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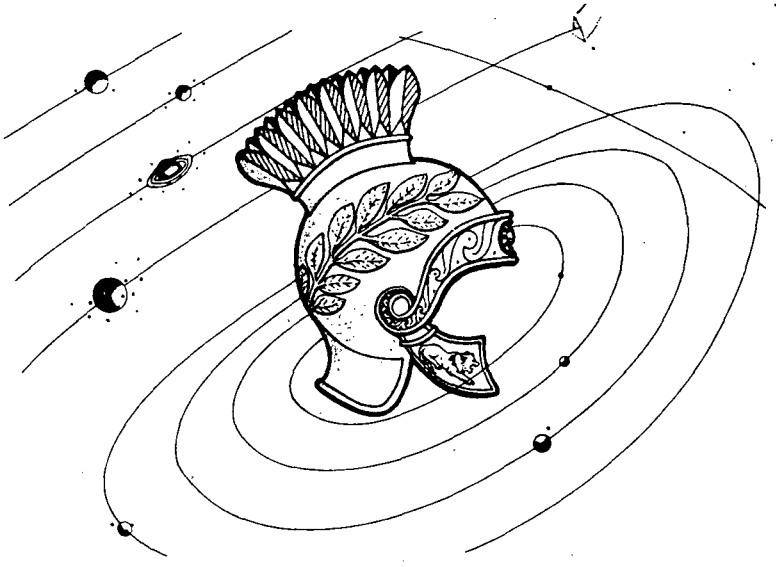

SELF POTENTIAL SURVEY, SAN EMIDIO, NEVADA

for

STANDARD OIL OF CALIFORNIA

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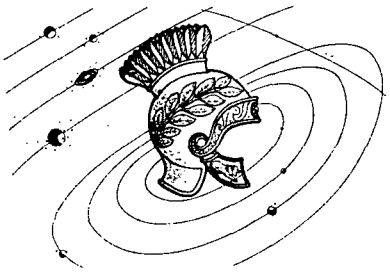
SENTURION SCIENCES, INC.
TULSA, U.S.A.



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SELF POTENTIAL SURVEY, SAN EMIDIO, NEVADA
STANDARD OIL OF CALIFORNIA

INTRODUCTION

A spontaneous potential survey was conducted for Standard Oil of California at a geothermal prospect in Nevada. The site was in the San Emidio Valley (T29N, R23E), Washoe County. A total of 126 measurements were made from May 13-20, 1974.

INSTRUMENTATION AND FIELD PROCEDURE

The S-P measurements were made with a Kiethley 155 Microvoltmeter with 10 megaohms input impedence. The potential difference between points 1000ft. apart was measured continuously for each traverse. Electrode preparation was difficult in some parts of the valley, particularly in the dry sand and gravel alluvial fans. The first readings were made on the isolated southern traverse shown on the map. This traverse was discontinued because of the poor repeatability of the readings in the dry alluvials. On the valley floor the soil was damp at depths from 2-3 inches to 1-2 feet and electrodes could be planted which gave consistent and highly repeatable readings. At each of the stations shown on the map, 2 seperate readings were made using different electrode plants as a continuous check on the validity of the measurements.

