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Subject: [External_Sender] Flooding MSA Template
Date: Thursday, January 21, 2016 4:59:25 PM
Attachments: [MSA Draft Scope and Template - rev Of 1-19-16 \(2\).docx](#)

Mike;

We have addressed your comments on our flooding MSA template. Our response is summarized below and the resulting template is attached. We are also addressing your comments on the G.4.4 (THMS) example and have developed examples for the other strategies: G.3 (Flooding < FLEX DB), G.4.1 (FLEX OK), G.4.2 (MOD FLEX), and G.4.3 (AMS). These examples are not ready to send to you yet, but we intend to work on them at our internal meeting next week and I expect to give you some of them during our meeting next Wednesday (weather allowing).

Let's stay in touch to discuss what effects the weather may have on our meeting. As you know, folks are traveling to get here and I want to provide them some information on Monday morning before they start their trip.

Thanks,

INITIAL COMMENTS ON CONTENT OF TEMPLATE

1. General Comment: Consider adding a short section prior to section 1.1 that provides an summary overview of the mitigating strategies assessment results, identify changes, if any, in mitigation strategies (e.g., modified FLEX, AMS, THMS), and key changes/modifications to equipment, connections, or deployment. – **OK, done**
2. General Comment: To minimize misunderstanding it would be best if the terminology used is consistent across the final integrated plan; flood hazard reevaluation report; NEI 12-06, Appendix G; and mitigating strategies assessment template. For example:
 - a. Page 1, Section 1.2, First Sentence: The sentence refers to “nature of any element.” It is clear from the sentence context that “nature of any element” is being used interchangeable with “flood parameters” or “flood event duration parameters.” But it may be better to use the terminology that is most aligned with flood hazard reevaluation report and MSFHI letter. – **OK, done**
 - b. Page 2, Section 1.3.1.2, Second Bullet: The last part of the sentence that includes “FLEX, AMS, or THMS.” It appears form the context of the sentence that “FLEX” should be “modified FLEX,” modifying FLEX,” or modifications to FLEX.” – **OK, done**
 - c. Page 3, Second Paragraph, Third Bullet: The sentence includes reference to a “revised FLEX.” It is clear from the sentence context that “revised FLEX” is being used interchangeable with “modified FLEX,” modifying FLEX,” or

“modifications to FLEX.” But it may be better to use the terminology that is most aligned with Appendix G. – **OK, done**

3. Page 1, Acronyms: To better align the template with Appendix G, consider adding FLEX DB to the list of acronyms along with the definition from Appendix G. – **OK, done**
4. Page 1, Table 1: Consider including an entry for localized intense precipitation in the table. – **There is no need to do this and it may cause confusion. The template asks that the table be repeated for each applicable hazard; LIP is one of the flood hazards.**
5. Page 1, Table 1: Consider including an entry for other effects in the associated effects portion of the table. – **OK, done**
6. Page 2, Table 1, Bullet 3: Consider including a description similar to bullet 4 instead of “none” for bullet 3. – **OK, done**
7. Page 2, Table 1, Bullet 10: In addition to discussing “period of recession,” “when flood waters completely recede,” and “plant is safe and stable state,” consider including a discussion on “when site access is restored” under this bullet. – **OK, done**
8. Page 2, Section 1.3.1.2: Consider addressing the possibility that two or more of the alternate strategies may need to be selected to address different parameters that are not bounded by the FLEX design-basis flood. – **Done by a change to 1.3.1.1. Note that only one strategy will be identified for each hazard; the strategies will not be identified on a parameter-by-parameter basis.**
9. Page 2, Section 1.3.1.2: Consider including a discussion of or list of the portion of FLEX strategy (incl., equipment) that could not be implement for MSFHI. – **Done, guidance was added to specify which hazards would not allow a FLEX strategy. Note, however it would not be possible to determine specifically what aspects of FLEX would not be implementable for a specific hazard without completing a MSA for FLEX for the hazard. The procedure allows a plant to adopt a strategy based on judgment, without completing a detailed MSA to find the specific impacts on FLEX. The guidance also asks for a basis for the strategy adopted.**

