PMTurkeyCOLPEm Resource

From: Comar, Manny
Sent: Wednesday, July 01, 2015 2:23 PM
To: Steve Franzone
Cc: Comar, Manny; TurkeyCOL Resource
Subject: FW: ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15
Attachments: June 2015 NRC Audit Action List (Rev 0).docx

Steve:

Based on the staff recollection, attached is the highlighted item that needs to be addressed to complete 3.7 and 3.8 action items. Please acknowledge these along with the due dates.

Thanks

From: Neuhausen, Alissa
Sent: Wednesday, July 01, 2015 11:05 AM
To: Patel, Pravin; Comar, Manny
Subject: RE: ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15

I've highlighted all the items that have actions associated with them.

Alissa Neuhausen
General Engineer (NSPDP)
NRO/DE/SEB1
301-415-5734

From: Patel, Pravin
Sent: Wednesday, July 01, 2015 10:51 AM
To: Comar, Manny
Cc: Neuhausen, Alissa; Thomas, Vaughn; Xu, Jim
Subject: RE: ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15

Manny,

There are items that FPL did not include in the list from the audit. You have the action items from the exit meeting . Please go through the list and ask FPL to include all the items that they owe us and schedule committed for those. It is important that those items do not fall through crack.

Pravin

From: Comar, Manny
Sent: Wednesday, July 01, 2015 10:10 AM
To: Candelario, Luissette; Heeszel, David; Karas, Rebecca; Patel, Pravin; Plaza-Toledo, Meralis; Seber, Dogan; Stieve, Alice; Thomas, Vaughn; Walsh, Lisa; Xi, Zuhan; Xu, Jim
Subject: FW: ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15

FYI

From: Franzone, Steve [mailto:Steve.Franzone@fpl.com]
Sent: Monday, June 29, 2015 3:50 PM
To: Comar, Manny
Cc: Burski, Raymond; Orthen, Richard; Maher, William
Subject: [External_Sender] ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15

I have attached the up-to-date matrix for you use. The green highlights are potential topics for Thursday's public call.

Thanks
Steve Franzone
NNP Licensing Manager - COLA
"Keep away from people who try to belittle your ambitions. Small people always do that, but the really great make you feel that you, too, can become great." ~ Samuel Langhorne Clemens
561.694.3209 (office)
754.204.5996 (cell)

Hearing Identifier: TurkeyPoint_COL_Public
Email Number: 1041

Mail Envelope Properties (ea61ef80e7a346ec866c58726d343e6c)

Subject: FW: ASER FSAR CHAPTER REVIEW STATUS MATRIX - 6/29/15
Sent Date: 7/1/2015 2:22:55 PM
Received Date: 7/1/2015 2:22:56 PM
From: Comar, Manny

Created By: Manny.Comar@nrc.gov

Recipients:
"Comar, Manny" <Manny.Comar@nrc.gov>
Tracking Status: None
"TurkeyCOL Resource" <TurkeyCOL.Resource@nrc.gov>
Tracking Status: None
"Steve Franzone" <steve.Franzone@fpl.com>
Tracking Status: None

Post Office: HQPWMSMRS05.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	2648	7/1/2015 2:22:56 PM
June 2015 NRC Audit Action List (Rev 0).docx	39173	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Action	Disposition
Audit Issues	
1. FIRS for TB	Acceptable – No further action
2. Backfill COV	Min 1.5 for fill and 0.5 for others – No further action
3. RAI 3.7.1-15 proposes value(See Comment 6)	New words acceptable – revise RAI 3.7.1-15
4. SASSI Output vs bearing capacity for concrete fill	Acceptable – no further action
5. Address potential voids under the Cat 2 Structures	Provide write-up as discussed Wed. Afternoon for review on 6/25/15(AM) NRC Comment:Action Item #5 Grouting under Cat. 2 structures a) One pager or bulletized list was provided to include void in model under Cat. 2 structures and conduct similar analysis to NI model. b) Voluntary submittal including UFSAR mark-ups to be submitted roughly 07/24. Draft submittals may be provided earlier. Support for public phone calls to be provided as necessary.
6. Bearing capacity at top of lean concrete	See Audit Issue 9
7. Revise ITAAC 2.5.4-26 on voids	ITAAC to be revised/RAI open due 7/15/15. Plan to discuss at Public meeting on Thurs,7/2.
8. Revise ITAAC 2.5.4-27 on shear wave	Submit revised RAI/ITAAC. Plan to discuss at Public meeting on Thurs, 7/2.
9. Bearing Capacity – Pseudostatic using max/min, 2.5.4-26 / calc #	Walkthrough of Calc. methodology: 6-24-15 audit results: A response based on the discussion

