



FEMA

Delaware Seismic Exploration Getting a Picture of the Subsurface

The State of Delaware - There have been more than 550 documented earthquakes within 150 miles of Delaware since 1677. The largest registered earthquake occurred in the New Castle County area in 1871. The second-largest was in 1983 near the Delaware River in northern Delaware. In this area, there are no known fault traces on the surface of the Earth. In order to identify the faults responsible for the earthquakes, their detection in the subsurface is required.

The Delaware Geologic Survey (DGS) developed a joint cooperative agreement with the U.S. Geological Survey (USGS) to artificially produce seismograms in order to get a picture of the subsurface. Using a geophysical data processing technique developed by the USGS Geological Division in Menlo Park, Calif., and with staff from that center, the faults were explored.

Seismic waves were produced by firing 8-gauge shotgun shells into the ground at a depth of approximately 12 to 18 inches below the surface. Simultaneously 1-pound explosive charges, at a depth of approximately 10 to 15 feet below the surface, were detonated. The results from both sets of explosions were recorded on an array of five seismographs with 300 active channels.

This project provided the first opportunity to study and map the possible subterranean fault line in Delaware. It presented scientists with a relatively non-invasive method of imaging the subsurface. The high-resolution seismic reflection and refraction survey identified possible faults that may be associated with earthquakes in the northern Delaware area.

The information garnered from this study will be useful to planners and local governments when considering development in the local area. It will be especially useful when selecting sites for critical facilities. The dollar values saved are not measurable since the objective is to prevent development on the fault or at least make sure it meets earthquake-building standards.



State-wide,
Delaware



Quick Facts

Sector:

Public

Cost:

\$280,000.00 (Estimated)

Primary Activity/Project:

Mitigation Planning/Disaster Resistant Universities

Primary Funding:

National Earthquake Hazards Reduction Program (NEHRP)