MICROGEOPHYSICS
CORPORATION

SELF-POTENTIAL SURVEY

McCOY, NEVADA

Paul Larry Brown, President

Bob Dorman, Geophysicist

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10900 WEST 44TH AVENUE / WHEAT RIDGE, COLORADO 80033 / (303) 424-0499

1.0.0 SELF-POTENTIAL SURVEY

1.1.0 Introduction

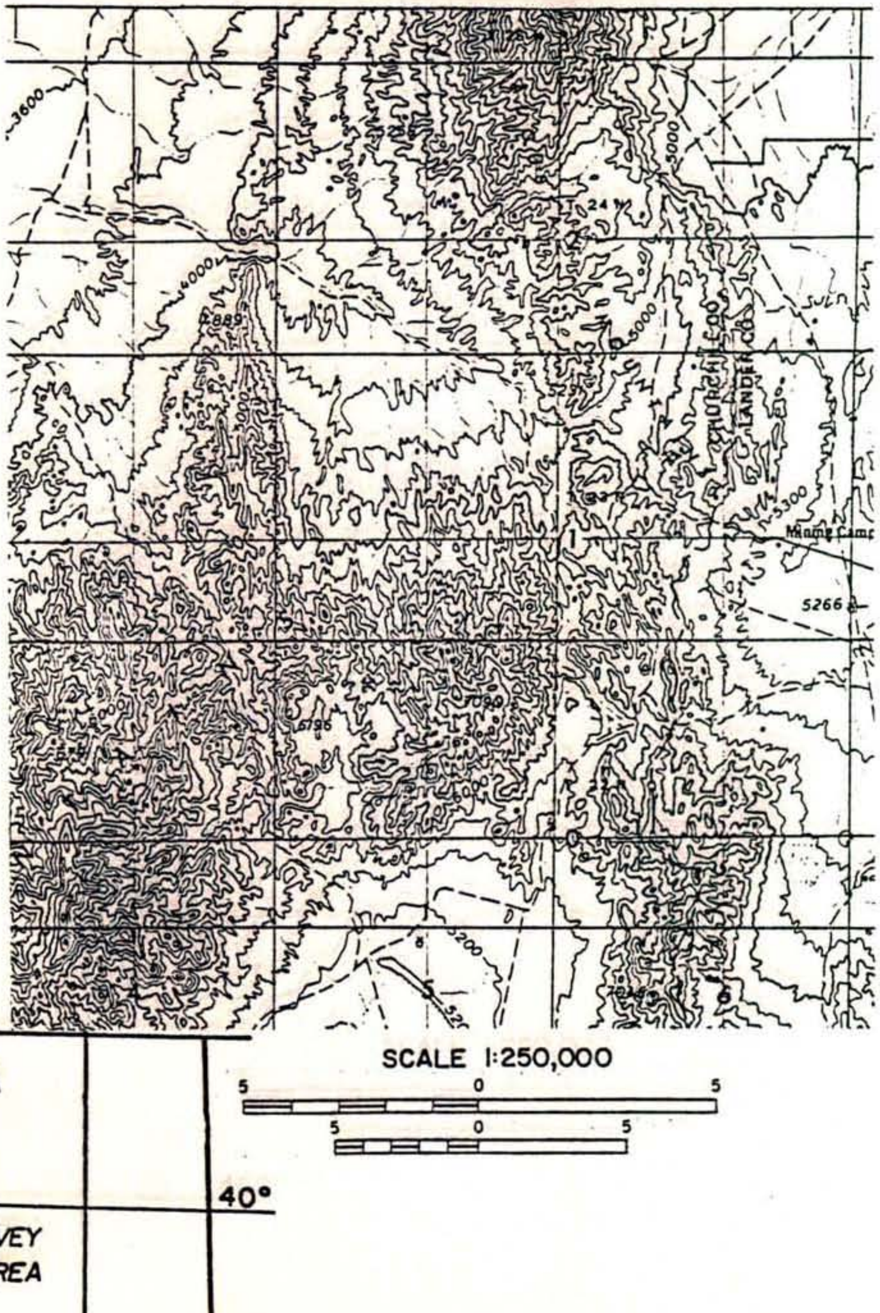
During May of 1979, MicroGeophysics Corporation conducted a self-potential passive-electrical survey (SP) in the vicinity of McCoy, Nevada.

