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REPORT ON

PROPRIETARY

INTERPRETATION OF AEROMAGNETIC
DATA IN
WEST-CENTRAL NEVADA
(PROJECT NO. 1)

2-69

FOR

OCCIDENTAL MINERALS CORPORATION

BY

HUNTEC LIMITED
TORONTO, ONTARIO
FEBRUARY, 1969

ABSTRACT

Aeromagnetic data from a survey flown at 9,000 feet A.S.L. above west-central Nevada was interpreted. The main objective of the analysis was to establish whether or not there exists some relationship between locations of known copper mineralization and features in the aeromagnetic data.

The computed energy spectrum of the data indicates that the principal contributions to the data were effects from two levels of magnetized sources;

a) Near-surface (ground level) sources: average depth 6,000 feet A.S.L.

b) Regional sources: average depth 500 feet A.S.L.

A matched filter was designed to separate these two sets of effects and present them on a Regional Magnetic Component Map and a Residual Magnetic Component Map. A very definite structural pattern is evident in the Downward Continued Regional Component Map. The interpreted structure consists of a series of parallel northeast-southwest trending faults spaced at intervals of 4 miles. The faults appear to be left-lateral. Nine of the eleven noted locations of copper mineralization lie close to or on these faults. It is recommended that more detailed evaluation of this structural pattern be made by interpretation of low level aeromagnetic data in the Yerington area and in the Walker River Indian Reservation.

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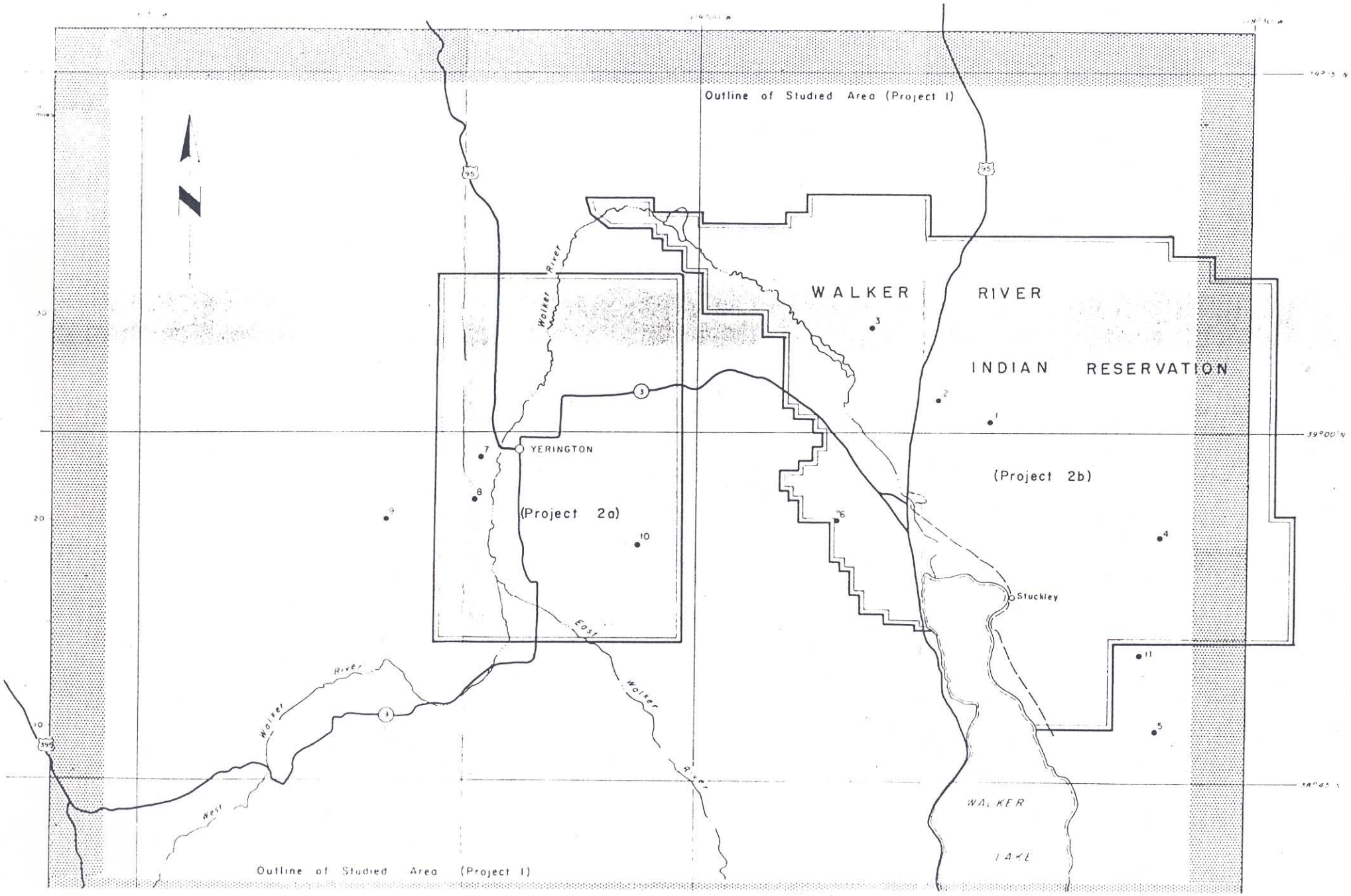
LIST OF MAPS AND FIGURES

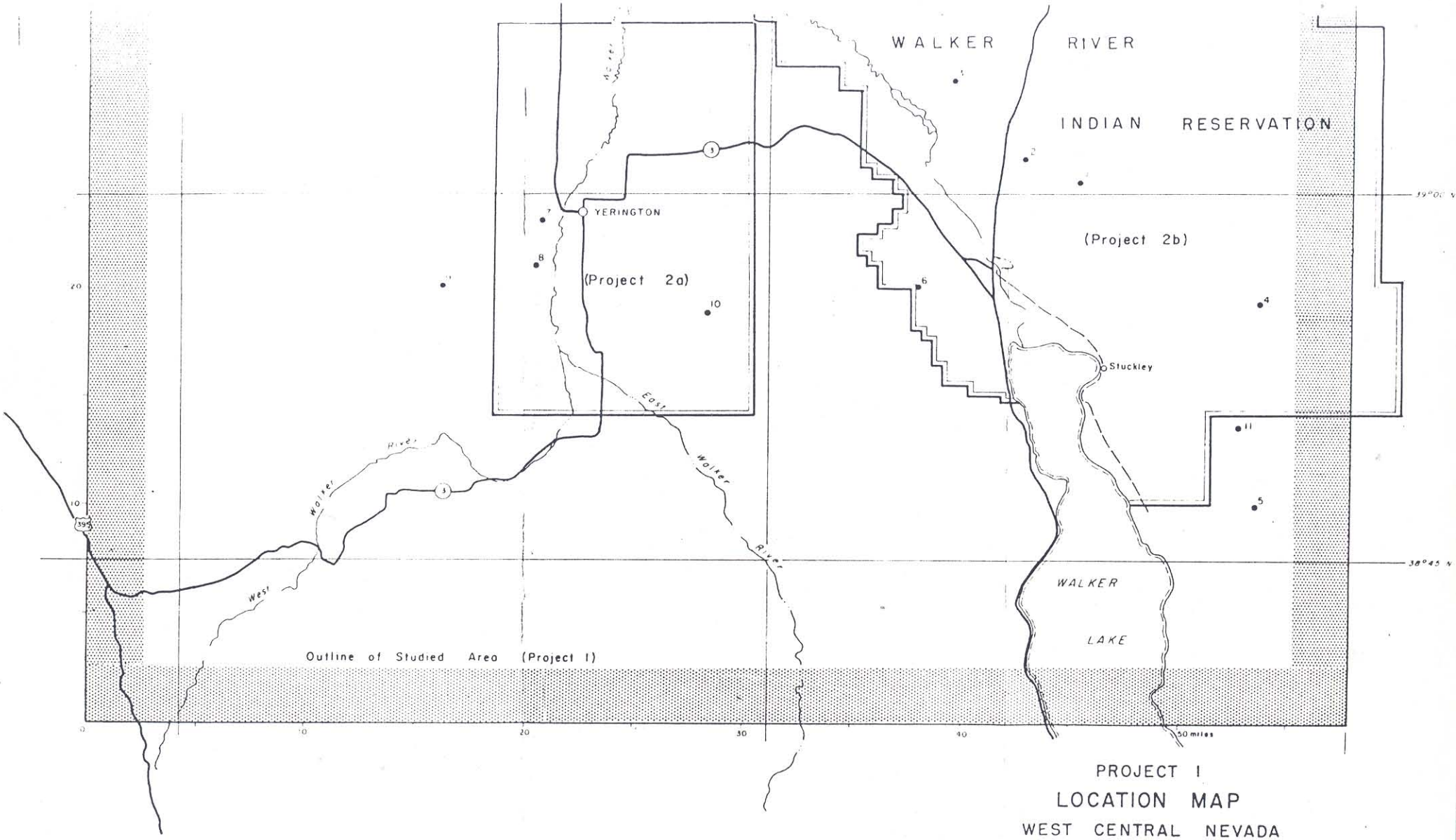
1. INTRODUCTION

1.1 THE AEROMAGNETIC DATA

A U.S.G.S. aeromagnetic survey was done in west-central Nevada, adjacent to and east of the Sierra Nevada, by Lockwood, Kessler and Bartlett, Incorporated in 1967. The survey flight pattern consisted of east-west flight lines spaced at intervals of approximately one mile. The survey was flown at a constant barometric altitude of 9,000 feet A.S.L. The magnetometer data is presented in contour map sheets at a scale of 1 inch equals 1 mile. The minimum contour interval in these maps is 20 γ.

The area of study comprises a compilation of sheets 18, 19, 20, 25, 26 and 27 of the above aeromagnetic survey. The area is centred at 119°W, 39'N. Figure 1 shows the outline of the area of study which is 44 miles north-south and 60 miles east-west. Most of the Walker River Indian Reservation is included in the area, as well as the town of Yerington. Ground elevations in the area vary from 6,100 feet A.S.L. to 6,500 feet A.S.L. in the Cocoon Mountains, Terrill Mountains and Desert Mountains to 4,000 feet A.S.L. in the vicinity of Walker Lake. The Yerington area is at an elevation of about 5,000 feet A.S.L. The terrain clearance of the survey aircraft in the area of study is therefore in the range 2,500 to 5,000 feet.


Outline of Studied Area (Project 1)
WALKER RIVER
INDIAN RESERVATION
(Project 2b)
(Project 2a)
YERINGTON
Stuckley
Walker River
East Walker River
West Walker River
WALKER LAKE
39°00'N
Outline of Studied Area (Project 1)



PROJECT I
LOCATION MAP
WEST CENTRAL NEVADA

SCALE

HUNTER LIMITED JANUARY, 1969

FIG. I

1.2 LOCATION OF COPPER MINERALIZATION

Copper mineralization has been observed at a number of localities in west-central Nevada;

1.	Calico	118°45.3'W	39°00.4'N
2.	West Calico	118°46.8'W	39°01.4'N
3.	Afterthought	118°49.5'W	39°04.6'N
4.	Hottentot	118°35.1W	38°56.0'N
5.	Wild Horse Canyon	118°34.6'W	38°47.0'N
6.	Black Mountain	118°52.5'W	38°56,3'N
7.	Yerington	119°11.9'W	38°59.0'N
8.	Mason	119°12.3'W	38°57.2'N
9.	Casting Copper	119°16.5'W	38°56.3'N
10.	Lyon	119°02.7'W	38°55.3'N
11.	Copper Hill	118°35.6'W	38°50.2'N

The positions of the above localities is only approximate. The locations are based on information provided on a 1 inch equals 1 mile composite geological map (c/o B.W. Adams, Jan. 27th, 1969). According to Knopf (1918), the oldest exposed rocks in the area are of Triassic age and consist of andesites, soda rhyolite-felsites and limestones with subordinate quartzite shale and gypsum.. These rocks have an aggregate thickness of 8,000 feet, of which 3,200 feet are volcanic rocks. Triassic rocks were intruded by Cretaceous granodiorite. The intrusion was associated with metamorphism of the older rocks to

garnet, wollastonite and allied sillicates. After metamorphism quartz-monzonite dikes and stocks were injected and subsequently faulting took place. Porphyry coppers are closely associated with the quartz monzonite stocks.

Up to 7,000 feet of Tertiary volcanic rocks rest unconformably on Mesozoic rocks. The upper middle and lower members of the Tertiary sequences are basalt - andesite flows - rhyolite.

Ore bodies (Knopf, 1918) are contact-metamorphic replacements of Triassic limestones and the localization of these ore bodies is related to faulting. Principal ore consists of pyrite and chalcopyrite; in bodies up to a few thousand feet long, and 100's of feet wide. Examples of this type of mineralization are Yerington (7), Mason (8) and Casting Copper (9). According to Bateman (1950) major tectonic breaks or faults served as lines of weakness into which the monzonite porphyry plugs or stocks were intruded in Cretaceous or early Tertiary time.

Mineralization in the Calico area of the Walker River Indian Reservation is discussed by Lawrence and Redmond (1967). The Calico area lies within the Walker Lane fault zone. The mineralized area is overlain by Tertiary volcanic tuffs which are at least 1,300 feet thick, and which have been intruded by later andesite, basalt and rhyolitic dykes and plugs. The andesite has an equivalent of 1/2% magnetite. Basement rocks are quartz-monzonite and diorite which intrude Mesozoic sediments; sandstone, siltstone and carbonates. Mineralization

occurs in the skarn zone at the contact between granitic and sedimentary rocks, and consists of a large magnetite-pyrrhotite deposits, 2,000 feet thick, 1 mile long and 600 feet wide.

There are two sets of faults in the Calico area;

1) a northwest extension of the Walker Lane fault zone, which strikes northwest and involves right-lateral movement of up to 10 miles. Ore deposits do not appear to have been affected by movement along these faults.

2) north-east trending faults cutting northwest structures, down-faulted to southeast.

An aeromagnetic survey flown at 500 feet terrain clearance outlined a 1,500 γ anomaly over the Calico mineralization. Copper mineralization at the flank of this anomaly is suggested by drilling. Drilling has cut zones averaging 30 to 50% iron over intervals of 500 to 600 feet.

Mineralization and exploration at the Hottentot prospect is discussed by Lawrence and Wilson (1965). The Hottentot prospect is 10 miles southeast of the Calico area in the Walker River Indian Reservation. As in the Calico area two systems of faults are present;

1) Post-Miocene, <u>northwest</u> trending strike dip faults, which have had right-lateral movement of up to 2,000 feet.

2) Mesozoic to recent, <u>northeast</u> trending faults which cut (1).

Lawrence and Wilson suggest that Mesozoic granitic intrusions

may have been "controlled" by the faulting.

Ground magnetometer surveying in the Hottentot area showed 3,000 to 4,000 γ anomalies. Drilling penetrated 32 feet of massive magnetite, at a depth of 713 feet, after penetrating 706 feet of Tertiary volcanic tuff. Copper mineralization appeared to be at the flank of the magnetic anomaly.

1.3 OBJECTIVES OF THIS PROJECT

This report describes the methods used and the results obtained in a program involving the interpretation of the aeromagnetic data. The main objectives of the program are as follows:

1) Separate the magnetic effects which are associated with
   a) magnetization close to ground level, e.g., in the vicinity of Tertiary volcanics, topographic effects, etc. (Near-Surface Component).
   b) magnetization at relatively great depth (Regional Component).
2) Relate the locations of known mineralization to features in the Regional and Near-Surface magnetic component maps.
3) To outline locations of potential mineral deposits.
4) Depending upon the results of this program, to recommend whether or not the analysis of low level, more detailed survey data (Projects 2a Yerington and 2b Walker River, see Proposal of January 6th, 1969) is necessary to increase the

resolution of the location of potential mineral deposits.

2. PROCESSING OF AEROMAGNETIC DATA

2.1 DIGITIZATION

Optimum sampling of aeromagnetic maps is accomplished by digitization on a square grid where the grid interval is no larger than half the flight line spacing.

The aeromagnetic maps were digitized on a square grid at intervals of one-half the survey line spacing; 0.5 miles. This involves interpolation of the total magnetic field intensity at 10,769 grid points. The data was digitized in units of 10 γ, using a magnetic field datum of 2,000 γ. The digitization was verified by visual inspection.

2.2 REGRESSION PLANE

In order to determine the geomagnetic gradient in the data, a tilted plane was fitted to the data using the method of least squares. The equation of this plane is

$$To(x,y) = C_1 + C_2x + C_3y$$

where x,y are distances in miles in the north and east directions, respectively. The origin for the x-y axes is at the extreme southwest corner of the survey area (see Figure 1). The computed values of the coefficients are as follows:

$$C_1 = 2350.24 \text{ gammas}$$

C_2 = 11.18 gammas/mile.

C_3 = 5.12 gammas/mile.

The tilted plane was then subtracted from the data thereby removing the variation in the intensity of the main earth's magnetic field across the survey area.

2.3 LOGARITHMIC ENERGY SPECTRUM

Figure 2 shows the computed logarithmic energy spectrum of the data. The spectrum shows the frequency (or wavelength) components in the data. The frequency axis is in the units of cycles per mile. The most conspicuous feature in the spectrum curve is the rapid drop-off of the amplitude of the spectrum at low frequencies, compared to the behaviour of the spectrum at higher frequencies. The steep slope of the curve at low frequencies (i.e. long wavelengths) identifies the contribution from the anomalies due to deeply buried magnetization. The estimated average depth to these "regional" sources is 1.6 miles or 8,500 feet. At higher frequencies the gentler slope of the spectral curve is associated with the sharp anomalies or relatively near-surface magnetic sources. The estimated average depth of these sources is 3,000 feet; the same order of magnitude as the average terrain clearance of the survey aircraft (9,000 feet A.S.L. flight altitude/6,000 feet A.S.L. ground level).

Besides this depth information, the excellent resolution of deep-seated and shallow effects in the spectrum provides the basis for

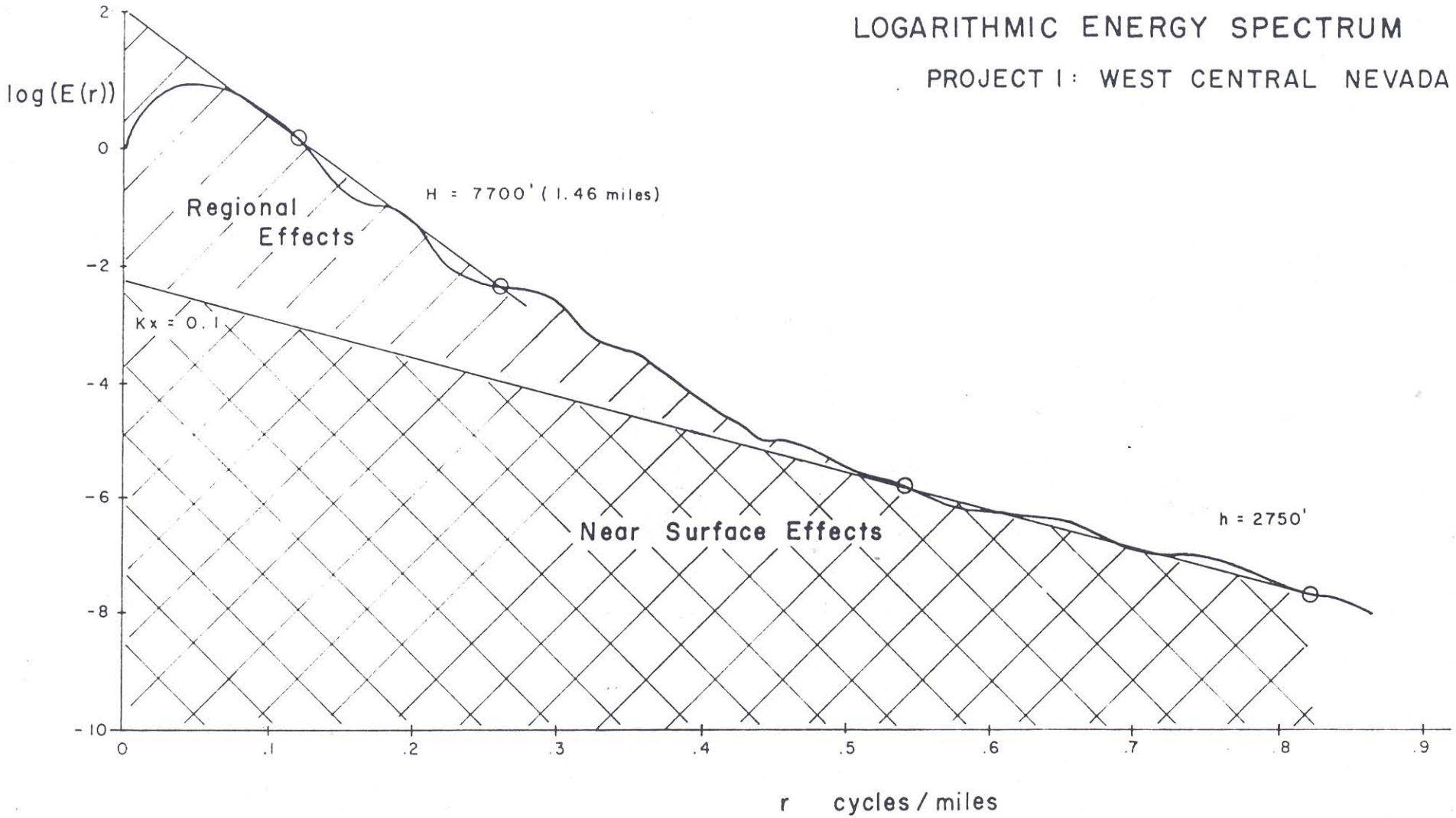

LOGARITHMIC ENERGY SPECTRUM
PROJECT I: WEST CENTRAL NEVADA
log(E(r))
2
0
-2
-4
-6
-8
-10
Regional Effects
H = 7700' (1.46 miles)
Kx = 0.1
Near Surface Effects
h = 2750'
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
r cycles / miles

FIG. 2

the design of a matched filter whereby the data can be analyzed into "regional" and local or "near-surface" components. The theory and mathematical development for the matched filter operation is described in detail by Spector (1968).

