

DC# 42322

QA:NA

Ground Motion Saturation Evaluation (GMSE) Data Needs Workshop

7/13/04

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The objective of the data needs workshop is to identify potential near-term (12-18 month) studies that would reduce uncertainty in extremely low probability ($< 10^{-5}/\text{yr}$) earthquake ground motions at Yucca Mountain. Recommendations made at the workshop will be considered by BSC and DOE management in formulating plans for FY05 seismic-related investigations.

Based on studies done earlier this year, a bound on peak ground velocities (PGVs), consisting of a uniform distribution from 150 cm/s to 500 cm/s, has been applied to the existing PGV hazard curve for the underground repository horizon, for use in the forthcoming License Application. The technical basis for this bounding distribution is being documented, along with the basis for a slightly less conservative bound in the form of a roughly triangular distribution from 153 cm/s to 451 cm/s.

The objective of the GMSE studies is to provide a technical basis for reducing remaining excessive conservatism, if any, in the extremely low probability ground motions that are used in postclosure performance assessments. Potential studies that have already been suggested include:

- Additional tests of failure-strains of repository rocks, at, above, and below the repository horizon
- Identification and evaluation of nuclear explosion data that may help establish strain limits in tuff
- Numerical modeling of seismic wave propagation through repository rock column to test hypothesis that nonwelded tuffs below the repository horizon would fail in tension and prevent extreme strains from being transmitted to the repository
- Evaluation of seismic failure threshold of bladed, fragile-appearing lithophysal crystals
- Evaluation of whether a ground motion parameter other than PGV would correlate better with calculated drip-shield and waste-package damage states
- Qualification and use of finite seismic-source model to evaluate probabilities of extreme ground motions from extreme scenario earthquakes (e.g., magnitude 6.7 at 5 km)
- Evaluation of extreme ground motions along San Andreas Fault and implications for Yucca Mountain

The objective is, on the basis of such studies, to revise the existing hazard curves, generate new time histories, and reevaluate postclosure seismic consequences. Note that the objective is to provide a basis for imposing a reasonable upper bound on the existing hazard curves, without reopening or repeating the existing probabilistic seismic hazard analysis for Yucca Mountain.