The SP method has been used to isolate areas which produce distinctive ground voltage patterns. A map of the SP voltages, with respect to some arbitrary zero potential, can produce a pattern of positive and negative potentials. These patterns are interpreted in terms of lateral changes in resistivity, geologic structure, and moving water that produces streaming potentials along conduit systems provided by faults. The following section contains a summary of operations, results and discussion of the self-potential survey.

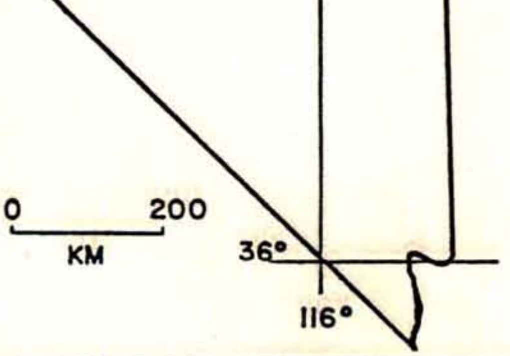
1.2.0 Summary of Operations

SP traverses were planned and conducted by a two-member crew. The traverses were closed loops several tens of kilometers in circumference. All equipment and supplies were carried when vehicle use was not possible. A discussion of the equipment is contained in the Instrumental Appendix. The percentage of off-road to on-road kilometers traversed was high. Also the rough terrain conditions in the Angusta and Clan Alpine Mountains limited average production. However an average of 6.8 line-km of coverage per day was maintained throughout the survey period.

LOCATION & INDEX MAP



SCALE 1:250,000



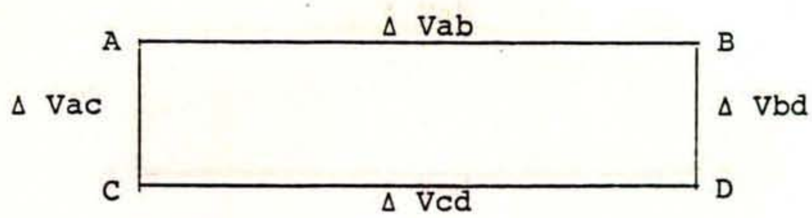
The data-collection procedure was as follows: Each man was equiped with all necessary instrumentation including non-polarizing electrodes, high-impedence voltmeters, and one kilometer of wire marked at 200 m takeouts on a portable chest reel. The trailing electrode was firmly planted at the beginning of each one km traverse. The wire was then laid out at 200, 400, 600, 800 and 1000 m lengths - an SP reading being taken at each 200 m takeout position. Pot drift was measured at the beginning and end of each kilometer. At the end of each kilometer traverse the electrodes were reversed to assure no commulative error due to a potential difference in the electrodes. Using this procedure, as stated above, an average of 6.8 km per day could be traversed.

1.3.0 Summary of Data Processing Techniques

Discussion of data processing techniques is important to an understanding of the interpreted results.

Data coming from the field are in terms of delta voltages and pot-drift corrected accumulated voltages.

In the office, station location maps are drawn up and individual loops and legs of loops are identified. Each leg of a loop is then marked with a delta voltage for the whole leg as shown below.



All such legs over the whole survey are assigned delta voltages. Loops which tie with minimal error may then be readily identified. Once all "good" loops are identified, corrections for individual legs containing errors are calculated using a multipath loop tie technique. That is, all loops containing a common "problem" leg are tied to determine what the true delta voltage for the "problem" leg should be. That leg may then be linearly corrected. An attempt is therefore made, using this technique, to put the correction where the error occurs and not to make changes on survey lines that don't need correcting.

Typical errors are caused by tellurics and shallow lateral resistivity changes. Errors of this type occur over relatively short distances (a few kilometers) and may be identified on particular legs, and therefore should not logically be shared around a whole loop.

