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Puna Geoth

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Volcanic Steam Power Proposed for Puna Area

HILO—A bold experiment to see if volcanic heat can be converted into electrical energy is planned in the still hot 1955 Puna eruption area.

Magma Power Co., a Nevada corporation whose president, B. C. McCabe, has offices in Los Angeles, has taken a long-term lease on 614 acres of Olaa Sugar Co. land to try to develop natural steam commercially.

DIRECTORS OF the sugar company recently ratified the agreement giving Magma Power sole rights to drill and tap the steam supply underground for conversion to commercial power.

The area is along the old Kalapana Road, where a 1955 fissure line of spatter cones still exude steam. The tract also includes the Iilewa crater area. A 2/6/60

A PART OF the area is the tourist-attracting zone near the Nii home where a volcano erupted in a cucumber patch.

An Olaa spokesman said the lease entails a minimum rent on a 25-year basis, renewable for a 99-year tenure, with Olaa Sugar guaranteed a percentage of profits from electrical power sold.

MAGMA OFFICIALS have approached Hilo Electric Light Co. to see if it would be interested in a more cheaply produced power, HELCO Manager William MacKenzie said.

"Of course, we're interested and wish them success. There's no doubt natural steam makes a cheaper operation than manufactured steam."

MacKENZIE said Magma is successfully producing power from steam in Geyser City, Calif. He said there are two other areas in the world producing commercial power from volcanic steam. They are in New Zealand and Italy, he said.

Magma is entitled only to power development rights of the Puna land, Olaa Sugar Co. said. The plantation is reserving rights to otherwise develop the tract so long as it does not interfere with the power firm.

NOTE:

ATTACHED NOTES ARE FROM:
"TEMPERATURE PROFILES IN WELLS ON THE ISLAND OF HAWAII" — DAVID EPP & A. JOHN HALUNEN, JR. -
NSF GRANT GI-38319
HAWAII INSTITUTE OF GEOPHYSICS
UNIVERSITY OF HAWAII

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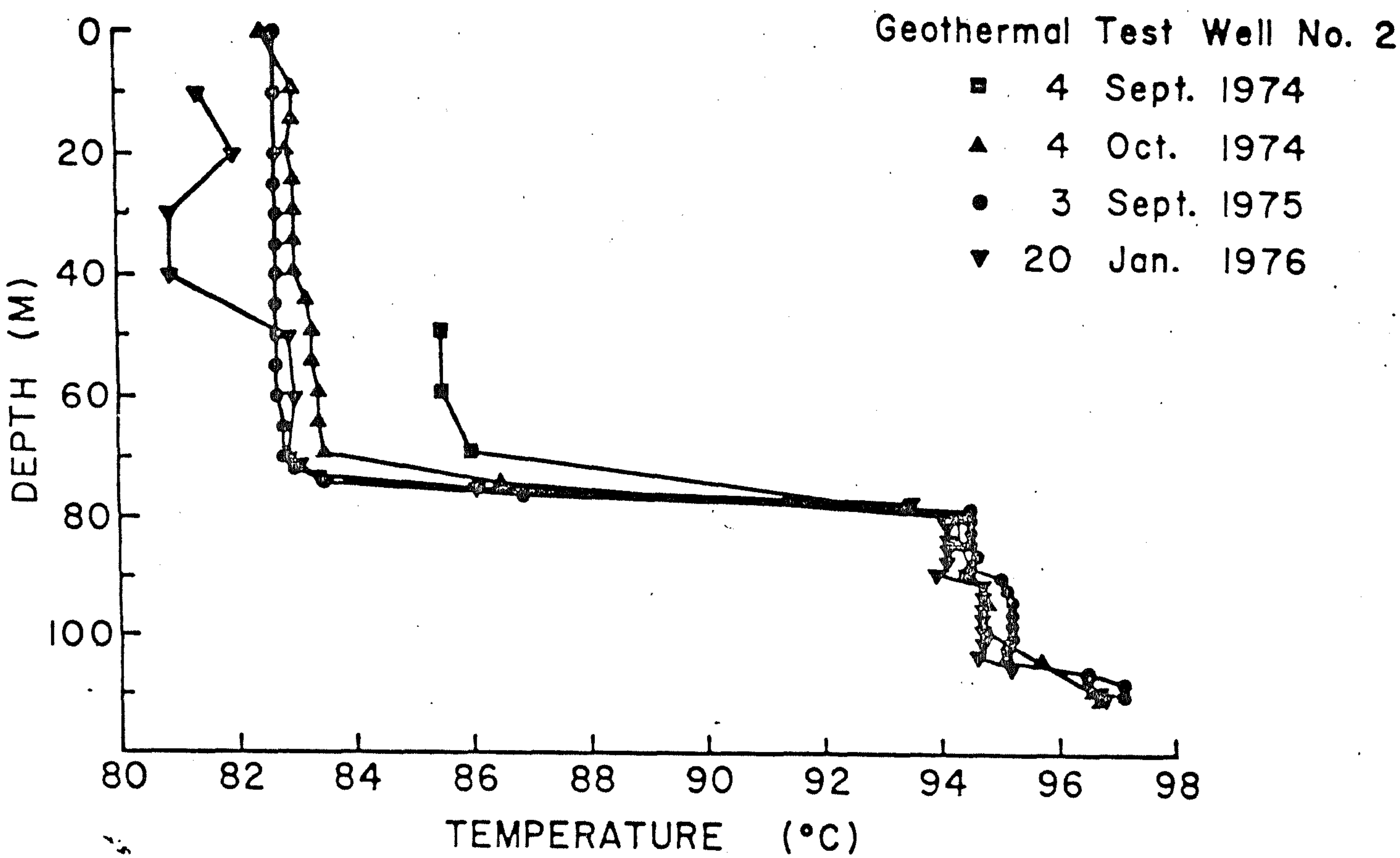
information for these wells are given in the Division of Water and Land Development Report R34 (1970). Table 1 in the Appendix lists data for the wells measured. The remainder of the Appendix contains temperature versus depth profiles and tables for these wells. In the temperature versus depth profiles, the dashed line gives the depth to water. These profiles show that there is often a change in temperature and temperature gradient across the air-water interface. This change is probably caused by more rapid circulation in the air column.