Comments on Level of Detail of Template

10. Page 1, Table 1: If associated effects were not described in the flood hazard reevaluation report and MSFHI letter, then a description on how the associated effects were determined should be provide consistent with the level of detail in flood hazard reevaluation report. – **Not done. The MSA is a summary of the results; the table provides this summary. It is not appropriate to provide a level of detail consistent with the flood hazard report. Additional information on any associated effects can be found in the documentation retained on site.**
11. Page 3, Section 1.3.1.3, Third Bullet: Will the description include modification to deployment plans? – **OK, done**
12. Page 3, Section 1.3.1.4, Third Bullet: Will the detailed list include both passive and

active equipment? – **Changed to state that the list will include changes to FLEX equipment. The level of detail in the list should be consistent with OIP and FIP. Note that NEI 12-06 App G identifies equipment used for AMS or THMS as FLEX equipment.**

Other Comments on Template

13. Page 2, Table 1, Bullet 10: As written the bullet could be misread to indicate that the plant was not safe at some point. Since the purpose of strategies is to keep the plant safe, consider revising sentence to indicate that “plant continued to be safe” or “plant was safe and stable throughout” the event. – **OK, done**
14. Page 2, Table 1, Bullet 10: If the goal is to maintain the plant in a safe and stable state indefinitely, then consider adding “indefinitely to the end of the sentence. – **OK, done**
15. Page 3, First and Fourth Paragraphs: It appears that the paragraph should include a reference to “Section 1.3.1” – not “Section 2.3.1.” – **OK, done**
16. Page 3, Last Sentence: Consider providing a fuller title for the “Program Document” (e.g., FLEX Program Document). – **OK, done. An additional sentence was added to clarify what should be submitted to the NRC.**

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ADDITIONAL MSA TEMPLATE COMMENTS

31. Page 1, Section 1.1 and Table 1: Section 1.1 indicates that MSFHI can be characterized by summary or reference to FHRR submittal. In Table 1, will the values for flood scenario parameters be explicitly listed or provided by reference? **Explicitly listed. Section 1.1 (now 2.1) is an introduction, the explanation of the table is in 2.1. Added “in the following table” to the end of the first sentence and the phrase “for clarity, copy the relevant information into the table below” at the end of the paragraph.**
32. Page 1, Column 2: FLEX design basis is clearly defined in section G.3. In some cases the FLEX design basis may differ from the [site] current design basis. Consider adding guidance to the template to explicitly state whether the FLEX design basis differs from or is the same as the [site] current design basis. **OK. See revised template and related examples.**
33. Page 1, Table 1: The table indicates for “max Stillwater elevation” and “max wave run-up elevation” that the height should be listed in feet mean sea level (MSL). Not all licensees used MSL as the datum for their site. Consider expanding the units to include the other datum used such as NAVD88. **OK, added to Notes 1 and 2**
34. Page 1, Table 1, Note 4: The items listed for discussion in note 4 appear to be only for the effects of erosion. Because note 4 is intended to address both deposition and erosion, consider listing effects for deposition such as sediment deposition. **OK, added to Note 4.**

- 35. Page 3, Section 1.3.1.3 and Section 1.3.1.4: Consider adding an additional bullet similar to the second bullet in Section 1.3.1.3 for flood protection features. If flood protection features are changed, a description and justification of the change should be provided. **Added a bullet to section 2.3.1.4 to describe and explain any changes to flood protection features. Justification is pertinent to the basis of the adopted strategy, not to each different feature necessary to carry out the strategy.**
- 36. Page 3, Section 1.3.1.3, Second Bullet and Section 1.3.1.4, First Bullet: After the "Description" consider adding "and justification." A summary justification should be included with any changes to the sequence of events for the flood hazard. **OK, but used the word "explanation" instead of justification. The justification is pertinent to the basis of the adopted strategy, not to each different action necessary to carry out the strategy.**

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2016 Mitigating Strategies Assessments for Flooding Documentation Requirements (DRAFT)

Acronyms:

- MSFHI – Mitigating Strategies Flood Hazard Information (from the FHRR and MSFHI letter)
- FHRR – Flood Hazard Reevaluation Report
- DB – Design Basis
- AMS – Alternative Hazard Mitigating Strategies
- [THMS – Targeted Hazard Mitigating Strategies](#)
- [FLEX DB – FLEX Design Basis \(flood hazard\)](#)

Definitions:

FLEX Design Basis Flood Hazard: the controlling flood parameters used to develop the FLEX flood strategies.