Once an error corrected loop has been calculated, accumulated voltages are contoured in smoothed and unsmoothed form.

1.4.0 Results and Discussion

Plate 1 and 2 illustrate the contour maps of the SP data taken at McCoy. Plate 1 is a map of the raw data. Plate 2 is a filtered version of the raw data. The filtered version is a 1 km low pass data base to attenuate the smaller period components of the SP data. Plate 3 and Plate 4 illustrate the profile data used to construct the two contour maps. Plate 3 is the non-filtered, raw data profile and Plate 4 shows the filtered version.

1.5.0 Interpretation

The interpretation of the SP survey data is based primarily on the contour maps of both raw data (Plate 1) and 1 km filtered data (Plate 2). The self-potential patterns are principally controlled by major regional faulting, striking both N30°W and N30°-45°E, which can be recognized on Plate 2 as lineations in the west-central and east-central survey area and lineations and elongations of contours in the northwestern and south-central survey area respectively.

Purturbations on these major contour trends are caused by more shallow structure (relatively speaking) and shallow, lateral resistivity changes associated with changing lithology or mineralization. Examples of this are seen at the McCoy mercury mine where mineralization created a negative self-potential anomally. It may be of geothermal significance that this negative anomally is stretched out in an east-west direction as-well-as along the major structural trend directions described previously.

Dipolar anomalies are typically of the order of 20-30mv except in a few areas. These areas are listed as follows:

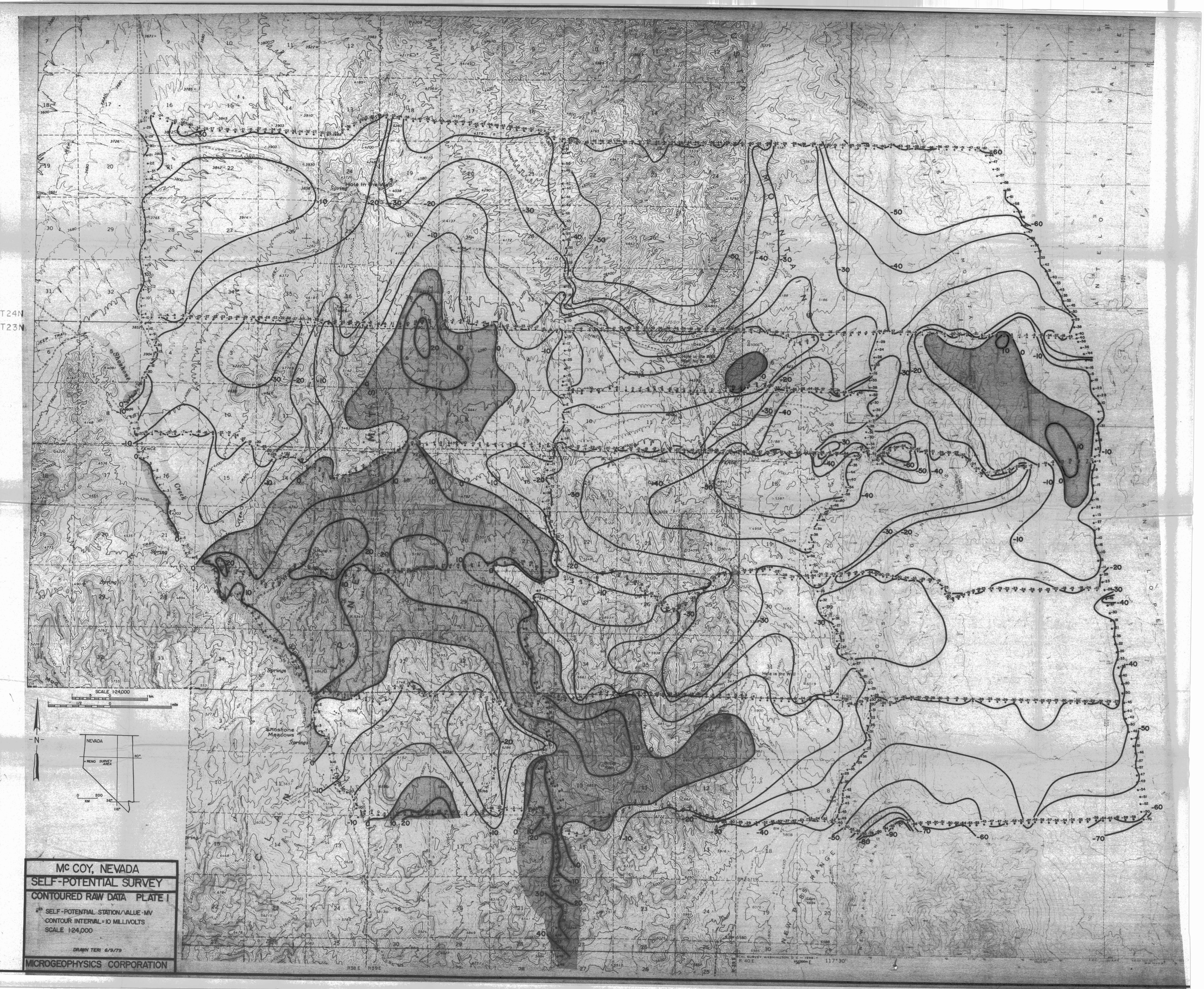
1. East of McCoy mine striking NW (Magnitude of anomaly may be purturbed by mineralization).

