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GEOTHERMAL EXPLORATION IN TRANS-PECOS, TEXAS

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Knowledge of the thermal regime in Trans-Pecos Texas has been slow to accumulate, despite the presence of several interesting natural geothermal phenomena. These occur mainly within the Rio Grande Valley between El Paso and Big Bend National Park, and consist mainly of hot springs and hot wells. Present limited heat-flow data suggest an increased heat-flow in the river zone, as compared with the high plains to the east. A series of 67 gradient holes measured largely in Presidio county also support this observation. Twenty gradient holes measured in the high plains have an average gradient of about 30°C/km; forty seven gradient holes measured in the Rio Grande Valley area have an average gradient of about 77°C/km. These results correlate well with the silica geothermometry studies of Hoffer (1979).

All of the new drilling for geothermal gradient and heat flow studies have been concentrated in an area near Hueco Tanks State Park. Interest in the area was raised by the silica geothermometry map of Hoffer (1979) and its proximity to El Paso, which is less than 25 miles away and expanding rapidly toward the area of geothermal interest. Several industries in El Paso appear to be potential users of non-electrical grade hot waters. A total of 14 holes have been drilled for geothermal gradient and heat-flow measurements. Of these, 12 were 50 meters deep and all but two had gradients in excess of 100° C/km, one having a gradient as high as 306°C/km. Of the remaining two, one penetrated bedrock at about 50 meters and was drilled to a total depth of 125 meters. The gradient in the limestone bedrock is 170°C/km and the heat flow is about 11 x 10^{-6}cal/cm^2 sec. This is the highest heat flow thus far reported for a locality in the Rio Grande Rift. The last hole is 300 meters deep and has a gradient of 142°C/km and a heat flow of 9 x 10^{-6}cal/cm^2 sec.

We feel that the Hueco Tanks site is very promising for at least space heating applications of hot water. Based on the 300 meter hole the potential for electricity grade temperatures still exist but the tight limestone bedrock may require hot dry rock extraction technology.

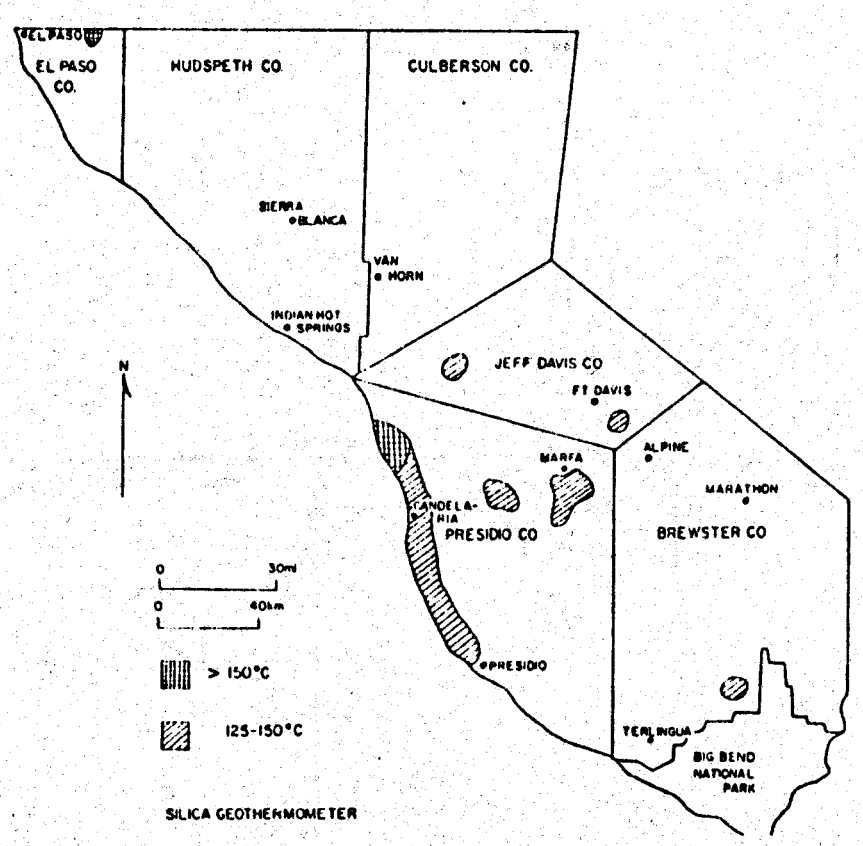

Figure 1. Silica geothermometer temperatures, Trans Pecos, Texas. After Hoffer (1979).

