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CFE RESISTIVITY STUDIES AT CERRO PRIETO
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In order to define the probable extent of the Cerro Prieto geothermal field and to establish the geothermal possibilities of the Imperial and Cerro Prieto faults, the Comisión Federal de Electricidad performed about 200 vertical electric soundings during the last half of 1977 and first half of 1978. In these surveys Schlumberger arrays were used with current electrode spacings of up to 10 km.

The electrical study and its correlation with data collected using other geophysical methods and from several deep wells show that regional anomalies of high and low resistivity are associated with horsts, grabens and en echelon faults. It should be noted, however, that the boundaries of the area which could potentially be developed cannot be defined, since no sharp resistivity contrasts were interpreted.

A low resistivity anomaly southeast of Cerro Prieto is located in an area with no surface thermal manifestations. Though the anomaly might be associated with sediments having special porosity and salinity characteristics, the possibility that it could also correspond to some geothermal activity cannot be dismissed because of its proximity to the active Cerro Prieto fault.

LBL RESISTIVITY STUDIES AT THE CERRO PRIETO GEOTHERMAL FIELD
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ABSTRACT

In a joint venture, LBL and C.F.E. have undertaken a series of dc resistivity studies at the Cerro Prieto geothermal field. In the present study dipole-dipole resistivity data have been collected and two-dimensional modeling studies have been performed using these and existing Schlumberger data taken by C.F.E. The goals of the present research are (a) to determine whether the reservoir region or controlling geologic structure can be delineated by careful dc resistivity measurements and proper interpretation, (b) to establish permanent electrode stations so that measurements may be repeated at regular intervals to determine whether temporal changes in resistivity occur within the reservoir region, and (c) to perform the first set of replicate measurements.

During 1978 two long dipole-dipole resistivity lines were surveyed, each with dipole lengths of 1 and 2 kilometers, N=1 to N=5. The northern line D-D' is 18 kilometers long and extends easterly from the Cucapa Mountains into the Mexicali Valley passing just south of the Cerro Prieto volcano. This line follows C.F.E. Schlumberger resistivity line 1. Line E-E' is 16 kilometers long and was measured several kilometers to the south of D-D'. This line trends subparallel to D-D' and crosses the central portion of the present production zone. Data were collected with the LBL 25 kw motor generator and signal averaging receivers. The error in these measurements has been calculated to be between 5 and 15 percent at all stations.

Two-dimensional modeling studies on both Schlumberger and dipole-dipole data sets yield a compatible model, consistent with known geological features. Several important observations are made from the models. (1) The reservoir region within the production zone is not clearly delineated with dc resistivity measurements. This is an expected result, however, since the background resistivity is very low, between 1 and 2 ohm-meters. (2) The Imperial and Cerro Prieto faults are clearly delineated in the resistivity models; each fault is characterized by a change in the bulk section resistivity suggesting that they act as aquicludes.