw ARS comparison with PBSRS for the NEI check.</p> <p><u>Confirmatory NEI Check</u></p> <ul style="list-style-type: none"> • The confirmatory NEI check is conducted by convolving the SSI input time-histories (from the foundation level) through LB, BE, and UB strain compatible soil profiles and comparing the [smoothed] envelope of the resulting top-of-the-column ARS with the corresponding full column and partial column PBSRS. • The analysis is carried out linearly using time histories as input (SHAKE2000) • The comparison shows that the intent of the NEI check is met by confirming that soil column frequencies are captured by the three deterministic LB, BE, and UB soil profiles. • It should be noted PBSRS is developed using RVT approach that results in a smooth response spectrum while the confirmatory NEI check is performed by 	<p>CLOSED</p> <p>See 091015S032A</p>
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Cont.	the PBSRS and provide justification of acceptability of the instances where PBSRS exceeded the envelope ARS. The applicant is also requested to describe how the RVT method is used to perform the NEI check.	<p>one time history in each direction. For a proper comparison, smoothing the response spectrum from time history analysis is performed.</p> <ul style="list-style-type: none"> • Negligible instances of PBSRS exceeding the envelope (next slides) <ul style="list-style-type: none"> – Small percentages over narrow frequency ranges – Do not correspond to a missing soil column frequency 	
<p>091015S080B</p> <p>09/10 Slides 32 – 37</p> <p>NRC Action #10 09/10 Mtg Slides 32 and 81</p>	<p>4/15 Meeting – Action 14 - Figures Showing NEI Check: the smoothing of the curves is not justified</p> <p>NRC Action #10, Slides 32 and 81: FSAR should include the comparison of envelope of the raw ARS with PBSRS for the NEI check and justifications for acceptability of any dips of surface ARS envelop below the PBSRS.</p>	<p>September 29, 2015: Refer to 091015S032A.</p> <p>September 10, 2015, Meeting: FSAR Figures to be revised and justifications for acceptability of any dips of surface ARS envelop below the PBSRS.</p> <p>Related to Slides 82-106 (NRC 8/31 Question 1)</p>	<p>CLOSED</p> <p>See 091015S032A</p>
<p>091015S080C</p> <p>09/10 Slides 82 - 106</p>	<p>NRC 8/31 Question 1 – regarding July 2015 letter and markups [Confirmatory NEI Check]: why is smoothing of the curves acceptable</p>	<p>September 29, 2015: Refer to 091015S032A.</p> <p>Related to Slide 32, September 10, 2015, Meeting: *NRC specifically mentioned that +/-20 percent smoothing is not acceptable. NRC mentioned smoothing curves may be left but should not be used for any argument sake. Part of the argument is that the ISRS are broadened by +/-15 percent. Also, the exceedances do not represent any missing soil column frequencies.</p>	<p>CLOSED</p> <p>See 091015S032A</p>

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<p>091015S107A</p> <p>September 10, 2015, Presentation Slide 107</p> <p>NRC Staff Question #2 for 9/10 public meeting</p>	<p>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 base mat instead of the bottom of the concrete fill below the CB basemat. This basis should be included in the FSAR Section 3.7.1.</p>	<p>Information will be added to 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</p> <p>Refer to CCR package NA3-15-7012.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>
<p>091015S107B</p> <p>NRC Action #18 09/10 Mtg Slide 107</p>	<p>NRC Action #18, Slide 107: Dominion will include in FSAR the basis of defining CB control motion at CB basemat instead of bottom of concrete fill.</p>	<p>September 30, 2015: Dominion action for FSAR updates.</p> <p>Refer to CCR package NA3-15-7012.</p>	<p>CLOSED</p> <p>See 091015S107A</p>
<p>091015S108A</p> <p>September 10, 2015, Presentation Slides 108 - 115</p> <p>NRC Staff Question #3 for 9/10 public meeting</p>	<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,</p>	<p>October 1, 2015: 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. [NOTE: This is a corrected description of the change.]</p> <p>September 29, 2015: FSAR will be revised to incorporate “manifestation” where appropriate and to change “restart” to “shutdown” for OBE.</p> <p>September 23, 2015, Teleconference: The NRC asked that FSAR Section 3.7.1.1.6 be revised to refer to the “site-dependent SSE <u>manifestation</u> at grade” to clarify that this is used only for the purpose of defining the OBE for restart of the plant following an earthquake in Section 3.7.4, and not for purposes of design. Dominion agreed to modify the wording.</p>	<p>OPEN</p> <p>The issue is tracked as a follow-up action item.</p>