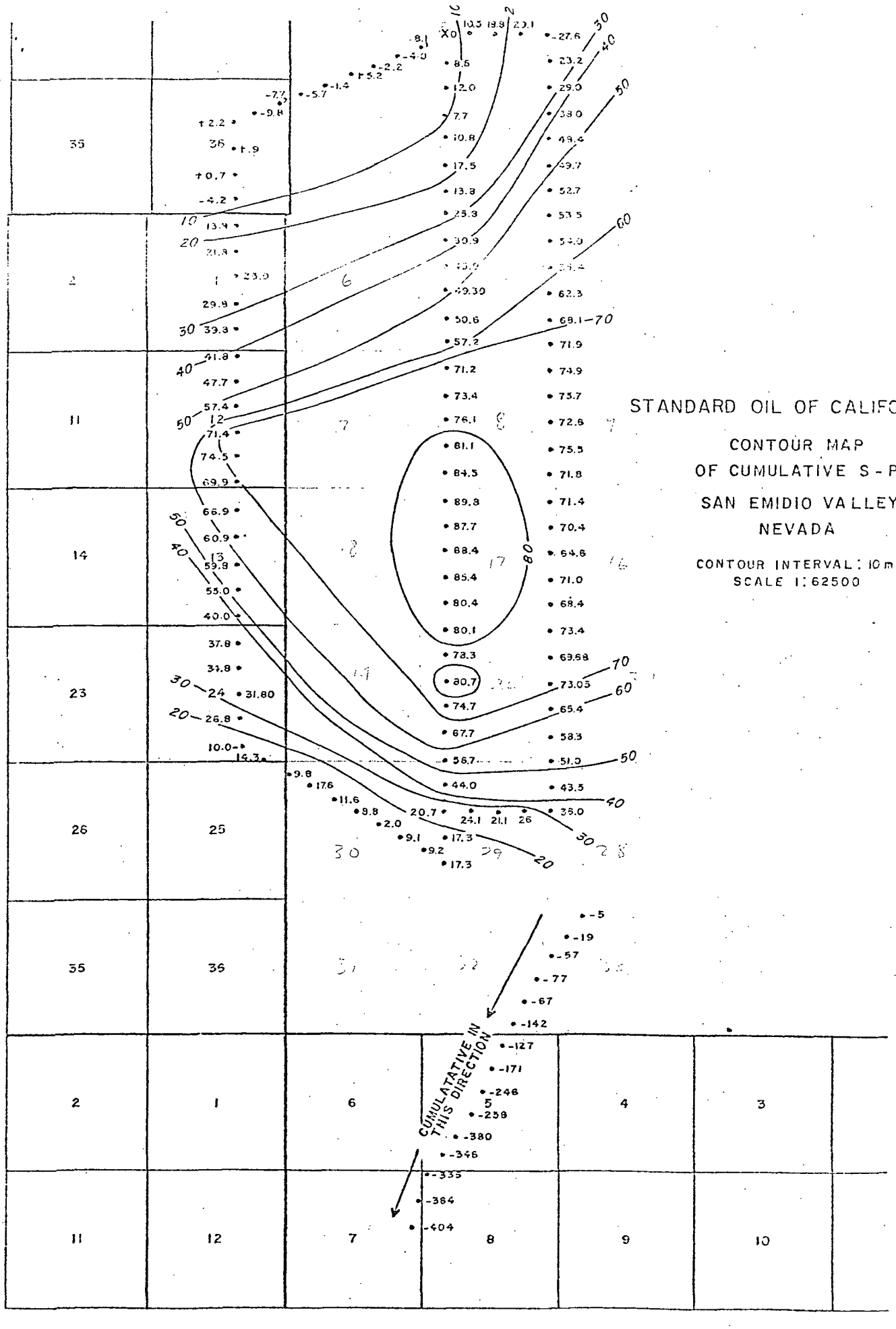
DATA PRESENTATION

The station locations are shown on the map. The number written beside each station is not the reading of the S-P at each station but the cumulative voltage along each traverse relative to an arbitrary point (a benchmark at the north end of the center traverse). Each individual S-P reading is actually a measurement of the gradient of the electric field in the direction of the line of traverse, times the line length. The sum of these measurements, relative to the arbitrary origin is contoured at levels of equal potential. The sign of the readings was kept consistent by connecting the north end of the dipole to the negative terminal of the instrument and the south end to the positive terminal. The cumulative curves of the S-P data along each of the north south traverses are shown as profiles. It should be noted that the eastern and western lines are cumulative relative to their starting points and not relative to the benchmark to the north which is the arbitrary origin of the contoured data map. As can be seen from the profile curves a typical S-P reading in the valley varied from + 0.1 to + 15 mV. The cumulative effect of these measurements was a well defined high on each of the profiles. Around the closed traverses the cumulative voltage was very small, being 8mV for the western loop and 3.4mV for the eastern loop. These small errors in the cumulative voltage are on indirect indication of the general reliability of the measurements, for they come close to satisfying the basic physical law that the sum of the voltages around any closed

path in an electric field be zero.