2.4 REGIONAL MAGNETIC COMPONENT MAP

A filter was designed from the analysis of the energy spectrum. Key parameters for this design are as follows;

1) Difference in average depths between near-surface and regional magnetic sources; H-h = 1.0 miles.

2) Ratio of spectral power (see Figure 2); $K_x = 0.2$.

3) Maximum frequency band-width of regional component; $r_o = 0.5$ cpm.

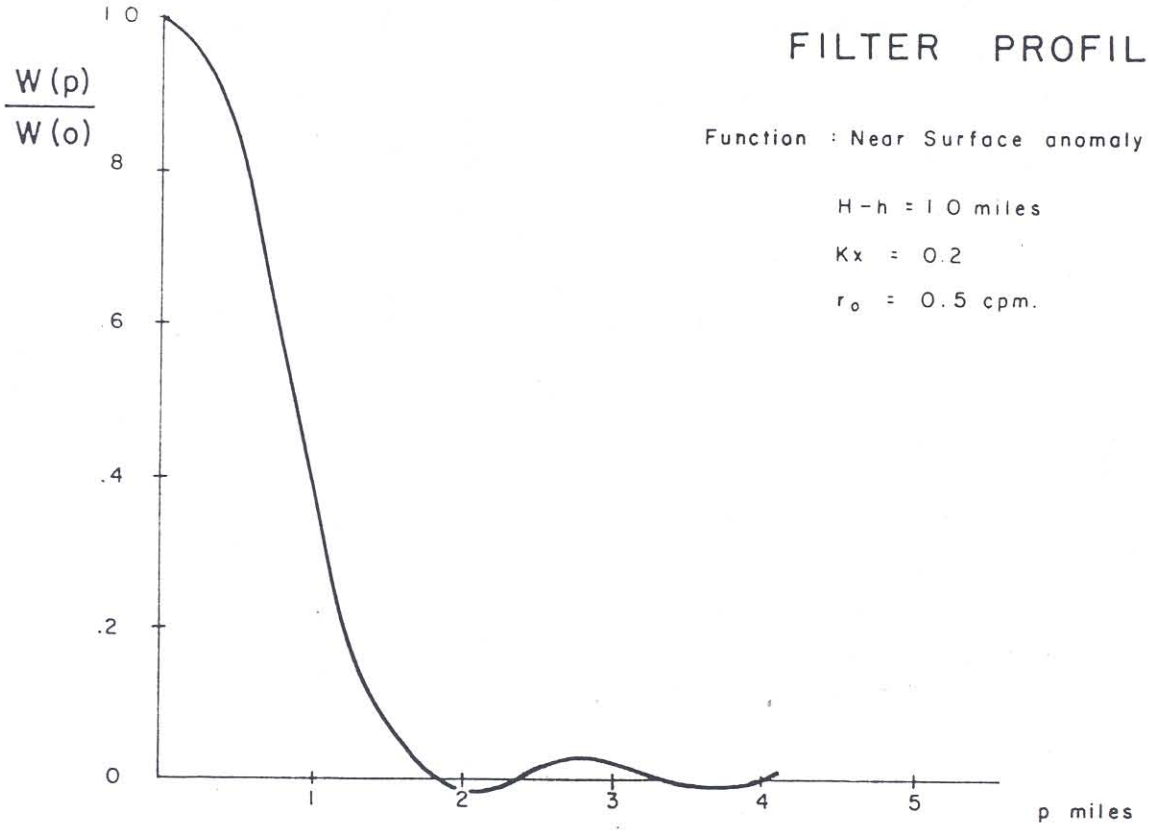
The filter is computed with the aid of the following formula;

$$W(\rho) = \frac{1}{2\pi} \int_{o}^{r_o} \frac{r\, Jo\,(\rho r)\, dr}{1 + K_x . r\; e(H-h)r}$$

where J_o is the zero order Bessel function and radial distance,

i.e. $\rho = \sqrt{x^2 + y^2}$ (miles)

Figure 3a shows a profile of the normalized filter. It is seen that the effective width of the filter is about 1.5 miles. This is the width of the


FILTER PROFILE 3a
Function : Near Surface anomaly filtering
H − h = 1.0 miles
Kx = 0.2
r_o = 0.5 cpm.
W(p) / W(o)
1.0
.8
.6
.4
.2
0
1
2
3
4
5
p miles

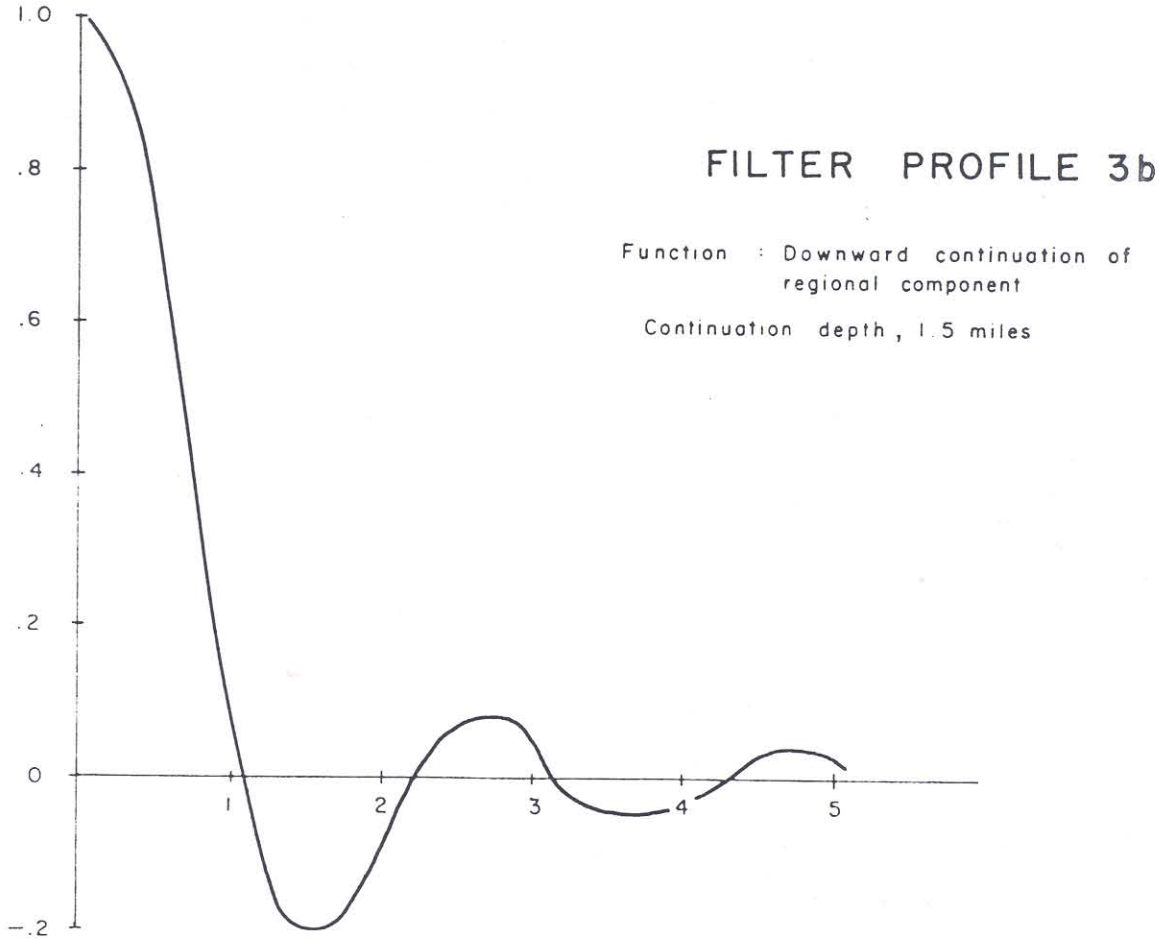

FILTER PROFILE 3b
Function : Downward continuation of regional component
Continuation depth, 1.5 miles
1.0
.8
.6
.4
.2
0
−.2
1
2
3
4
5

FIG. 3

zone adjacent to the survey map borders that filtering cannot be fully effected.

Figure 4 shows the Regional Magnetic Component Map. The main features of this map are as follows;

1) The northern part of the map is dominated by a broad northwest-southeast trending magnetic high which has an amplitude of about 100 γ. The anomaly is flanked along its southwestern edge by a broad 150 γ magnetic low.

2) In the vicinity of Calico (1 and 2) the magnetic high becomes discontinuous and is broken southeast of Calico.

3) The Calico area is associated with a 200 γ anomaly.

4) The south-central part of the map is characterized by a pattern of magnetic highs and lows. The amplitude of these features range from 60 to 130 γ. There does not seem to be a consistent trend to these features.

5) The south-western edge of the map involves a 330 γ anomaly which trends northwest. This anomaly may be due in part to topographic effects because in this area, i.e., the Sierra Nevada, the survey involved terrain clearances of less than 1,000 feet.

6) The relationship of known copper mineralization and aeromagnetic features is as follows;

   a) Calico; on flank of 200 γ anomaly.

b) West Calico; on flank of 200 γ anomaly.

c) Afterthought; on flank of 100 γ anomaly.

d) Hottentot; on flank of 120 γ anomaly.

e) Wild Horse Canyon; on flank of 90 γ anomaly.

f) Black Mountain; on flank of 60 γ anomaly.

g) Casting Copper; on flank of 70 γ anomaly.

h) Lyon; near peak of circular 130 γ anomaly.

i) Copper Hill; on flank of low amplitude (30γ) magnetic high.

Yerington (7) is located in a broad magnetic low.

2.5 DOWNWARD CONTINUED REGIONAL MAP

In order to increase the resolution of regional magnetic anomalies, the Regional Magnetic Component Map was downward continued. A profile of the filter operator for matched filtering and downward continuation is shown in Figure 3b. The width of the filter is about 3 miles.

Figure 5 shows the Downward Continued Regional Component. It is apparent that downward continuation has provided a greatly increased resolution of regional anomalies. A very definite structural pattern is evident in the downward continued map. The pattern is characterized by offsets of anomalies and significant changes in magnetic relief over short distances.

Figure 6 shows the interpreted structural pattern derived from an analysis of Figure 5. A series of northwest trending

faults are interpreted. The faults are surprisingly parallel. The faults are spaced at intervals of from 2 to 6 miles. The faults are flanked by relatively large magnetic anomalies. Zones associated with these anomalies are outlined in Figure 6. These zones may be areas of magnetite enrichment and may therefore be associated with the intrusion of quartz-monzonite stocks and dykes.

At some locations it is possible to estimate the direction of movement along the faults, viz., from the offset of anomalies that appear to have been affected by faulting. In the main the faulting appears to be left-lateral with large strike slip movement in the order of 1 to 3 miles.

Nine of the eleven noted locations of copper mineralization lie close to or on these fault lines.

2.6 NEAR-SURFACE MAGNETIC COMPONENT MAP

Magnetic effects of near-surface magnetization are presented in Figure 7. These effects were determined by subtracting the Regional magnetic component from the original data. The following features are evident in Figure 7;

1) The west part of the map is characterized by a series of intense, short wavelength anomalies. The amplitudes of these anomalies range from 80 to 250 γ . The anomalies are probably due to the topographic effects of the Pine Nut mountains which have elevations of 8,500 to 8,800 feet

A.S.L. Because the aeromagnetic survey elevation was 9,000 feet, the terrain clearance in the vicinity of these mountains could have been as little as 200 to 500 feet, as compared to 3,000 to 4,000 feet in the eastern half of the survey.

2) At Calico and Lyon strong anomalies are found; a 110 γ anomaly trending northwest-southeast at Calico, an 85 γ anomaly at Lyon, which appears to have been offset by a north-east trending fault.

3) For the most part anomalies in the Near-surface map have very small amplitudes i.e., less than 50 γ. This indicates the near-surface magnetization is quite weak relative to magnetization at depth (pre-Cenozoic rocks).

3. CONCLUSIONS AND RECOMMENDATIONS

1. The magnetic effects of regional and near-surface magnetic sources are apparent in an aeromagnetic compilation derived from a survey flown at 9,000 feet A.S.L. above west-central Nevada. Resolution of these two components was possible in the computed energy spectrum of the aeromagnetic data. The average depths to these two systems of sources are as follows:

   a) Near-surface sources - 6,000 feet A.S.L.

   b) Regional sources - 500 feet A.S.L.

2. Regional and near-surface effects were separated by means of spectral analysis and matched filtering. Particularly in the Regional Component Map, localities of known copper mineralization appear to be related to aeromagnetic anomalies. In the Regional Component Map the copper areas are almost always located on the flanks of magnetic anomalies. The only exceptions to this are Yerington (7) and Mason (8).
   In the Residual Component Map only the Calico and Lyon localities are associated with significant magnetic anomalies. This lack of correspondence corroborates the fact the copper mineralization occurs at depth, i.e., below the thick Tertiary and Quaternary volcanic rocks which are exposed at ground level.

In the Calico locality strong Regional and Near-Surface anomalies are evidenced. This indicates that magnetic effects at Calico are due to both shallow and deep magnetization.

3. Downward Continuation of the Regional Component was done in order to resolve structure at depth. A structural pattern was interpreted from the downward continued field map. It consists of a series of parallel northeast trending faults which are spaced at intervals of approximately 4 miles. Almost all zones of known copper mineralization lie at these faults or are in close proximity to them.

A number of significant magnetic anomalies is indicated in the downward contoured map and these anomalies are flanked or terminated by the northeast trending faults. These anomalies indicate possible zones of magnetite enrichment. At areas which have been drilled, e.g., Calico and Hottentot, magnetite enrichment is associated with porphyry coppers. The copper mineralization occurs at the flanks of the magnetic anomalies (Figure 6). Exploration in areas along the flanks magnetic anomalies is therefore recommended.

This fault pattern was observed by Lawrence and Wilson (1966) in the Hottentot area and by Lawrence and Redmond (1967) in the Calico area. According to Lawrence and Wilson these faults are Mesozoic to Cenozoic. Because of the observed relationship between the interpreted faults and areas of known copper

mineralization it is recommended that future ground exploration be directed to these fault line locations.

4. Analysis of the low level aeromagnetic data in the Yerington area (Project 2a) and in the Walker River area (Project 2b) is strongly recommended. The main objectives of this analysis will be to improve the resolution of magnetic features considered in Project 1 and to provide a more detailed picture of structure at depth. This analysis should include matched filtering and downward continuation of the regional component in the data in order to remove effects of near-surface magnetization, which in the large has been shown to be unrelated to the location of porphyry copper mineralization in west-central Nevada.

Respectfully submitte,

Allan Spector

Allan Spector, Ph.D.,
Section Head,
Analytical Methods.

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Eagle So
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INDUCED POLARIZATION AND RESISTIVITY SURVEY CALICO HILLS AREA, LITTLE CALICO AND BLACK EAGLE SOUTH MINERAL COUNTY, NEVADA

FOR

OCCIDENTAL MINERALS CORPORATION

CANADIAN AERO *Mineral Surveys* LIMITED

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2 Expanders

INDUCED POLARIZATION AND
RESISTIVITY SURVEY
CALICO HILLS AREA, LITTLE CALICO AND
BLACK EAGLE SOUTH
MINERAL COUNTY, NEVADA

FOR

OCCIDENTAL MINERALS CORPORATION

INTRODUCTION:

At the request of Dr. James A. Anderson of Occidental Minerals Corporation, personnel of Canadian Aero Mineral Surveys, Limited conducted an induced polarization and resistivity survey on the titled properties in Mineral County, Nevada.

The survey was under way during the period from January 12 to March 8, 1970, and covered a total of two pole-dipole expanders and sixteen pole-dipole profiles. The survey was under the field direction of Avinash V. Hardas, M.S., Engineer for Canadian Aero Mineral Surveys, Limited. From February 11 to February 23 the survey was temporarily shut down for equipment maintenance and a review of the data. The crew returned to the field on February 23 and completed the project on March 8, 1970.

PURPOSE OF THE SURVEY:

Previous reconnaissance induced polarization and resistivity surveys (1969) had indicated some moderately anomalous IP response zones. Certain of these zones were later drilled and sulfide mineralization was indicated.

The purpose of this survey was to confirm and detail the known anomalies and to extend the IP coverage where necessary.

SURVEY PROCEDURES:

Induced polarization and resistivity measurements were made in the time domain mode of operation. A conventional system of measurement which uses a time cycle of 2.0 seconds "on" and 2.0 seconds "off"; 2.0 seconds "on" and 2.0 seconds "off" (current reversed) was used.

The commencement of the measurement of the secondary voltage is delayed by 0.45 seconds to avoid coupling and other transient effects. The integration is performed during the period from 0.45 seconds to 1.10 seconds after the cessation of current.

To conform to a standard presentation the integral time constant is adjusted to give induced polarization readings equivalent to those obtained with transmitter cycles of 3.0 seconds "on" 3.0 seconds "off", with integration of the secondary voltage during the first second of the "off" period.

Throughout the survey, (except for expanders C_1 and C_2) a conventional pole-dipole array of six current electrodes were used.

A reference electrode was set at 10,000 feet at right angles to the direction of the line. Potential electrodes occupied positions on both sides of the current-electrode and measurements were made for pole-dipole separation factors (n) of 1 to 6. This resulted in obtaining a total line coverage of approximately nine

times the dipole length, when a full line is read.

The data from each line is plotted in quasi-sections to facilitate presentation of data at all spacings used. Because of asymetery in the geometry of a pole-dipole electrode configuration there is a small area in the vicinity of the center line in the quasi sections where contours can be confusingly distorted. The readings are no less valid, however, the data must be carefully studied in this area to be of value.

Apparent polarization response is in units of millivolt-seconds per volt or milliseconds (ms); and apparent resistivity is in units of ohm-meters.

For the sake of convenience, the titled areas are described separately in this report. No attempt has been made to interpret the data in detail, as it is understood that Charles L. Elliot, Consulting Geophysicist, will do the complete interpretation.

CALICO HILLS AREA:

A total of two pole-dipole expanders and five pole-dipole profiles were surveyed in this area. A dipole length of 1500' was used for the expanders and 1000' for the profiles. The purpose of the expanders was to test the possibility of an intrusive at maximum effective depth of penetration near the vicinity of drill hole CA-8.

A strong response of more than 25.0 ms is noted on lines C_3 and C_4 and 72.5. Lines C_5 and C_6 show a 20.0 to 30.0 ms response to the southwest.

LITTLE CALICO:

Two pole-dipole profiles using 1000' spacings were surveyed in this area. A weak response of 15.0 to 19.0 ms is noticed on the south side of both the lines.

BLACK EAGLE SOUTH:

Nine pole-dipole profiles were completed using a dipole spacing of 1000'. A moderate IP response at depth of more than 18.00 ms is noticed on several lines. Line BES-10 crossed a contact of an intrusive outcrop at approximately 5500' southwest from center. Moderate IP response at the southwest end of this line may require further study. (For further details see C. L. Elliot's report).

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS:

In general, mild to strong IP response has been noted in all the three areas. The response occurs at depths with no apparent correlation to exposed near-surface rocks.

Of all the three areas, Black Eagle South is of top priority by nature of its strong IP response. The large intrusive mass south of the immediate area surveyed may be of interest as an increase in IP response at depth towards this area is indicated.

It is possible some consideration should also be given in extending Lines LC-1 and LC-2 to the south.

