DEPARTMENT OF CONSERVATION

Managing California's Working Lands

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CALIFORNIA GEOLOGICAL SURVEY PROGRAM PLACES QUAKE INSTRUMENTS IN BARSTOW AREA

BARSTOW – The California Geological Survey (CGS) has expanded its inventory of seismic instruments in the Barstow area to help enhance public safety during earthquakes. Three new stations have been installed east of Mojave. These "accelerographs" are not an early warning system, but instead collect data about the response of buildings and structures to ground motion. After an earthquake, the information – used to improve public safety, and help emergency responders and local planners – is transmitted from the instruments to central computers at headquarters in Sacramento.

"The information we gather with these instruments ultimately can help make structures better able to withstand damaging earthquakes, which are infrequent but inevitable in California," said Dr. John Parrish, the State Geologist of California and chief of CGS.

While Southern Californians are aware of the threat posed by the San Andreas Fault, there are a number of small faults in the Barstow area that are considered active, including the Lenwood, Mount General, Calico and Camp Rock faults. The new stations, operated by CGS' Strong Motion Instrumentation Program (SMIP), are close to the Camp Rock and Calico faults.

"There are a group of northwest-trending faults that don't have very frequent earthquakes but are capable of big ones in the Mojave," CGS Supervising Geologist Chris Wills said. "Barstow's right in the middle of that."

Several large earthquakes have been centered near Barstow in recent times, including the magnitude 6.5 Manix earthquake in 1947, the magnitude 7.3 Landers earthquake in 1992, the magnitude 7.1 Hector Mine earthquake in 1999, and a magnitude 5.1 earthquake in 2008. The Landers quake triggered slippage along the Calico Fault.

"We have a small number of stations in the Barstow area, and these three to the east in the Newberry Springs area help to improve our coverage of that part of the state," said Dr. Anthony Shakal, head of SMIP.

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"Scientists agree that the next large earthquake in California is likely to occur in the southern part of the state. Barstow is an important area for us because although it's not on the San Andreas Fault, it's a hub for transportation and is subjected frequently to seismic shaking, so we're likely to get valuable data from our instruments there."

The accelerographs measure the vertical and horizontal response of buildings and soils. When activated by earthquake shaking, the devices produce a digital record from which the critical characteristics (acceleration, velocity, displacement) of ground motion can be calculated. The information gathered by SMIP is processed and disseminated to seismologists, engineers, building officials, local governments and emergency response personnel throughout the state.

SMIP data has verified the performance of new types of earthquake-resistant construction, and has contributed to improved formulas in the California Building Code for calculating building vibration periods, which is vital in earthquake-resistant design.

CGS, part of the California Department of Conservation, established SMIP in 1971 after the damaging San Fernando earthquake. SMIP has installed and maintains recording instruments at more than 1,150 locations statewide, including the city halls of Los Angeles, San Francisco and Oakland, and at the State Capitol. A number of high-rises, dams and all major bridges are instrumented.

"California has a world-class scientific effort that not only helps protect public health and safety in this state, but also influences structural engineering and earthquake planning and preparedness around the world," noted California Department of Conservation (DOC) Director Mark Nechodom. CGS is part of the department.

The goal of SMIP and its partners in the California Integrated Seismic Network (CISN) – the California Institute of Technology, U.C. Berkeley and the U.S. Geological Survey – is to have at least one instrument in every ZIP code in the state.

Within a few minutes of a large earthquake, data from the SMIP and CISN seismic instruments are used to create a "ShakeMap." Among other things, the ShakeMap helps emergency responders determine where the highest levels of shaking have occurred and thus where critical infrastructure – such as transportation corridors and water lines – is most likely to be damaged.

SMIP data is available at the joint state-federal data center at strongmotioncenter.org as well as the Department of Conservation's Web site, www.conservation.ca.gov, and at www.quake.ca.gov. There is also information about how the public can prepare for future earthquakes.

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