DISCUSSION

The well defined high on the north south traverses and the closure on the contour map are in the general vicinity of the springs that reach the surface in the valley. It is possible that the hydrologic regime responsible for the springs gives rise to the S-P anomaly. Differential oxidation or cation exchange by trace minerals such as zeolites might give rise to electro-chemical gradients large enough to be measured at the surface. The magnitude of the anomaly is not large compared to those measured over sulphide bodies (normally 500 → 1000mV) or compared to the anomaly measured by the U.S.G.S. at Long Valley Caldera (Anderson, L.A., and Johnson, G.R., Self Potential Survey of Long Valley Caldera, U.S.G.S. open file report, Menlo Park, 1974). The well defined and consistent gradients and closure and their proximity to the springs are important in terms of the application of S-P measurements to geothermal exploration. If there is any correlation between the S-P anomaly and the results of any other geophysics in the area the interpretation of the S-P data could be put on firmer ground. It is possible that the S-P data is an indication of the hydrology or chemistry of geothermal systems but the value of S-P surveys is difficult to evaluate because virtually none have been run over known geothermal areas. Comparison should be made of this S-P data with the results of heat flow, resistivity, and passive seismics. Without such a comparison the value of the S-P data alone cannot be determined.



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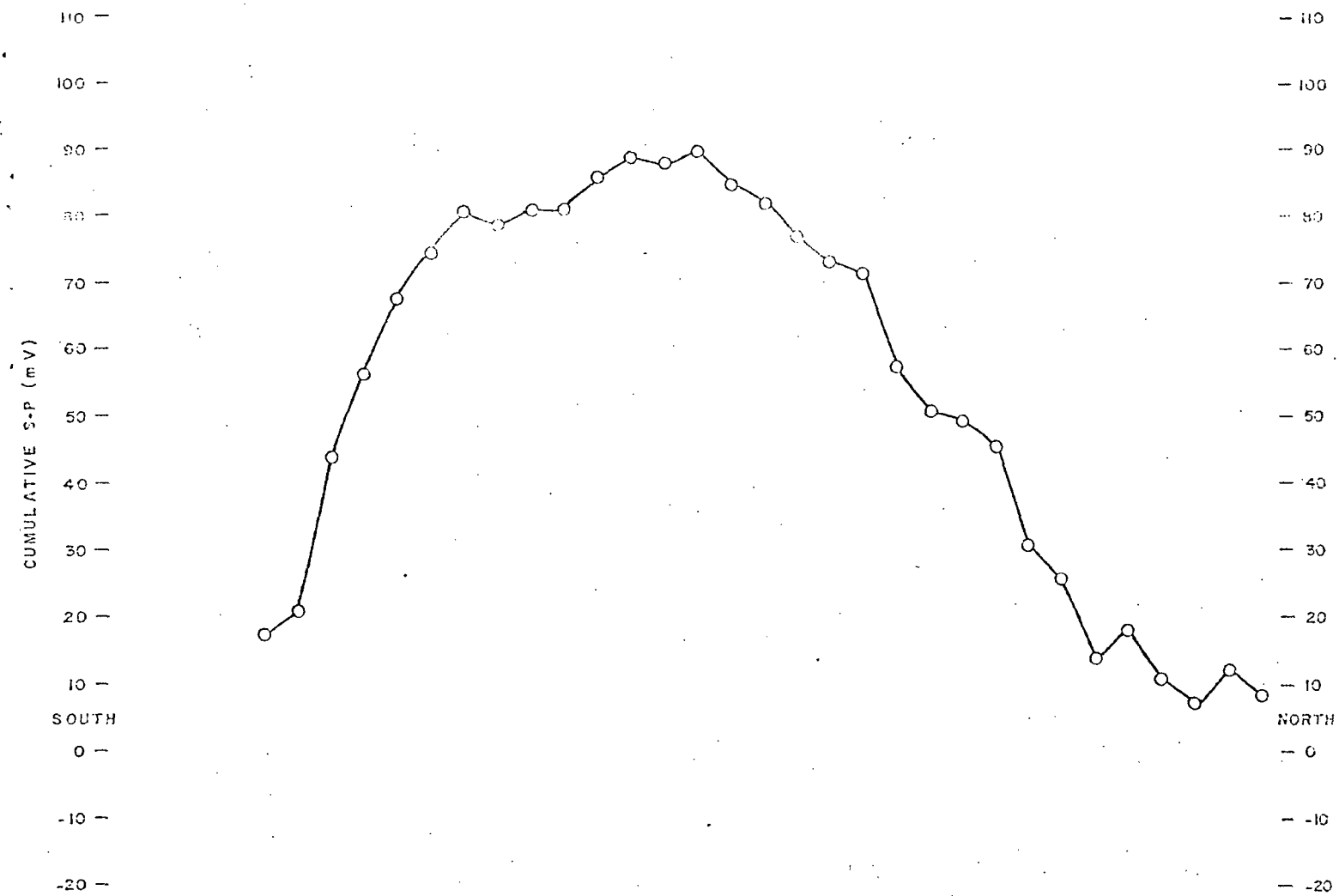