Respectfully submitted,

A. V. Hardas, M.S.

W. Gordon Wieduwilt
Geophysicist

Tucson, Arizona

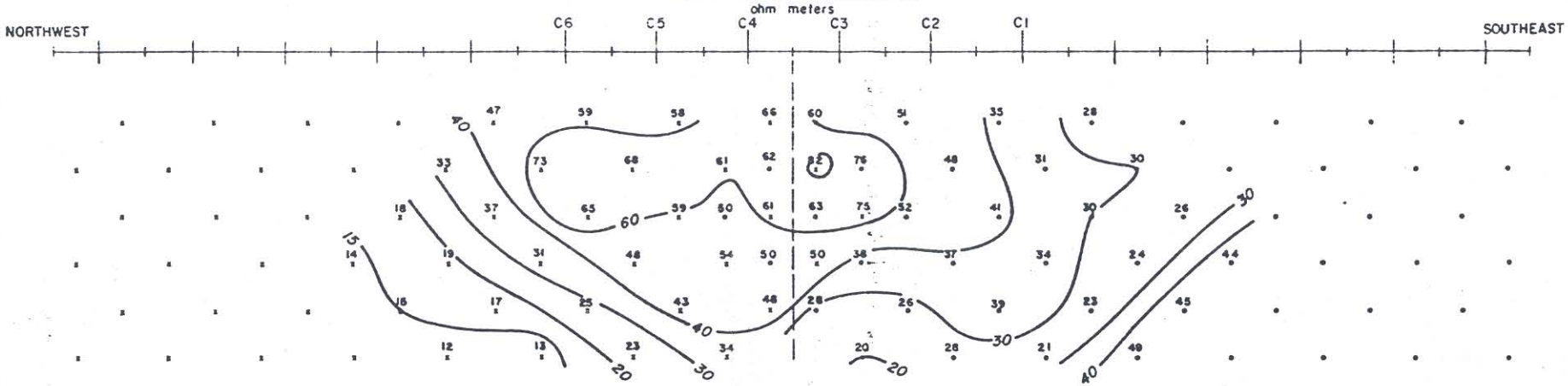
March 16, 1970

6000 0145 (0120)

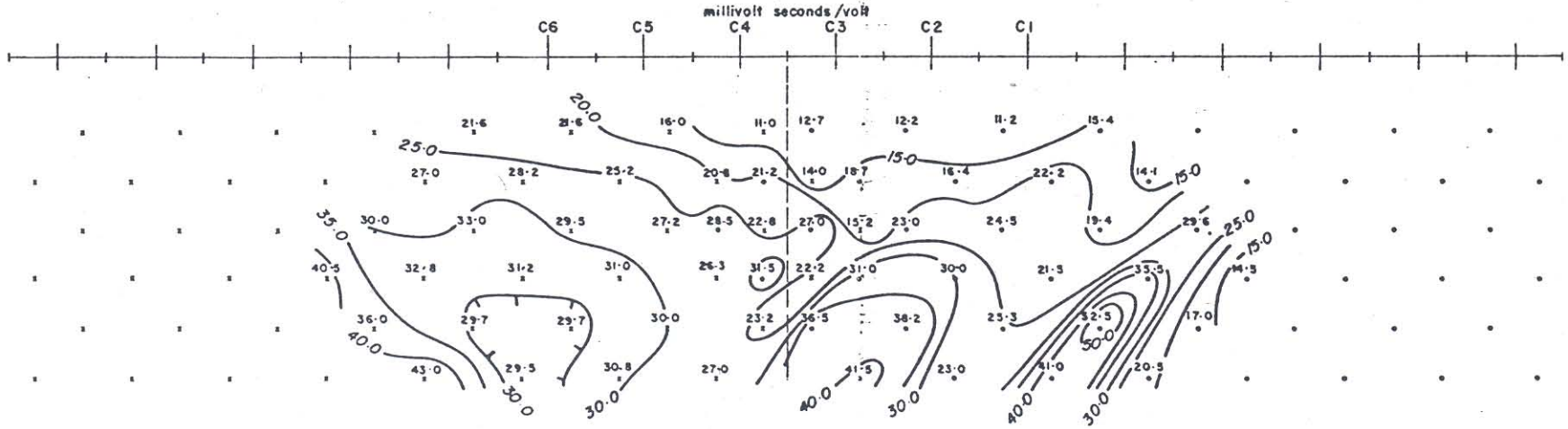
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

CALICO HILLS AREA — MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

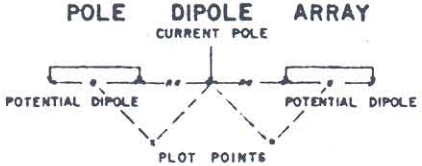
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE C-3

LOOKING . . . . NE

DIPOLE LENGTH . . . 1000

DATE JAN. 29, 1970

LEGEND

FENCE . . . . . .

PIPELINE . . . . .

POWERLINE . . . . .

CANADIAN AERO Mineral Surveys LTD.

OTTAWA, ONT., CANADA

TUCSON, ARIZONA, U.S.A.

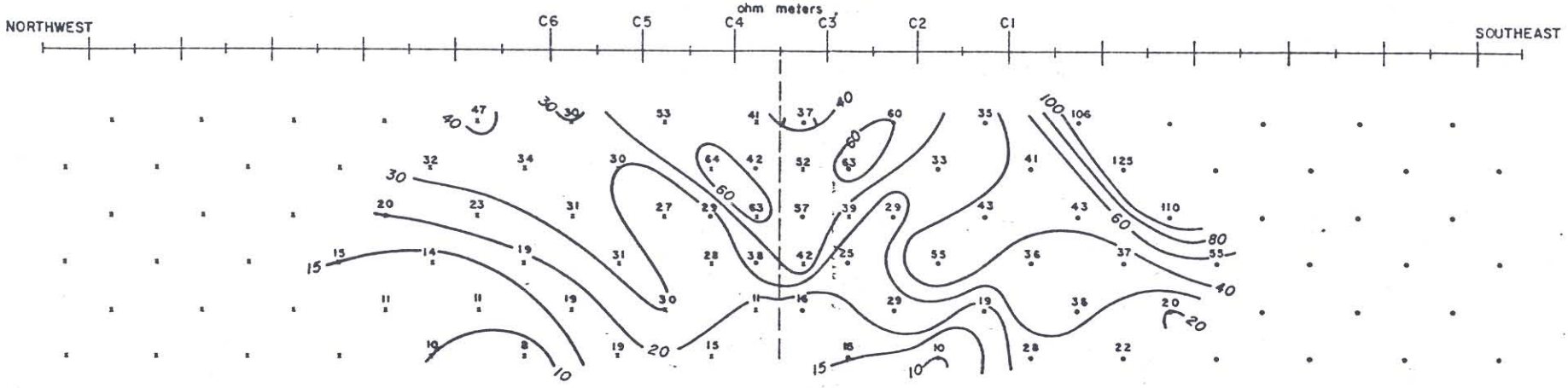
C A M E 02225

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

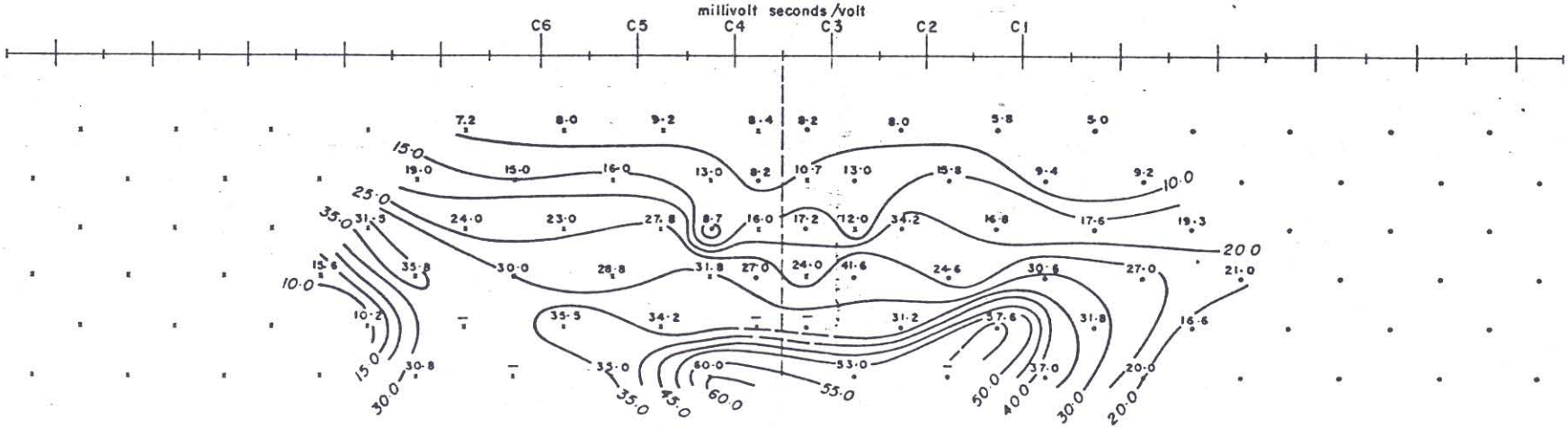
6000 0145 (0120)

CALICO HILLS AREA — MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

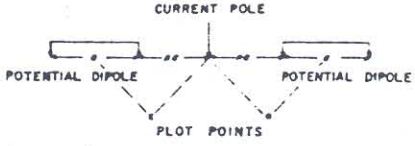
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE . . . C-4
LOOKING . . . NE
DIPOLE LENGTH . . . 1000'
DATE FEB. 9, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

CANADIAN AERO
Mineral Surveys LTD.
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A.

C. A. M. 9.02223

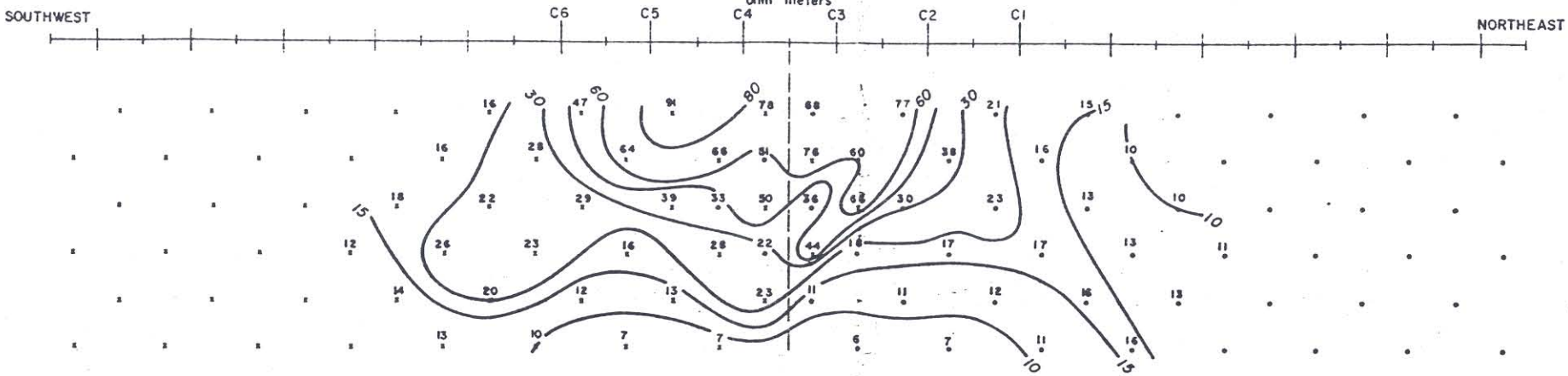
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

6000 0145 (0120)

CALICO HILLS AREA — MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

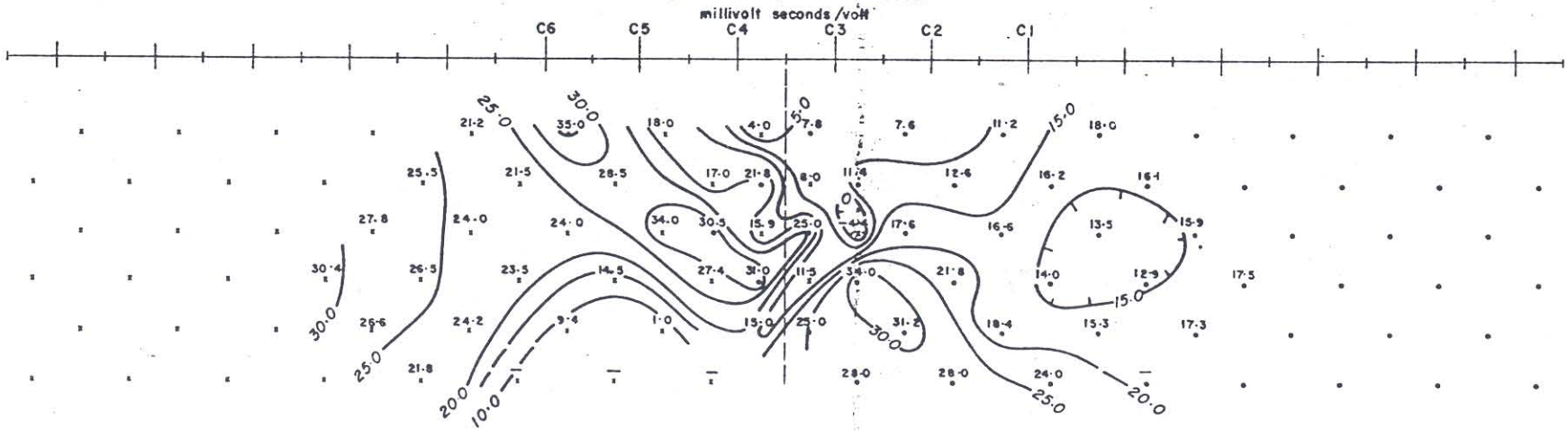
APPARENT RESISTIVITY

ohm meters

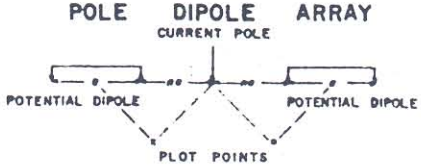


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE . . . C-5

LOOKING . . . . NW

DIPOLE LENGTH. . .1000'

DATE: MAR.5,1970

LEGEND

FENCE

PIPELINE

POWERLINE

CANADIAN AERO Mineral Surveys LTD.

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TUCSON, ARIZONA, U.S.A.

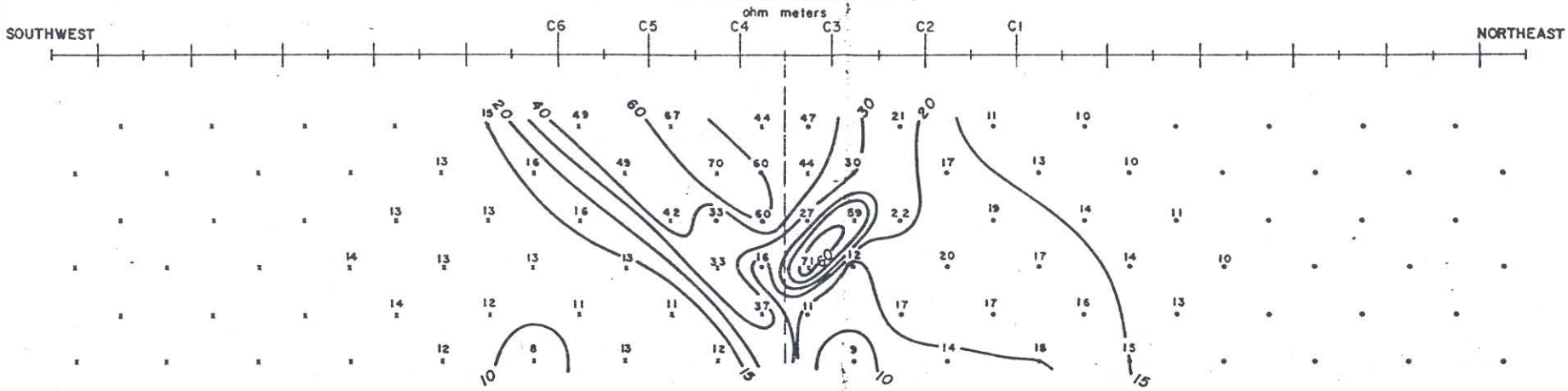
C.A.M.S. 02223

6000 0145 (0120)

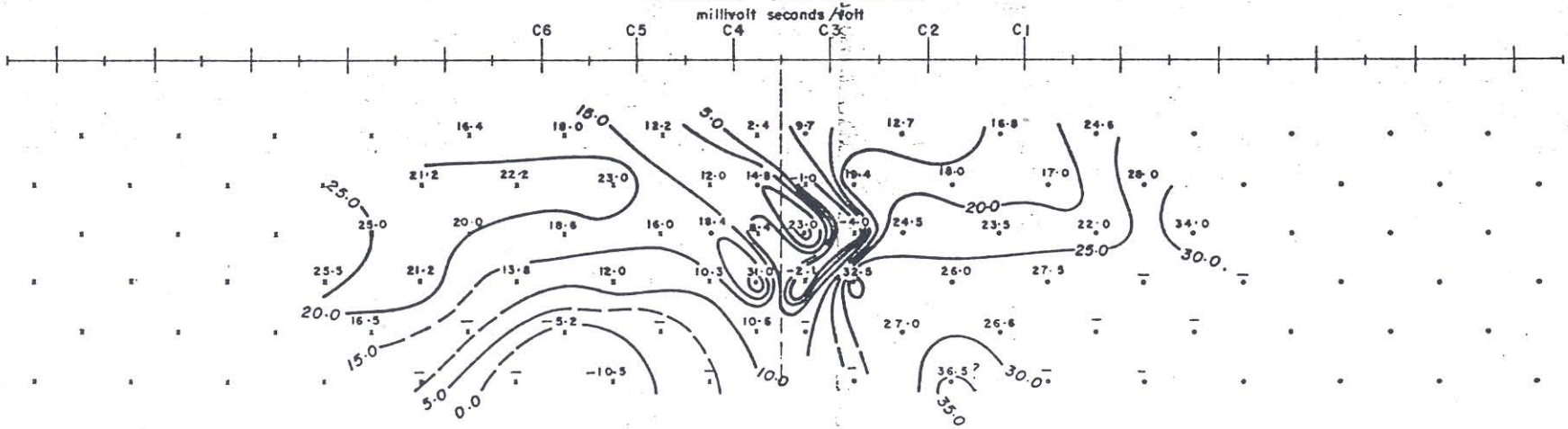
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

CALICO HILLS AREA — MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

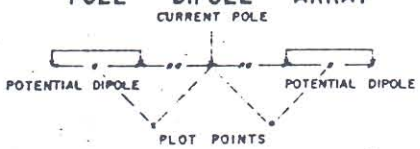
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds / volt



POLE DIPOLE ARRAY



LINE C-6

LOOKING . . . NW

DIPOLE LENGTH . . . 1000'

DATE: MAR, 6, 1970

LEGEND

FENCE . . . . . .

PIPELINE . . . . .

POWERLINE . . . .

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OTTAWA, ONT., CANADA

TUCSON, ARIZONA, U.S.A.

C. A. M. S 02223

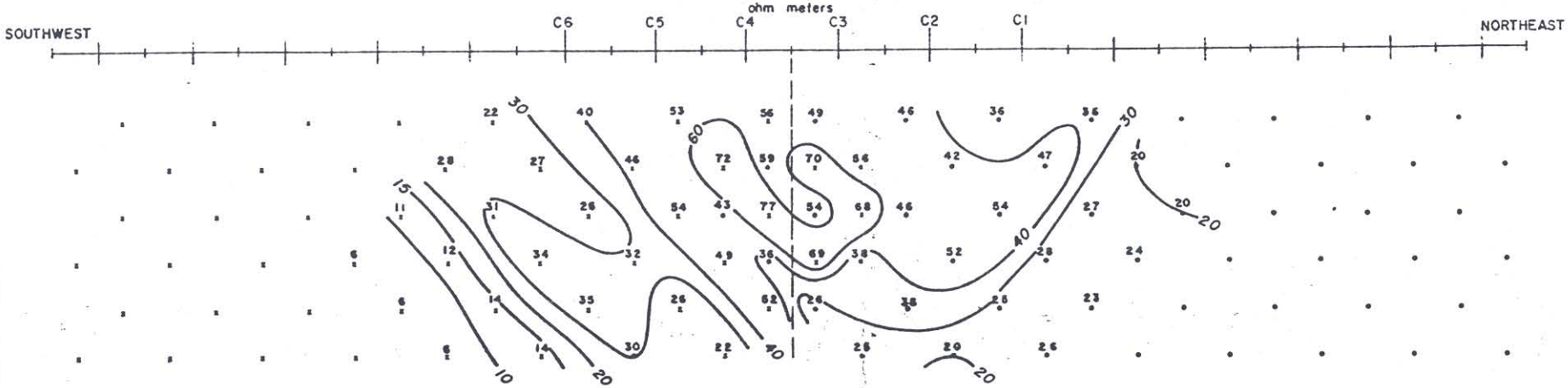
6000 0145 (0120)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

CALICO HILLS AREA – MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

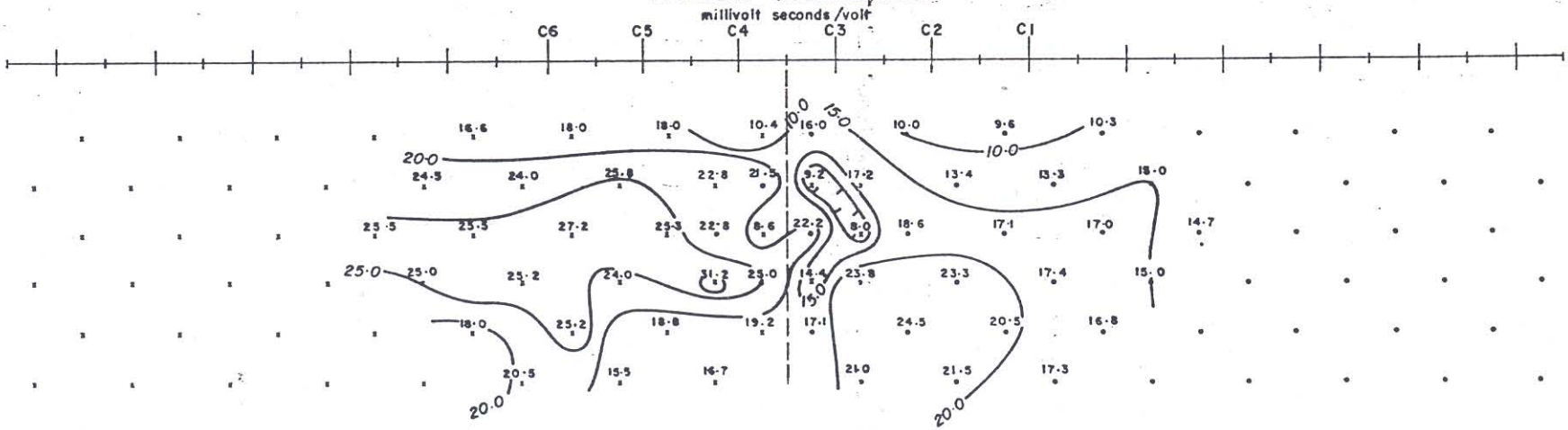
APPARENT RESISTIVITY

ohm meters

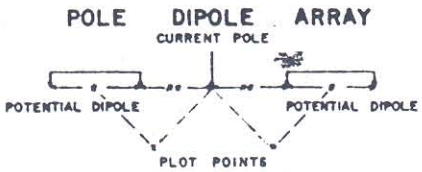


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE . . . 72·5 NW

LOOKING . . . . NW

DIPOLE LENGTH . . 1000'

DATE..JAN, 27, 1970

LEGEND

FENCE

PIPELINE

POWERLINE

CANADIAN AERO Mineral Surveys LTD.

