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REPORT

INTERPRETATION OF INDUCED POLARIZATION,

RESISTIVITY AND GROUND MAGNETIC DATA

BLACK EAGLE SOUTH AREA

WALKER RIVER INDIAN RESERVATION

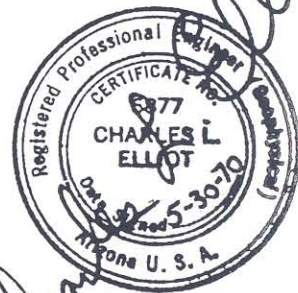
MINERAL COUNTY, NEVADA

PROPRIETARY

for

Occidental Minerals Corporation

Wheat Ridge, Colorado



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

Ref: OC9E

The Black Eagle South area within the Walker River Indian Reservation, Mineral County, Nevada was brought into prominence as an airborne magnetic feature resulting from the reinterpretation of the existing airborne magnetic data as performed by Lockwood, Kessler & Bartlett, Inc. in the fall of 1969. The results of this reinterpretation and specifically the interpretation of the Black Eagle South area based on airborne magnetic data was presented in my report of December 19, 1969. As a result of this interpretation of the recompiled data, it was recommended in my report of December 19, 1969 to perform a limited ground magnetic survey in order to locate this interesting magnetic feature on the ground and to test such apparent buried intrusive zone with selected reconnaissance induced polarization - resistivity lines. These recommendations were approved and such a program was begun shortly after the first of the year, 1970.

Pertinent references to which the reader should consult for further information on the Black Eagle South area are as follows:

1. Report - Interpretation of Airborne Magnetic Data,

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

2. Letter - To Dr. James A. Anderson from C. L. Elliot, May 19, 1970. Re: Physical Property Laboratory Determinations, Drill Core Samples, Drill Hole BE-1, Black Eagle South.
3. Report - 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, Ltd. report, A. V. Hardas and W. G. Wieduwilt, March 16, 1970.

The ground magnetic survey consisting of three long profile lines was run in the Black Eagle South area, Mineral County, Nevada located approximately in section 29, T 14 N, R 31 E. The prime purpose of the ground magnetic survey was to further examine the magnetic feature recognized in the aforementioned airborne magnetic data over the Walker River Indian Reservation as flown by Aero Service Corporation and to positively locate this feature for subsequent exploration activities. The ground survey was performed by John H. Volgamore, Occidental Minerals Corporation, Reno, Nevada using a McPhar Fluxgate Magnetometer type M-700 that was rented from Canadian Aero Mineral Surveys,

Ltd., Tucson, Arizona. This magnetic instrument measures the vertical field component of the earth's magnetic field.

The three lines surveyed by Volgamore were lines BES-1, BES-2, and BES-3. These lines are shown on the attached Interpretation Overlay and were oriented northeast-southwest and northwest-southeast, intersecting about the interpreted position of the magnetic body as interpreted from the airborne magnetic data. In all, 39,600 feet of magnetic profile line were surveyed. The ground magnetic profiles for the three lines surveyed are shown on the attached Ground Magnetic Profile Sheet at a scale of 1 inch = 1000 feet and 1 inch = 500 gammas.

The induced polarization - resistivity survey of the Black Eagle South area was performed in the spring of 1970 by Canadian Aero Mineral Surveys, Ltd., Tucson, Arizona under the direction of W. Gordon Wieduwilt, Manager. This survey was performed under the field direction of A. V. Hardas, field engineer for Canadian Aero Mineral Surveys, Ltd. under the supervision of C. L. Elliot, Mining Geophysical Engineer, Tucson, Arizona. The results of this survey were reported in the final Canadian Aero Mineral Surveys report dated March 16, 1970.

In all, nine lines were surveyed with the induced polarization



and resistivity methods and the lines surveyed and their positions and layout are shown on the attached Interpretation Overlay. All of the survey work was performed with the conventional inline pole-dipole array with a dipole length of 1000 feet and separations of the current pole and the pickup dipole of 1 to 6 times the dipole length. The resistivities were moderately good at Black Eagle South and therefore the data is of good quality.

Attached to this report are the following maps and sheets;

1. Ground Magnetic Profiles, Vertical Field, Black Eagle South area, Mineral County, Nevada for Occidental Minerals Corporation, Wheat Ridge, Colorado at scales of 1 inch = 1000 feet and 1 inch = 500 gammas, May, 1970.
2. Interpretation Overlay, Black Eagle South Area, Walker River Indian Reservation, Mineral County, Nevada for Occidental Minerals Corporation, Wheat Ridge, Colorado. Scale 1 inch = 1000 feet, May, 1970.