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		<p>3.7.1.1.6). OBE is defined as 1/3 of the SSE.</p> <ul style="list-style-type: none"> • The instrument free field location, once determined, will include appropriate spectral ratios to transfer the recorded motion of the instrument to the site condition of OBE spectrum. (FSAR Section 3.7.4.2) • With the above approach considering the consistency of the seismic soil column analysis, the OBE exceedance criteria will be compared to the recorded site response in a consistent manner <p>Follow-up call with NRC on September 23, 2015, to discuss OBE definition; consideration of RG 1.60 was not discussed in 9/10 meeting; is site-dependent SSE at grade the right term. NRC wants to see that PBSRSs enveloped. Need to show each of the PBSRSs envelop each structure. NRC initially stated OBE needs to envelop the lower level (minimize), but will further assess based on information provided in meeting and readdress in September 23, 2015, call. Need to clearly explain that RB and CB use the same envelope for design. Assuming NRC accepts method used for developing OBE, need to make clear in COLA why appropriate to use bounding for OBE.</p> <p>Because the site-dependent OBE at-grade is specific to the RB/FB and CB soil conditions, FWSC need not be included. Once the location of the OBE instrument is known, spectral ratios will be developed later to transfer the recorded motion to the conditions consistent with RB/FB and CB.</p>	
091015S108B	NRC 8/31 Question 3 - regarding July 2015 letter and markups [Use of Site-Dependent SSE at-Grade for OBE Definition]. NRC	September 29, 2015: Based on the discussion with NRC on 9/23 call, NRC is OK with leaving the	CLOSED

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<p>09/10 Slides 109 – 115</p> <p>NRC Action #19 09/10 Mtg Slide 109</p>	<p>requested that the definition of OBE be moved to Section 3.7.4</p>	<p>OBE definition in Section 3.7.1.1.6. NRC will reference Section 3.7.1.1.6 in their 3.7.4 SER text.</p>	<p>The action by the applicant is acceptable.</p>
<p>091015S116A</p> <p>September 10, 2015, Presentation Slide 116</p> <p>NRC Staff Question #4 for 9/10 public meeting</p>	<p>FSAR markup Table 3A.13.2-201 on page 249 of 623, Damping Values for Dynamic Analysis, identifies the SSE and OBE damping values for various structural and mechanical components. For some of the components in this table, there are no corresponding damping values in the ESBWR DCD Table 3.7-1 or in RG 1.61 (e.g., fuel assemblies for horizontal and vertical directions applicable to OBE, and vent wall/diaphragm floor with 50% concrete stiffness contribution applicable to SSE). Therefore, provide the basis for the damping values presented in the FSAR Table 3A.13.2-201, for those components which are not identified in ESBWR DCD Table 3.7-1 or in RG 1.61.</p>	<p>See 091015S116B.</p> <p>September 29, 2015: Dominion committed to add to the FSAR. Refer to 091015S116B.</p> <p>September 10, 2015, Meeting: For each damping value, clearly state where the value came from (e.g., the DCD). Have calculations supporting the values available at the audit. Revise FSAR with additional information.</p> <p>See table on Slide 119.</p>	<p>CLOSED</p> <p>See 091015S116B</p>
<p>091015S116B</p> <p>09/10 Slide 116</p> <p>NRC Action #20 09/10 Mtg Slide 116</p> <p>091015S116B Cont.</p>	<p>NRC 8/31 Question 4 regarding July 2015 letter and markups [Basis for Damping Values in FSAR Table 3A.13.2-201]</p> <p>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.</p>	<p>October 1, 2015: Revise FSAR Section 3A.13.2 as follows: "Table 3A.13.2-201 provides the damping values used for the site-specific SSI analyses. <u>The damping values are based on RG 1.61, DCD Table 3.7-1, and the DCD model.</u>" Refer to CCR package NA3-15-7012.</p> <p>September 29, 2015: NRC and Dominion agreed that the basis for damping will be included in the FSAR. Update the FSAR to either include the information in the table or include an explanation in the Section 3A.13.2 discussion.</p> <p>See 091015S116A.</p>	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p>