Action	Disposition
	will be added to the RAI and the calculation will be posted to the reading room. Also see response to NRC Comment 01.
10. Remove ITAAC for 2.5.4-32 and revise RAI	FSAR to be updated to include discussions on water membrane on diaphragm wall (i.e. protection against chlorines and sulfates)
11. Revise ITAAC for 2.5.4-31	Incorporate ITAAC from 2.5.4-33. Plan to discuss at Public meeting on Thurs, 7/2.
12. Provide revised ITAACS to NRC PM by Monday 6-29-15	
NRC Comments Beyond RAIs	
Comment 01: Several RAIs have addressed the ability of the lean concrete fill to transfer shear on a vertical plane at the toe of the RC foundation. The formation of cracks in the low strength concrete fill would reduce the effective area of the transfer of load and consequently affect stiffness and radiation damping in the SSI problem. This reduction may decrease SSI frequency and increase amplitude of seismic response.	NRC Resolution: The dynamic bearing capacity is calculated assuming lean concrete fill has properties of underlying limestone. 6-24-15 audit results: This will be addressed in response to RAI 2.5.4-26 NRC Comment:RAI 3.7.1-14 and Comment 1 to be addressed with RAI 2.5.4-26 response. The resolution to this item also resolves action #9. RAI response including UFSAR mark-ups to be provided by 07/15. A draft will be available earlier. a) A pseudostatic Plaxis analysis using max/min. will be performed with void in

Action	Disposition
	model using non-associated flow rule. If there is insignificant yield at void location, no need for additional analysis. b) Calculation will be placed in reading room c) Response will be included with RAI 2.5.4-26 d) The evaluation of lean concrete is incorporated in Calculation 135054.F-26 Bearing Capacity for Turkey Point 6&7 e) Some model details already included in RAI 2.5.4-19 (base case – no voids) f) Bulletized plan was provided at the meeting.
Comment 02: **Attachment 2, Page 5 of 172**, Figures 2.1-3 and 2.1-4 present 5% damped spectra for in-column motions in the H1 and H2 directions for the NI site profile. Presumably these spectra were resulting from response calculations for the same iterated strain site profiles (BE, UB and LB) that are used in the SSI calculations and for the same FIRS input spectra at a depth of 41.5'. Figures 2.1-6 and 2.1-7 present similar information for the FAR site profile. Please explain why the resulting in-column spectra for H1 and H2 directions that are defined to match the same FIRS input spectra are so different. Figures 2.1-9 through 2.1-14 indicate similar differences in the corresponding surface outcrop spectra that are used directly as input to the SSI analyses. Are the iterated site profiles for the BE, UB, and LB cases the same for the H1 and H2 directions?	NRC Resolution: The applicant agreed to revisit the development of the in-column motions and respond to this question at the audit. Applicant response: The outcrop time histories were developed following the spectral matching criteria in SRP 3.7.1 (NRC, 2007) using Option 1 (i.e., single set of three component time histories), Approach 2. The two horizontal time histories were matched to the same horizontal FIRS spectrum. These outcrop time histories were used to generate the within motion time histories and corresponding response spectra based on the strain compatible

Action	Disposition
	BE, UB, and LB soil profiles. The same soil profiles were used for the two horizontal cases (i.e., H1 and H2). The noted variability in the surface response between the two horizontal components is a result of the differences in the matched horizontal time histories which meet the SRP 3.7.1 spectral matching requirements.This has been observed in several other studies, and is related to differences in phasing of the time histories, energy distribution, duration, arias intensity, etc. when combined with soil column response. NRC Response: Comment 2: Bechtel provided acceptable written response to comment 2 for audit summary.
Comment 03: **Attachment 2, Page 42 of 172:** The second sentence of the second paragraph [For each profile the site response was computed as the average of the lower-bound (LB), best-estimate (BE), and upper-bound (UB) S-wave velocity profiles.] is confusing. Should the statement read [A smoothed average site response at the ground surface was computed from the surface responses from the lower-bound (LB), best-estimate (BE), and upper-bound (UB) S-wave velocity profiles.] An average site profile was indicated to also have been calculated and associated with this average surface response. If a RG 1.60 FIRS input was applied to this average profile at the foundation depth, would the resulting surface motion envelope the surface motions resulting from the individual site responses computed for the H1 and H2 motions?	NRC Resolution: The applicant needs to clarify what average site response means, and how it is used. The applicant should justify the use of the average of 3 site profiles in lieu of the more accurate 60 profiles. Applicant response: As discussed in the audit meeting, Figure 10 of Bechtel Calculation 25409-000-K0C-0000-000066 shows a comparison of the propagated RG 1.60 motion to the surface, using the LB, BE

