

From: Thomas, George *incc*
Sent: Tuesday, August 30, 2011 5:11 PM
To: Li, Yong; Manoly, Kamal; Khanna, Meena; Chakravorty, Manas
Subject: Important Note regarding the OBE Exceedance Criteria in RG 1.166

Folks,

Just to bring to your attention that the Criterion for Determining OBE Exceedance (See RG 1.166, Reg Position C4) essentially requires TWO checks (considering seismic instrumentation was operable) of the recorded free-field ground motion in two horizontal directions and the vertical direction:

1. (a) Acceleration Response Spectra Check for frequency range 2 to 10 Hz based on 5% damping (where design spectra values are less than 0.2g, compare to 0.2g)
(b) Velocity Response Spectra Check for frequency range 1 to 2 Hz (where design spectra values are less than 6 in/sec, compare to 6 in/sec)

AND

2. Cumulative Absolute Velocity (CAV) Check (to get CAV, integrate the recorded acceleration time history for the duration of the record (i.e., absolute area of the accelerogram) for each direction, and compare to 0.16 g-sec)

RG 1.166 CRITERION for OBE Exceedance: BOTH the Response Spectra check AND the CAV check must be exceeded. (As Yong has pointed out before, strictly speaking, these checks should be made on the free field ground motion)

Essentially, for plants with low SSE ground response spectrum (i.e., less than 0.2g) it is possible to exceed the OBE and even the SSE ground response spectra and yet NOT exceed the OBE, based on the above criterion, and the resulting observed earthquake damage can be minimal.

Note that CAV is independent of the design OBE and SSE ground response spectra. The CAV parameter is a measure of the damage potential of the ground motion for SSCs at a site. It is sensitive to potentially damaging low-frequency motions but less sensitive to high-frequency motions which are not damaging.

Thanks.
George