The prime purpose of the ground survey of the Black Eagle South area was to locate the magnetic feature derived from the airborne magnetic data firmly on the ground and to supply additional information about the magnetic feature in order to check the airborne interpretation. Further as previously

recommended, it was decided to cover the magnetic feature with reconnaissance induced polarization and resistivity lines such as line BES-1 and line BES-3 as shown on the attached Interpretation Overlay in order to determine if sulfide mineralization was in association with the postulated buried intrusive feature. After completion of this program it was discovered that an anomalous induced polarization response was noted off of the magnetic feature to the north and northwest and as a result, the induced polarization and resistivity program was expanded to adequately detail the anomalous IP feature. As a consequence nine profile lines in all were surveyed with the induced polarization - resistivity method.

The interpretation of the original airborne magnetic data yielded a solution for the postulated buried intrusive at Black Eagle South as having an average magnetic susceptibility of  $9800 \times 10^{-6}$  cgs units reflecting three to four percent magnetite by volume and buried at a depth the order of 1500 feet below ground surface. These magnetic properties definitely suggested intrusive and/or tactite material and as a result, the recommendation for further work was made by C. L. Elliot.

The initial ground follow-up work at Black Eagle South consisted of the aforementioned ground magnetic lines. This data particularly from lines BES-1 and BES-3 yielded an average solution

with a susceptibility of  $8000 \times 10^{-6}$  cgs units at an average depth the order of 1100 feet. This magnetic content would still suggest that the postulated buried intrusive feature contained the order of three percent magnetite by volume. As shown on the attached Interpretation Overlay the horizontal extent of the buried magnetic body based on the ground interpretation is quite restrictive as compared to the horizontal extent as derived from the airborne data. To the southeast at surface there are exposed young volcanics with some magnetic activity. Consequently, the airborne magnetic response probably in part was quite close to the ground solution and the two compliment each other quite nicely.

On the basis of the location of the magnetic feature and its restricted horizontal extent particularly to the southeast, lines BES-1 and BES-3 were initially surveyed with the induced polarization - resistivity method in order to ascertain if the postulated buried intrusive body contained sulfide mineralization of sufficient quantity to be of economic interest. Line BES-2 was not surveyed with the induced polarization - resistivity methods in that this line was located significantly off to the southeast of the magnetic feature as interpreted from the ground magnetic data.

As a result of the two reconnaissance induced polarization



lines an anomalous induced polarization feature was discovered off to the north and northwest of the buried magnetic feature. The outline of the anomalous induced polarization feature has been subsequently determined from a detailed survey by the induced polarization - resistivity method and is shown on the attached Interpretation Overlay. The horizontal extent of the feature is approximately 8000 feet by 3000 feet and buried at a depth of the order of 2000 feet. From the data it was interpreted that it had a true induced polarization response of 35 to 40 millivolt-seconds per volt reflecting a maximum possible of three to four percent sulfides by volume.

Normally other non-sulfide mineralization and structures respond to the induced polarization method and consequently, the actual sulfide content is usually less than the indicated maximum. Particularly in Nevada, it is a well known fact that many non-sulfide minerals respond, particularly in the young volcanics in northern Nevada. As a consequence, this target had finite limits and had about the right possible sulfide mineralization content and reasonable dimensions suggestive of a typical porphyry copper type of target. As a result this feature was recommended for drill testing and drill hole BE-1 shown in location on the attached Interpretation Overlay was drilled to test this induced polarization feature.



Drill hole BE-1 was drilled to a total depth of 2845 feet and adequately sampled the induced polarization anomaly as interpreted from the surface data. Drill hole BE-1 intersected volcanics and mudstones to its total depth. However, around 2150 feet a redded mudstone began and intermittently continued on to the total depth. As a result of this and with the possibility that this was the cause of the induced polarization anomaly, selected core samples were taken and run in the physical property laboratory of Elliot Geophysical Company, Tucson, Arizona to determine their induced polarization response and resistivity values.

