

From: [Valentin-Olmeda, Milton](#)
To: [Gregoire, Donald W.](#); [Wolfgramm, Desiree M.](#)
Cc: [Rogalski, Richard J.](#); [Shtaih, Habib](#); [Clymer, David R.](#); [Philpott, Stephen](#)
Subject: Revised questions to support the Columbia SPRA Audit
Date: Friday, January 10, 2020 1:30:00 PM

Don & Desiree,

The staff provided me with a revised list of system-plant response questions from what I provided yesterday.

Please address the following questions instead:

REVISED System-plant response questions:

1. Section 5.2 and Appendix A of the SPRA submittal describe the peer review process used to establish the technical adequacy of the SPRA. It is explained that the SPRA full-scope peer review and subsequent focused-scope peer review were conducted against the CC-II supporting requirements of PRA Standard ASME/ANS RA-S Case 1 utilizing the peer review guidance in NEI 12-13. Address the following regarding implementation of the seismic PRA peer review process:

- a. Clarify that both the SPRA full-scope peer review and focused-scope peer review considered the NRC staff comments and proposed resolutions on NEI 12-13 (ADAMS Accession Nos. ML18025C025 and ML18025C022).
- b. If not, provide the results of a gap assessment against the NRC staff comments and proposed resolutions. Discuss the impact of identified gaps on the submittal.

2. Tables 5.4-2 and 5.5-2 of the SPRA submittal provide the dominant risk contributors to seismic core damage frequency (CDF) and seismic large early release frequency (LERF), respectively. Some of the risk significant events are not reflected in the top ten cutsets provided for seismic CDF and seismic LERF in Tables 5.5-4 and 5.5-5, respectively. For example, event S_E-MC-7A_8A_S11D is ranked as No. 4 for CDF and No.5 for LERF in Tables 5.4-2 and 5.5-2, respectively. However, this event is not present in the top 10 cutsets in Tables 5.4-5 or 5.5-5. Based on the information available as part of the audit, the same event appears only twice in the top 50 CDF cutsets (at ranks 44 and 50), and does not appear in the top 50 LERF cutsets. Explain the rationale for basic events (such as S_E-MC-7A_8A) being risk significant when they do not show up repeatedly in the top 50 cutsets, and provide the insights which cutsets include this basic event. This information is needed for completing topic No. 15 of the checklist.

3. Sections 5.4 and 5.5 of the SPRA submittal provide seismic CDF and LERF importance measures for risk-significant fragility groups and operator errors. Based on this information, it appears that there is the potential for substantial cost-justified safety improvements that

could significantly reduce the seismic CDF and/or LERF. The following SSC failures and operator errors, if eliminated, appear to have the potential to reduce the seismic CDF by 1E-05 per year or the LERF by 1E-06 per year and be cost-justified:

S_CHTR-GR-4	Chatter Group 4 - E-MC-4 interaction
S_CHTR-GR-1	Chatter Group 1 - Building-to-building Impact
S_CHTR-GR-5A	Chatter Group 5 - E-SL-73 interactions
S_CHTR-GR-5B	Chatter Group 5B – E-MC-7BA interactions

Therefore, and to complete item No. 16 of the checklist, please address the following:

- a. Elimination or significant reduction in the probability of each one or combination of the following SSC failures during a seismic event appears to have the potential to decrease the mean seismic CDF by 1E-05 per year:

- S_CHTR-GR-4
- S_CHTR-GR-5A
- S_CHTR-GR-1

Explain whether cost-justified plant improvement possibilities exist that would reduce the seismic CDF contribution by 1E-05 per year by eliminating or reducing the individual or combination failure probability of these failures.

- b. Elimination or significant reduction in the probability of each one or combination of the following SSC failures during a seismic event appear to have the potential to decrease seismic LERF by 1E-06 per year:

- S_CHTR-GR-1
- S_CHTR-GR-4
- S_CHTR-GR-5B

Explain whether cost-justified plant improvement possibilities exist that would reduce the seismic LERF contribution by 1E-06 per year by eliminating or reducing the individual or combination failure probability of these failures.