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<p>091015S117A</p> <p>September 10, 2015, Presentation Slides 117 – 122</p> <p>NRC Staff Question #5 for 9/10 public meeting</p>	<p>Describe the NA3 approach and the criteria for enhancing the site-specific seismic demand (e.g., structural load, wall pressures, ISRS, etc.) calculated based on the envelope of the stand-alone SSI analyses to bound any potential effect of the stiffness variation and the SSSI sensitivity analyses.</p>	<p>October 1, 2015: Refer to Issue 092815A1003 for follow-up issue</p> <p>September 10, 2015, Meeting: Have a technical basis for SSSI effects on soil bearing pressure, stability, lateral pressure on walls. Confirm technical basis is available for cases where exceedances are not enveloped. Add to FSAR justification for criteria for enveloping seismic loads. See Slides 117-122. Refer to the Conclusions in Appendix B of RB/FB SSI Report WG3-U71-ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001 and the CB-RB/FB SSSI report WG3-U73-ERD-S-0005.</p>	<p>CLOSED</p> <p>See 092815A1003</p>
<p>091015S117B</p> <p>09/10 Slide 120</p>	<p>Question 5 regarding July 2015 letter and markups: use of scaling if SSSI analyses of CB-RB/FB yields results that exceed ISRS from CB SSI analyses</p>	<p>October 1, 2015: Refer to Issue 092815A1003 for follow-up issue. Revise the FWSC seismic analysis report (WG3-U63-ERD-S-0001) to provide an explanation for the scaling factor approach. Ensure this is discussed in the FSAR as well.</p> <p>September 10, 2015, Meeting: NRC will review scaling method during audit. Refer to the CB-RB/FB SSSI report WG3-U73-ERD-S-0005.</p>	<p>CLOSED</p> <p>See 092815A1003</p>

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<p>091015S117C</p> <p>09/10 Slides 118-122</p>	<p>NRC 8/31 - Question 5 regarding July 2015, letter and markups [Approach and criteria for enhancing site-specific seismic demand]: justify the approach used to envelope seismic loads</p>	<p>October 1, 2015: Dominion refer to Issue 092815A1003 for follow-up issue.</p> <p>September 29, 2015: NRC Staff suggested adding to FSAR justification for criteria for enveloping seismic loads. Dominion to consider FSAR changes. Revise the report to include this information.</p> <p>Refer to the Conclusions in Appendix B of RB/FB SSI report WG3-U71-ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001 and the CB-RB/FB SSSI report WG3-U73-ERD-S-0005.</p>	<p>CLOSED</p> <p>See 092815A1003</p>
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		<p>September 10, 2015, Meeting: Refer to slide 75; Peak exceedance of <10 percent is critical point on when can use.</p> <p>Envelope or must state technical basis for not doing so; seismic demand/soil bearing pressures. Make sure analysis is available so staff can look at during audit. Refer to the Conclusions in Appendix B of RB/FB SSI report WG3-U71-ERD-S-0001, CB SSI report WG3-U73-ERD-S-0001 and FWSC SSI report WG3-U63-ERD-S-0001 and the CB-RB/FB SSSI report WG3-U73-ERD-S-0005 and FWSC-CB SSSI report WG3-U73-ERD-S-0002.</p>	
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<p>091015S123A</p> <p>September 10, 2015, Presentation Slide 123</p> <p>NRC Staff Question #6 for 9/10 public meeting</p>	<p>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.</p>	<p>October 1, 2015: Dominion will revise the FSAR to address the change in the technical reports that were revised.</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 6.4-1 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 	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p>
<p>091015S123B</p> <p>09/10 Slide 123</p>	<p>NRC 8/31 Question 5 regarding July 2015 letter and markups: SSSI effects on FWS roof out-of-plane loads exceed standard design</p>	<p>September 30, 2015: FSAR changes as described in 091015S123A.</p> <p>September 29, 2015: Revised CB-FWSC SSSI report to correct error related to this topic. Refer to Section 6.4 of the FWSC-CB SSSI report WG3-U73-ERD-S-0002. Explained during Audit 1 that exceedance is already included in design basis described in report.</p>	<p>CLOSED</p> <p>See 091015S123A</p>
<p>091015S124A</p> <p>September 10, 2015, Presentation Slide 124</p> <p>NRC Staff Question #7 for 9/10 public meeting</p> <p>091015S124A Cont.</p>	<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</p>	<p>October 1, 2015: Dominion will 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>September 29, 2015: Add to FSAR Section 3A.17.11 the bullets to explain how exceedances are addressed. Refer to the CB-RB/FB SSSI</p>	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p> <p>See also 092815A1003</p>