OTTAWA, ONT., CANADA

TUCSON, ARIZONA, U.S.A.

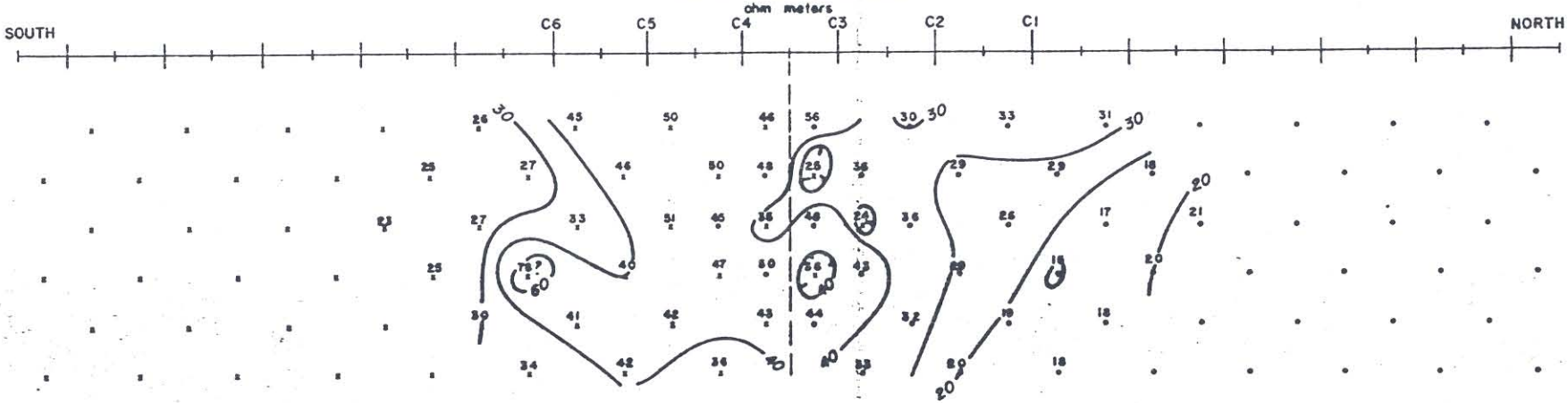
C.A.M.S. 0222

6000 0145 (0120)

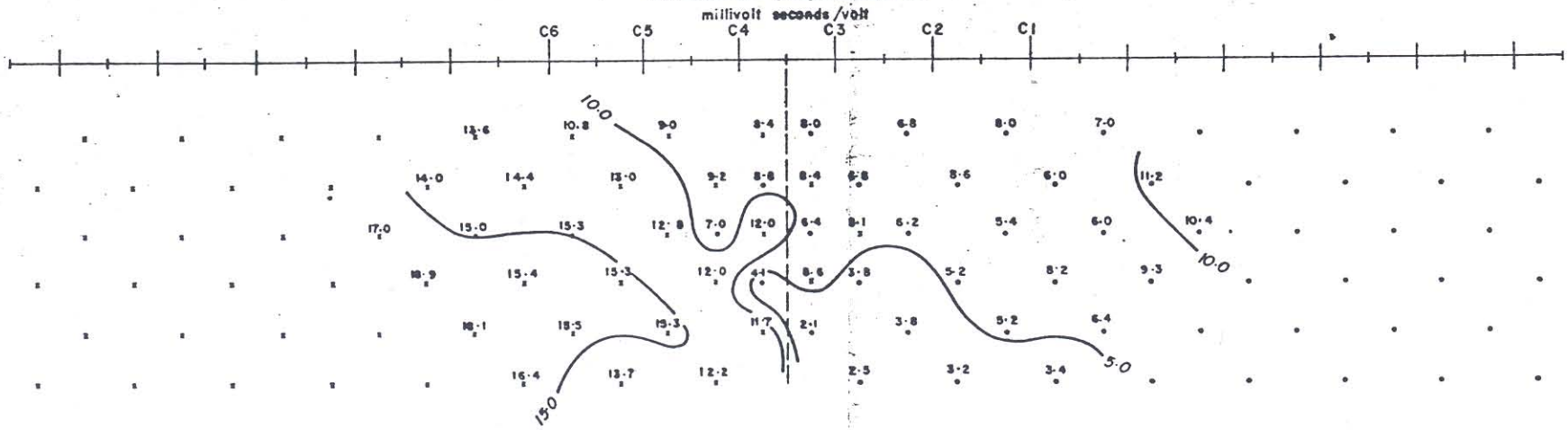
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

LITTLE CALICO - MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

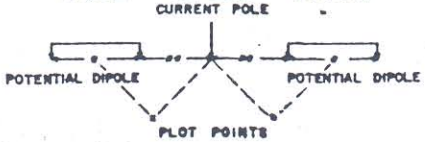
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE L.C-1

LOOKING. . . WEST

DIPOLE LENGTH . . . 1000'

DATE: JAN, 18, 1970

LEGEND

FENCE. . . . . .

PIPELINE. . . . .

POWERLINE. . . . .

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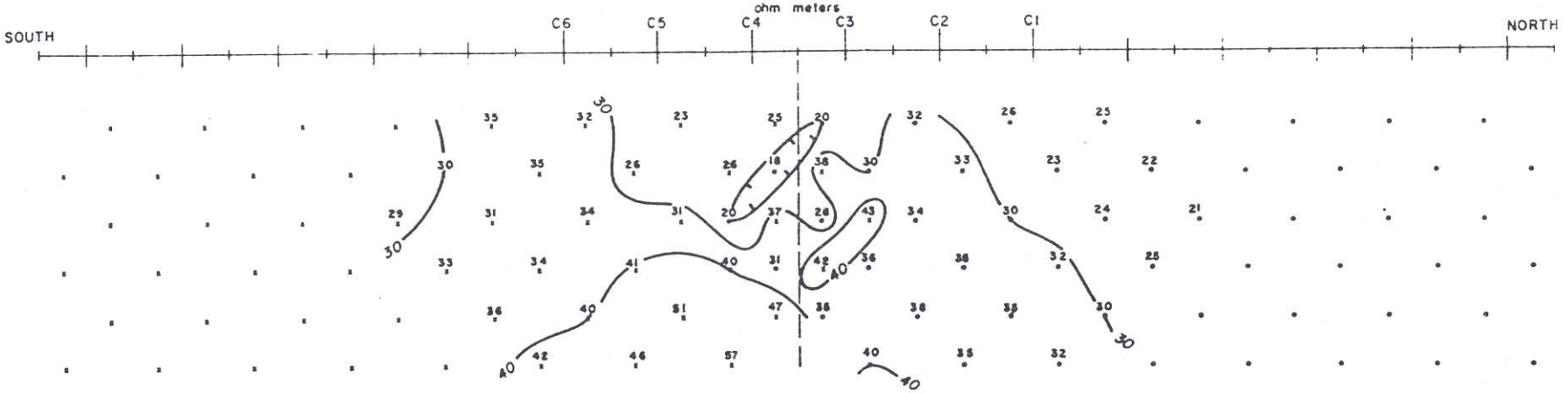
46000 0145 (0120)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

LITTLE CALICO - MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

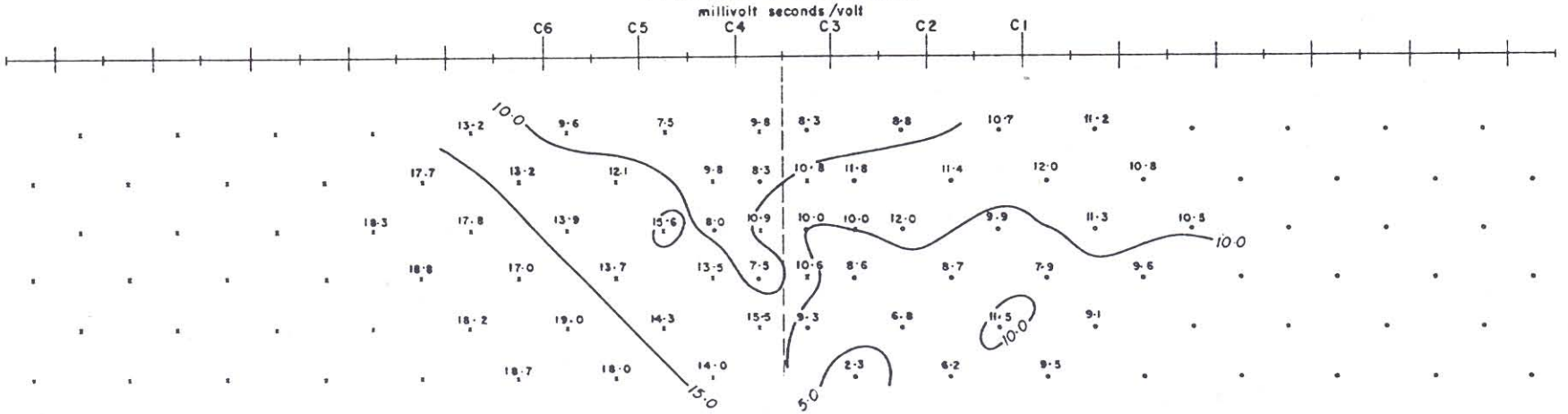
APPARENT RESISTIVITY

ohm meters

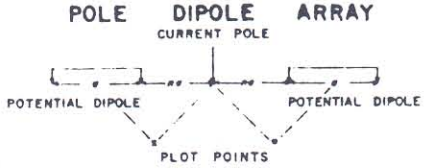


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE . L-C-2
LOOKING . . WEST
DIPOLE LENGTH . . 1000'
DATE. JAN. 21, 1970

LEGEND
FENCE . . . . . .
PIPELINE . . . . .
POWERLINE . . . . .

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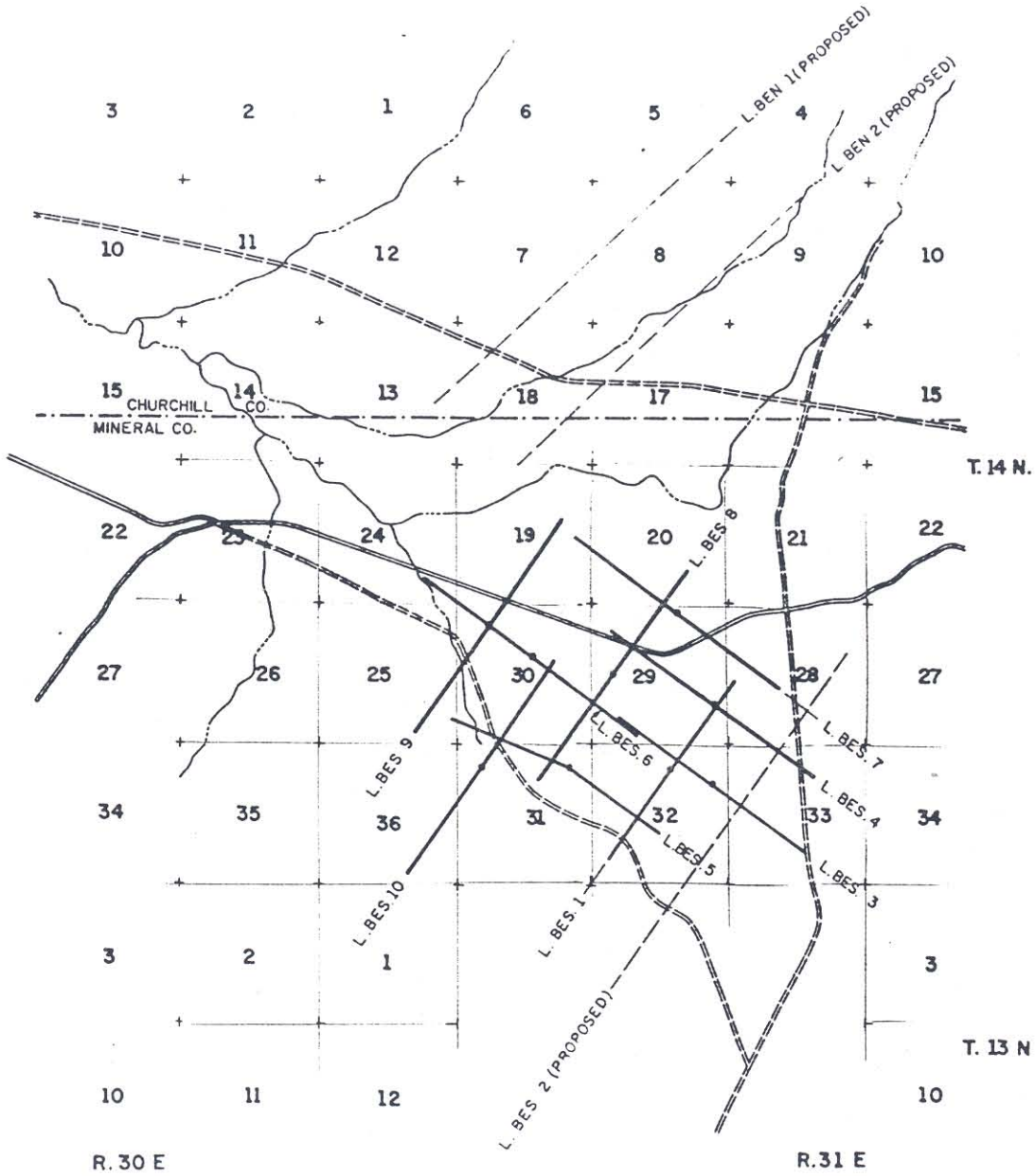
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A.

C.A.M.S. 02223

6000 0145 (0120)



SCALE: 1" = 1 MILE

I.P. and RESISTIVITY SURVEY

PLAN MAP

BLACK EAGLE SOUTH

MINERAL COUNTY, NEVADA

for

OCCIDENTAL MINERALS CORPORATION

by

CANADIAN AERO MINERAL SURVEYS LIMITED

A DIVISION OF ...

C.A.M.S.02223

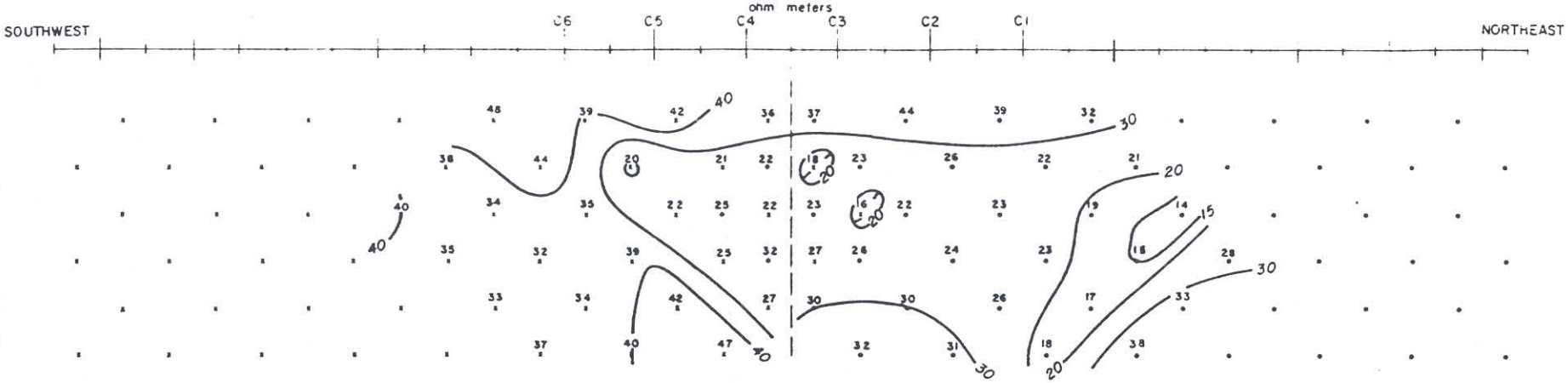
6000 0145 (0120)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

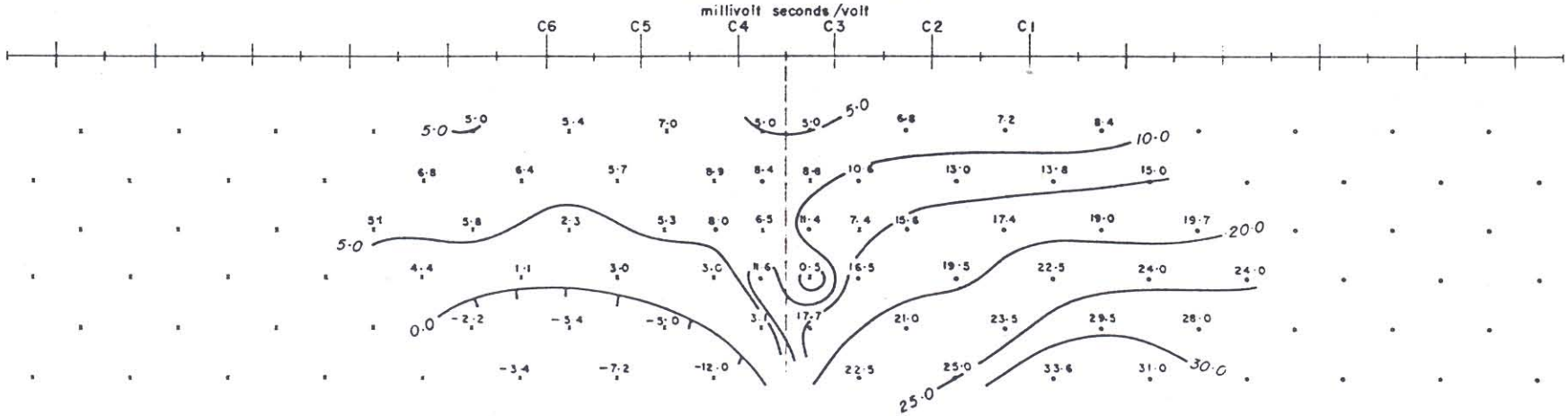
APPARENT RESISTIVITY

ohm meters

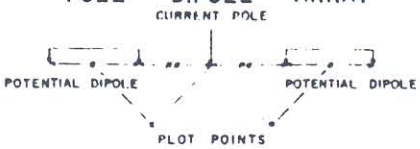


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE BES 1
LOOKING NW
DIPOLE LENGTH 1000'
DATE JAN, 23, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT, CANADA
TUCSON, ARIZONA, U.S.A.