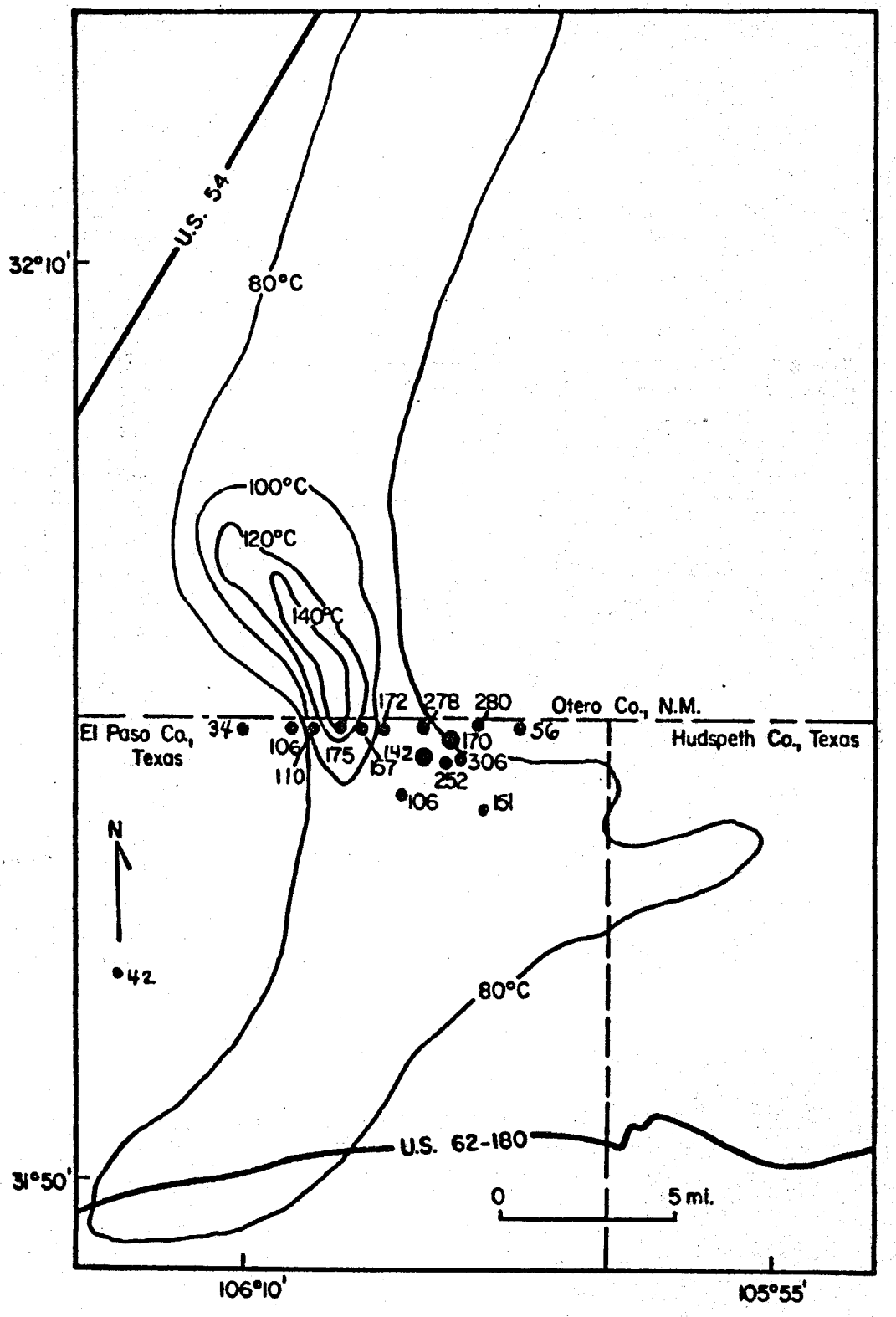

Figure 2 . Location of gradient holes near Hueco Tanks. Gradients are in ^{o}C/km. Silica temperature contours after J.M. Hoffer (1979). The large dot with a gradient of 170^{o}C/km penetrated bedrock, the heat flow is 11 h.f.u. The large dot with a gradient of 142^{o}C/km also penetrated bedrock, the heat flow is 9 h.f.u.