2. South-central survey area, approximately 5 km east of McCoy Peak striking NE.

3. Northwest survey area striking N-NE.

4. Southwest survey area striking N-NW.

Generally the survey area as a whole gets more negative to the north and southeast. The central and southwestern portions of the survey area are relatively high except in the vicinity of McCoy mine due to mineralization or geothermal phenomenon.


Mc COY, NEVADA
SELF-POTENTIAL SURVEY
CONTOURED RAW DATA PLATE I
-23 SELF-POTENTIAL STATION/VALUE-MV
CONTOUR INTERVAL=10 MILLIVOLTS
SCALE 1:24,000
DRAWN TERI 6/9/79
MICROGEOPHYSICS CORPORATION
T24N
T23N
NEVADA
RENO
SURVEY AREA
Shoshone Meadows
Hole in the Wall
Spring
Springs
R 38 E
R 39 E
R 40 E
117°30'
-60
-70
-50
-40
-30
-20
-10
0
10
20
30
40


T24N
T23N
Hole in the Wall
Spring
Shoshone Meadows
SCALE 1:24,000
km.
mile
N
NEVADA
RENO
SURVEY AREA
40°
36°
116°
KM
Mc COY, NEVADA
SELF-POTENTIAL SURVEY
CONTOURED FILTERED DATA-PLATE 2
SELF-POTENTIAL STATION/VALUE-MV
CONTOUR INTERVAL=10 MILLIVOLTS
SCALE 1:24,000
MICROGEOPHYSICS CORPORATION

Mc COY, NEVADA
SELF-POTENTIAL SURVEY
PROFILED RAW DATA PLATE 3
• SELF-POTENTIAL STATION
SCALE 1:24,000
DRAWN BY TERI 6/12/79
MICROGEOPHYSICS CORPORATION
SCALE 1:24,000
N
NEVADA
RENO
SURVEY AREA
T24N
T23N
MV
00
-50
-100
Hole in the Wall
Spring
Shoshone Meadows
Springs
JEEP TRAIL
FENCE
Creek
ANTELOPE
MOUNTAINS
NEW PASS RANGE
R 40 E
117°30'


MV
00
-50
-100
Hole in the Wall
Shoshone Meadows
Springs
Shoshone
Creek
FENCE
JEEP TRAIL
ANTELOPE VALLEY
MOUNTAINS
NEW PASS RANGE
SCALE 1:24,000
NEVADA
RENO
SURVEY AREA
KM
R 38 E
R 39 E
R 40 E
117°30'
McCOY, NEVADA
SELF-POTENTIAL SURVEY
PROFILED FILTERED DATA · PLATE 4
• SELF-POTENTIAL STATION
SCALE 1:24,000
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