

## **EVALUATION OF RADIOLOGICAL RISK FROM SEISMOTECTONIC PROCESSES AT THE CANDIDATE HIGH-LEVEL WASTE REPOSITORY AT YUCCA MOUNTAIN NEVADA, USA**

1STAMATAKOS, J. A., 2JUSTUS, P. 1GHOSH, A., 1HSIUNG, S., 1MIKLAS, M., 1CHEN, R., and 2IBRAHIM, A. K., 1CNWRA\*, Southwest Research Institute, San Antonio, TX 78238, USA. 2U.S. NRC, Washington, D.C., 20555, USA.

Proposed new regulations for high-level waste disposal at the candidate Yucca Mountain repository are based on a risk-informed, performance-based approach. In this context, risk is defined as expected annualized dose to the average member of the residence group that is expected to receive the greatest radiological-release exposure. Risk is estimated by multiplying the probability of an event by its associated radiological dose-consequence. Within this risk-based approach, NRC and CNWRA staff conducted quantitative performance assessment studies of disruptive scenarios that include possible waste package rupture by faulting and seismicity-induced rockfall on the emplacement drifts. Potential radiological release to the accessible environment from the damaged waste packages occurs through groundwater transport pathways. Performance assessment models were constructed to evaluate these disruptive events within a total system performance assessment. Models of faulting and rockfall were derived from extensive field and numerical modeling results, including a probabilistic seismic hazard assessment recently completed by the U.S. Department of Energy. Although many variables remain unconstrained, including final waste package and drift designs, preliminary results indicate that faulting and seismicity-induced rockfall do not pose a significant risk to repository performance. Faulting within the candidate repository is too infrequent and disrupts too few waste packages to be of consequence. Rocks that may fall on waste packages from earthquakes are too small to significantly damage waste packages. \* Work supported by the U.S. NRC (Contract NRC-02-97-009). This work is an independent product of the CNWRA and does not necessarily reflect the views or regulatory position of the NRC.