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	<p>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>	<p>report WG3-U73-ERD-S-0005 and the CCR package NA3-15-7012.</p> <p>September 10, 2015, Meeting:</p> <ul style="list-style-type: none"> • FSAR Section 3A.17.11 will be revised to: • Describe exceedances in CB response due to RB/FB SSSI effects • Explain that SSSI induced exceedances in CB torsional response are enveloped by shear load demands obtained from SSI analyses of CB standalone model • Explain that SSSI induce exceedances of seismic lateral load demands have negligible effect on out-of-plane flexural and shear stress demands on the CB west exterior wall • Note that ISRS exceedances due to RB/FB SSSI effects are included in CB site-specific ISRS (see discussion on Question 8) 	
<p>091015S124B</p> <p>09/10 Slides 124- 125</p> <p>NRC Action #21 09/10 Mtg Slide 124</p> <p>091015S124B Cont.</p>	<p>NRC 8/31 Questions 7 & 8 regarding July 2015 letter and markups [SSSI exceedances for CB and RB/FB reports]: explain basis for exceedances</p> <p>NRC Action #21, Slide 124: Dominion will include in the FSAR consideration of any exceedances in the CB due to site-specific CB-RB/FB SSSI analysis.</p>	<p>September 30, 2015: Future 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>September 29, 2015: Dominion and NRC discussed changes to FSAR Section 3A.17.11 that add the bullets to explain how exceedances are addressed. Statements available in reports....discuss with NRC at Audit 1 whether FSAR change is needed. Remove incoherency as a justification (September 10, 2015, Meeting: deleting in reports).</p>	<p>CLOSED</p> <p>See 091015S124A and 092815A1003</p>

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		Refer to the CB SSI report WG3-U73-ERD-S-0001, the CB-RB/FB SSSI report WG3-U73-ERD-S-0005 report and the CCR package NA3-15-7012.	
<p>091015S125</p> <p>September 10, 2015, Presentation Slide 125</p> <p>NRC Staff Question #8 for 9/10 public meeting</p>	<p>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 percent at a frequency of 25 Hz and by 25 percent 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.</p>	<p>October 1, 2015: 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>September 30, 2015: Similar to above (091015S124B), the FSAR as well as the CB-RB/FB SSSI Report and the CB Seismic Analysis Report will be revised to address exceedances. Incoherency will not be used as justification.</p> <p>September 29, 2015: Discussed revising FSAR 3A.17.11, Section 5.4 of CB-RB/FB SSSI report, and Section 6.3 of CB Seismic Analysis Report. Refer to the CB SSI report WG3-U73-ERD-S-0001, the CB-RB/FB SSSI report WG3-U73-ERD-S-0005 report and the CCR package NA3-15-7012</p> <p>September 10, 2015, Meeting:</p> <ul style="list-style-type: none"> • Site-specific design ISRS will be enhanced to address 25 percent peak exceedance at \approx 50 Hz in ISRS for CB basemat vertical response • ISRS results from SSI analysis of CB standalone model and SSSI analysis of CB-RB/FB model will be enveloped and broadened 	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p> <p>See also 092815A1003</p>
<p>091015S125</p> <p>Cont.</p>			

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<p>091015S127A</p> <p>September 10, 2015, Presentation Slide 127</p> <p>NRC Staff Question #10 for 9/10 public meeting</p>	<p>The applicant has included the ITAAC Tables 2.4.15-1, 2.4.16-1, 2.4.17-1, and 2.4.18-1 for performing the site-specific SSI and SSSI analyses to address the NAPS DEP 3.7-1. The design commitment states that the design of the Non-Category I structure precludes any adverse interaction with Seismic Category I structures. However, the design commitment should be more specific, to indicate that seismic SSSI interaction of the "Non-category I structure" with the "adjacent seismic Category I structure" will not impair the ability of Seismic Category I structures to perform their safety-related functions.</p>	<p>Current wording will be changed for improving clarity.</p>	<p>CLOSED</p> <p>See 091015S029A</p>
<p>091015S127B</p> <p>NRC Action #8 09/10 Mtg Slides 29 and 127</p>	<p>NRC Action #8, Slides 29 and 127: Dominion will revise the design commitments for considering SSSI effects on Cat I structures due to interaction of Cat II structures. Staff will review this issue at Audit-1.</p>	<p>Dominion and NRC discussed ITAAC changes during Audit 1.</p> <p>September 10, 2015, Meeting: Clarify wording in the SC II structures ITAAC.</p>	<p>CLOSED</p> <p>See 091015S029A</p>
<p>091015S127C</p> <p>09/10 Slides 126-127</p> <p>NRC Action #22 09/10 Mtg Slide 126</p>	<p>NRC 8/31 Question 9</p> <p>NRC Action #22, Slide 126: Staff requested DOM to provide site-specific ITAAC for the access tunnel</p>	<p>Dominion and NRC discussed ITAAC during Audit 1.</p> <p>September 10, 2015, Meeting: Make sure COLA is clear that access tunnel is designed to NA3 seismic demand. ITAAC is being added</p>	<p>CLOSED</p> <p>See 091015S126</p>
<p>092815A1001</p>	<p>Provide the technical basis for not including ASCE-4-98 loadings in the analysis of lateral earth pressure in accordance with SRP Section 3.8.4 Acceptance Criteria II.4.H.</p>	<p>Dominion and NRC discussed during Audit 1.</p>	<p>CLOSED</p> <p>The information provided by the applicant was reviewed and found acceptable.</p>