The **fragilities questions** from my last email remain unchanged and we look forward to hearing back from you on those as well.

I apologize for the confusion this may cause.

We could have an audit call to explain our questions if needed.

Respectfully,

Milton Valentín, PM
Beyond Design Basis Management (Fukushima)

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From: Gregoire, Donald W. <dwgregoire@energy-northwest.com>
Sent: Thursday, January 09, 2020 2:40 PM
To: Valentin-Olmeda, Milton <Milton.Valentin-Olmeda@nrc.gov>
Cc: Wolfgramm, Desiree M. <dmwolfgramm@energy-northwest.com>; Rogalski, Richard J. <rjrogalski@energy-northwest.com>; Shtaih, Habib <hshtaih@energy-northwest.com>; Clymer, David R. <drcllymer@energy-northwest.com>
Subject: [External_Sender] RE: Questions to support the Columbia SPRA Audit

Thanks Milton. We do need time to assess how long it will take to get the requested information and also gather any questions we might have. I expect we will reach out to you some time next week on these topics.

For your information, I will be forwarding this responsibility over to Desiree Wolfgramm for the interim as I am moving on to a new job starting next week. It may be a few months before my position is filled.

Her contact info is as follows:

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Don Gregoire

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From: Valentin-Olmeda, Milton <Milton.Valentin-Olmeda@nrc.gov>
Sent: Thursday, January 09, 2020 10:42 AM
To: Gregoire, Donald W. <dwgregoire@energy-northwest.com>
Cc: Philpott, Stephen <Stephen.Philpott@nrc.gov>
Subject: Questions to support the Columbia SPRA Audit

EXTERNAL: Think Before You Click!

Email sent from: "Valentin-Olmeda, Milton" prvs=2708fda6a=Milton.Valentin-Olmeda@nrc.gov

Don,

The purpose of this email is to solicit the following information to support the audit review of the Columbia 50.54(f) seismic probabilistic risk assessment (SPRA) submittal (ADAMS Accession No. ML19273A907). As previously explained in my email from 11/1/2019 (ADAMS Accession No. ML19305C934), the staff is using a technical checklist (ADAMS Accession No. ML17041A327) for this review. The following audit questions will support this effort;

Fragility questions:

1. Section 4.2.1 of the SPRA submittal discusses ranking of structures, systems and components (SSCs) as Rugged, High, Medium and Low during walkdown and appears to imply that some sort of high confidence low probability of failure (HCLPF) screening level was assigned to those SSCs. Please clarify the basis for assigning HCLPF 1.8g for SSCs ranked as "High" and how was this information integrated in overall screening process discussed in Section 4.4.1. This information is needed to complete checklist topic No. 8.
2. Provide sensitivity analysis developed in response to Fact and Observation (F&O) No. 22-5 to demonstrate conservatism in fragility based on Fussell-Vesely criteria. This information is needed to complete checklist topic No. 8. Additionally, please clarify whether this sensitivity is included in SPRA submittal Table 5.7-1.
3. The NRC staff notes in Section 3.3.1 (Page 37) of SGH Report 168059-R-04, Rev 2 (reference posted in e-Portal, non-public) that the Effective Frequency / Effective Damping method presented in EPRI-TR 103959 was modified to account for soil structure interaction effects. To understand the implementation of SOV in the SPRA and to complete checklist topic No. 12, please provide Section 8.3.1.2 of SGH Document No. 168059-CD-01 in the e-portal.
4. The Radwaste/Control building shows relatively high uncertainty (SGH Report 168059-R-04, Rev 2, Table 4-1) when compared to other adjacent buildings. Please provide access to document 168059-CA-022 "Seismic Fragility of Radwaste / Control Building using Separation of Variable (SOV)" via e-Portal. This information is needed to understand implementation of SOV discussed in sections 3.3.1 and 4.2 (SGH Report 168059-R-04, Rev 2) for structural fragility and evaluate checklist topic No. 12.
5. Based on the review of the SPRA submittal Tables 5.4-2 and 5.5-2, the NRC staff notes that estimated uncertainties for several components are very high. In order to understand the sources of uncertainties and evaluate checklist topic No. 12, please provide the fragility calculation for the following SSCs:
 - MCR Cabinet correlation group B (S_MCR_CAB_GR_B, Table 5.4-1 and 5.5-2) using hybrid approach;
 - DG-Room STANDBY AIR HANDLING UNITS (S_DMA_AH_1, Table 5.4-2 and 5.5-2) using

hybrid approach;