1. Summary

[Provide a brief introduction that states whether or not the FLEX design basis flood bounds the MSFHI and if not, summarizes what mitigation strategy \(FLEX works, modify FLEX, AMS, or THMS\) has been adopted and the key changes to equipment or deployment. No details are expected in this section, those will come later in the MSA.](#)

2. Documentation

~~1.1.2.1.~~ [NEI 12-06, Rev. 1a2, Section G.2 – Characterization of the MSFHI \(all licensees need to complete\)](#)

Document the characterization of the MSFHI. This can be done by summarizing and/or referencing the FHRR submittal and associated RAI/Audit responses.

~~1.2.2.2.~~ [NEI 12-06, Rev. 1a2, Section G.3 – Comparison of the MSFHI and FLEX DB Flood \(all licensees need to complete\)](#)

Document ~~the nature of~~ any [flood parameter](#) not bounded for all applicable flood-causing mechanisms [in the following table](#). The following table format can be used for each applicable flood mechanism. Identify if individual controlling flood-causing mechanisms or a bounding set of parameters are utilized. The table can be used to define individual controlling mechanisms or bounding parameters. If one set of bounding parameters are utilized, note the associated mechanism for each parameter. This information should have already been developed with the FHRR submittal, and associated RAI responses; ~~and can be referenced in lieu of presenting for clarity, copy the relevant information again with the~~ [into the](#) table below.

If the FLEX design basis flood bounds the MSFHI for all applicable flood causing mechanisms, no further evaluation is necessary.

- Submit a closure letter to the NRC documenting the result.
- If the FLEX design basis flood differs from the plant design basis flood (additional conservatism may have been included in the FLEX DB flood in anticipation of MSFHI results), document the relationship of the FLEX DB flood to the plant design basis flood in Table 1 for each flood mechanism and explain the changes.

Table 1 – Flood Causing Mechanism A or Bounding Set of Parameters

Flood Scenario Parameter		<u>Plant DB Flood</u>	FLEX Design Basis Flood Hazard	MSFHI	<u>MSFHI Bounded (B) or Not Bounded (NB) by FLEX DB</u>
Flood Level and Associated Effects	1. Max Stillwater Elevation (ft. MSL)				
	2. Max Wave Run-up Elevation (ft. MSL)				
	3. Max Hydrodynamic/Debris Loading (psf)				
	4. Effects of Sediment Deposition/Erosion				
	<u>5. Other associated effects (identify each effect)</u>				
	<u>5-6. Concurrent Site Conditions</u>				
	<u>6-7. Effects on Groundwater</u>				
Flood Event Duration	<u>7-8. Warning Time (hours)</u>				
	<u>8-9. Period of Site Preparation (hours)</u>				
	<u>9-10. Period of Inundation (hours)</u>				
	<u>10-11. Period of Recession (hours)</u>				
Other	<u>11-12. Plant Mode of Operations</u>				
	<u>12-13. Other Factors</u>				
<p>Additional notes, 'N/A' justifications (why a particular parameter is judged not to affect the site), and explanations regarding the bounded/non-bounded determination.</p> <ol style="list-style-type: none"> <u>None Use Mean Sea Level or other applicable datum.</u> <u>None Use Mean Sea Level or other applicable datum</u> <u>None [Discuss the loads on flood barriers caused by flowing water and associated debris as identified in the FHRR.]</u> <u>[Discuss velocity and scour results and provide comparisons with CDB, permissible velocities, presence of scour resistant material, soil deposition, etc.]</u> <u>4.5. [Discuss any other significant detrimental effects associated with the flood hazard that are not otherwise listed in the table.]</u> <u>5-6. [Discuss conditions that could exist concurrent with this flood-causing</u> 					

	<p>mechanism or combined-effect flood (e.g. high winds, ice formation, etc.))</p> <p>6-7. [Discuss if and how this flood-causing mechanism or combined-effect flood could cause a surcharge to groundwater, considering flood duration and soil conditions.]</p> <p>7-8. [Discuss warning time; may include information from relevant forecasting methods (e.g., products from local, regional, or national weather forecasting centers) and ascension time of the flood hydrograph to a point (e.g. intermediate water surface elevations) triggering entry into flood procedures and actions by plant personnel. Reference NEI 15-05 for LIP.]</p> <p>8-9. [Discuss period of site preparation (after entry into flood procedures and before flood waters reach site grade).]</p> <p>9-10. [Discuss period of inundation.]</p> <p>10-11. [Discuss period of recession, when flood waters completely recede from site and plant is continues to be in a safe and stable state that can be maintained <u>indefinitely and include applicable references to the document where the information is contained if not contained in the description in section 1.1. Also discuss the timing of loss and restoration of site access if the site is not accessible due to flooding for some period during the MSFHI.</u>]</p> <p>11-12. [Additional notes regarding plant mode of operations <u>and include applicable references to the document where the information is contained if not contained in the description in section 1.1.</u>]</p> <p>12-13. [Discuss other plant-specific factors (e.g. waterborne projectiles) <u>and include applicable references to the document where the information is contained if not contained in the description in section 1.1.</u>]</p>
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~~1.3.2.3.~~ NEI 12-06, Rev. ~~1a2~~, Section G.4 – Evaluation of Mitigating Strategies for the MSFHI