STANDARD OIL OF CALIFORNIA

PROFILE OF CUMULATIVE S-P

NORTH TO SOUTH ALONG CENTER TRAVERSE

SAN EMIDIO VALLEY, NEVADA

HORIZONTAL SCALE

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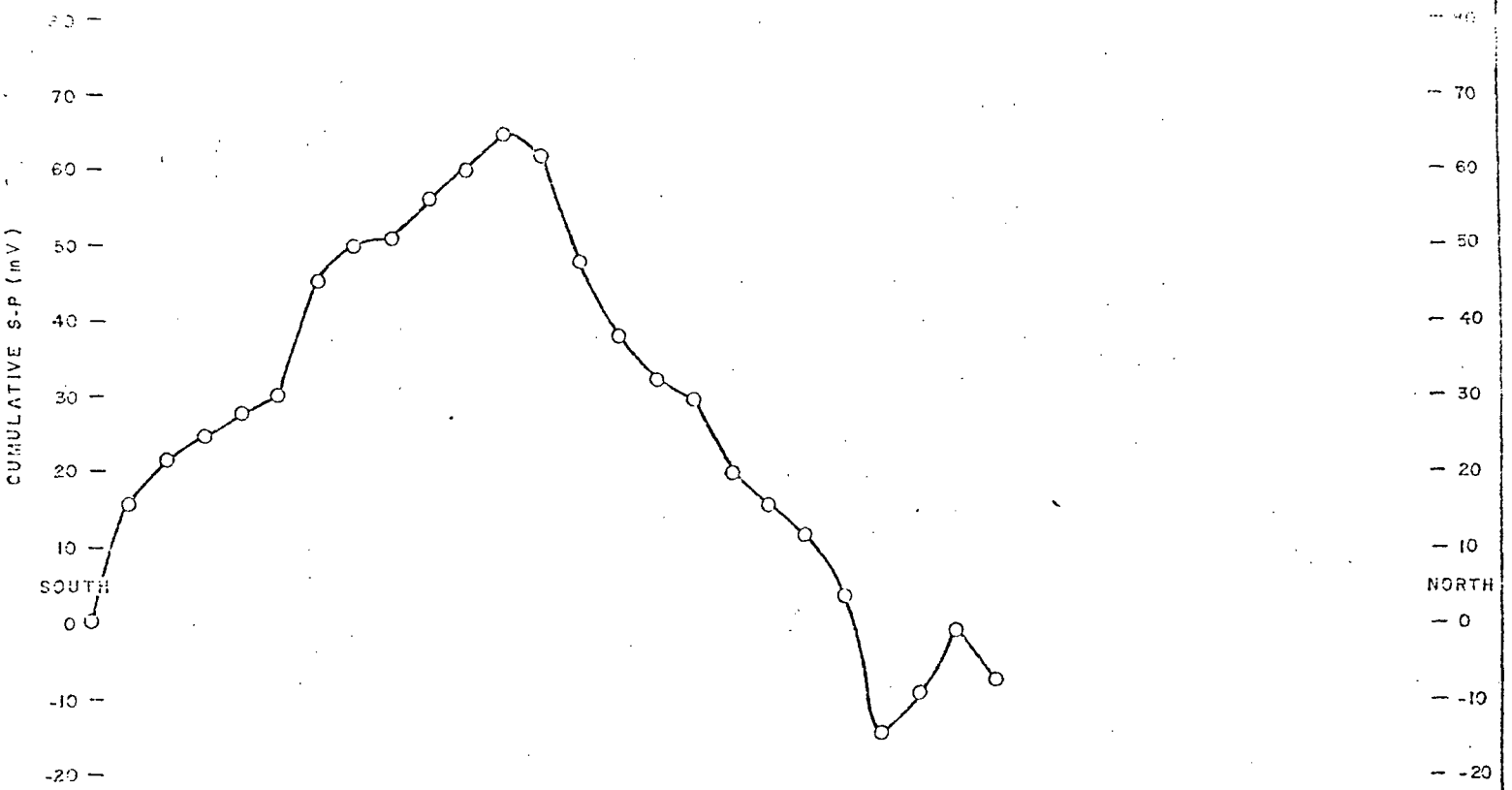