The laboratory determinations of induced polarization and resistivity values were reported in my letter to James A. Anderson of May 19, 1970. The laboratory results indicated that the red mudstone tended to a high polarization response. On average the polarization response below 2150 feet was higher than above this elevation. Consequently, it was assumed that drill hole BE-1 had adequately sampled the induced polarization response and without any indication in the core of economic interest, the hole was abandoned at a total depth of 2845 feet.

The Black Eagle South project was an economic failure although in all sense of the word, a technical success. The recompilation of the airborne magnetic data yielded an obvious magnetic

intrusive feature deserving follow-up work. The follow-up induced polarization program located an anomalous feature in close association with the magnetic feature and of such a size and apparent possible sulfide mineralization grade to be a good porphyry type of target. One drill hole, drill hole BE-1 was drilled to test the target and yielded polarizable material at depth unfortunately of a non-sulfide origin within the volcanics and thereby the project was abandoned. This situation is more common than one realizes in northern Nevada and this type of condition with strong response to the induced polarization method makes exploration for copper targets in Nevada exceedingly frustrating and difficult. However, an induced polarization anomaly when discovered as in the case of Black Eagle South must be drilled and tested with at least one hole to ascertain whether it is a volcanic response or a sulfide response. Black Eagle South was thus an economic failure but truly a technical success.

