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Castaneda Spring

Aubrey Pk.

ARTILLERY MTNS.

Artillery Pk.

Alamo

MOHAVE CO.

YUMA CO.

Williams

T 12 N

T 11 N

T 10 N

R 15 W

R 14 W

R 13 W

INFORMATION

INDICATES MAGNETOMETER TRAVERSE

INDICATES MAJOR MAGNETIC ANOMALY

INDICATES MINOR MAGNETIC ANOMALY

NOTE

LAUSON & DARTON 1923 MAP SOURCE

CLEOPATRA MINE & CLAIM GROUP

ARTILLERY MTNS. MINING DISTRICT
MOHAVE COUNTY, ARIZONA

MAGNETIC SURVEY

(TOTAL INTENSITY, BY MOBILE MAGNETOMETER)

FOR

INSPIRATION CONSOLIDATED COPPER CO.

BY

HEINRICHS GEOEXPLORATION CO.

SCALE 1" = APPROX. 1 MILE TUCSON, ARIZONA

DECEMBER, 1960

Alamo Mojave County.
Insp. Cor Ca. Co. F

12/8/60

12.

Mo. Mag.

Mineral w/ Magnetite.

Best Western
Rancho Grande.

2 hr drive "
5 days.

Big Sandy
7 Mi to 93 from
4 M on "
Alamo X ing turn left
35.6 Mile to Alamo. on Rt
3 turnoffs. (4.4 mi, 6.1,
2.1 Mi after crossing river.
At Jade Mine Sign turn left for 7.8 Mi.

TOTAL INTENSITY AEROMAGNETIC MAP OF JEROME-PRESCOTT AREA, YAVAPAI COUNTY, ARIZONA

RELATIVE TO ARBITRARY DATUM

½ 0 1 2 3 4 Miles

Contour interval 50 & 250 gammas

Flown approximately 1000 feet above surfure

1950

Information

Base map by Brunton & Pace methods
by
Hugh Olmstead
Scale 1" = 500'
Interpretation by J.W. Marlatt

CLEOPATRA MINE AREA
MOHAVE COUNTY, ARIZONA
MAGNETIC SURVEY
by
MOBILE MAGNETOMER
DECEMBER, 1960

MAP Nº 1

Castaneda Spring

Aubrey Pk.

Artillery Pk.

Alamo

T 12 N

T 11 N

T 10 N

R 15 W

R 14 W

R 13 W

MOHAVE CO.

YUMA CO.

Williams

HILLS

RANGE

1150

1250

1000

2000

3000

A

B

C

D E F

G H

I

J

K

P

INFORMATION

INDICATES MAGNETOMETER TRAVERSE

INDICATES MAJOR MAGNETIC ANOMALY

INDICATES MINOR MAGNETIC ANOMALY

NOTE

LAUSON & DARTON 1923 MAP SOURCE

CLEOPATRA MINE & CLAIM GROUP

ARTILLERY MTNS. MINING DISTRICT
MOHAVE COUNTY, ARIZONA

MAGNETIC SURVEY

(TOTAL INTENSITY , BY MOBILE MAGNETOMETER)

FOR

INSPIRATION CONSOLIDATED COPPER CO.

BY

HEINRICHS GEOEXPLORATION CO.

SCALE 1" = APPROX. 1 MILE TUCSON , ARIZONA

DECEMBER , 1960

GEOPHYSICAL RECONNAISSANCE
by
MOBILE MAGNETOMETER

of

CLEOPATRA MINE CLAIM GROUP & SURROUNDING AREAS
T11 & 12N, R14 & 15 W, Mohave County, Arizona