STANDARD OIL OF CALIFORNIA

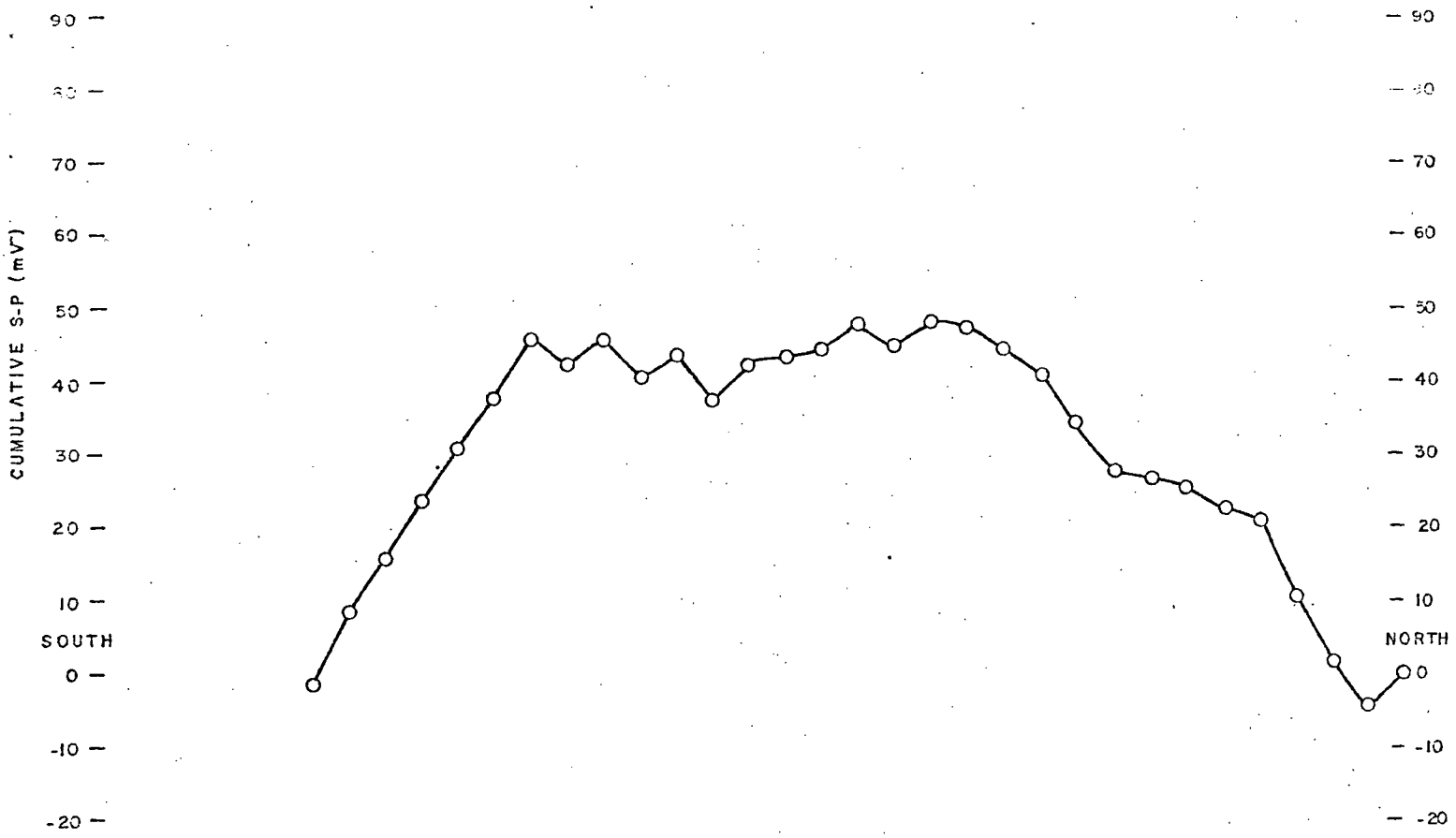
PROFILE OF CUMULATIVE S-P
SOUTH TO NORTH ALONG WESTERN TRAVERSE
SAN EMIDIO VALLEY, NEVADA

HORIZONTAL SCALE

0 1 2

MILES

SENTURION SCIENCES, INC.