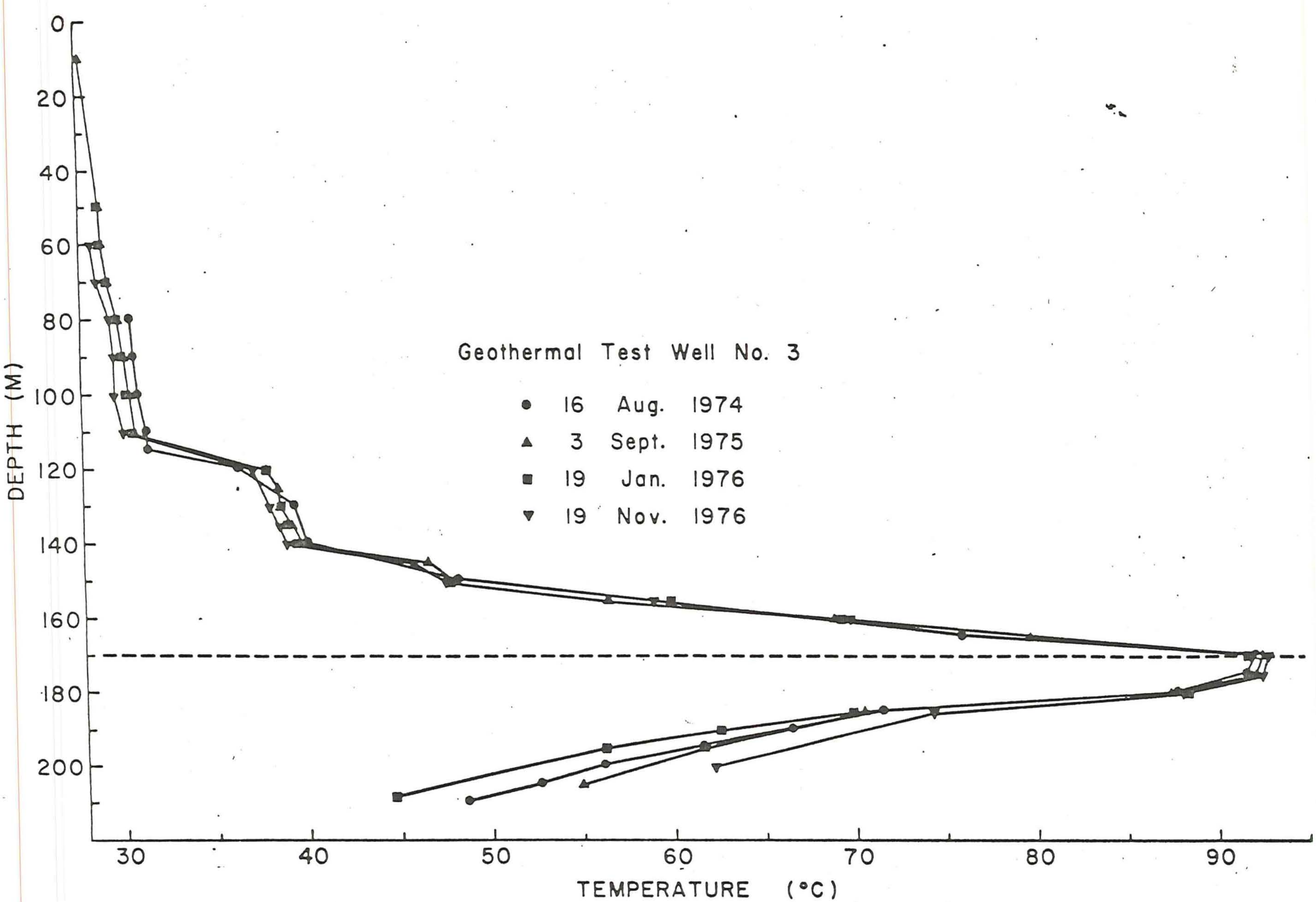
Figure 2 shows the maximum temperature measured in each well. The highest temperatures were recorded in the wells on the Puna rift zone (Fig. 3). Temperatures in 3389-01 (9-4) and 2102-01 (9-10) are considerably lower than temperatures in wells closer to the rift zone, indicating that the temperature decreases rapidly to the north and south of the rift zone.