Respectfully submitted,

ELLIOT GEOPHYSICAL COMPANY

*Charles L. Elliot*

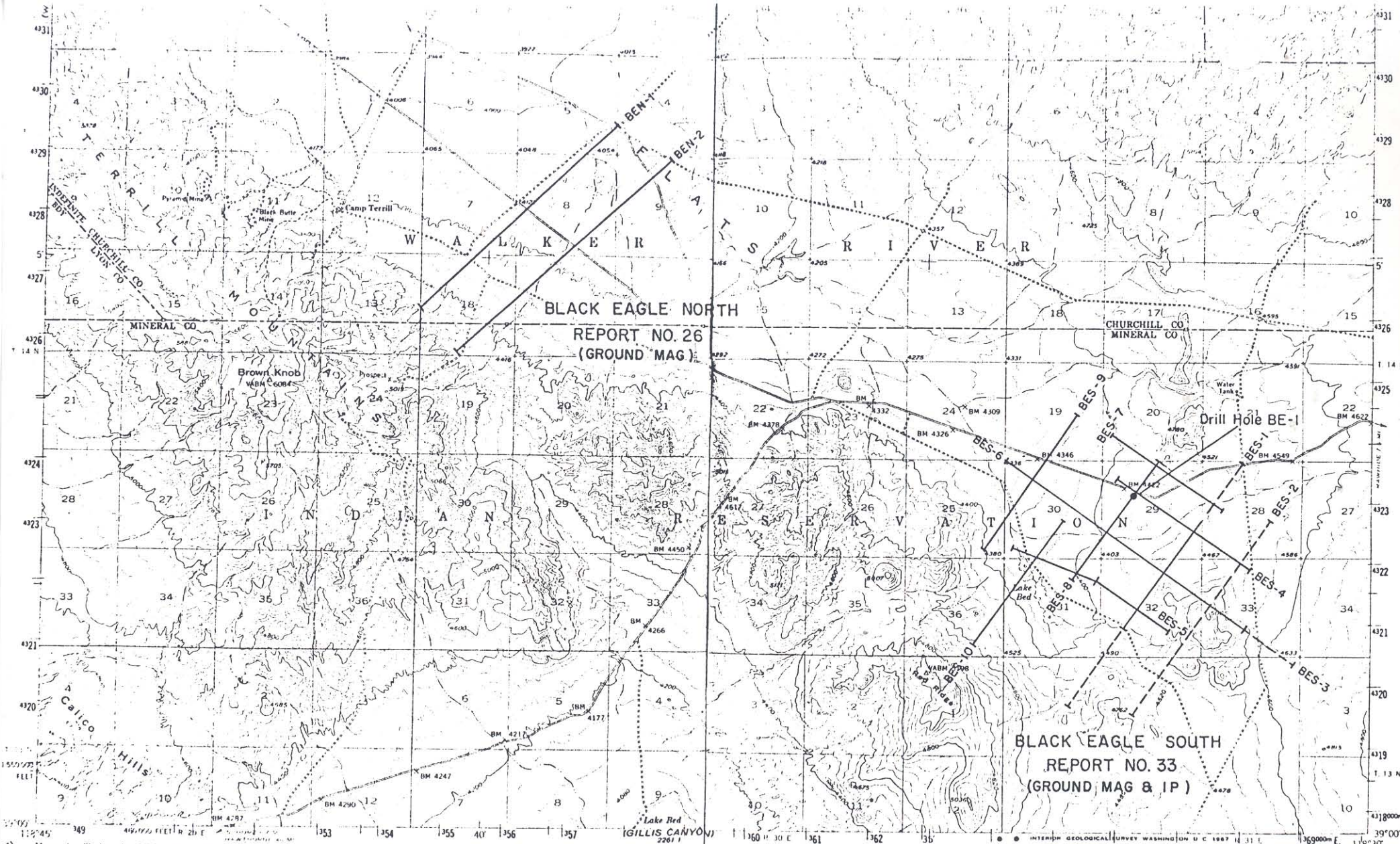
Charles L. Elliot

Tucson, Arizona  
May 30, 1970

Attachment: Interpretation Overlay  
Ground Magnetic Profile Sheet

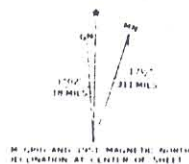
Distribution: James A. Anderson  