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	and UB strain-compatible profiles, and its comparison to the site-specific PBSRS. The SSI input motion was modified to envelop the surface PBSRS. In sensitivity analysis, the updated profile is very close to the original BE profile as shown in Figure D.1-1 of the RAI response. In addition, as shown in Figure 3JJ-252, Attachment 2 Page 137 of 172, comparison of the updated and original amplification functions shows very close amplification values. Based on these observations, the updated profile is expected to envelop the PBSRS. NRC Response:Comment 3: Bechtel provided acceptable written response to comment 3 for audit summary.
Comment 04:Attachment 2,**Page 61 of 172,** Figures D1-1 through D1-6 present plots of S-wave, P-wave and (presumably) S-wave damping for the NI and FAR profiles that are to be used in SSI calculations. Figures D2-1 through D2-6 present similar information for the updated profiles. Does the term "estimated BE" profile indicated in these figures refer to the average profile determined as indicated in Comment 03 above?	NRC Resolution: The applicant needs to clarify what the difference is between the BE and the estimated BE profile. Similarly, the definition of the updated BE and updated estimated BE profile should be explained. Applicant response: The term "estimated BE" profile indicated in these figures refers to the average profile of the LB, BE and UB profiles used in the sensitivity analysis. This definition will be included in the response to

Action	Disposition
	RAI 3.7.1-15. NRC Response:Comment 4: Acceptable response was provided. Will be incorporated in RAI 3.7.1-15.
Comment 05:Attachment 2,**Page 109 of 172,**The third paragraph indicates that a "normalized SPT resistance of 30 blows per foot" will be used to determine properties of the fill material. The Applicant needs to define the term "normalized SPT resistance".	NRC Resolution: The applicant should clarify what normalized means. Applicant response: The SPT N-value increases with increasing effective overburden stress in the soil. Thus, if we specify the N-value of a material, then we need to also specify the overburden stress. When the overburden stress is equivalent to atmospheric pressure (about 100 kPa or 2.1 ksf), the N-value is termed "normalized" and is referred to as N_1. Thus the "normalized SPT resistance" N_1 is the SPT resistance when the soil overburden stress is 1 atmosphere or about 100 kPa. In this case, N_1 = 30 blows per foot. The third paragraph (of RAI3.7.1-15) will be modified as follows: "… ~~normalized~~ SPT resistance **(normalized with respect to overburden pressure)**of **N_1 =** 30 blows per foot…" NRC Response: Comment 5: Acceptable

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	response was provided. Will be incorporated in RAI 3.7.1-15.
Comment 06: Attachment 2,**Page 115 of 172** The fourth paragraph of Section 3JJ.7.3 indicates that an iterative process (10 repetitions) was used with the RG 1.60 motion scaled to 0.1g. Figures 3JJ-273 and 274 indicate the convergence to the RG shape with the 10 iterations. However, no description is provided of where the RG motion is being input, what the initial site profile is, and what is being iterated (strain, site properties, etc.). Therefore, there is no appreciation of why this process (whatever it is) is appropriate.	NRC Resolution: The applicant will provide calculations at the audit that support the iterative process. Applicant response: Attachment 2, Page 118 of 172(of RAI 3.7.1-15) , will be modified as follows: In the RG 1.60 analyses, strain-compatible profiles were developed using full-column iterative site response to achieve a RG 1.60 spectrum at the foundation elevation. The approach used here is iterative and consists of running the site response analysis, using P-SHAKE, with modified rock motions (input at bedrock) convolved through each of the 3 profiles (LB, BE and UB) and computing the response at the foundation elevation horizon. The analysis is repeated, modifying the input rock motion each time, until the 5% damped mean ARS at the foundation horizon closely matches the SSE. As an example of this process, the first and tenth iterative of the FAR profile with "updated" site profiles are shown in Figures 3JJ-273 and 3JJ-274, respectively. ~~Although there is still some discrepancy in the fit at frequencies above 20 Hz, because the RG 1.60 spectral shape is not a~~