- Chatter Group 1 (S_CHTR_GR_1, Table 5.4-2 and 5.5-2) using SOV;
- Critical SWGR Rooms AIR HANDLING UNIT (S_WMA_AH_53A_B, Tables 5.4-2 and 5.5-2) using SOV.
- HVAC ducts located in different structures (e.g., S_HPCS_DUCT_DG3, and S_RW_DUCT_525, Table 5.4.2 and 5.5.2)

6. Table 5.5-2 in the SPRA submittal indicates that fragility of Service Building is evaluated using SOV. However, the SGH Report 168059-R-04, Rev 2 (Page 66) states that hybrid approach was used. Please clarify which method was used and provide the reference where the final fragility analysis is documented. This information is needed to complete topics No. 9 and No. 12 of the checklist.

System-plant response questions:

1. Tables 5.4-2 and 5.5-2 of the SPRA submittal provide the dominant risk contributors to seismic core damage frequency (CDF) and seismic large early release frequency (LERF), respectively. Some of the risk significant events are not reflected in the top ten cutsets provided for seismic CDF and LERF in Tables 5.5-4 and 5.5-5, respectively. For example, event S_E-MC-7A_8A_S11D is ranked as No. 4 for CDF and No.5 for LERF in Tables 5.4-2 and 5.5-2, respectively. However, this event is not present in the top 10 cutsets in Tables 5.4-5 or 5.5-5. Based on the information available as part of the audit, the same event appears only twice in top 50 CDF cutsets (at ranks 44 and 50), and does not appear in top 50 LERF cutsets. Explain the rationale for basic events (such as S_E-MC-7A_8A) being risk significant when they do not show up repeatedly in the top 50 cutsets and justify the representativeness of the significant risk contributors in Tables 5.4-2 and 5.5-2 of the submittal. This information is needed for completing topic No. 15 of the checklist.

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2. Sections 5.4 and 5.5 of the SPRA submittal provide seismic CDF and LERF importance measures for risk-significant fragility groups and operator errors. Based on this information, it appears that there is the potential for substantial cost-justified safety improvements that could significantly reduce the seismic CDF and/or LERF. The following SSC failures and operator errors, if eliminated, appear to have the potential to reduce the seismic CDF by 1E-05 per year or the LERF by 1E-06 per year and be cost-justified:-

-

- S_CHTR-GR-4 Chatter Group 4 - E-MC-4 interaction
- S_CHTR-GR-1 Chatter Group 1 - Building-to-building Impact

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Therefore, and to complete item No. 16 of the checklist, please address the following:

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- a. Elimination or significant reduction in the probability of failure of S_CHTR-GR-4 during a seismic event appears to have the potential to decrease the mean seismic CDF by 1E-05 per year. Explain whether cost-justified plant improvement possibilities exist that would reduce the mean seismic CDF contribution by 1E-05

per year by eliminating or reducing the failure probability of this failure:

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- ~~b- Elimination or significant reduction in the probability of failure of S_CHTR-GR-1 and S_CHTR-GR-4 during a seismic event appear to have the potential to decrease seismic LERF by 1E-06 per year. Explain whether cost-justified plant improvement possibilities exist that would reduce the seismic LERF contribution by 1E-06 per year by eliminating or reducing the individual failure probability of these failures.~~

Please let me know if a conference call is needed to explain our audit questions.

I look forward to hearing back from you to proceed with the audit review.

Respectfully,

Milton Valentín, PM
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