Arthur R. Still  
John H. Volgamore





Mapped, edited, and published by the Geological Survey

— IP Survey Lines  
- - - Magnetic Survey Lines



CONTOUR INTERVAL 40 FEET  
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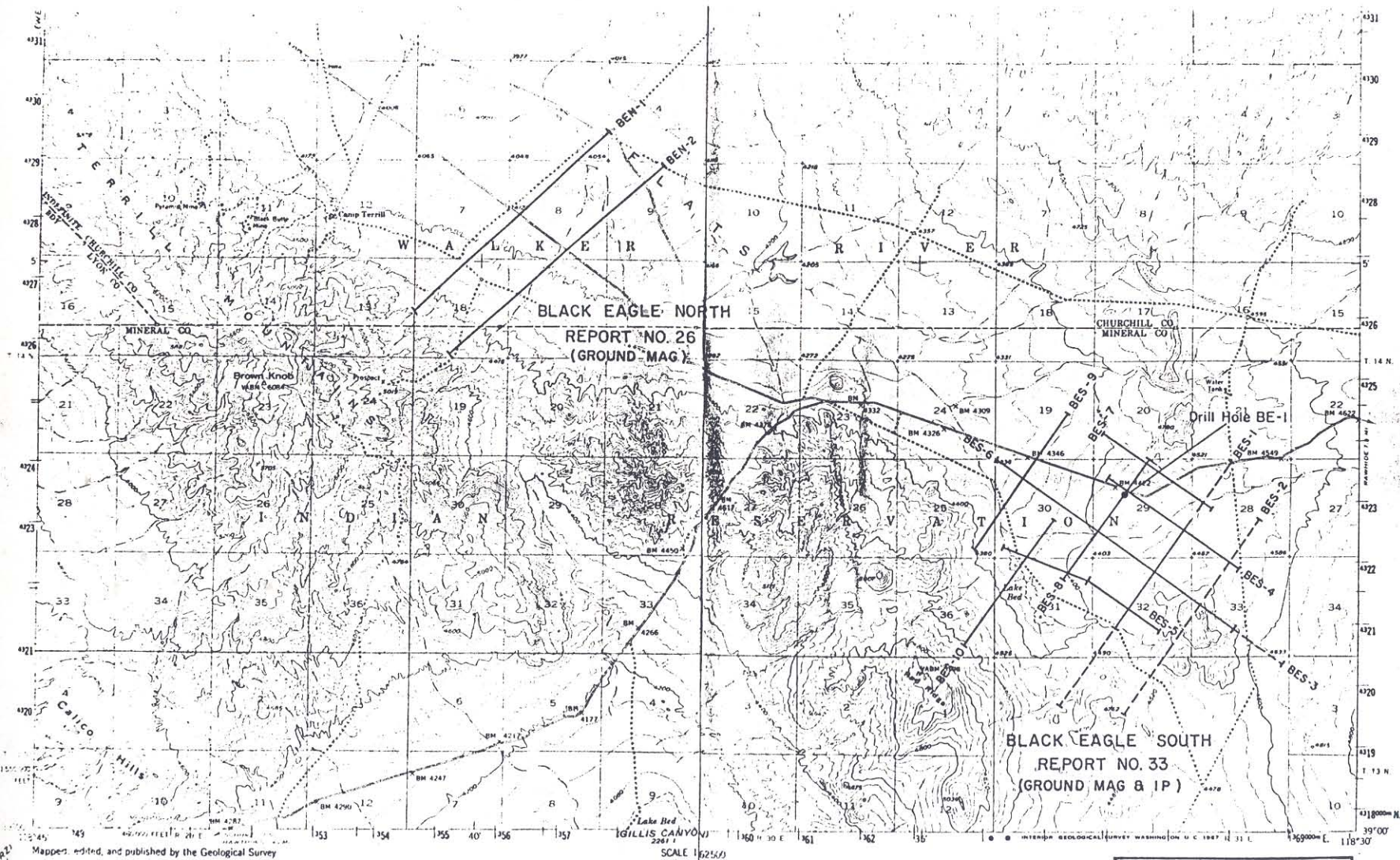
**OCCIDENTAL  
MINERALS  
CORPORATION**