C.A.M.S. 09223

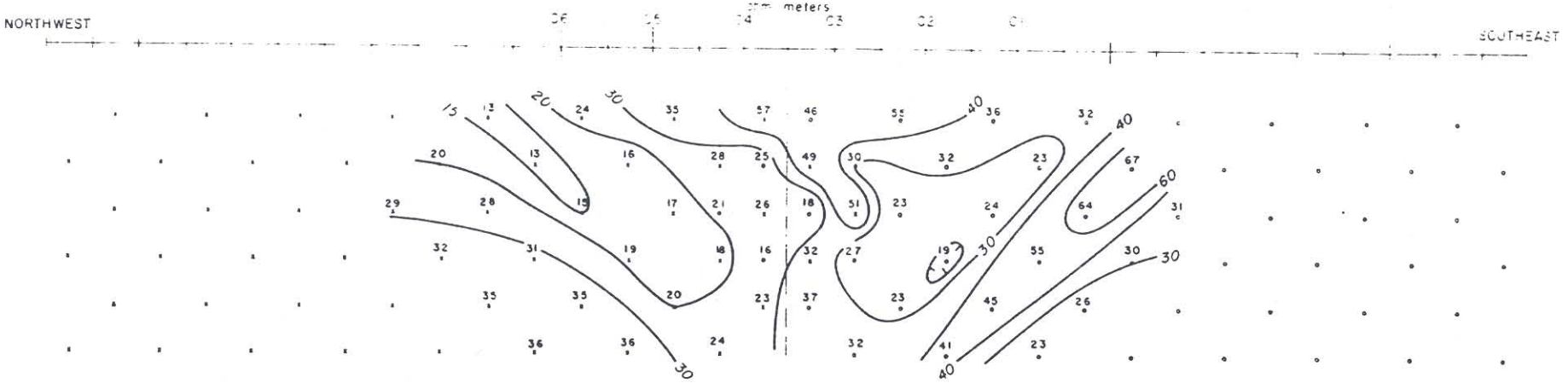
6000 0145 (0120)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

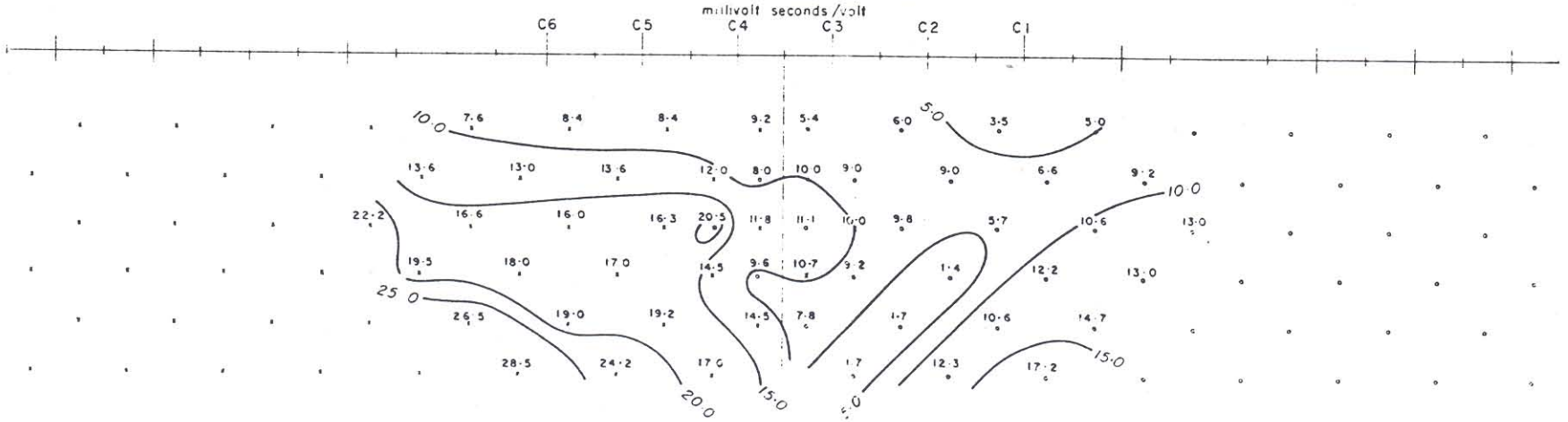
APPARENT RESISTIVITY

ohm meters

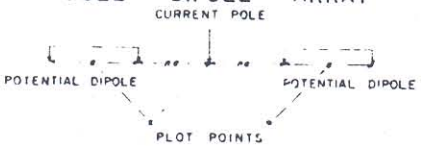


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE BES-3
LOOKING NE
DIPOLE LENGTH 100'
DATE: JAN. 2nd, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

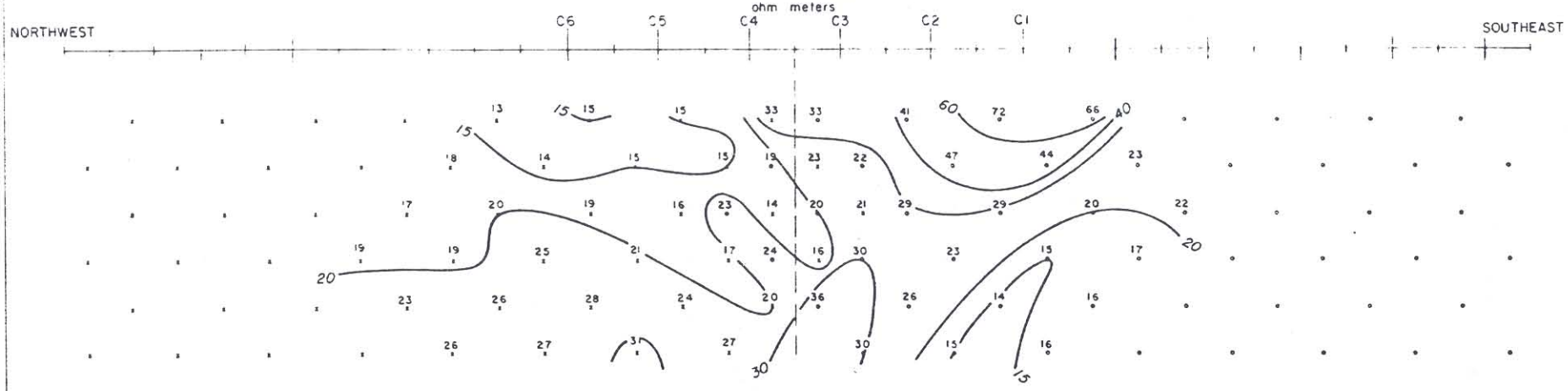
CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A.

6000 0145 (0120)

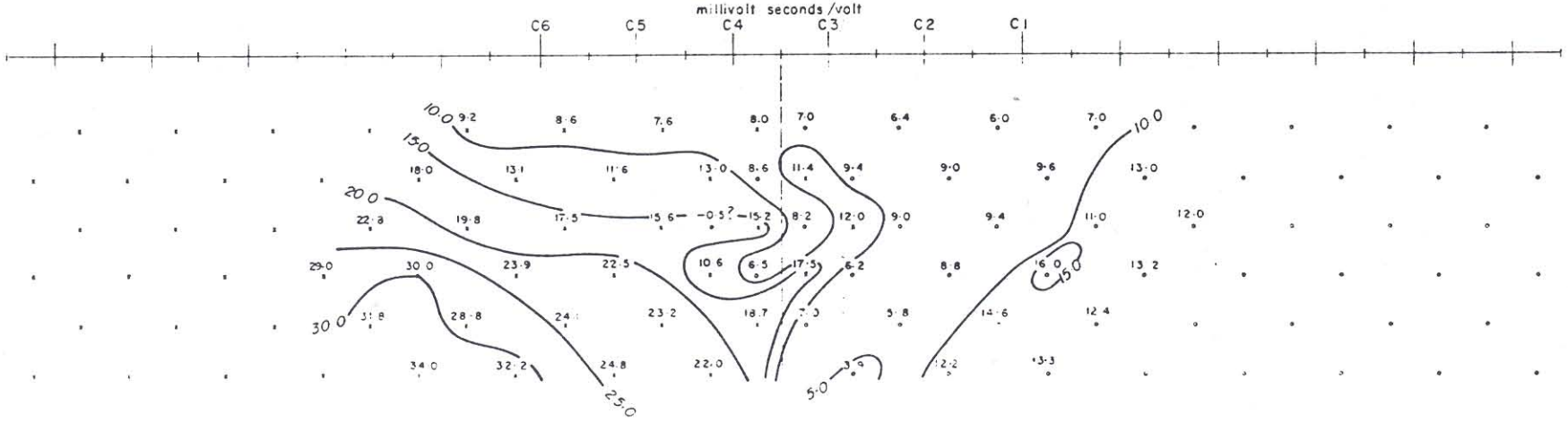
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY

CURRENT POLE

POTENTIAL DIPOLE — POTENTIAL DIPOLE

PLOT POINTS

LINE BES-4

LOOKING NE

DIPOLE LENGTH 100C

DATE JAN 31,1970

LEGEND

FENCE

PIPELINE

POWERLINE

CANADIAN AERO. Mineral Surveys LTD

OTTAWA, ONT., CANADA

TUCSON, ARIZONA, U.S.A.

C A M S 02223

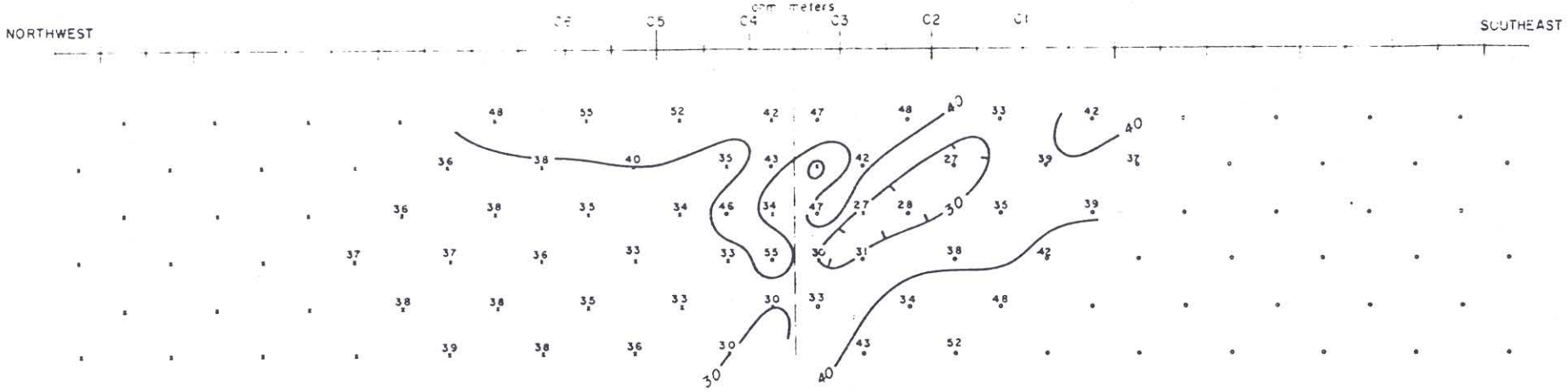
6000 0145 (0120)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

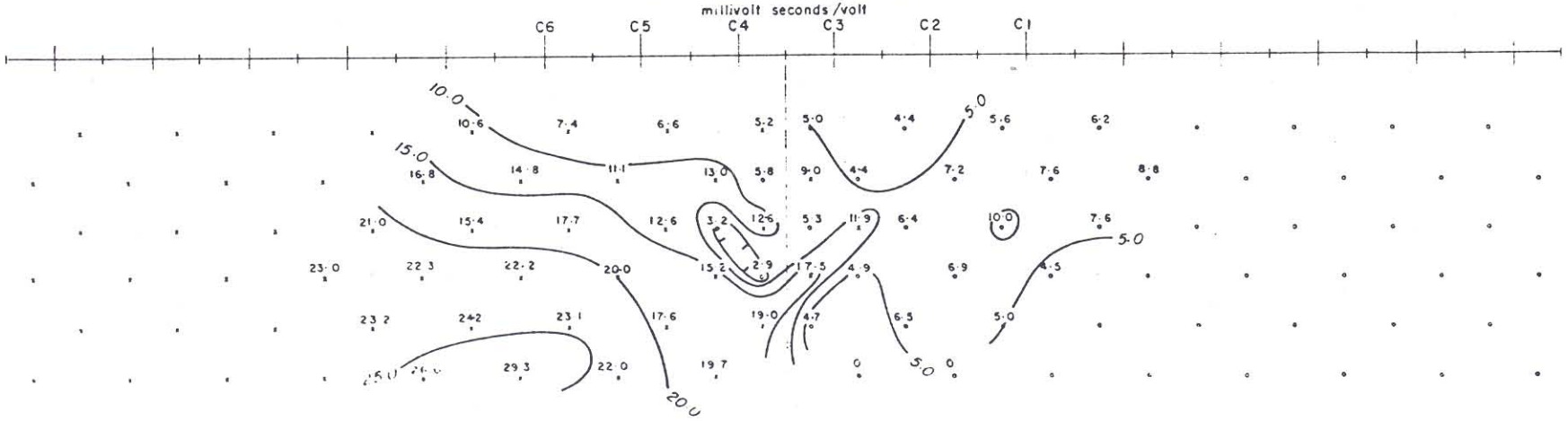
APPARENT RESISTIVITY

ohm meters



APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY

LINE	BES-5
LOOKING	NE
DIPOLE LENGTH	1000'
DATE	

LEGEND

FENCE
PIPELINE
POWERLINE

CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT, CANADA
TUCSON, ARIZONA, U.S.A

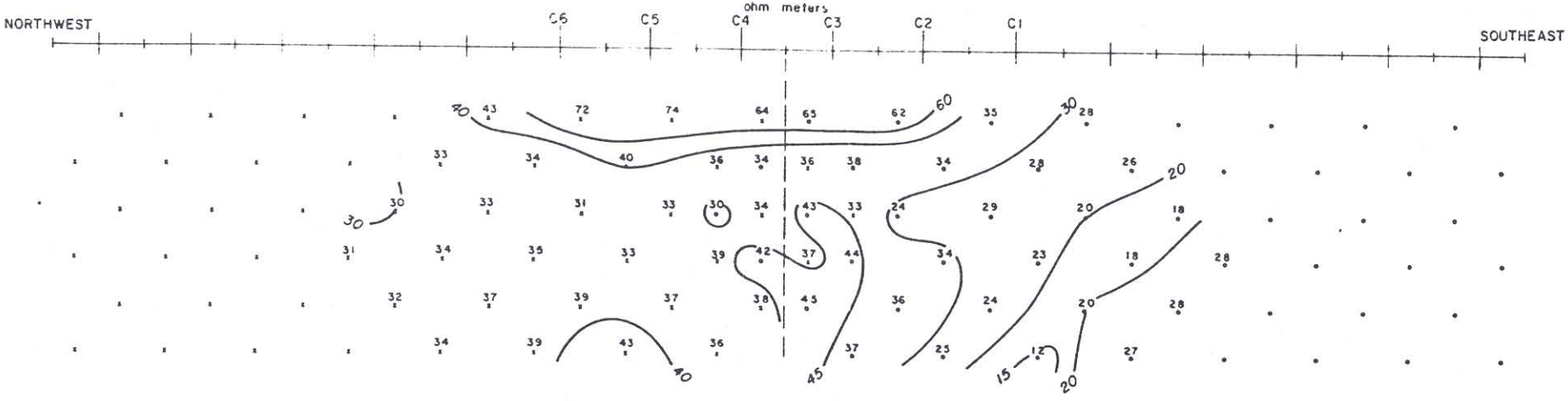
CAMS 02223

6000 0145 (0100)

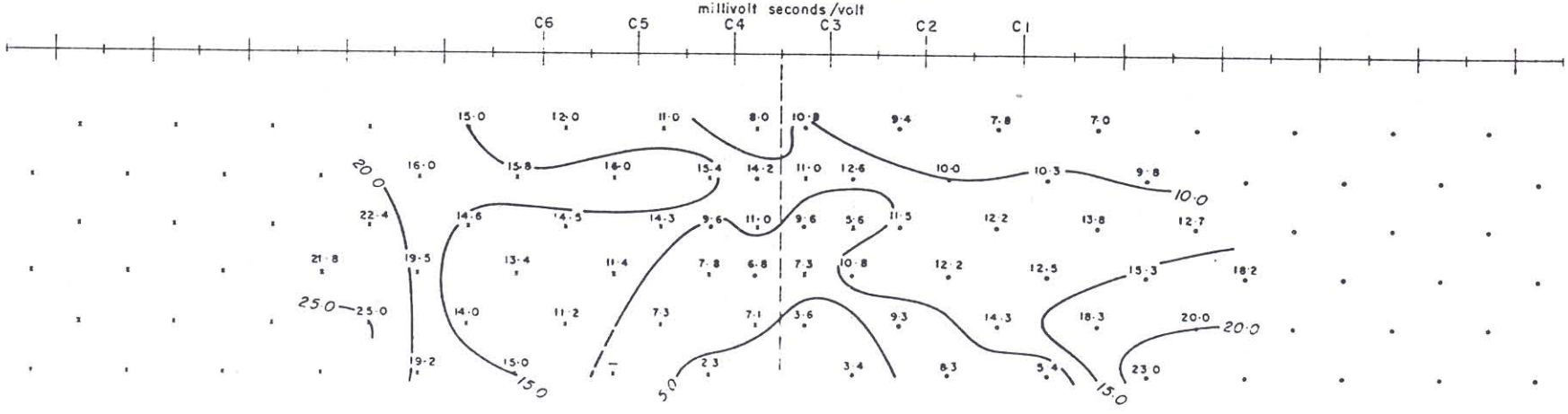
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

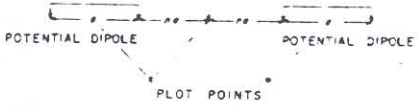
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE BES - 6
LOOKING NE
DIPOLE LENGTH 100C'
DATE. FEB 4, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A

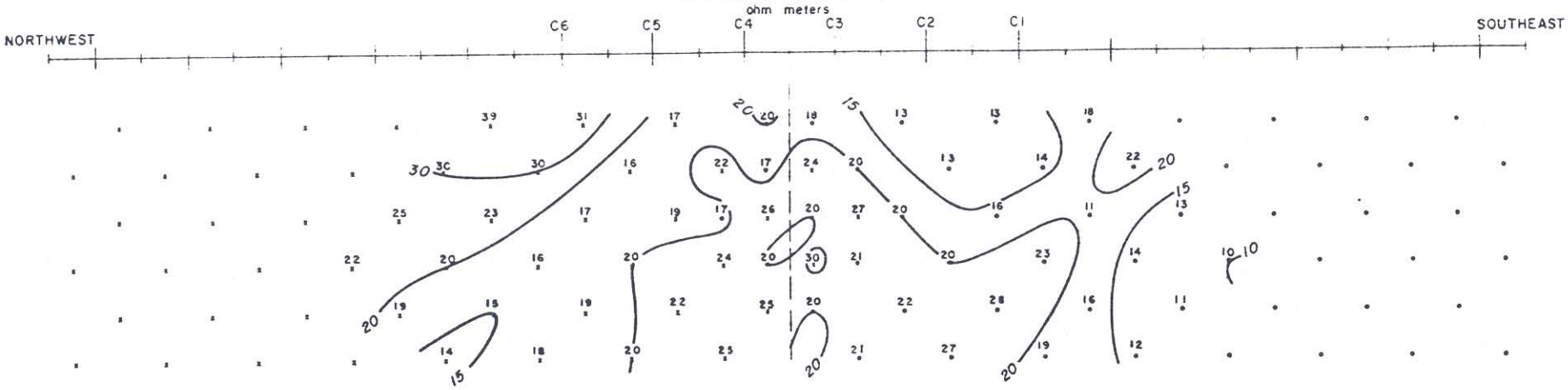
C.A.M.S 02223

6000 0145 (0120)

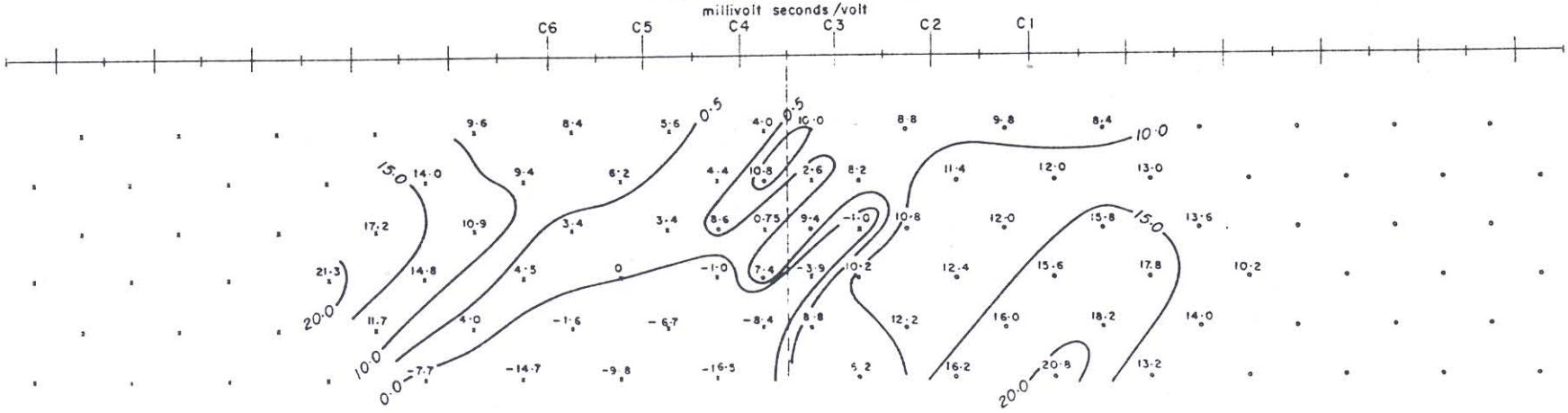
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

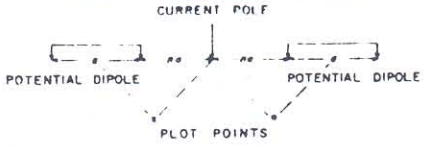
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds /volt



POLE DIPOLE ARRAY



LINE BES-7
LOOKING NE
DIPOLE LENGTH 1000'
DATE FEB.7,1970

LEGEND
FENCE
PIPELINE
POWERLINE

CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A

C A M S 02223

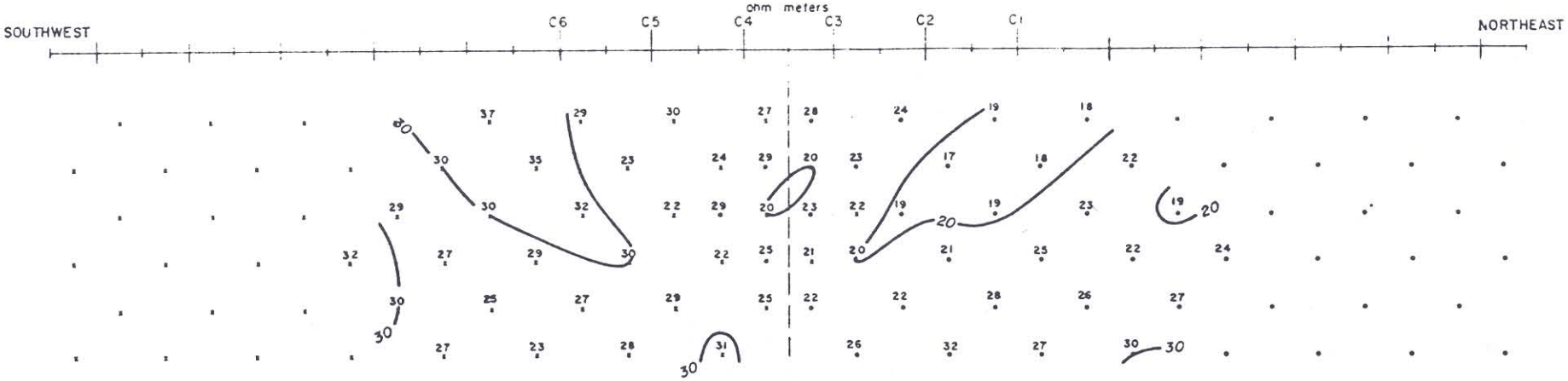
6000 0145 (0120.)

TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

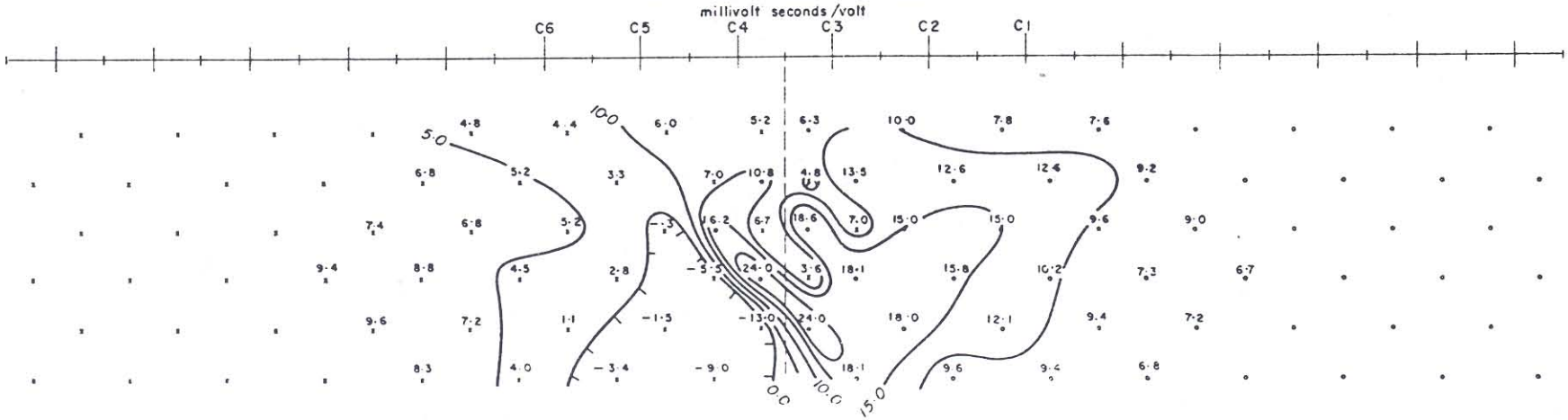
APPARENT RESISTIVITY

ohm meters

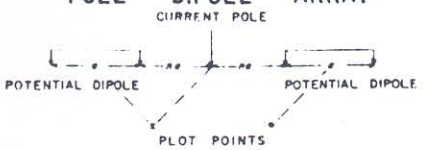


APPARENT POLARIZATION

millivolt seconds/volt



POLE DIPOLE ARRAY



LINE BES. 8
LOOKING . . . NW
DIPOLE LENGTH . . 1000'
DATE: FEB, 26, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

CANADIAN AERO Mineral Surveys LTD.
OTTAWA, ONT., CANADA
TUCSON, ARIZONA, U.S.A.

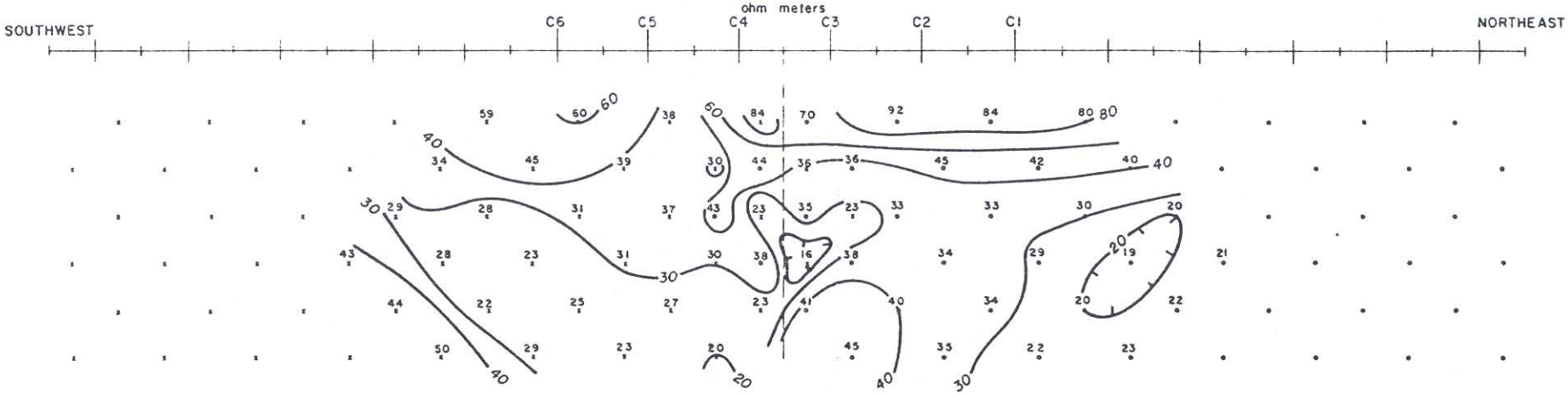
C A.M S 02223

6000 0145 (0190)

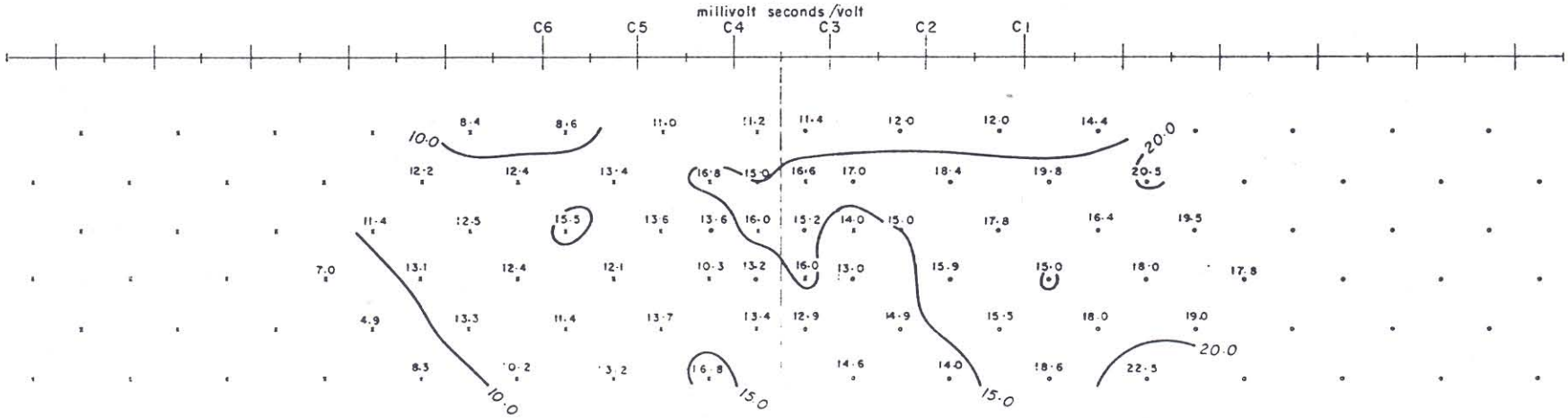
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH–MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

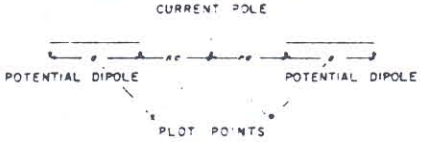
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE . . BES – 9

LOOKING NW

DIPOLE LENGTH 1000'

DATE FEB. 22, 1970

LEGEND

FENCE

PIPELINE

POWERLINE

CANADIAN AERO Mineral Surveys LTD

OTTAWA, ONT., CANADA

TUCSON, ARIZONA, U.S.A.

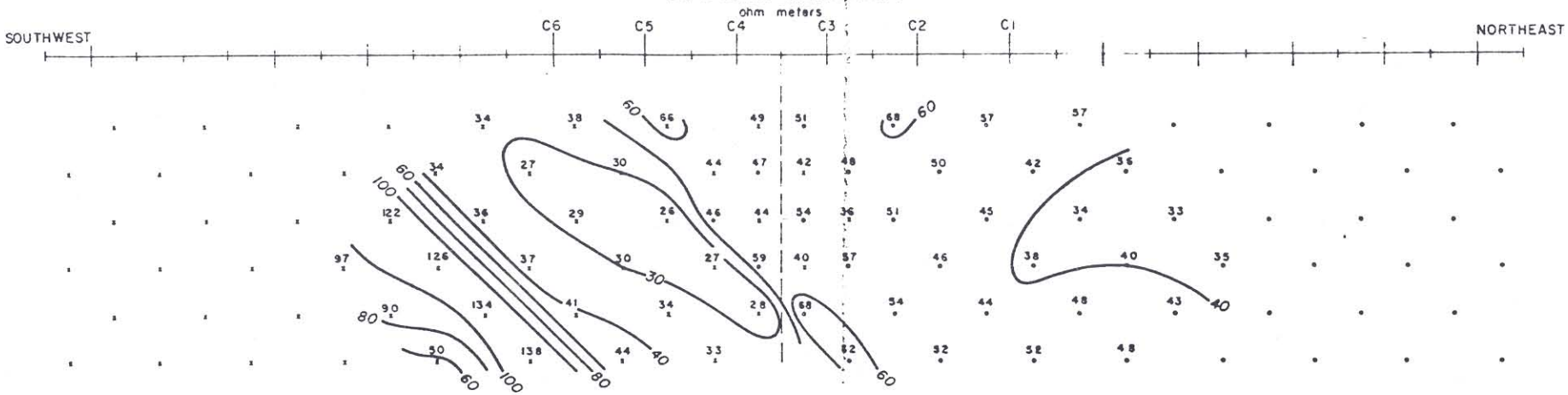
C A M S 02223

6000 0145 (0120)

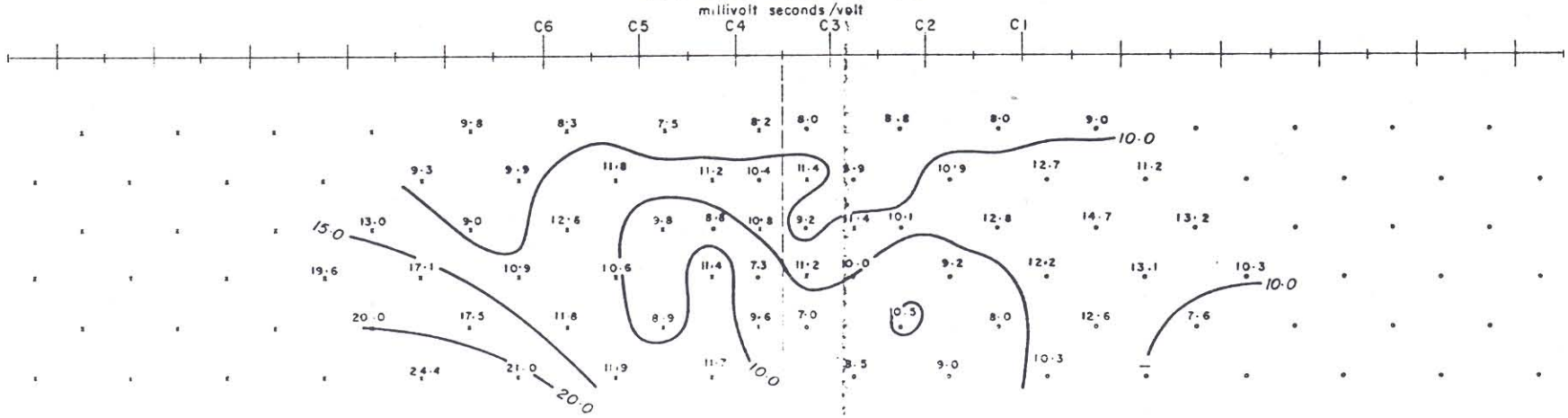
TIME DOMAIN INDUCED POLARIZATION AND RESISTIVITY SURVEY

BLACK EAGLE SOUTH-MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION

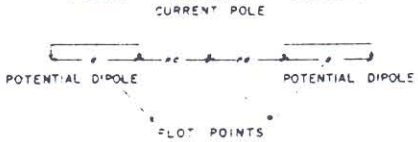
APPARENT RESISTIVITY
ohm meters



APPARENT POLARIZATION
millivolt seconds/volt



POLE DIPOLE ARRAY



LINE BES 10
LOOKING NW
DIPOLE LENGTH 1000
DATE MAR, 2, 1970

LEGEND
FENCE
PIPELINE
POWERLINE

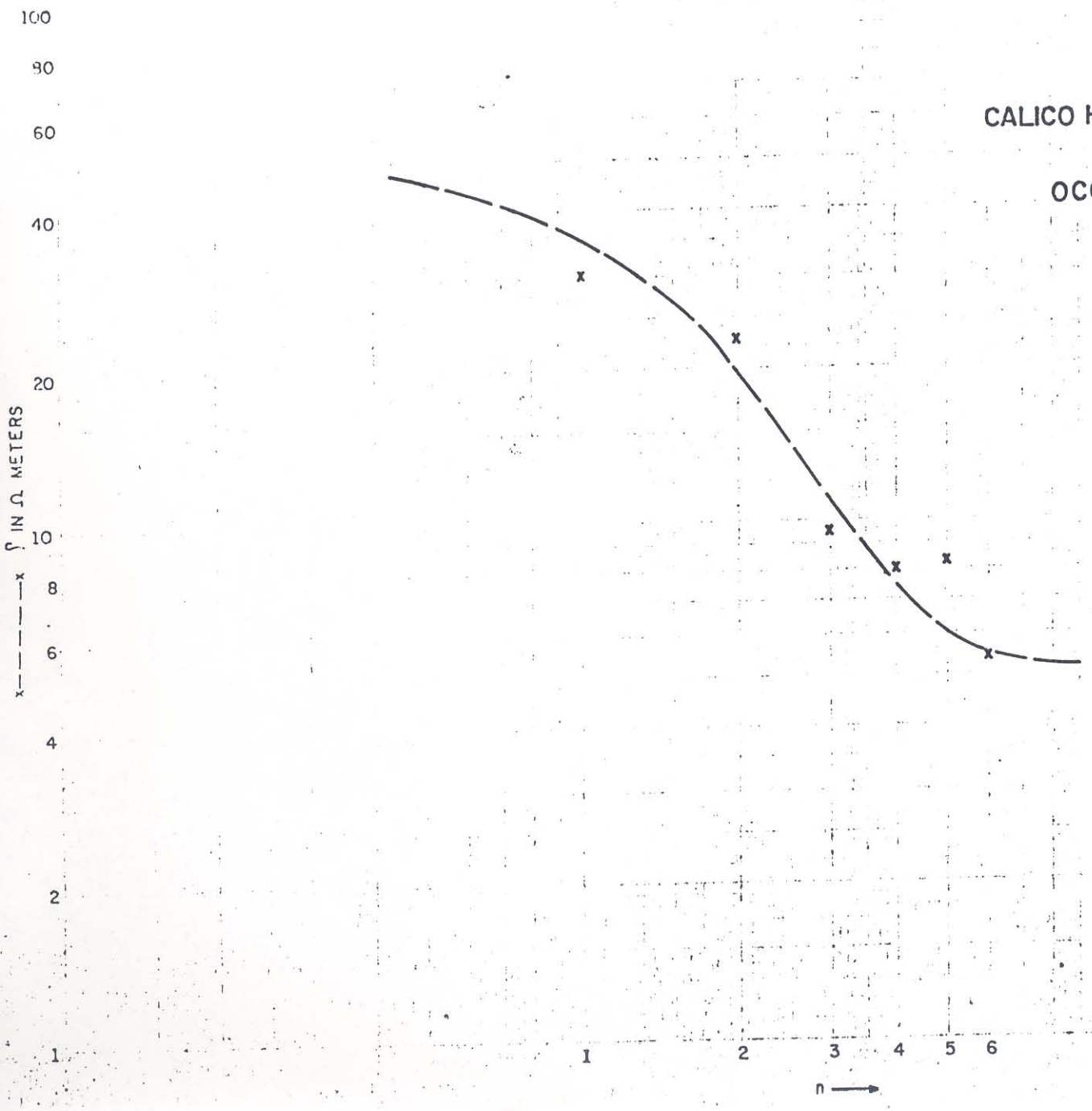
CANADIAN AERO Mineral Surveys LTD
OTTAWA, ONT, CANADA
TUCSON, ARIZONA, U.S.A

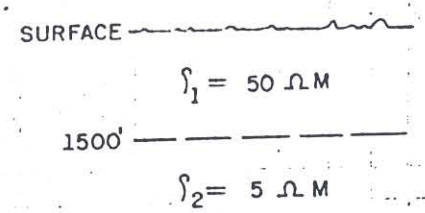
C A M S 02223

6000 0145 (0120)

