

NRR-PMDAPEm Resource

From: DiFrancesco, Nicholas
Sent: Tuesday, May 26, 2015 4:54 PM
To: Thomas.N.Weber@aps.com
Cc: Christopher.Wandell@aps.com; Carl.Stephenson@aps.com; Paul.Hom@aps.com; Shams, Mohamed; Jackson, Diane; Vega, Frankie
Subject: NRC Technical Focus Areas in Support of Public Meeting on June 9

Mr. Weber,

In support of the public meeting scheduled for June 9, 2015, the NRC staff would like to gain additional technical understanding in several areas to support productive public meeting discussions. In addition to providing a general overview of the SSC and GMC SSHAC Reports and March 2015 50.54(f) response for Palo Verde Nuclear Generating Station (PVNGS), please provide additional clarification on the following topics.

Seismic Source Characterization

1. Provide clarification on how the uncertainty derived from the difference in cumulative slip rates on Quaternary faults in Arizona in comparison to the geodetic slip rates in southern Arizona were evaluated and incorporated into the model. In addition, explain why faults that were originally part of the USGS National Seismic Hazard Mapping Project (NSHMP) and that are now part of the PVNGS SSC include alternative possibilities for geologic and geodetic slip rates while other PVNGS SSC faults that were not included in the NSHMP do not consider geodetic slip rates.
2. With respect to the geologic mapping project, provide clarification regarding the stratigraphic correlation of Quaternary units used throughout the site area and site vicinity maps, please explain
 - a. how the 16 Quaternary units on the site map resolve into five units on the site vicinity maps,
 - b. the rationale for singling out the river terrace unit (Qorh) as a stand-alone unit, and
 - c. the apparent mismatch of units between the site area map and the site vicinity map along the north-south trending Qorh river terrace (along the eastern side of the site area map) with the Qi1 alluvial fan surface (to the north and the south of the Qorh unit on the site vicinity map).
3. With respect to the areal source zones, provide the rationale for
 - a. choosing to model the spatial variation of the recurrence rate using variable, but continuous and relatively smooth seismicity rather than using uniform rates similar to the previously completed SSHAC Level 2 PVNGS SSC,
 - b. not using a floor during the smoothing analysis of recurrence parameters as the host zones and other zones have cells with a rate of zero, and
 - c. not using earthquakes with magnitudes lower than M4.67 to determine the recurrence parameters for the Eastern source zones.

Ground Motion Characterization

1. Considering the limited bandwidth of the data recorded by the TA array, provide additional detail on the process used to estimate the target site kappa values and their uncertainties. In addition, describe in more detail how the site amplification at the recording stations was accounted for in the estimates of site kappa.
2. Provide additional detail regarding the evaluation of candidate GMPEs for PVNGS for distance California and Mexico sources. Specifically, describe in more detail the evaluation of Kishida et al. (2014) of the potential effects of the Q differences on the ground motions, which provides justification for the conclusion that although there are differences in Q between California and

Arizona, these differences do not lead to a significant discrepancy in the average distance attenuation over the distance range of 200-400 km.

3. With regard to the candidate GMPEs for PVNGS for the Greater Arizona Sources, provide additional rationale for limiting the use of the Bindi et al. (2014) for magnitudes greater than M7.
4. Provide additional detail on the development of the common function form used to fit the candidate GMPEs. Specifically, please discuss how model parameters such as depth to $V_s=1$ km/s and 2.5 km/s (which are present in some of the candidate GMPEs) are accounted for in the final functional form.

Site Response

1. Provide additional detail regarding the V_s -kappa adjustment factors. Specifically, provide the bases for
 - a. the host V_s profile,
 - b. the target deep V_s profile (including the use of a logarithmic standard deviation of 0.35 to develop the upper and lower profiles),
 - c. the target kappa value used for the kappa adjustments and whether the input FAS were corrected to the site kappa of 0.033 sec or a lower baserock kappa value,
 - d. use of a logarithmic standard deviation of 0.5 to determine the upper and lower site kappa values,
 - e. the scenario events (magnitudes and distances) used to develop the input spectra for the V_s -kappa adjustment factors,
 - f. not including the V_s -kappa adjustment factors as additional epistemic uncertainty on the median GMMs instead of capturing this variability as part of the variability in the site amplification functions.

Please let me know if you have any questions on the above focus areas.

Thanks,

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