December 1960

for

INSPIRATION CONSOLIDATED COPPER COMPANY
Inspiration, Arizona

by
HEINRICHS GEOEXPLORATION COMPANY
P. O. Box 5671 Tucson, Arizona

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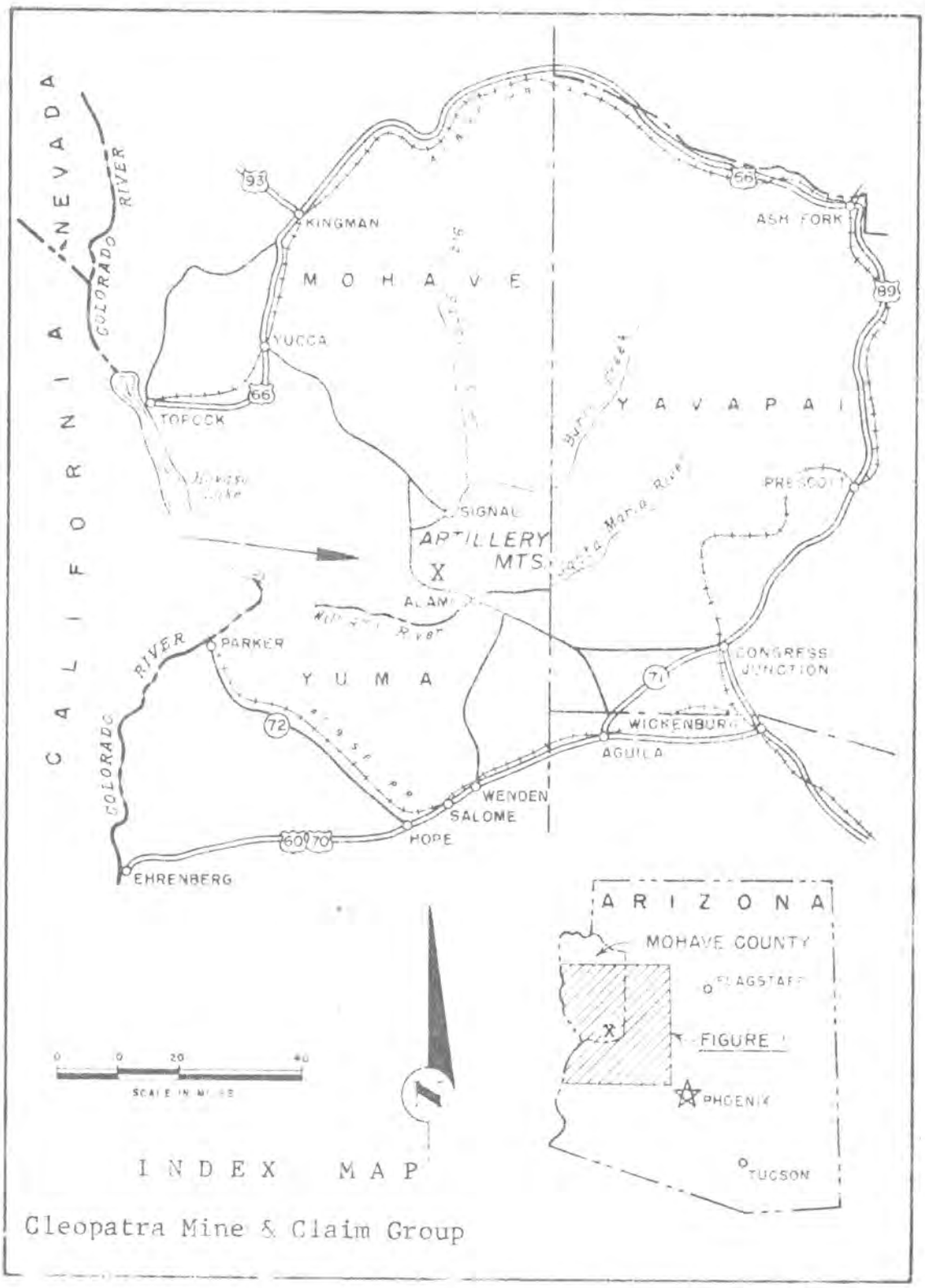
MAPS IN POCKET

1. Detail of area around Cleopatra Mine with relative magnetic values in color 1" = 500'

2. Regional coverage with major anomalies and/or anomalous areas spotted. Scale 1" = 1 mile approx.

3. Original Mobile Magnetic Records



Cleopatra Mine & Claim Group

INTRODUCTION

At the request of Mr. Hugh Olmstead on December 8, 1960 the mobile magnetometer with a two man crew, Mr. J. W. Marlatt and Mr. N. P. Estrada, was sent on December 9, 1960 to the Artillery Mountains Mining District, Mohave County, Arizona to make a magnetic reconnaissance survey of the Cleopatra Mine claim group and surrounding areas. Records were obtained on December 10, 12, 13, 14 & 15, 1960 and the crew and vehicle returned to Tucson in the afternoon and evening of December 15, 1960. A total of just over 100 miles of continuous total intensity magnetic profiles were obtained.