POLE-DIPOLE EXPANDER C-2

CALICO HILLS AREA – MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION





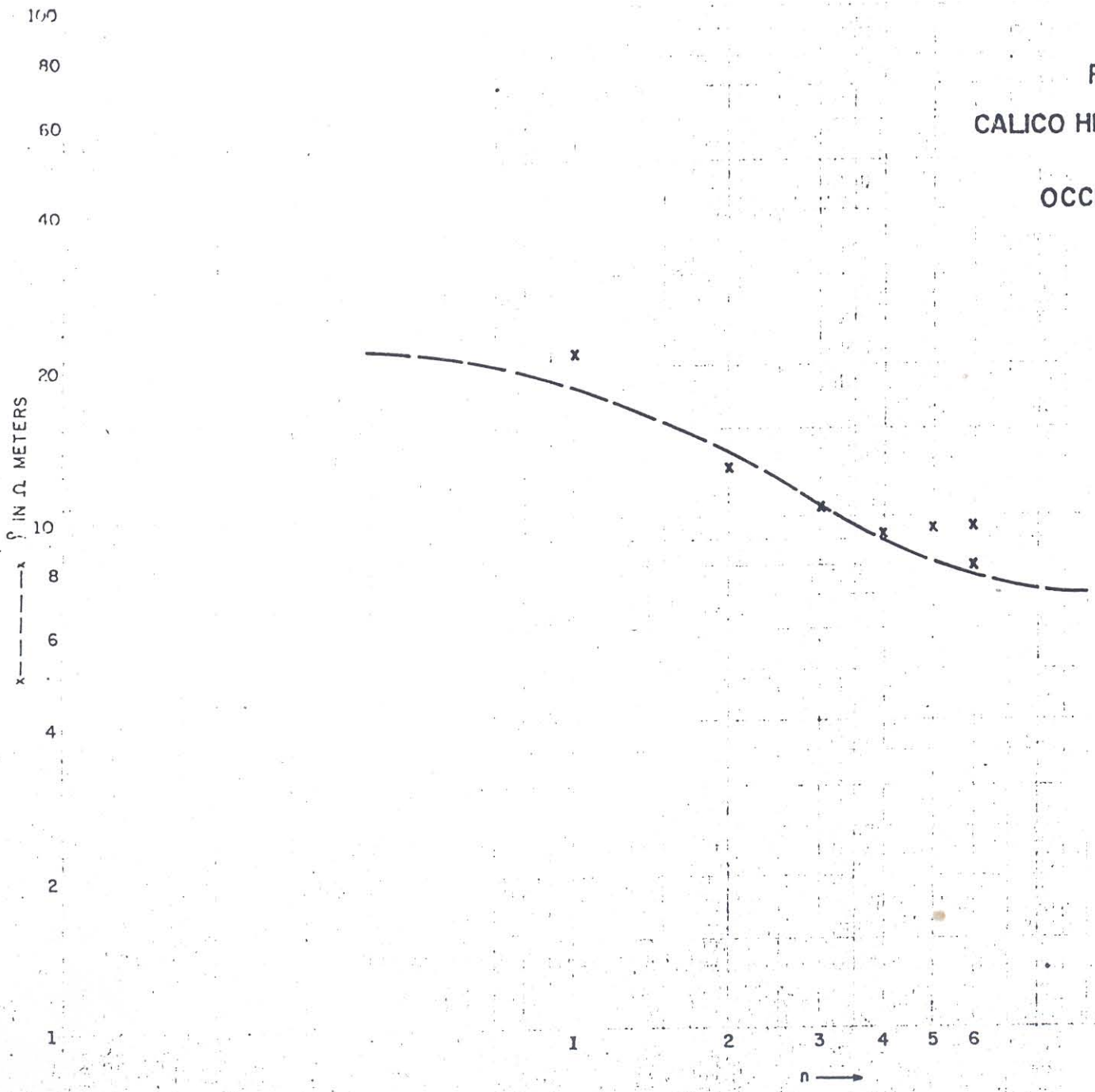
Canadian Aero Mineral Surveys, Ltd

02223

6000_0145 (0120)

POLE-DIPOLE EXPANDER C-1

CALICO HILLS AREA – MINERAL COUNTY, NEVADA
for
OCCIDENTAL MINERALS CORPORATION



SURFACE

$\rho_1 = 22\ \Omega M$

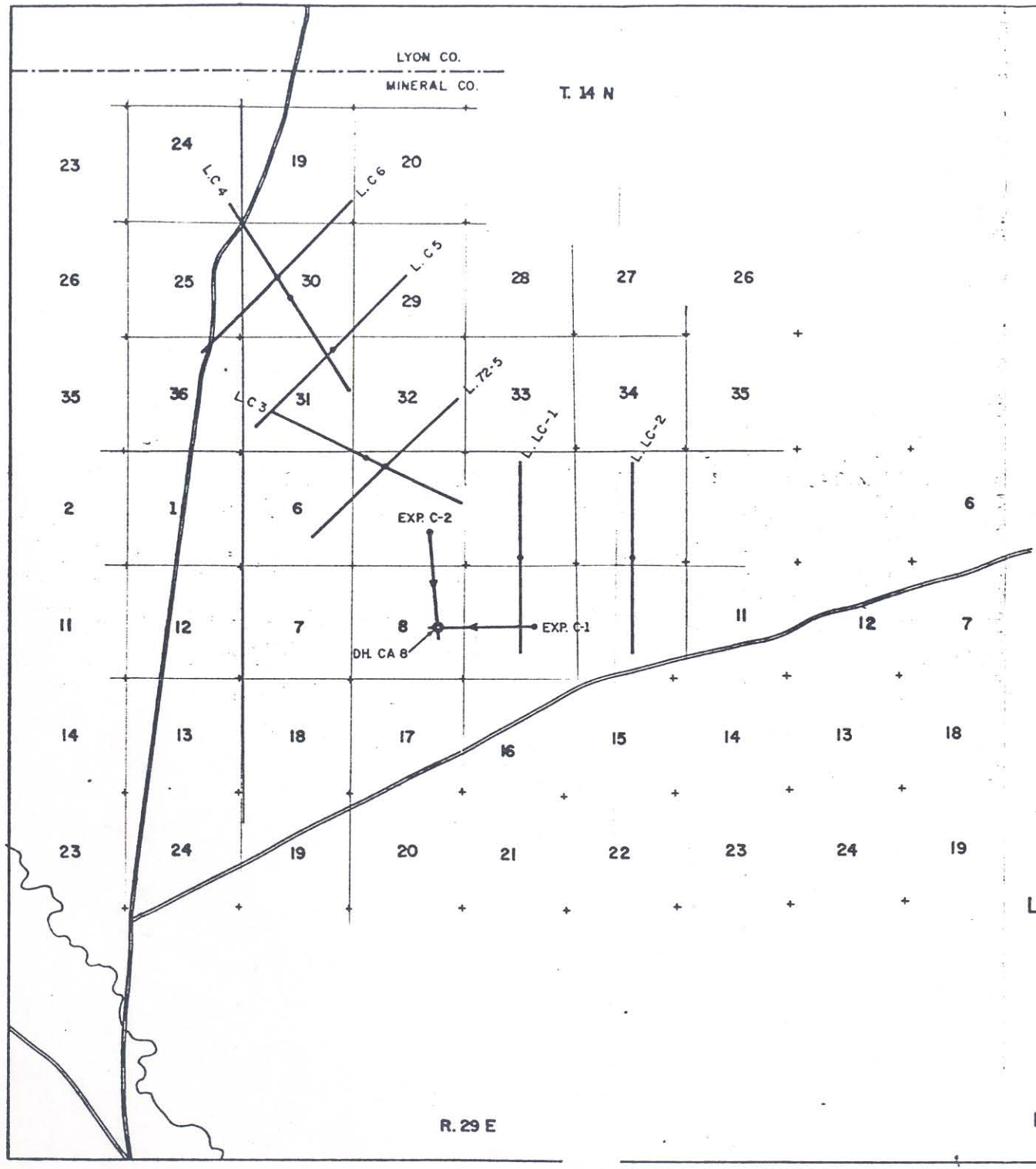
1500'

$\rho_2 = 7\ \Omega M$

Canadian Aero Mineral Surveys, Ltd

02223

6000 0145 (0120)



N

SCALE 1"=1 MILE

I.P. and RESISTIVITY SURVEY

PLAN MAP

LITTLE CALICO - CALICO HILLS AREAS

MINERAL COUNTY, NEVADA

for

OCCIDENTAL MINERALS CORPORATION

by

CANADIAN AERO MINERAL SURVEYS LIMITED

A DIVISION OF LITTON INDUSTRIES

C.A.M.S. 2223

9 maps #31
6000 0145 (0120)

REPORT

REINTERPRETATION OF AIRBORNE MAGNETIC DATA
WALKER RIVER INDIAN RESERVATION
MINERAL, LYON AND CHURCHILL COUNTIES, NEVADA

for

Occidental Minerals Corporation

Wheat Ridge, Colorado

Registered Professional Engineer (Geophysical)
CERTIFICATE No. 6877
CHARLES L. ELLIOT
Date Signed 5-28-70
Arizona U. S. A.

ELLIOT GEOPHYSICAL COMPANY
Mining Geophysical Engineers
4653 East Pima Street
Tucson, Arizona 85712

Ref: OC9E

This report is an adjunct to my report "Interpretation of Airborne Magnetic Data, Walker River Indian Reservation, Mineral, Lyon and Churchill Counties, Nevada" for Occidental Minerals Corporation, Wheat Ridge, Colorado, December 19, 1969. The aforementioned report comprised the reinterpretation of airborne magnetic data from only a part of the data available for the Walker River Indian Reservation and such area had been selected last fall for reinterpretation by Arthur R. Still. Subsequent to this and as a result of that reinterpretation, it was decided to recompile the remaining data for the Walker River Indian Reservation. This report thereby discusses the results of this recompilation outside of the area discussed in my previous report of December 19, 1969.

The original airborne magnetic data for the Walker River Indian Reservation area was flown by Aero Service Corporation in 1963 for the account of Walker-Martel Mining Company. The reduction of this data in the form of 15 sheets that were previously available to Occidental Minerals Corporation were very poor quality such that good interpretations of this data could not be realized. Aero Service Corporation is a reputable airborne

geophysical contractor, however, the resulting data reductions were apparently done by personnel of Walker-Martel Mining Company who were completely unfamiliar with good geophysical data reduction techniques. As a result this data was very difficult to interpret into meaningful geologic solutions. A case in point is the results for Black Eagle South as reported in my previous report of December 19, 1969. This outstanding intrusive feature was not clearly defined in the original data reductions and yet after their recompilation, this feature was clearly indicated and its geologic significance readily discerned.

As a result of this, it was decided to recompile the remaining data from the Walker River Indian Reservation. Lockwood, Kessler & Bartlett, Inc., Pasadena, California were again selected to recompile the remaining data as they had performed in the selected area. Lockwood, Kessler & Bartlett followed the same procedures as outlined in my previous report for the reduction of this data. One difference worthy of note is in the northwestern extreme of the Walker River Indian Reservation data area, the magnetic data was not obtained from the 1963 survey by Aero Service Corporation. The data here was obtained by Walker-Martel from an unknown source and the only raw data available to us was a contoured magnetic sheet of this restricted area. This data appears to be of excellent quality

and was tied to the remaining majority of the Walker River Indian Reservation by tie lines flown by Aero Service Corporation in 1963. Therefore all of the data for the Walker River Indian Reservation is contiguous.

The final presentation by Lockwood, Kessler & Bartlett, Inc. of the magnetic data is at a scale of 1 inch = 1/2 mile using the four 15' topographic sheets in the area of interest as the best available base maps. In that most of our geological information is available at a scale of 1 inch = 1 mile and thereby to facilitate analysis and correlation with this available geological information, the output of Lockwood, Kessler & Bartlett, Inc. was reduced photographically to a scale of 1 inch = 1 mile. The airborne magnetic data at both scales is included with this report.

Pertinent references and data available for analysis of the Walker River Indian Reservation area are as follows:

1. Report - Review of All Geophysical Data, Calico Prospects, Schurz, Mineral County, Nevada for Occidental Minerals Corp., C. L. Elliot, April 10, 1969.
2. Report - Interpretation of Airborne Magnetic Data, Calico Area, Schurz, Mineral County, Nevada for Occidental Minerals Corp., C. L. Elliot, September 5, 1969.

3. Aeromagnetic Survey, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, LKB Project 9679, November, 1969, 1" = 1/2 mile.

4. Aeromagnetic Survey, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, LKB Project 9679, November, 1969, 1" = 1 mile.

5. Interpretation of Aeromagnetic Data in West Central Nevada (Project No. 1), Huntec Limited, A. Spector, February, 1969.

6. Contour Maps of Airborne Magnetic Data, sheets 1 through 15, Aero Service Corporation, Airborne Magnetic Survey, May, 1963.

7. Topographic sheet, Allen Springs, Nevada, 1951, 15' quadrangle.

8. Topographic sheet, Schurz, Nevada, 1964, 15' quadrangle.

9. Topographic sheet, Weber Reservoir, Nevada, 1951, 15' quadrangle.

10. Topographic sheet, Gillis Canyon, Nevada, 1964, 15' quadrangle.

11. Geologic Map of Lyon, Douglas, Ornsby and part of Washoe Counties, Nevada, J. G. Moore, 1:200,000, 1961, Mineral Investigation Field Studies Map No. MF-80.

12. Geology and Mineral Deposits of Mineral County, Nevada, Nevada Bureau of Mines Bulletin 58, D.C. Ross, 1961.

13. Progress Geologic Map of Nevada, B. Webb, R.B. Wilson, July 1962, 1:500,000.

14. Composite Map Churchill, Lyon and Mineral Counties, Walker Indian Reservation, Nevada, 1" = 1 mile compilation by Occidental Minerals Corp. personnel, January, 1969.

15. Interpretation of Airborne Magnetic Data, Walker River Indian Reservation, Mineral, Lyon and Churchill Counties, Nevada for Occidental Minerals Corporation, Wheat Ridge, Colorado, December 19, 1969, C. L. Elliot.

16. Aeromagnetic Data, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, L.K.B. Project 0522, 1" = 1/2 mile, March 1970, four sheets.

17. Aeromagnetic Data, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, L.K.B. Project 0522, 1" = 1 mile, March 1970, four sheets.

The purpose of this review and reinterpretation of all of the airborne magnetic data from the Walker River Indian Reservation was to re-evaluate if any other magnetite-rich tactite zones such as is known at Calico and Hottentot and/or any other buried intrusive bodies were indicated within the limits of the survey area. The ultimate objective here was to reduce the Walker River Indian Reservation area to only those significantly interesting zones that might be withdrawn and held over a longer

term by Occidental Minerals Corporation for further evaluation and exploration. With the background knowledge in a magnetic sense for the Calico, Black Eagle South and Hottentot areas, reasonably good interpretations of the airborne magnetic data can be readily accomplished.

Quantitative techniques were employed to derive the most probable values of magnetic susceptibility of the hidden magnetically causitive bodies as well as their geometric aspects of horizontal extent and interpreted depth below ground surface. Conventional quantitative geophysical techniques of interpretation were employed to derive this information.

Accompanying this report are the following maps and sheets:

1. Interpretation Overlay, Airborne Magnetic Data, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, 1 " = 1 mile, May, 1970.
2. Aeromagnetic Data, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, L.K.B. Project 0522, 1" = 1/2 mile, March 1970, four sheets.
3. Aeromagnetic Data, Walker River Indian Reservation, Churchill, Lyon and Mineral Counties, Nevada, L.K.B. Project 0522, 1" = 1 mile, March 1970, four sheets.

A perusal of the accompanying aeromagnetic survey data (four

sheets from the recompilation of Lockwood, Kessler & Bartlett, Inc.) indicate a lot of magnetic activity within the Walker River Indian Reservation and with a very pronounced northwest-southeast trend. This trend is compatible with the regional geology as known in the Walker River Indian Reservation. Cutting across this northwest-southeast magnetic trend are indications of many cross faults with a northeast-southwest trend. This again is known from geological considerations and supports the work of Spector in his report of February, 1969 in which he has proposed many northeast-southwest cross faults displacing the generalized northwest-southeast structural trends.

Further, a perusal of the aeromagnetic data will suggest many high gradient responsive zones indicative of young surface volcanic features and again these are known to exist extensively in the Walker River Indian Reservation. Previous analysis of magnetics in this section of Nevada has indicated that these young Tertiary volcanics do respond quite moderately in a magnetic sense and therefore these features tend to mask any significant magnetic anomalies from buried magnetic features such as tactite zones and intrusives.

Predominantly tactite zones have a very strong response and therefore the surface and airborne expressions of buried tactite features should normally stand out above the magnetic

level of surface Tertiary volcanics. This is not necessarily always the case but would appear to be a reasonable conclusion. Magnetic response of buried intrusions on the other hand are not normally large responses and therefore they can be easily masked by the higher gradient, higher level response of the surface Tertiary volcanics. Consequently, in volcanic covered areas as expressed magnetically, buried intrusives could exist and we would not necessarily be able to recognize these features. This concept was amply demonstrated at Black Eagle South in which surface Tertiary volcanics were responding giving rise to part of this response and yet the magnetic response of the buried intrusive of a reasonably high magnetic susceptibility clearly showed above the surface volcanic response.

On the accompanying airborne magnetic survey sheets the most outstanding magnetic feature is the Calico deposit itself located generally in sections 5, 6, 7, 8, of T 13 N, R 29 E. The next most significant magnetic features are the responses for Black Eagle South located in sections 32 and 33 of T 14 N, R 31 E and the Hottentot deposit located in undivided territory approximately located in equivalent section 2, T 12 N, R 30 E. These two features are both clearly indicated in the aeromagnetic data. Further, there is the magnetic response of the Little Calico located generally in sections 9 and 10

of T 13 N, R 29 E and the predominantly volcanic indications of the Terrill Mountains feature located in sections 19, 20, 21, 28, and 29 of T 14 N, R 30 E and the Black Eagle North feature located in sections 7, 8, and 17 of T 14 N, R 31 E. These are the pronounced magnetic features within the Walker River Indian Reservation and these features are indicated on the attached Interpretation Overlay.

Also shown on the attached Interpretation Overlay are all of the interpretation points where magnetic features have been interpreted. All of the remaining points beyond those areas mentioned above do not appear to be significant magnetic features and are predominantly reflecting volcanics which are likely Tertiary volcanics at or near surface.

On the attached Interpretation Overlay is shown the boundary of the previous re-evaluation of airborne magnetic data within the Walker River Indian Reservation and as reported in my report of December 19, 1969. The boundary of the airborne magnetic coverage is also shown on the attached Interpretation Overlay.

One further anomalous feature that was just barely indicated within the limits of the airborne magnetic coverage is the feature along the east boundary of the Walker River Indian Reservation survey in T 12 N. This feature is not defined

adequately for a good interpretation and it appears that the body extends outside of the limits of the Walker River Indian Reservation and therefore is beyond the scope of this report. It is however of possible interest to determine geologically a possible source for this feature. The regional airborne magnetic coverage of southwestern Nevada as available from the U.S. Geological Survey on open file as flown by Lockwood, Kessler & Bartlett, Inc., 1967, does not show any predominant magnetic feature in the vicinity of this indication and therefore this feature perhaps does not have any significance. It is predominantly outside of the Walker River Indian Reservation therefore it is beyond the scope of this report.

The significant magnetic zones within the area covered in the previous report of December 19, 1969 need no further discussion here in that they have been adequately covered in the previous report. The main significant zone not covered in the previous report is the Hottentot deposit area. From the airborne magnetic data this zone has a significant magnetic feature almost identical in shape, magnitude and gradients to that at Black Eagle South. The indicated magnetic susceptibility is 8900 x 10^{-6} cgs units reflecting a bulk average magnetite content of the order of three per cent magnetite by volume. The indicated depth below ground surface to the magnetic causitive structure is indicated to be the order of 800 feet. This interpreted

depth is in excellent agreement with the known depth to the dioritic intrusive body as determined by drilling and will be covered in more detail in a subsequent report. On the basis of the similarity in anomaly and interpreted susceptibility of 8900 x 10^{-6} cgs units for Hottentot as compared to 9800 x 10^{-6} for Black Eagle South, it would seem very reasonable that the Black Eagle South causitive body is the same dioritic material as is known at the Hottentot deposit.

In summary the only area of any possible significance not covered in the previous report of December 19, 1969 is the Hottentot deposit area and this area may deserve some further work before relinguishing rights in the Walker River Indian Reservation back to Walker-Martel Mining Company. In that much is already known about the Hottentot deposit and immediate area, no further comments are necessary here in that a discussion of the Hottentot data including ground data will be covered in a subsequent report. Based on the airborne magnetic data as flown by Aero Service Corporation in 1963 and some additional data obtained from an unknown source as recompiled by Lockwood, Kessler & Bartlett, a select few significant zones are clearly recognizable as indicating buried intrusive material and/or tactite zones. These significant zones are as follows: Calico Deposit, Little Calico, Terrill Mountains, Black Eagle South, Black Eagle North and Hottentot. The Calico deposit

and Little Calico areas have been adequately covered by other geophysical techniques as well as extensive geological investigations and drilling. No further work based on this study is anticipated in these areas.

Black Eagle South area has had induced polarization coverage and one drill hole has been drilled on an IP anomaly. No further work at this time is recommended at Black Eagle South.

Black Eagle North area appears to be predominantly a Tertiary volcanic indication and was covered on the ground with ground magnetics supporting this conclusion. No further work is recommended at Black Eagle North.

The Terrill Mountains area appears to be predominantly indicative of surface volcanic activity of such an extent that clear indication of any buried intrusive material is not really possible. As a consequence no further work can be recommended in this area.

The Hottentot deposit area has had ample ground magnetic coverage and some poor quality induced polarization resistivity coverage. It is anticipated that further work may be necessary here and this will be covered in a subsequent report. As far as the rest of the Walker River Indian Reservation is concerned,

no economic significance can be derived from the existing airborne magnetic data and on this basis no further work of a geophysical nature is recommended in the remaining portions of the Walker River Indian Reservation.

