UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

NATIONAL CENTER RESTON, VIRGINIA 22092

release: IMMEDIATE (prepared August 12, 1975) -

SCIENTISTS FIND SOURCE OF OROVILLE EARTHQUAKES

The fault zone responsible for a series of earthquakes that have shaken the Oroville area north-central California since Friday, August 1, has been identified by the U.S. Geological Survey.

The geologic "culprit" is revealed by a zone of aftershocks and by a zone of surface fractures. The distribution of aftershocks shows that the fault zone inclines westward in the direction of the Sacramento Valley to at least 5 miles deep.

The main shock of the earthquake series occurred at 1:20.p.m., PDT, August 1, registering about 6.0 on the Richter Scale, and occuring at a depth of above five miles under Palermo. It was followed by numerous aftershocks, many of which measured more than 4.0, with three reaching magnitude 5.0.

USGS scientists, who have been monitoring the seismic activity in the Oroville area since August 1, report that aftershocks continue to be recorded. They say, however, that the tremors are decreasing in both number and intensity, a pattern that appears normal, and which would indicate that the biggest shock has already been experienced. They emphasized, however, that positive assurance could not be given that there will not be another magnitude 6 or even larger in the days or weeks ahead.

Although considerable data are being obtained from several seismograph stations that are in the area, there are still some unanswered questions related to the seismic activity at Oroville. Among those questions is the possibility that the water in the Oroville Dam — located about two miles northeast of Oroville — had triggered the earthquakes. Such questions reflect the fact that the filling of a number of large reservoirs in various parts of the world has been accompanied by earthquakes. The 770-foot high Oroville Dam was first filled in 1968, with one rather large change of the water level reported within the past year.

In response to questions about the Oroville Dam, USGS scientists said that Survey data analyzed thus far do not prove that the reservoir triggered the earthquakes. They added, however, that neither does the evidence rule out some relationship, and that it may be difficult to find definitive evidence one way or the other.

The Oroville earthquake, like the Alaska earthquake of March 1964 and the San Fernando, Calif. earthquake of February 1971, have produced data of great value to engineers involved in the design and construction of buildings and dams to resist earthquake forces.

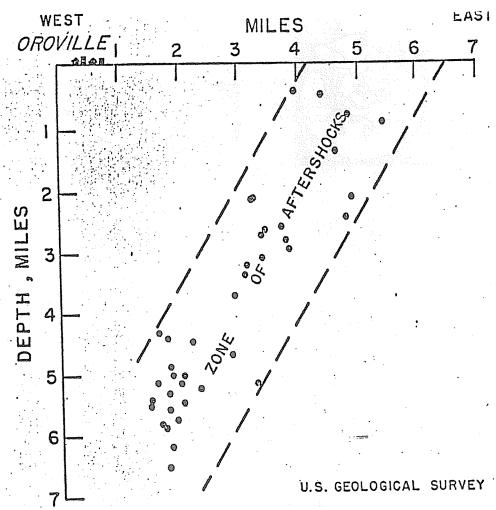
In the past, engineers have been hampered by inadequate data on the forces of strong shaking by earthquakes, particularly within a few miles of earthquake epicenters. At Oroville, excellent records are being obtained. One seismographic instrument, for example, at Oroville Dam, operated cooperatively by the California Department of Water Resources and the USGS, was only about ten miles from the epicenter, and recorded strong motion for two or three seconds. The strongest pulses of motion in a vertical direction were 13 percent of the force of gravity. At two other sites, Chico and Marysville, the peak motion was 8 and 7 percent of gravity, respectively.

Following the main earthquake, ten temporary instruments were installed, five by the California Division of Mines and Geology, and five by the California Institute of Technology in cooperation with the USGS. More than 30 aftershocks left their records on this network.

The USGS scientists said that they have many months of additional data analysis before them. Level lines will be run to see if any changes in elevation related to the fault movement can be detected; extremely sensitive instruments are being operated to test for quake-related deformation of the Earth's surface. Such changes can give good evidence of uplift or depression of mountain blocks, and add importantly to understanding the movements within the crust of the Earth that generate earthquakes.

The scientists emphasized that they cannot predict whether a magnitue 6 earthquake will occur near Oroville in the near future. Noting that earthquake prediction research is being carried out in the United States by the USGS and many universities and private groups as well as in Japan, the Soviet Union, and the People's Republic of China, they expressed confidence that earthquake prediction will eventually be possible. They said, however, that an operational earthquake prediction system, perhaps comparable to the tsunami warning service, will depend on further scientific observations and advances.

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SECTION THROUGH EARTH'S CRUST NEAR OROVILLE, CALIF., SHOWING DISTRIBUTION OF AFTERSHOCKS ALONG WEST-DIPPING FAULT ZONE IS THE ZONE IDENTIFIED BY USGS SCIENTISTS AS THE SOURCE OF THE OROVILLE EARTHQUAKE SERIES THAT BEGAN ON AUG. 1, 1975.

