

## **NRR-PMDAPem Resource**

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**From:** DiFrancesco, Nicholas  
**Sent:** Friday, November 13, 2015 11:18 AM  
**To:** Philippe Soenen (Pns3@pge.com)  
**Cc:** Shams, Mohamed; Lingam, Siva; Horstman, William (WRH5@pge.com); Michael Richardson (mjrm@pge.com)  
**Subject:** Information Request Related to Diablo Canyon Regulatory Audit of the Reevaluated Seismic Hazard

Mr. Soenen,

In follow-up to the Regulatory Audit conducted on Sept 11, 2015 (Agencywide Documents Access and Management System [ADAMS] No. ML152448099) NRC staff identified technical information needs and issued a request for additional information dated October 1, 2015 (ADAMS No. ML15267A774) to support reviewing the Diablo Canyon Power Plant's reevaluated seismic hazard. In response to the technical information requests, PG&E made available electronic records for review on the PG&E electronic reading room. In review of those records, the NRC staff has identified the following additional information needs to support understanding of the site response approach:

### Vs-kappa adjustment factors

- Clarify the source(s) of the host-region Vs30 760 m/sec profile(s) and provide the profile(s) in tabular format
- Provide the target Vs profiles (lower, middle, upper) in tabular format
- Provide the quarter wavelength (QWL) or square-root impedance (SRI) linear site amplification factors (or explain applicable approach) for the host Vs30 760 m/sec profile(s) compared to the QWL amplification factors for the target Vs profiles
- Provide the magnitudes and distances used to compute the response spectra compatible [Fourier Amplitude Spectrum] FAS using Inverse Random Vibration Theory (or explain applicable approach)
- Provide the host kappa values and target site kappa values
- Provide the target reference baserock kappa values where  $\text{kappa}_{\text{baserock}} = \text{kappa}_{\text{site}} - \text{kappa}_{\text{profile}}$  and indicate the depth for the reference baserock horizon
- Provide the final Vs-kappa factors used to modify the [Southwest United States] SWUS median [Ground Motion Model] GMMs

### Analytical Site Response Approach

- Provide in a table: layer description, thickness, density, and Vs values for the lower, middle and upper base case Vs profiles as well as the scale factor used to develop the lower and upper profiles
- Provide the shear modulus and damping ratio curves and the depth ranges over which each curve is implemented
- Provide the site kappa values for each of the three profiles
- Provide the number of randomizations, and the correlation model used to randomize the Vs about each of the three base case profiles
- Indicate whether the damping ratios are constrained to a maximum of 15 percent
- Provide the magnitudes and distances of the earthquakes used for the input Vs-kappa corrected spectra and indicate the location where these spectra are input into the site response analysis
- Provide a description of the approach used to develop the site amplification factors, including the incorporation of both the aleatory and epistemic uncertainty.
- Indicate whether the amplification factors are constrained to not fall below 0.5

- Provide a description of the approach used to develop the control point hazard curves, including how the aleatory uncertainty in the amplification factor is incorporated into the hazard integral

#### Empirical Site Response Approach

- Provide a description of any deviations from the approach used to develop the empirical site term as described in Sections 2.3.5 and 2.3.6 of the March 15, 2015 Seismic Hazard Screening Report [SHSR] submittal
- Provide the Vs30 values used for [seismic station] ESTA27 and ESTA28

#### Final Ground Motion Response Spectra (GMRS)

- Provide the bases for developing control point hazard curves that combine the results of both the analytical and empirical site response approaches, including the weighting for the two approaches

This email will be added to public ADAMS and incorporated as part of the audit summary.

Please let me know if you have any questions.

Sincerely,

*Nick DiFrancesco*

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