STANDARD OIL OF CALIFORNIA

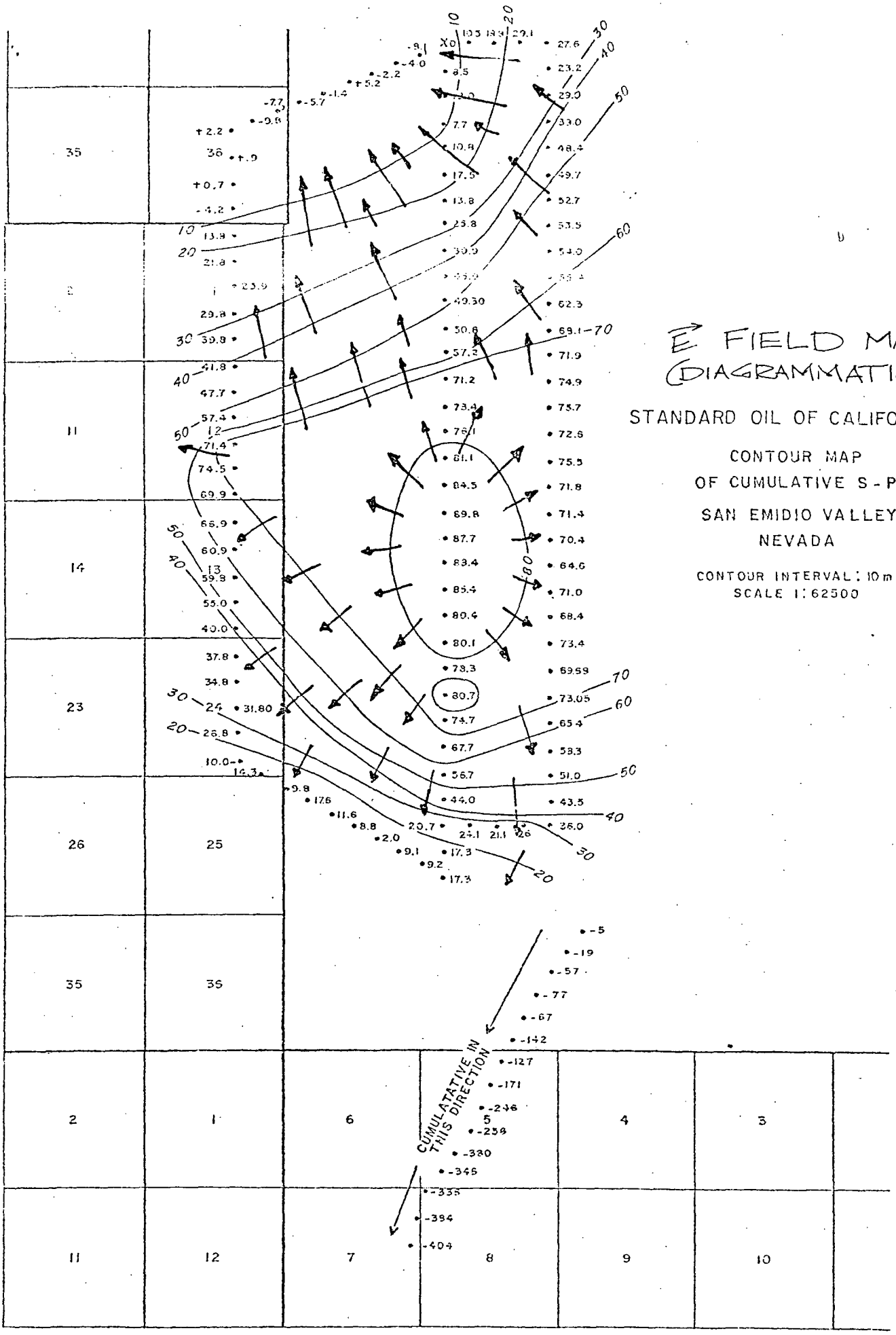
PROFILE OF CUMULATIVE S-P
NORTH TO SOUTH ALONG EASTERN TRAVERSE
SAN EMIDIO VALLEY, NEVADA

HORIZONTAL SCALE

0 1 2

MILES

SENTURION SCIENCES, INC.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CUMULATIVE IN THIS DIRECTION
E FIELD MAP (DIAGRAMMATIC)
STANDARD OIL OF CALIFORNIA
CONTOUR MAP
OF CUMULATIVE S-P
SAN EMIDIO VALLEY
NEVADA
CONTOUR INTERVAL: 10 mV
SCALE 1:62500
SENTURION SCIENCES, INC.