

PACIFIC GAS AND ELECTRIC COMPANY

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December 12, 1978

SUBJECT: Effect of October 4, 1978 Earthquake on Helms Pumped Storage Power Plant Site

TO: Editor EERI Newsletter

On Wednesday morning, the 4th of October 1978, at approximately 0940, an earthquake was felt at the Helms Project Site.

The UC-Berkeley seismographic station reported RM 5.7, with epicenter approximately 15 miles northwest of Bishop, California. The Helms Project site is about 38 miles S S W of the reported epicenter.

The Helms Project consists of extensive underground excavations. Of approximately fifty people who were underground at the time, only nine reported having felt the earthquake. A majority of them were located in the vicinity of the Powerhouse excavation, 1000 feet underground. Those who did not feel the earthquake were generally part of the heading crew, where the normal tunneling activities (drilling, shotcreting, mucking) masked the seismic waves.

People who reported having felt the earthquake were working away from the main headings and were standing on the ground (surveyors, electricians, laborers, inspectors). They were interviewed on the day of the earthquake and their accounts were generally consistent. Only 1 or 2 impulses were felt during the earthquake, with little shaking. The earthquake had a felt duration of 1 or 2 seconds. No unusual noises or rockfalls were reported, and the sensation was that of a small or distant explosion.

Although the people who felt the earthquake underground were away from the major excavation activities, they were subject to high noise levels (earplugs required) and vibrations from the fan line and miscellaneous equipment. These conditions may have reduced the perceptible effects of the earthquake.

People who described the surface ground motion were located at PG&E's Helms Project Headquarters Office or the Contractor's Tule Meadow Trailer Park at the time of the earthquake. Both locations are shallow alluvial sites (10 to 50 ft. cover) over granitic bedrock.

The duration of strongly felt motion, at the surface, was 5 to 20 seconds. The seismic waves seemed to progress in two main wave fronts, 3 to 5 seconds apart. A strong initial impulse was felt, followed by a decaying pattern. Then a lesser pulse was felt, and again the seismic waves attenuated. The shaking was described by some as gentle, long period waves.

The earthquake was felt indoors by practically everyone and outdoors by most. Many people ran outside to investigate during the excitement. The sensation was that of a heavy body striking a building. Windows and doors rattled and walls and building frame creaked. A few people outside during the earthquake observed a woodpile collapsing and some rockfalls on distant slopes. One interesting report came from a logger working on the forested slopes east of Wishon Dam. Although he didn't feel the earthquake (he was sitting on some type of equipment), he did notice the trees moving in a wave front from northeast to southwest.

In summary, earthquake had a shorter duration of less intensity in the underground excavations than were felt on the surface. MMI at the surface was IV to V.

O. W. Steinhardt/N. F. Sweeney

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