

Application of Site Amplification Factors

Site amplification factors will be calculated as described in Section 2.4 (SPID reference section, incorporating highlights from SAF Methodology document. As discussed in that section, multiple models of site amplification factors (and associated uncertainties) will be developed, indicating the log-mean and log-standard deviation of control-point motion divided by input rock motion, for various spectral frequencies. For input to site hazard calculations, these multiple models will be combined, with weights, to derive overall log-means and log-standard deviations of site amplification for each spectral frequency. For each spectral frequency and input rock motion (i.e. input rock amplitude) the total log-mean m_T and log-standard deviation σ_T of site amplification are calculated as:

$$m_T = \sum w_i m_i$$

$$\sigma_T = \sqrt{\sum w_i [(M_i - M_T)^2 + \sigma_i^2]}$$

where i indicates individual site amplification models, w_i is the weight on each model, and m_i and σ_i are the log-mean and log-standard deviation, respectively, of each site amplification model i .

The soil uncertainties will be incorporated into the seismic hazard calculations using a formulation similar to eq. (6-5) in Ref. 8, wherein the site amplifications (with uncertainties) are incorporated into the hazard integral to estimate the distribution of site amplitudes given earthquake magnitude and distance. The implementation will estimate the distribution of rock amplitude as a function of M and R , and the site amplification (given the rock amplitude) for the value of M at which site amplifications were calculated. This is sufficiently accurate because site amplifications are not high dependent on M and R .

Reference 8 from above (from DRAFT Section 2 of SPID):

Risk Engineering, Inc. (2001). Technical Basis for Revision of Regulatory Guidance on Design Ground Motions: Hazard- and Risk-Consistent Ground Motion Spectra Guidelines, USNRC Rept. NUREG/CR-6728, Oct.