**BLACK EAGLE  
WALKER RIVER  
INDIAN RESERVATION**

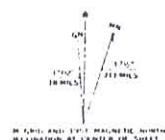
Map By <b>ELLIOT</b>	Date <b>MAY 1970</b>
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<b>BLACK EAGLE</b>		
<b>WALKER RIVER</b>		
<b>INDIAN RESERVATION</b>		
Drawn By: <b>ELLIOT</b>	Date: <b>MAY 1970</b>	
Edited By:	Date:	
To: <b>Company</b>	Received:	
	File:	



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R 30 E

R 31 E

23 24

19

20

21

22

26 25

BES-6

28

27

35 36

31

32

33

34

21

3

T 14 N  
T 13 N

BES-3  
14400 SW

BES-2  
13000 SW

BES-1  
15000 SW

11 12

# LEGEND

- IP Survey Lines
- Magnetic Survey Lines
- IP Anomalous Zone
- Magnetic Body (ground interpretation)
- Magnetic Body (airborne interpretation)



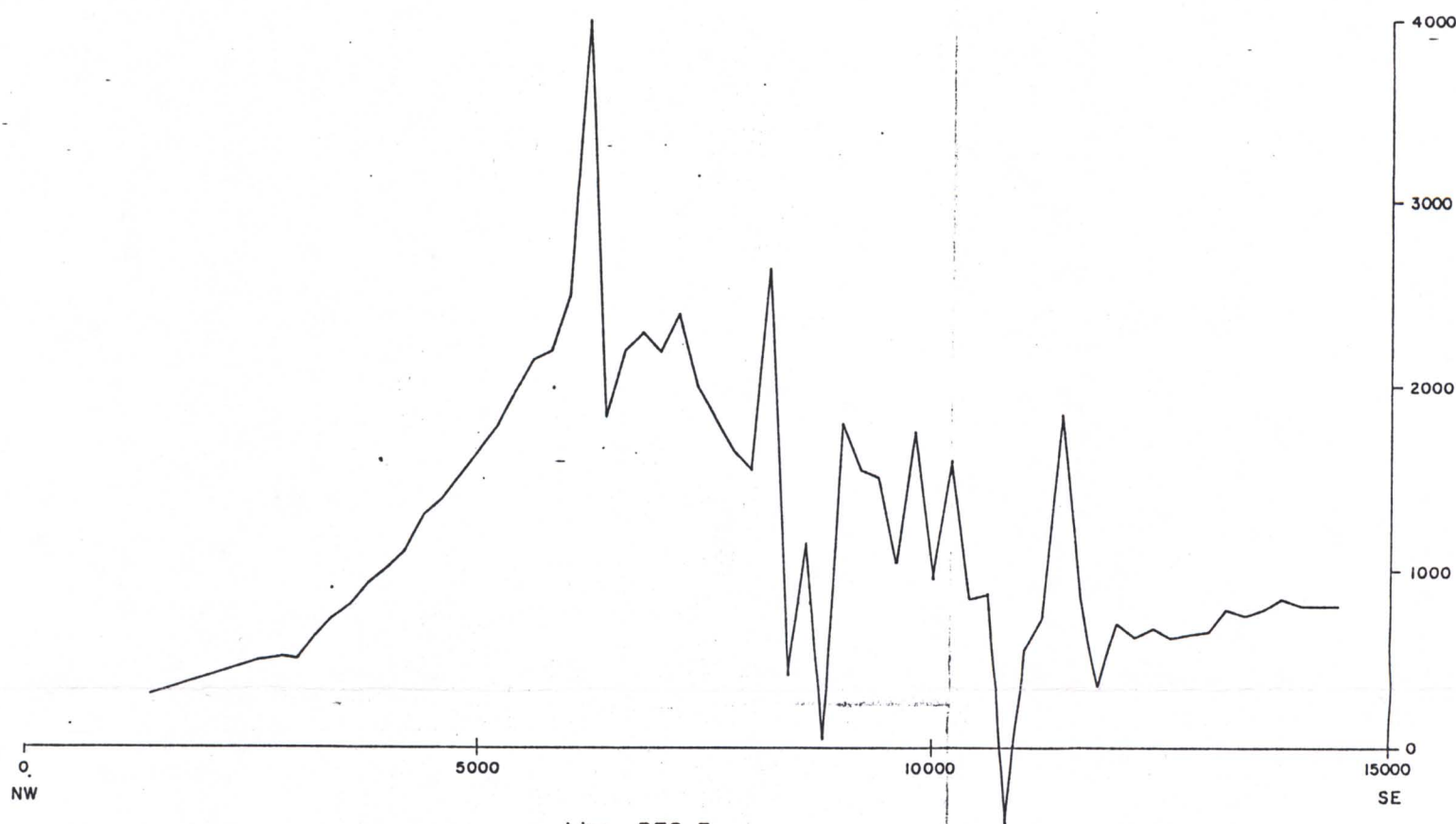
ELLIOT GEOPHYSICAL COMPANY  
Mining Geophysical Engineers  
Tucson, Arizona