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092815A1002	The SSE definition (for Tier 1) in Part 10 of the COLA should reflect the SSI Input Response Spectra at the 220' elevation in addition to FIRS at the 282' elevation. The July markups of FSAR 3.7.1 captured both FIRS at elev. 282' and SSI Input Response Spectra at elev. 220'. The same language can be added to the Tier 1 definition of SSE.	October 1, 2015: Dominion will 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. September 29, 2015: Dominion and the NRC were aligned with the NRC observation. In response: Part 10 will be revised 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 This issue is tracked as a follow-up action item.
092815A1003	September 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, and SSSI analyses. Also describe use of scaling if SSSI analyses of CB-RB/FB yields results that exceed ISRS from CB SSI analyses	September 29, 2015: Dominion is aligned with NRC to update FSAR. New follow-up issue from Issues 091015S075A, 091015S117A, 091015S117B, 091015S117C, 091015S124A, 091015S124B, and 091015S125.	OPEN This issue is tracked as a follow-up action item.
092815A1004 092815A1004 Cont.	Technical Report SER-DMN-034: Shear capacity of concrete fill under FWSC: NRC requested technical basis for using ACI-207.1R-18 versus ACI-318.	AUDIT 2 ITEM. October 1, 2015: New follow-up issue from Issues 091015S012B, 091015S012C, and 091015S012E. Audit 2 item. Discuss during future seismic phone call. September 30, 2015: This issue will be addressed as an Audit 2 discussion item.	OPEN This issue is tracked as a follow-up action item.
092815A1005	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	October 1, 2015: New follow-up issue from Issues 091015S012A, 091015S012B, 091015S012C, and 091015S012E. Revise report to state that exceedances will be considered in design.	OPEN This issue is tracked as a follow-up action item.

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	surrounding soil. NRC also asked how these will be documented.	September 30, 2015: Dominion should provide information during the audit if practicable.	
092815A1006	CB-FWSC SSSI and CB-RB/FB SSSI Report editorial changes.	<p>October 1, 2015: 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 Figure 5.2-1 and Torsion in Figure 5.2-2. Revise the FSAR to address these inconsistencies.</p> <p>Revise the CB-FWSC SSSI Report: -On page 18, 2nd to last paragraph (starting with "the max aspect ratio"), add a reference to Appendix 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> <p>Revise the CB-RB/FB SSSI Report: -On page 17, there is a reference to Figure 3.2-1. This figure does not exist in the report. In looking at the document, I suspect that the intent is to reference Figure 3.2-1 of Reference 2-k (similar as done on page 11.) -In the second paragraph of Section 5.2, there is a sentence that reads. "As shown in Figure 5.2-1, the SSSI of the RB/FB has significant effect only on the CB torsional response". The reviewer asked whether the correct reference should actually be Figure 5.1-2.</p> <p>September 30, 2015: Dominion to revise CB-FWSC SSSI Report:</p>	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p>
092815A1006 Cont.			

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		<p>-On page 18, 2nd to last paragraph (starting with “the max aspect ratio”), add a reference to Appendix C to end of last sentence.</p> <p>-On page 16, in last paragraph of Section 4.2, add a reference to Figures 6.3-1 through 6.3-12.</p> <p>-Provide explanation and basis in Conclusion Section to describe exceedances describe in Section 5.6.</p>	
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.	October 2, 2015: 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.	<p>OPEN</p> <p>This issue is tracked as a follow-up action item.</p>