Mr. Walter E. Heinrichs, Jr. also visited the area for a day and a half to obtain visual aids on the ground of geology and rock types in order to assist in evaluating the magnetic results and determining the potential for other geophysical applications.

CONCLUSIONS

Lack of strong past production or known deposits of definite economic interest in the area precluded any good relative evaluation or correlation of the results. Definite anomalism associated with the Cleopatra Pit was technically encouraging. However, since this may represent a marginal or sub-marginal occurrence, the absolute value of the correlation is subject to some doubt. On the other hand, some of the other anomalies do

suggest a fair strength and distribution of possible contact metamorphic origin (later evidence also suggests diorite and diabase), which could relate directly or indirectly to major mineralization possibilities somewhere in the vicinity. Or if any of the anomalies or part of the trend could be proved economically, then the whole known trend and any others in the area would take on much greater significance.

Other than this, no apparent direct magnetic evidence of the location of a major intrusive mass was noted, but this does not mean that one does not exist. Geologically, a little garnetiferous rock was noted, but nothing of major size or intensity of development.

Reported airplanes, with instrument "birds" hanging beneath, suggest others may be interested in the magnetic picture of the area. Also, Fred Howell, Duvall chief geologist, stated he was interested in the apparent copper - hi iron association noted in the area.

Besides results showing magnetic correlation over known mineral showings, there was also considerable varying anomalism in the whole district. Several anomalies were found along a zone extending northwest from the Cleopatra Mine area, indicating a possible trend, with broader and higher anomalism to the northwest. It was not possible, due to terrain conditions, to obtain all the coverage desirable to confirm this trend and conditions causing it. However, Mr. Olmstead has stated finding considerable

magnetite in zones of diorite or diabase about 300' - 400' wide in this area, which at least in part, is very likely the cause. Further confirmation of this can probably be obtained by detailed comparison of the related magnetic and geologic locations.

There is a possibility that the anomalism around the Cleopatra Mine is different and not directly related to the four other anomalies to the northwest. There may be a southwest-northeast fault somewhat along the wash west of Cleopatra extending southwest beyond Fishers Camp. If so, there may be a cross fault intersection at or near the Cleopatra which could be a more paramount cause of ore locus, rather than direct factors only related to the magnetic concentration.

Several other sizeable anomalies were found in the survey. Their geological and potential mineralization significance is unknown and this should be checked on the ground.

The limestones and other sedimentary rock types in the Cleopatra area show a higher background of magnetic anomalism than is usual, and the schist, surprisingly, showed lower than usual. Thus there is not the sharp, or easily visible change in level on the records that is often found when crossing from one of these kind of broad rock types to another.

Part of the geology of the area is reportedly controlled by thrust faulting and preliminary evidence indicates contact metamorphism along the northwest trend on which the sharper

magnetic anomalies were found. Possibly, fringe effects of a large contact metamorphic zone are the cause of the relatively high concentration of magnetite in the limestones. There is also some suggestion that the magnetite may have concentrated in or along certain beds of the limestone and/or along the inferred thrust fault edges or contacts.

The magnetic work to date has not completely revealed any picture as to potential ore deposition, but has furnished some correlating evidence and leads as to structure and mineralization. Continuing evaluation of the property may bring to light additional and important information which may revise the present magnetic interpretation with results being either less or more favorable. Consequently, it is strongly recommended that we be kept informed of additional results and thinking as the work progresses.

RECOMMENDATIONS

Time being of the essence on the Cleopatra group option, our thinking is as follows:

1. Enough local geologic work to be done immediately on rock types, structure and alteration so as to either reject the property entirely or proceed with a more complete, phased evaluation. It is our understanding that a survey along these lines is presently being made. Of potential significance is the coloration, possibly of alteration to the north of the Cleopatra.

2. The areas of more favorable appearing magnetic anomalism

should be studied against their geologic backgrounds. This can be done in the office, but a more accurate and rapid evaluation can be made by taking the magnetic records on the ground and locating the exact areas of interest and closely observing the ground on and around them. This is particularly true of four areas of higher anomalism northwest of the Cleopatra, but three other areas (west of Fisher's Camp, a mile or two north of the Cleopatra, and the area east of the Kennecott claim group) should also be looked at.

