

From: [Valentin-Olmeda, Milton](#)
To: "[Diane Aitken](#)"
Subject: North Anna SPRA Audit Questions
Date: Thursday, July 12, 2018 2:32:00 PM

Diane,

As previously mentioned, here are the initial set of audit questions from the NRC staff.

North Anna Initial Questions Related to Checklist

1. Topic #2

North Anna SPRA Figure 3-1 shows the FIRS/SSI Input. Curves for the Main Steam Valve House 2 shows amplification with respect to GMRS whereas the two curves for Service Water Valve House 2 and Pump House show attenuation compared to GMRS. Please explain why the FIRS are significantly different when these structures are founded on soil (Table 4-2). To support your explanation, please consider making available the input profiles for the site response (just rock type, velocity, low-strain damping for the best-estimate profile).

2. Topic #4

Section 4.3 and Table 4-2 of the North Anna SPRA submittal indicate that LMSM was used in some of the structural models. Please identify which of the models were modified to meet SPID requirements and what was the extent of those modifications.

3. Topic #6

Section 4.3 on page 26 of the North Anna SPRA submittal states that scaling was not used because the shape of the GMRS-based spectra at the foundations of structures in the SPRA are completely different when compared to the spectral shapes used in the past design-basis or other seismic analyses performed. Later in the document, page 34 stated that scaling approach for reactor internals and NSSS components was used. Please clarify if scaling was used for reactor internals and NSSS components and how the difference in spectral shape was properly accounted for.

4. Topic #7

Section 4.3.4 of the SPRA submittal identifies that probabilistic response analysis were used in determining the response of four structures: Reactor Containment Building, Service Building, Auxiliary Building, and Unit 2 MS Valve House, please explain:

- (i) Why the probabilistic response analysis was only applied to these structure and not for all other structures in Table 4-2?
- (ii) Describe how the probabilistic response analysis can capture the full range of response from small elastic displacement to large deformations with plastic response?

5. Topic #8

Please explain the basis for the 1.0g HCLPF screening threshold, when compared to the HCLPF capacity of 1.8g calculated at North Anna Control point.

6. Topic #10

Please explain how Figure 6-7 of the SPID was applied in the analysis.
Please clarify whether there are other components, beside relays, that are sensitive to high frequency excitation.

Question Related to Appendix A

1. Please explain the roles, responsibilities, and purpose of PWORG review in relation to the review completed by the North Anna SPRA Peer Review Team (PRT).
2. Please explain whether the PRT had access to the findings and conclusions of the PWORG review, including the Position Papers used for conducting the SPRA.
3. Appendix A notes a list of “future work” identified in the PWORG review. Please explain how the resolution of this activity will affect the current findings of the PRT.

Question Related to Table A-2

1. Please explain why F&O 23-12 and its resolution are not included in Table A-2.
2. On SFR-A2, D1, F2 (F&O 24-2): Please provide access to “Dominion Position Paper 16, Revision 0, Assessment of Seismically-Induced Turbine Building Structural Damage” to allow for verification of resolution of this F&O associated with identification of critical failure modes.
3. On SFR-C6 (F&O 24-5): Please provide access to “Bechtel Study 25784-000-TC-GEG-00087: SB and SWPH Validation of the Extended Subtraction Method” to allow for verification of resolution of this F&O and to address the response to SPID Topic #7 associated with building response Analysis.
4. On SFR-A2, F2 (F&O 23-8): In response to F&O 23-8, the disposition indicated detailed fragility calculations and sensitivity studies were performed after the PRT review. Please explain the approaches used in the detailed calculations and sensitivity analyses to evaluate fragility and provide appropriate documents for Auxiliary building and Reactor containment building to allow for verification of resolution of this F&O.

Please let us know if we need to go over these via conference call.

Respectfully,

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