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PROBABILISTIC SEISMIC HAZARD ESTIMATES IN NEVADA: QUESTIONABLE RESULTS AND HOW WE MIGHT FIX THEM

Abstract: The hazard curves estimated by several probabilistic seismic hazard analyses in Nevada, including the high-profile analysis of the proposed Yucca Mountain nuclear waste repository, are not particularly credible. Hazard curves are, conceptually, the outcome of an experiment where ground motion is recorded at a single site for a very long time (e.g. >105 years), and then statistics of extreme values are derived from the data. To test the low probabilities, one can look for geological structures that would be different if strong shaking occurred. For instance, in the desert environment, 10,000 year old, precariously balanced rocks are one such indicator. In general, the challenge of testing hazard curves takes the problem into a realm requiring a broad spectrum of Earth sciences. Possible explanations for the inconsistency of PSHA and geological indicators are 1) ground motion prediction equations overestimate the ground motions, or 2) uncertainties are mishandled. Both explanations probably contribute. The second is almost surely the case, in several ways: a) the use of an ergodic assumption to estimate standard deviations, b) the assumption that ground motions have a lognormal distribution about the mean, and c) the treating of epistemic uncertainties as if they are aleatory.

Short Biography: John G. Anderson is Professor of Geological Sciences and Director of the Seismological Laboratory at the University of Nevada Reno. He received his Ph.D. from Columbia University in 1976. Dr. Anderson’s major research interest is engineering seismology including applications of geological and seismological information to estimate seismicity and seismic hazard, recording strong ground motions, understanding the physics of near-source ground motions and applications to engineering problems.

DATE: MONDAY, DECEMBER 8th, 2003  
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LOCATION: 223 JARVIS HALL, NORTH CAMPUS, UB

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