~~1.3.1.2.3.1.~~ NEI 12-06, Rev. ~~1a2~~, Section G.4.1 – Assessment of Current FLEX Strategies (all licensees need to complete)

Document the evaluation that demonstrates existing FLEX strategies are acceptable without modification for the MSFHI.

~~1.3.1.1.2.3.1.1.~~ Document for each flooding hazard with an exceedance, how whether FLEX is viable and if not, what strategy (modify FLEX, AMS or THMS) will be used to address the associated hazard. Reference Section G.4.1 in NEI 12-06 revision ~~1a2~~. Address each of the evaluation bullets in this section.

~~1.3.1.2.2.3.1.2.~~ Conclusions

Document which of the following conclusions are drawn from the assessment and provide a basis for the conclusions:

- If the evaluation demonstrates that the existing FLEX strategies can be deployed as designed for all applicable-flood causing mechanisms then the MSA is then considered complete.
- If the evaluation demonstrates that the existing FLEX strategies cannot be implemented as designed, then document the basis for selecting “modified FLEX”, “AMS”, or “THMS”.

1.3.1.3.2.3.1.3. NEI 12-06, Rev. ~~1a2~~, Section G.4.2 – Assessment for Modifying FLEX Strategies

Document the items in Section G.4.2 in NEI 12-06 revision ~~1a2~~. Address each of the evaluation bullets in this section.

If the existing FLEX strategies cannot be implemented as designed and “Modified FLEX” is selected to address the deficiencies, expand upon the documentation in Section ~~2.3.112.3.1~~ and provide the following:

- Summary of the changes to the FLEX strategies, including changes to deployment plans;
- Description and explanation of any revised sequence of events, if applicable, demonstrating the necessity of revised FLEX actions;
- Description and justification of any modifications (equipment, procedures, etc.), if applicable, to address the revised-modified FLEX actions; and
- Identify any validation items that will need to be re-performed based on the changes. Validation documentation does not need to be submitted and should be performed following any modifications or procedure revisions.

1.3.1.4.2.3.1.4. NEI 12-06, Rev. ~~1a2~~, Section G.4.3 and G.4.4 – Assessment of Alternative and Targeted Hazard Mitigating Strategies

Document the items in Section G.4.3 or G.4.4 as applicable in NEI 12-06 revision ~~1a2~~. Address each of the evaluation bullets in this section.

If the existing FLEX strategies cannot be implemented as designed and “AMS” or “THMS” is selected to address the deficiencies, expand upon the documentation in Section ~~2.3.11.3.1~~ and document the evaluation that concludes that the selected strategy will mitigate the MSFHI. The following items should be included:

- The A description of the sequence of events for the flood hazard(s) and explanation of any changes with respect to the original FLEX design;
- A detailed description of the mitigating strategies;
- A detailed list of changes to the FLEX equipment necessary for the mitigating strategies. The level of detail in the list should be consistent with the equipment list in the OIP or FIP;
- A description of what elements of the strategy have changed as compared to the mitigating strategies design approved for compliance with EA-12-049, and the basis for the change.
- A description and explanation of any changes to flood protection features.

- A description of how the provisions in Sections 3, 6, and 11 of NEI 12-06, Rev. [1a2](#) have been addressed;
- Describe any validation items that will need to be performed based on the changes. Validation documentation does not need to be submitted and should be performed following any modifications or procedure revisions.
- For a THMS, document the justification for not maintaining the containment capability.

The ~~documentation identified in this assessment~~ [MSA documentation retained at the site](#) should be included in and be of the same level of detail as that included in the [Diverse and Flexible Coping Strategies \(FLEX\)](#) Program Document. [The MSA submittal to the NRC should be at a level of detail consistent with the OIP or FIP.](#)

DRAFT