The elevation of the ground surface at GTW-2 is about 315 m, and the well is dry. Since it was drilled, the hole has caved in at a depth of about 110 m, 60 m above the original bottom. Below 75 m, the temperature increases with depth, and at 110 m it reaches 97°C. The temperature at the bottom of the hole at the time of drilling was 102°C, which suggests that the temperature continues to increase below 110 m. The temperature profile in this well shows discontinuities at 75 m, 90 m, and 105 m, which probably occur at the boundaries of lava flows.

The other wells in the Puna rift, which penetrate the water table, are characterized by an increase in temperature at the water table; the increase is most pronounced in GTW-3. In Figure 4, the temperatures in these wells are plotted relative to mean sea level. GTW-3, and to a lesser extent 2783-01 (9-9, Malama-Ki), show a decrease in temperature near the bottom of the hole, which suggests that the upper water layer in this area has passed through a high-temperature region located upslope from these wells.

Temperature measurements were repeated in four of the high-temperature wells on the Puna rift: GTW-2, GTW-3, 3081-01 (9-6, Kapoho), and 2783-01 (9-9, Malama-Ki); and at one well south of the rift: 2102-01 (9-10, Pulama). There is very little temporal variation in the temperature in GTW-2 and GTW-3 (except for the upper 75 m of GTW-2, which is explained above). Temporal changes of 2 to 5°C were measured in 3081-01 (9-6, Kapoho) and 2783-01 (9-9, Malama-Ki). The cause of those changes in unknown. Data are insufficient to relate the changes to some specific magmatic event or to a change in the pattern of groundwater movement.


Geothermal Test Well No. 2
4 Sept. 1974
4 Oct. 1974
3 Sept. 1975
20 Jan. 1976
DEPTH (M)
0
20
40
60
80
100
TEMPERATURE (°C)
80
82
84
86
88
90
92
94
96
98


Geothermal Test Well No. 3
● 16 Aug. 1974
▲ 3 Sept. 1975
■ 19 Jan. 1976
▼ 19 Nov. 1976
DEPTH (M)
0
20
40
60
80
100
120
140
160
180
200
30
40
50
60
70
80
90
TEMPERATURE (°C)