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	~~seismologically-plausible ground motion (rather, it is a design spectrum). However, the difference is not expected to influence the results.~~As shown in Figure 3JJ-274, the computed spectra closelymatch the RG1.60 spectrum, particularly at low to mid-range frequencies which are important for strain-compatible soil properties. The iterative process described above is applied to both the "initial" and "updated" NI and FAR site columns. The best-estimate SSI profiles were computed using the logarithmic mean of the LB, BE, and UB S-wave velocity profiles. NRC Response: Comment 6: Acceptable response was provided. Will be incorporated in RAI 3.7.1-15.
Comment 07:Attachment 2,Page 115 of 172,This section describes the methodology used for sensitivity assessment. Bullets 2 and 3 near the bottom of the page describe a smoothing process used prior to evaluating the significance of the change in motion between the "initial" analyses and the "updated" analyses. The following comments/questions are related to the effect of these two steps of the methodology on smoothing out, or muting, the actual differences between the responses for the "initial" and "updated" soil profiles. • The effect of bullet 2 is that the differences between the "updated" and "initial" responses are averaged over a 2 Hz wide band at 1 Hz and a 20 Hz wide band at 10 Hz. Given the relatively narrow frequency band of	NRC Resolution: The applicant will justify the use of a wide smoothing window given the potential under-prediction of the seismic response. Applicant response: The objective of the sensitivity analysis is to evaluate the effect of the updated properties using 3 profiles (LB, BE and UB). Since the original site response analysis results are based on the average response of 60 simulated profiles, which provides smooth ARS and ARS amplification

Action	Disposition
the site amplification functions, the use of this wide smoothing window for comparison between the "initial" and "updated" results can lead to under-prediction of the expected seismic response of the site and supported structure(s). • Bullet 3 infers that these "smoothed" ratios are used to multiply the SSI input motions from the "initial" analyses to obtain "updated" input motions. Since the smoothing process in bullet 2 potentially removes much of the site specific character of the soil amplification functions, it is expected that the end result of implementing bullets 2 and 3 to estimate "updated" ground motions will lead to an under-prediction of the input motion vis-à-vis using the more rigorous approach involving the convolution of 60 randomized columns. It is not clear how this approach to estimating the "updated" input motion yields input motions that are consistent with the requirements of the NRC's SRP and ISG-17.	functions, the results of the sensitivity analysis are averaged and smoothed to emulate the "rigorous" analysis in considering the full range of variation of dynamic properties. The effect of averaging and smoothing is shown in Figures 3JJ-251, -252.The mean amplification functions, when calculated as the average of 60 profiles, are much smoother than those obtained as the average of 3 profiles (LB, BE and UB), as expected. In addition, comparison of the individual amplification functions for each soil case between original and updated profiles show similar changes in site amplification, as seen in the comparison of means. NRC Comment:Comments 7 & 8: Acceptable response was provided to address these comments for audit summary.
Comment 08: Attachment 2, Page 115 of 172,Section 3JJ.7.4, reproduced below for reference, states that the mean ARS at the surface is computed using the arithmetic mean of the LB, BE, and UB, "updated" profiles. The responses computed using the LB and UB soil profiles are associated with soil profiles having a much lower likelihood of occurrence than that of the BE profile, yet the response from each of these profiles is given an equal weight in	NRC Resolution: The applicant will provide an explanation of the "updated" profiles and how they were selected/derived. Applicant response: Same response to comment 07.

Action	Disposition
the averaging approach described. This approach reduces the contribution of the most likely response while amplifying the contributions from the less likely LB and UB profiles. This average response is then used in the process to scale the "initial" ground motion results, which use 60 soil columns and preserve the proper distribution of likelihood, up to obtain estimated "updated" set of input motions and soil properties. This approach will result in scaling the input motion too little in the frequency band associated with the best estimate response, and too much in the frequency ranges of the less likely LB and UB responses.	NRC Comment: Comments 7 & 8: Acceptable response was provided to address these comments for audit summary.
Comment 09: Appendix B of Attachment 2 Enclosure 2 Transfer Functions are provided in Appendix B of Attachment 2 Enclosure 2. Appendix B are indicative of numerical problems in the 3-D solution. The response provided to RAI 3.7.1-16 is based on comparison of 2-D solutions for a range of Poisson's ratios. It is not clear from the RAI response that the transfer functions for 2-D solutions would be of a similar nature as those shown in Appendix B for the 3-D SASSI solutions, and therefore can be used as the basis for demonstrating the relatively low impact of the high Poisson's ratio on the 3-D solutions. The applicant is requested to provide transfer functions that are associated with the 2-D problems run for the RAI response 3.7.1-16.	NRC Resolution: The applicant will provide the 3D solutions for the NRC to evaluate the applicability of the 2D solutions to the 3D case. Westinghouse addressed the issue satisfactorily during audit. No further action required. NRC Comment:Comment 9: NRC staff viewed calculation TPG-1000-S2C-804 R2, Appendix A, this comment is resolved. No write-up required.