

## **GIS-Based Liquefaction Potential and Effects Mapping, Albuquerque-Santa Fe Corridor, New Mexico**

U.S. Geological Survey  
National Hazard Reduction Program

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Program Element I and II: *I: Products for Earthquake Loss Reduction (90%); II: Research on Earthquake Physics and Effects (10%)*

Key Words: Liquefaction, Susceptibility, Zonation, Seismic Hazard

### **INVESTIGATIONS UNDERTAKEN**

We are in the process of integrating our existing NEHRP-funded liquefaction susceptibility maps (Kelson et al., 1999) with recently completed probabilistic ground shaking hazard maps (Wong et al, 2000) to prepare liquefaction potential maps of the metropolitan Albuquerque area. The final maps will depict the potential for liquefaction within 100- and 500-year return periods, which, because of the relatively low rate of historic seismicity in the Rio Grande rift, will more accurately depict liquefaction hazard in and near Albuquerque than the existing liquefaction susceptibility maps.

In addition, we are in the process of applying established quantitative techniques for estimating the locations and magnitudes of possible liquefaction-related ground failures. We are converting the geotechnical database we compiled in cooperation with the New Mexico Bureau of Geology and Mineral Resources (Clark and Haneberg, 2001) to GIS format. We also are integrating surficial mapping from our liquefaction susceptibility mapping study (Kelson et al., 1999; 2000) with the database and high-resolution topography (2-foot-contour maps) to generate maps of possible liquefaction-related ground deformation. As part of this process, we have converted our geologic and liquefaction susceptibility mapping from graphics (Freehand) to GIS (ArcView 8.3) format.

Our project plan emphasizes development of GIS map layers for input into the City of Albuquerque and Bernalillo County GIS. This will address the present need for interactive hazard mapping tools for earthquake mitigation and response in the metropolitan Albuquerque area. The final products from this study will include 1:24,000-scale map layers that depict: (1) Potential for liquefaction within deposits present beneath the metropolitan Albuquerque area; (2) Potential for ground settlement (including isopach

maps of potential settlement); and (3) Potential for lateral ground displacement (including locations and estimated amounts of lateral spreads).

### **NON-TECHNICAL SUMMARY**

The objective of this project is to produce detailed, fully digital maps of the probability of liquefaction-related effects that could occur during large earthquakes near Albuquerque, New Mexico. Based on our previous NEHRP-funded liquefaction susceptibility mapping, large areas of the inner Rio Grande valley near Albuquerque are susceptible to liquefaction. The map products generated by our current effort will provide information on earthquake hazards near Albuquerque that take into account the likelihood of large surface-rupturing earthquakes. Development of the liquefaction hazard and ground deformation maps will incorporate, and build on, existing NEHRP products to provide valuable information for emergency preparedness, mitigation of potential risks, and development planning.

### **REPORTS PUBLISHED**

None.

### **DATA AVAILABILITY**

Primary data collected for this study includes boring logs and digital data sets, including publicly available basemap data and geologic and liquefaction hazard mapping in GIS files produced for this study and our earlier NEHRP-funded study. Draft and final copies of these documents are available in hard copy format or Microsoft Word, ArcView 8.3, and Freehand digital format.

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