INTERPRETATION OVERLAY  
BLACK EAGLE SOUTH AREA  
WALKER RIVER INDIAN RESERVATION  
MINERAL CO., NEVADA  
for  
OCCIDENTAL MINERALS CORP.  
WHEAT RIDGE, COLORADO  
Scale 1" = 1000' May 1970

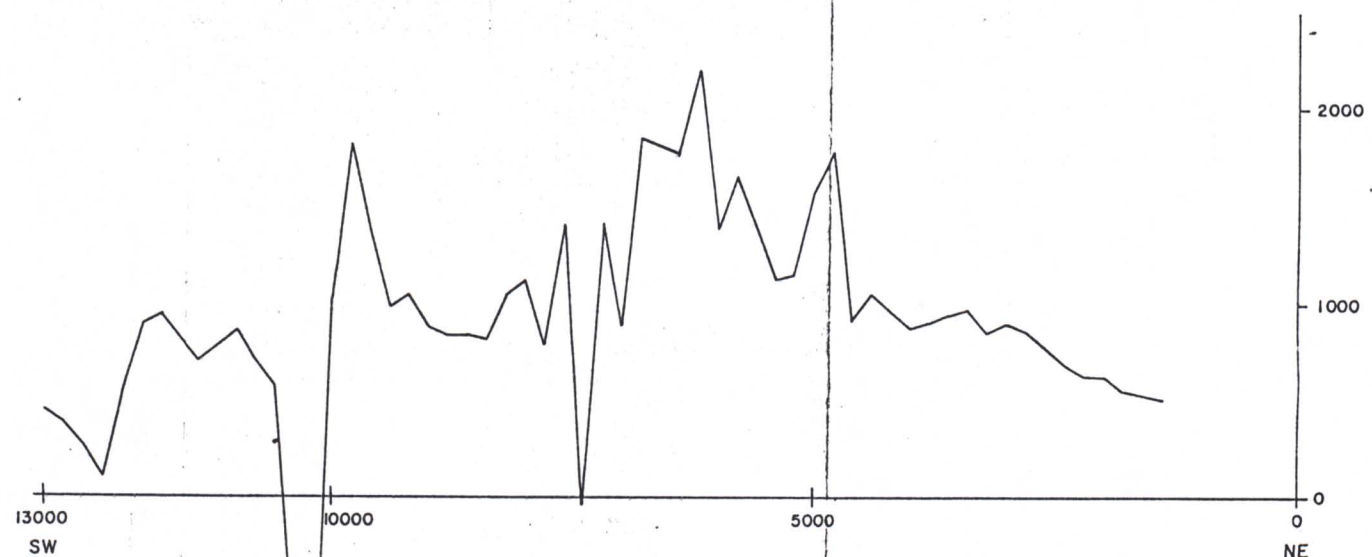
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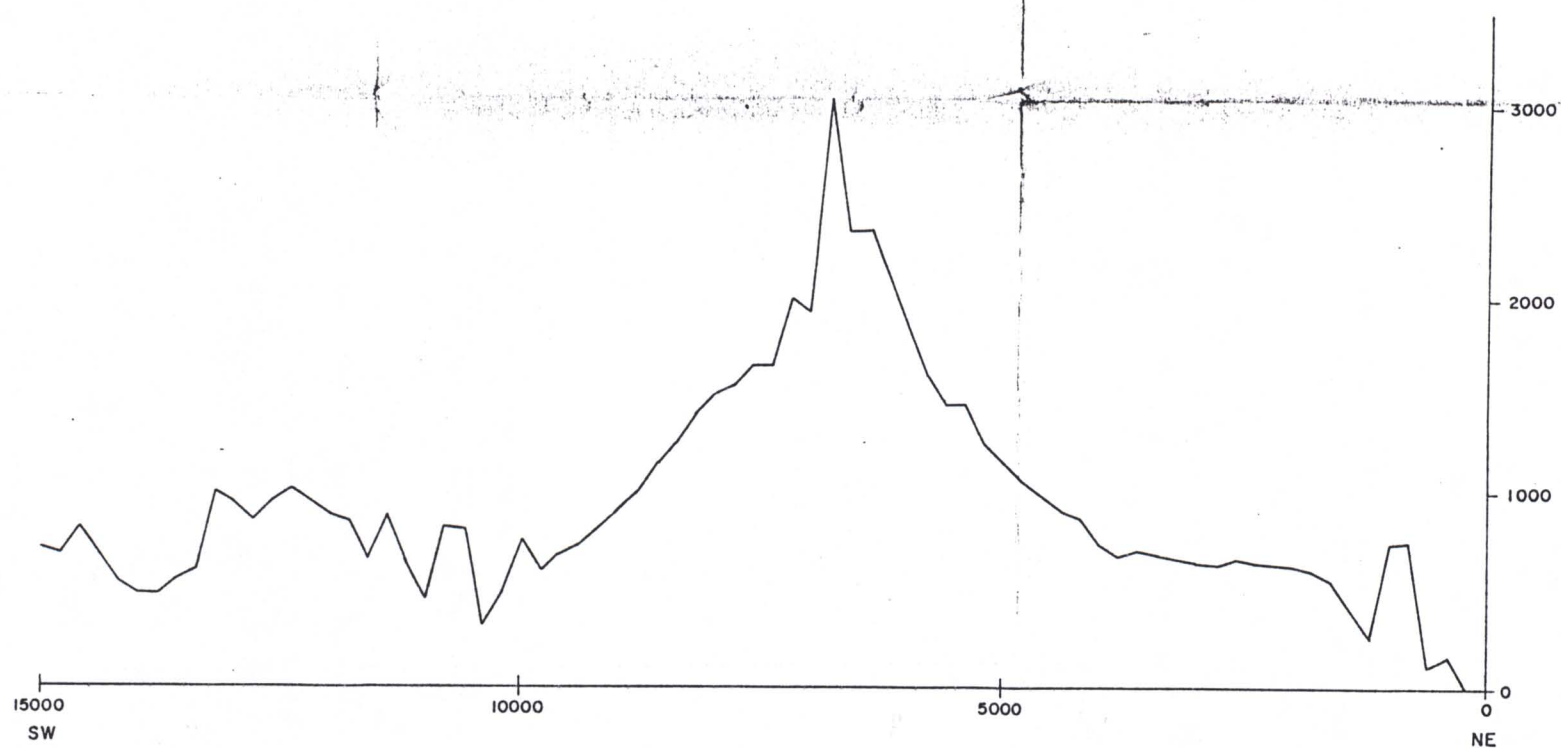
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Line BES-3



Line BES-2



Line BES-1

LEGEND

Data run by J.H. Volgamore with  
McPhar Fluxgate Magnetometer,  
Type M-700



ELLIOT GEOPHYSICAL CO.  
Mining Geophysical Engineers  
Tucson, Arizona

GROUND MAGNETIC PROFILES  
VERTICAL FIELD  
BLACK EAGLE SOUTH AREA  
MINERAL COUNTY, NEVADA  
for  
OCCIDENTAL MINERALS CORP.  
WHEAT RIDGE, COLORADO  
Horiz. Scale 1" = 1000' Vert. Scale 1" = 500 f  
MAY 1970

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