

Proposed tasks to address ETSZ issues

TASK A: Develop updated earthquake catalog

Using publicly available sources, extend the EPRI-SOG catalog (which goes through 1984) to 2007. Delete duplicate events and aftershocks, and determine estimates of EMB, SMB, and RMB for each earthquake in the catalog (to be consistent with the EPRI-SOG study). The study region will encompass the Eastern Tennessee Seismic Zone (ETSZ), roughly bounded by longitudes 82°-- 82°W and longitudes 34°-- 37°N, but will also extend significantly to the northeast to cover seismic sources representing the ETSZ from the EPRI-SOG teams.

TASK B: Calculate updated parameters for EPRI-SOG teams

Using both the EPRI-SOG catalog and the updated catalog from Task A, calculate seismicity parameters for each of the six EPRI-SOG representations of the ETSZ. This will involve multiple sources for some teams.

Task C: Calculate seismic hazard for EPRI-SOG teams with TIP and TVA $M_{\max}$ values

For a site located within the ETSZ, calculate seismic hazard using each EPRI-SOG team's representation of the ETSZ, with parameters from both the original earthquake catalog and the updated earthquake catalog. Modify the maximum magnitude ($M_{\max}$) distributions for the ETSZ zones to reflect the distributions published in the TIP study (Ref. 1) and TVA Dam Safety study (Ref. 2). Also include seismic hazard from the Charleston seismic zone (using recent representations from that zone, e.g. from the Vogtle ESP application) and from the New Madrid seismic zone (using recent representations from that zone, e.g. from the Clinton ESP application). Calculate hazard with EPRI (2004) ground motion equations with updated sigmas, both with and without the CAV filter (EPRI, 2006).

Task D: Document hazard sensitivity for EPRI-SOG teams

Write a description of the results from Task C in terms of the effect on GMRS ground motion at PGA, 25 Hz, 10 Hz, 5 Hz, 2.5 Hz, 1 Hz, and 0.5 Hz, of the updated seismicity parameters and of the updated (TIP and TVA) $M_{\max}$ values. Review the geologic and tectonic basis for the updated $M_{\max}$ values from the TIP and TVA Dam Safety studies. Develop recommendations on whether updates to the original EPRI-SOG parameters would increase or decrease GMRS ground motion, and whether such updates should be included in site hazard studies. If they should be included, recommend how that inclusion should take place.

Schedule: Preliminary results will be scheduled for 45 days following project start. A draft report will be scheduled for 60 days following project start.

References

1. LLNL (2002). *Guidance for Performing Probabilistic Seismic Hazard Analysis for a Nuclear Plant Site: Example Application to the Southeastern United States*, USNRC Rept. NUREG/CR-6607, Oct.
2. Geomatrix Consultants (2004). *Dam Safety Seismic Hazard Assessment*, report prepared for Tennessee Valley Authority, 2 vol, September.