Respectfully submitted,

ELLIOT GEOPHYSICAL COMPANY

Charles L. Elliot

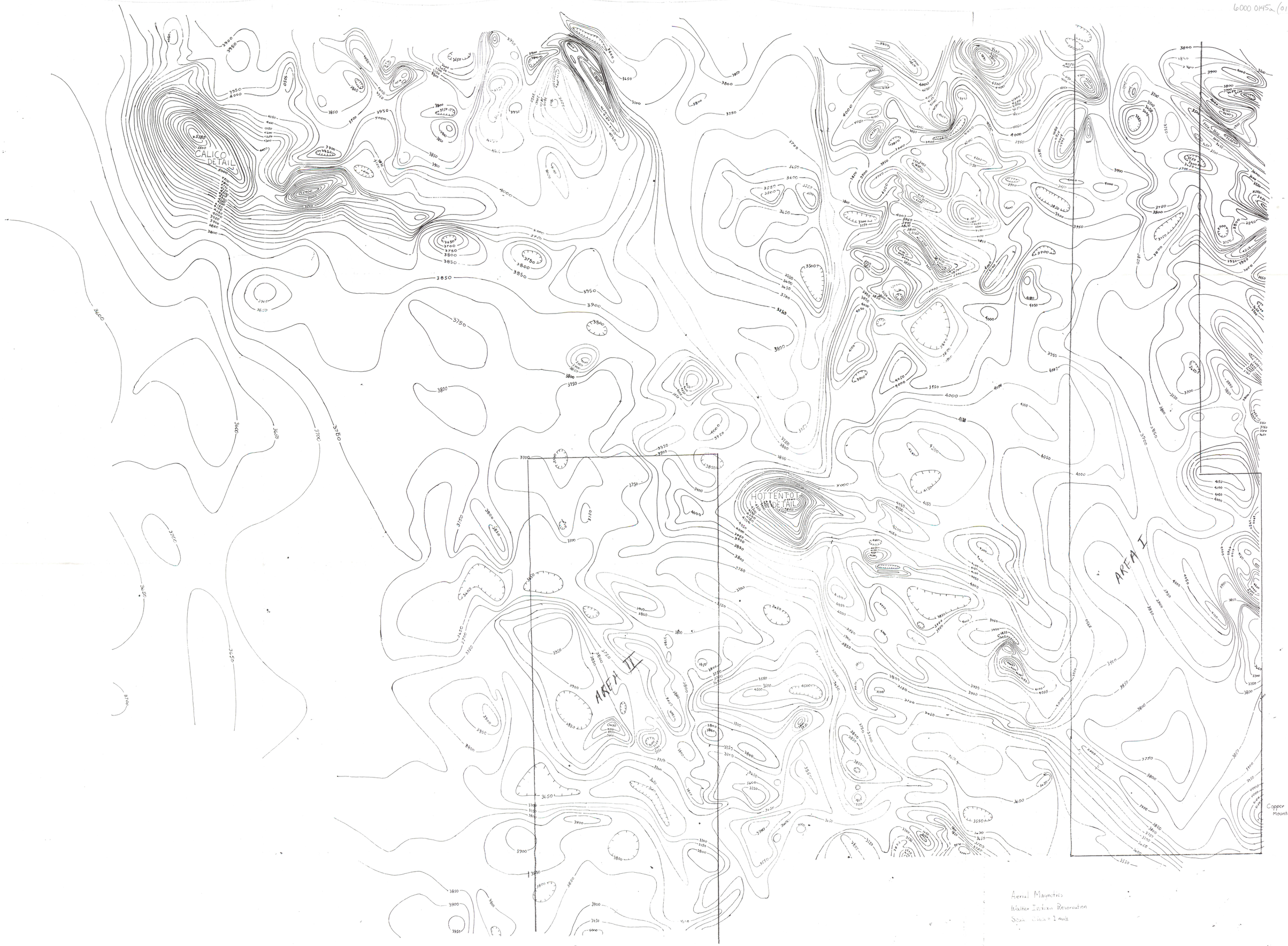
Charles L. Elliot
Registered Professional Engineer

Tucson, Arizona
May 28, 1970

Distribution: James A. Anderson
Arthur R. Still
John H. Volgamore

Attachment: Interpretation Overlay
Four Sheets - Aeromagnetic Data, 1 " = 1 mile
Four Sheets - Aeromagnetic Data, 1 " = 1/2 mile

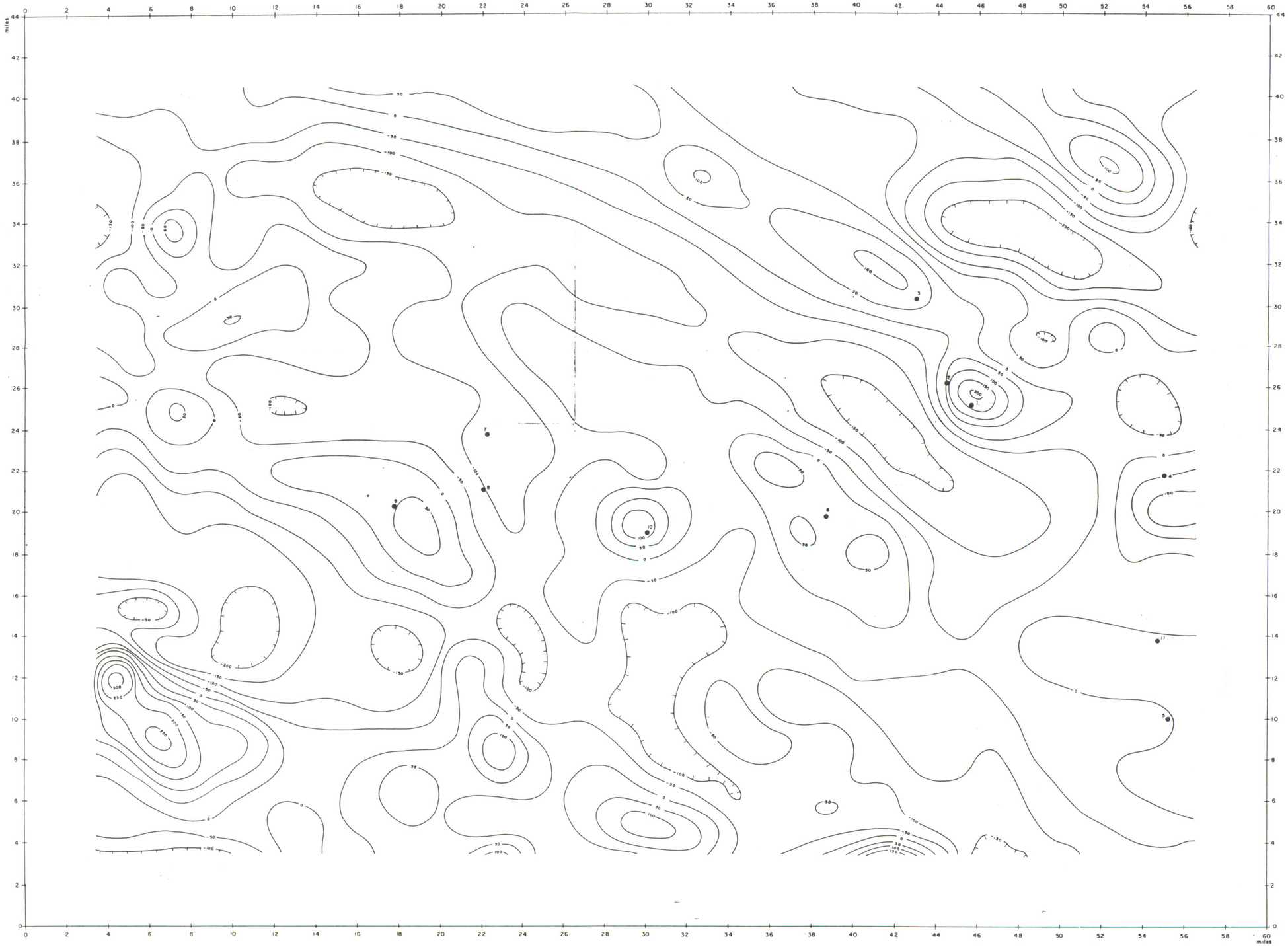
6000 0145a (0120)



Aerial Magnetics
Walker Indian Reservation
Scale: 1 inch = 1 mile

WM. L. WILSON
2[illegible] Thomas Jefferson Dr.
[illegible]

6000 0145b(0120)



LEGEND

●5 Location of known mineralization

OCCIDENTAL MINERALS CORPORATION

AEROMAGNETIC INTERPRETATION

PROJECT 1

WEST CENTRAL NEVADA

REGIONAL MAGNETIC COMPONENT

CONTOUR INTERVAL 50 GAMMAS

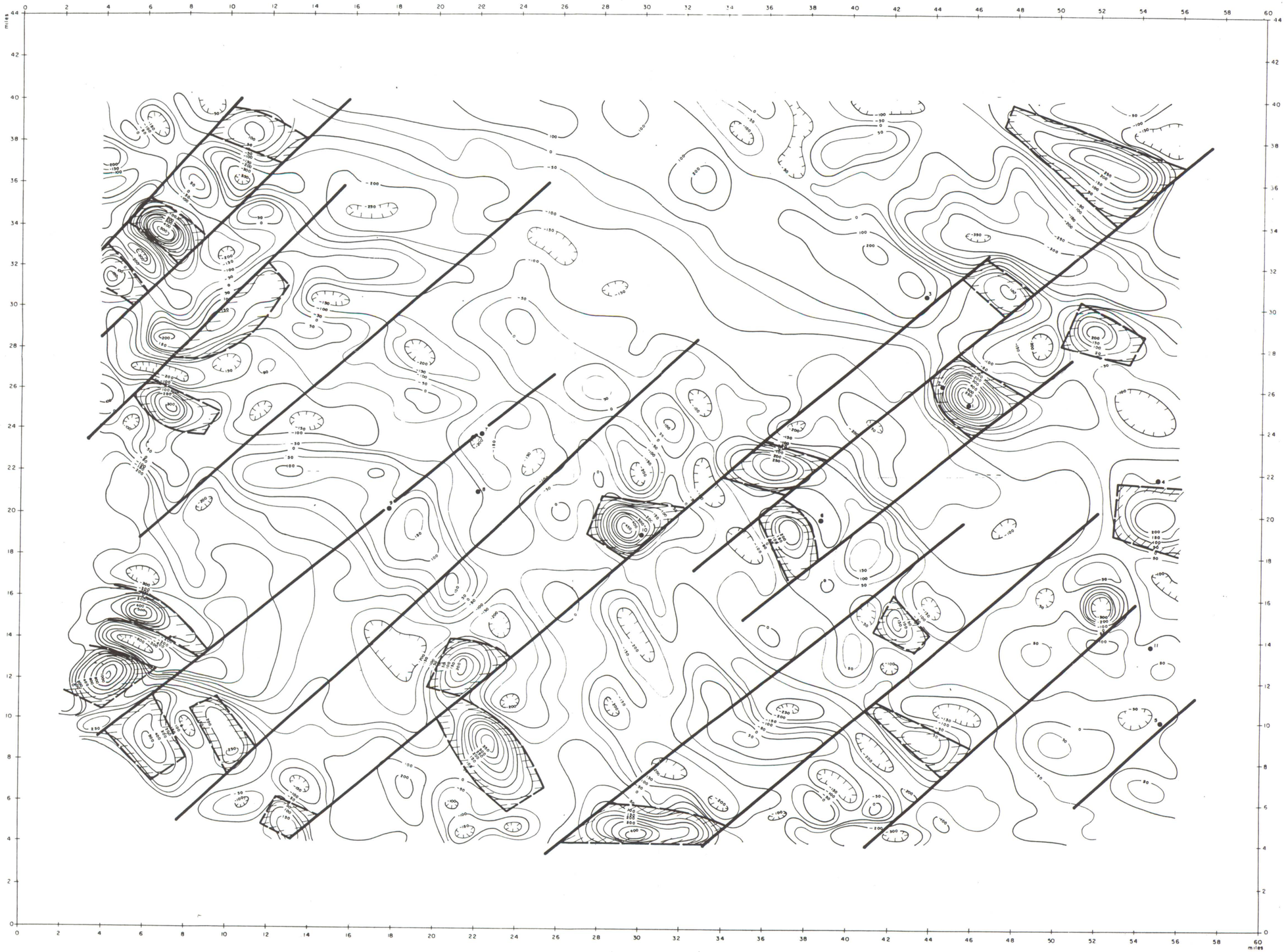
Scale

2 0 2 4 6 miles

Interpreted by
HUNTEC LIMITED, Toronto, Canada
February 1969
Job No PH1024/69

FIG. 4 #23

6000 014Ed (0120)



LEGEND

● 5 Location of known mineralization

Interpreted magnetic fault, inferred fault.

Zone of increased magnetization.

OCCIDENTAL MINERALS CORPORATION

AEROMAGNETIC INTERPRETATION

PROJECT 1

WEST CENTRAL NEVADA

DOWNWARD CONTINUED REGIONAL MAGNETIC COMPONENT WITH INTERPRETATION

Scale

2 0 2 4 6 miles

CONTOUR INTERVAL 50 GAMMAS

Interpreted by

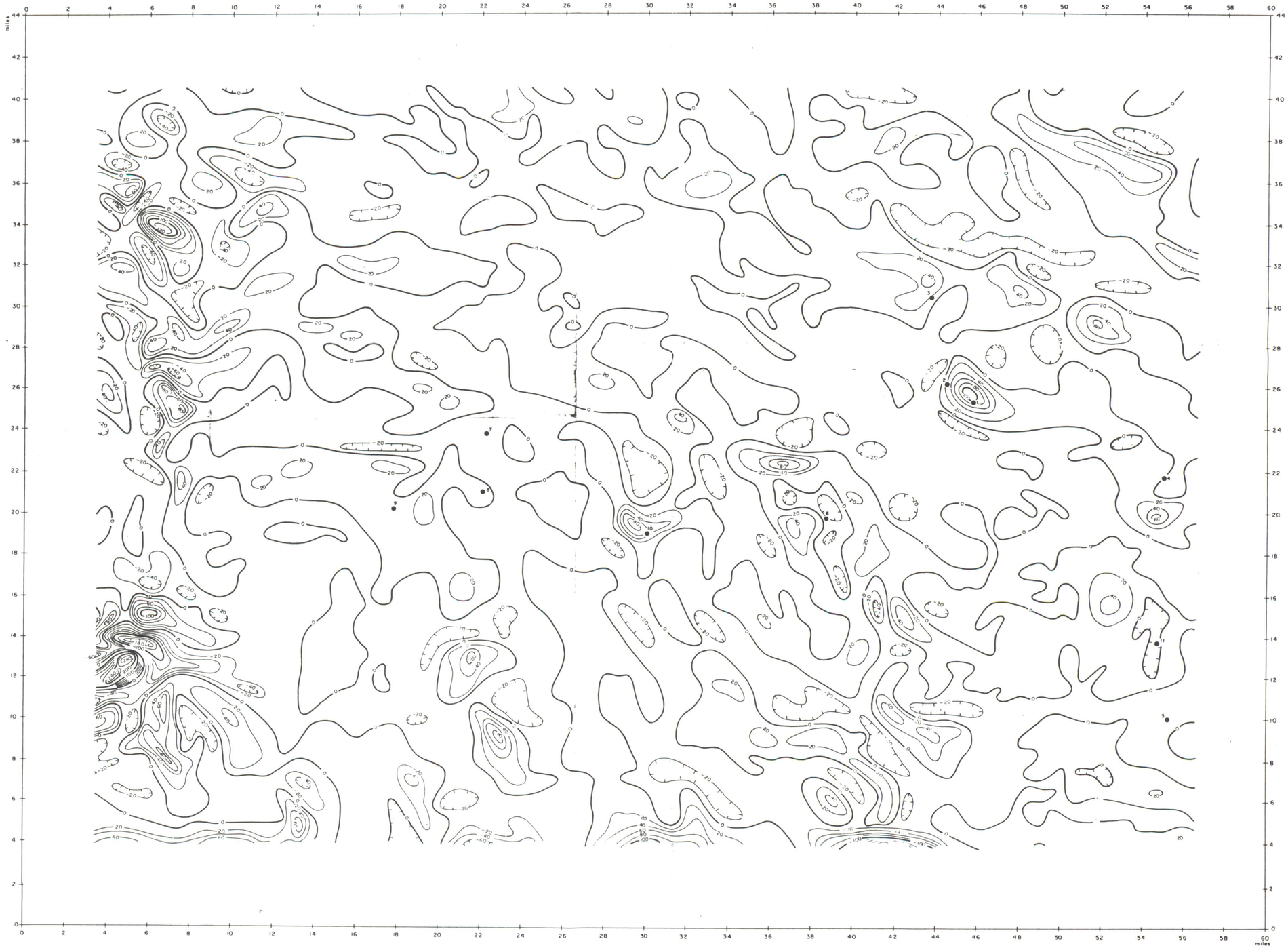
HUNTEC LIMITED, Toronto, Canada

February 1969

Job No. PH 1024/69

FIG. 6 #23

6000 0145e (0120)



LEGEND

● 5 Locations of known mineralization

OCCIDENTAL MINERALS CORPORATION

AEROMAGNETIC INTERPRETATION

PROJECT 1

WEST CENTRAL NEVADA

RESIDUAL MAGNETIC COMPONENT

CONTOUR INTERVAL 20 GAMMAS

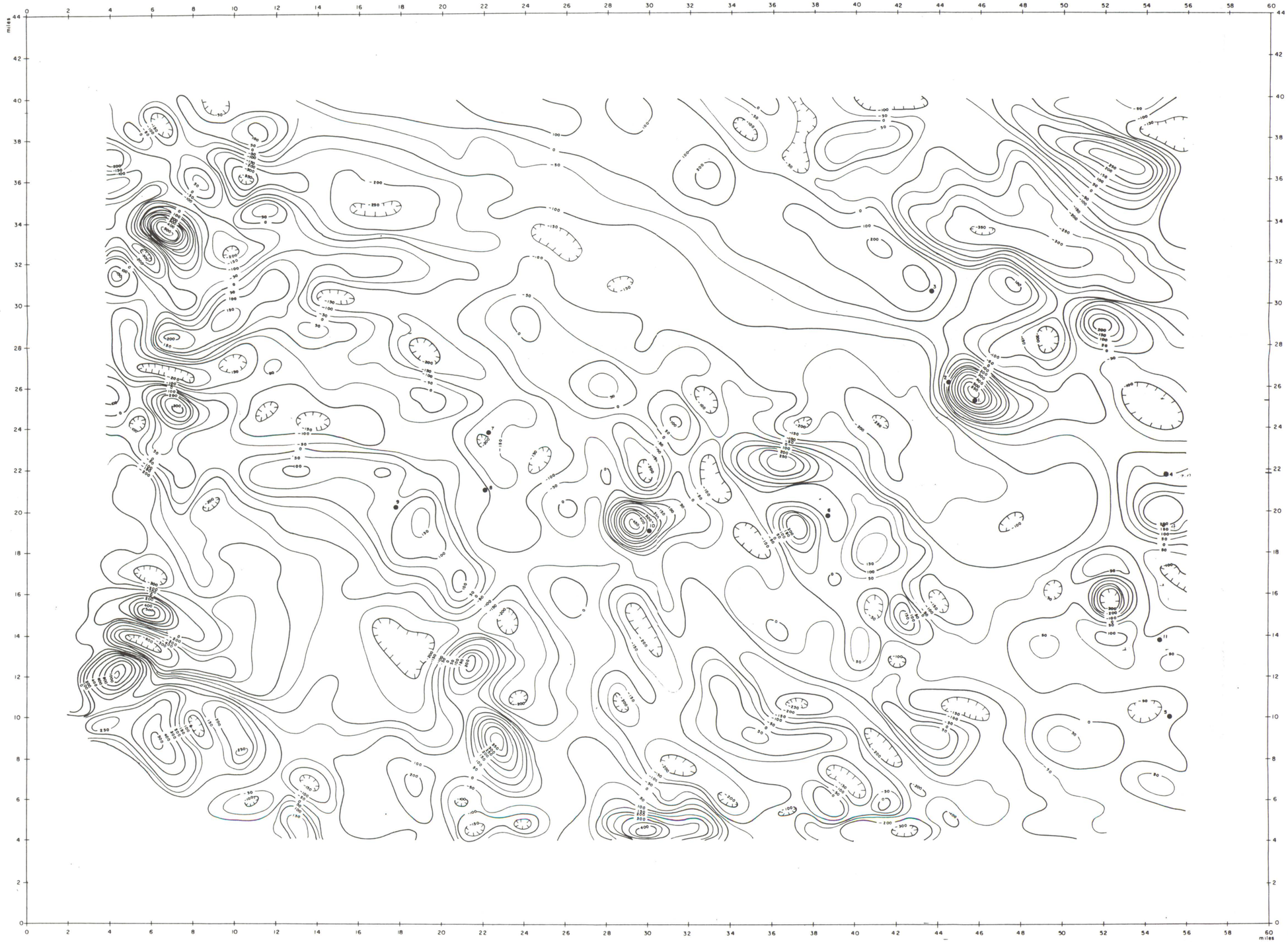
Scale

2 0 2 4 6 miles

Interpreted by
HUNTEC LIMITED, Toronto, Canada
February 1969
Job No. PH 1024/69

FIG. 7 (4-23)

6000 0145 (0120)



LEGEND

● 5 Location of known mineralization

OCCIDENTAL MINERALS CORPORATION

AEROMAGNETIC INTERPRETATION

PROJECT 1

WEST CENTRAL NEVADA

DOWNWARD CONTINUED REGIONAL MAGNETIC COMPONENT

CONTOUR INTERVAL 50 GAMMAS

Scale

2 0 2 4 6 miles

Interpreted by

HUNTEC LIMITED, Toronto, Canada

February 1969

Job No. PH 1024/69

FIG. 5.~~4~~29