BACA PROJECT

DATA AND REPORTS

GEOLOGY

No.	Transfer Date	Release Date	Title
1.	B	B	Hydrothermal Geology of the Valles Caldera, New Mexico by R.F. Dondanville - 1971.
2.	B	B	Airborne Infrared Geothermal Exploration--Valles Caldera, New Mexico Earth Resources Operations, North American Rockwell Corp.-1972.
3.	B	B	Electrical Resistivity Survey in Valles Caldera, New Mexico by Group Seven, Inc. - 1972.
4.	B	B	Additional Data--Electrical Resistivity Survey in the Valles Caldera, New Mexico by Group Seven, Inc. - 1972.
5.	B	B	Reconnaissance Resistivity Survey Baca Property, McPhar - 1973.
6.	B	B	Supplemental Report--Reconnaissance Resistivity and Schlumberger Depth Sounding Surveys Baca Property - McPhar - 1973.
7.	B	B	Quantitative Gravity Interpretation Valles Caldera Area, New Mexico by R.L. Segar - 1974.
8.	B	B	Mercury Soil Gas Survey Baca Prospect by Allied Geophysics Inc. - 1974.
9.	A	A	Mercury analysis - 1974 gradient holes.
10.	B	B	Geothermal Geology of the Redondo Creek Area Baca Location by T.R. Slodowski - 1976.
11.	B	B	Magnetotelluric--Telluric Profile Survey, Valles Caldera Prospect by Geonomics - 1976.
12.	B	B	Geological Resume of the Valles Caldera by T.R. Slodowski - 1977.

1973

REPORT ON THE RECONNAISSANCE RESISTIVITY SURVEY OF THE BACA PROPERTY, VALLES CALDERA AREA SANDOVAL COUNTY, NEW MEXICO FOR UNION OIL COMPANY

McPHAR GEOPHYSICS

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1. INTRODUCTION

At the request of Mr. Richard Domianville, consultant for Union Oil Company of California, McPhar has completed a Reconnaissance Resistivity Survey on the Baca Property, Valles Caldera Area, Sandoval County, New Mexico.

The geology of the Valles Caldera is described in an Outline of the Geology of the Jemez Mountains, New Mexico by C. S. Ross, et al, New Mexico Geological Society, Twelfth Field Conference p. 139-143. Generally the geology consists of a thick volcanic pile varying from basalt to rhyolite which represents successive effusions during the Pliocene. Post-caldera rhyolite forms most of the hills in the survey area and solfataric and hot-spring activity are present within the area. The Valles Caldera has been designated as a KGRA.

The purpose of the Reconnaissance Survey was to locate and delineate low-resistivity zones that might indicate areas of concentrated thermal activity. Measurements were made with 2000 foot dipoles at one-through-four dipole separations along widely-spaced reconnaissance lines through most of the valley in the area for easier accessibility. A frequency of 0.125 Hz. was used in order to minimize attenuation of the electric field due to eddy current dissipation of energy and at the same time avoid telluric noise.

The survey was conducted by Mr. Arlo Furniss, geophysicist, under the supervision of Mr. Domianville.

2. PRESENTATION OF RESULTS

The resistivity survey results are shown on the following data plots in the manner described in the notes which accompany this report.

Line	Electrode Intervals	Dwg. No.
1	2000 foot	R-6088 - 1
2	2000 foot	R-6088 - 1
3	2000 foot	R-6088 - 1
4	2000 foot	R-6088 - 2
5	2000 foot	R-6088 - 2
6	2000 foot	R-6088 - 2

Also enclosed with this report is Dwg. No. RP-4909, a plan map of the survey area showing the location of the survey lines at a

scale of 1" = 2000'. The definite, probable and possible Resistivity low anomalies are indicated by bars, in a manner shown in the legend, on this plan map as well as on the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

3. DISCUSSION OF RESULTS

The variation of the resistivity response of the reconnaissance survey is indicative of the complex geology of the Valles Caldera area. Anomalous responses which may represent increased geothermal activity have been located on five of the six survey lines. A discussion of the resistivity results along each survey line follows.

Line 1

Definite anomalous responses occur at 40N to 80N and 220N to 240N. The latter anomaly appears shallow and may represent a near-surface convection flow of geothermal waters which result in the probable anomaly extending from 240N to 280N and in possible anomalies from 200N to 220N and 280N to 300N. The wells in the vicinity of this anomaly should determine the validity of the interpretation.

The definite anomaly between 40N and 80N exhibits continuity at depth and is of definite interest.

The probable anomaly between 350N and 370N is open on the north. This response occurs near the intersection of Line 3 and is

referred to the discussion of that line.

Line 2

This line was surveyed through the center of Valle Grande and has not located any anomalous responses. The resistivity measurements are quite high for an expected alluvial-filled valley. It is suggested that the alluvium must be quite thin over this area.

Line 3

The resistivity results indicate a definite anomaly of varying depth for the entire length of this line. The near-surface resistivity high centered at 90N probably represents the post-caldera rhyolite that has formed the hills in this area.

This line has probably been surveyed along or adjacent to a fault which may be representative of a conduit for geothermal fluids.

Line 4

The definite anomaly located at 30E to 160E is centered over the suspected fault on Line 3. The probable anomaly from 10W to 80E may be the result of geothermal seepage from the above-mentioned fault.

Line 5

The possible anomaly located at 40E to 80E appears to be coincident with the weak anomalous response of Line 1.

Line 6

A definite, open-ended anomaly occurs between 10NW to 20SE. The pattern is not complete and additional work should be considered on this line, since the probable anomaly from 70E to 20SE indicates an increased conductivity to the northwest.

4. CONCLUSIONS AND RECOMMENDATIONS

The reconnaissance resistivity survey of the Valles Caldera area has outlined some areas of high conductivity which may represent increased geothermal activity. Line 3 of this survey exhibits low resistivity values for its entire length and may represent a possible fault zone which is a conduit for geothermal fluids. Line 4 crosses this proposed fault zone and suggests that the possible lateral extent of this zone is approximately 4000 feet. This area is of definite interest.

The definite anomalies on the south end of Line 1 and the north-west end of Line 6 are also of interest. Additional resistivity work should be considered in this area to determine the aerial extent of the anomalous response.

The survey line across Valle Grande failed to locate any anomalous zones. No further work in this area is suggested.

A complete correlation of all geological, geochemical, geophysical and well data should be conducted upon completion of the recommended additional work and prior to the selection of a drill-hole location.

McPHAR GEOPHYSICS INCORPORATED

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Dated: September 13th, 1973