3. In lieu of the above, and unless you have already formed other geological interpretations, no better drill site on the Cleopatra group than the center of the exposed Cleopatra mineralization was revealed by the geophysical work to date, and therefore should be the first site considered.

3b. An alternative to 3 above is to consider further geophysical work to more accurately delimit the character and extent of the exposed Cleopatra mineralization or any related mineralization nearby, such as the postulated structural zone involving the possible "200' - 300' breccia fault", and related "400' - 500' limestone section".

3c. Decision as to which of the above is preferable should be based in part on information and type of target to be expected and related expenditure involved. Sufficient hand magnetometer work to delineate the magnetic zone over and around the Cleopatra

Mine would take 3 to 5 days field work and 2 to 3 days office work at an order of $850.00 - $1250.00 cost. The aim of this would be to locate the point of maximum magnetite concentration as a potential drill target in comparison with the known mineral exposures. Feasibility will depend on the degree of direct magnetite-ore association which is indicated as being favorable in this local spot, but which may not be so elsewhere.

A more direct (but more expensive) determination of mineral concentration (sulfide) can be made by electrical work--especially induced polarization. This would apply particularly to the (deeper?) lime section-fault zone, or altered area to the north. Reconnaissance coverage of about 500 acres would take 5 to 8 days in field and 6 to 7 days in the office at the order of $2,500.00 to $3,500.00. A few trial lines of self potential reconnaissance and possibly geochem soil samples might be worth consideration, especially since this can be done relatively inexpensively at about $150.00 per line mile each.

4. If the area to the northwest of the Cleopatra (anomalies "G" & "H") appears to have geologic significance and any show of mineralization, open ground there should be staked with claim locations to hold them for at least 90 days until it can be further evaluated. A few hand magnetometer reconnaissance lines would help pin down where to locate these claims. Otherwise, follow up geophysical work would apply similarly as discussed in relation

to the Cleoparta area.

5. Consider the anomalous areas west of Fisher's Camp. (Anomalies "D", "E" & "F")/

6. Take a close look at the remaining two areas, which apparently are held by other party valid claims. Anomalies "C" & "K".

7. If enough interest is generated by the above, consider an airborne magnetometer survey so as to locate other anomalous spots that could be gone over in detail on the ground. Cost of this would be approximately $20,000.00.

RESULTS

The magnetic anomalism obtained may be divided into several categories:

1. Minor broad highs or lows with maximum variation on the order of 50 gammas over several hundreds or thousands of feet. No interest at this time until or unless geological work should prove them significant.

2. Considerable rapid variations across some rock types, especially schist, with variations on the order of 100 gammas. Customary and not considered otherwise significant at this time.

3. Short sharp anomalies of a couple hundred gammas. Dike, vein, seam or fissure-filled magnetite. May or may not have associated copper. Near surface, probably exposed, a few inches to a few feet in width. No special direct significance in relation

to major ore deposition.

4. Isolated anomalies of moderate size. 100 - 200 gammas, 100 - 500 feet across. Possible significance and would bear ground investigation. Might be corner or fringe of larger anomalous area. Secondary importance at this time but probably should not be entirely overlooked.

5. Zones of anomalism of 100 plus gammas over known areas of mineralization and old workings. Prime importance for ground checking and possible follow up with a hand magnetometer.

6. Zones of highest anomalism found, on the order of 400-600 gammas over several hundred feet. In some cases we believe they were crossed at a relatively shallow angle to the strike and therefore do not have as much width as the record might otherwise suggest. Of prime importance and should be ground checked immediately if not already done.

These, in part, may be due to diorite - diabase since reported by Hugh Olmstead.

<u>Anomaly "A"</u> Record # 2, a zone of anomalism or a series of anomalies traversed for approximately one quarter of a mile across Cleopatra Mine with variations up to 150 gammas and some suggestion of easterly dip component and/or step faulting down in a westerly direction. Probable source 0' to no more than 100' deep. Known to be related to Copper mineralization.

Anomaly "B", Records #3 & #10. A broad high probably obliquely traversed for approximately 3,000', northwest of where drill was working. True width unknown therefore depth or width not determinable. Complex variation suggests possibility of being either exposed or relatively shallow. Weak copper mineralization, garnetization and old workings observed.

Anomaly "C". An anomaleous area picked up on Records #3, #30 & #33. Not enough coverage except to say there is an area around and near a recent camp and some old prospect workings that features a broad low, with a possible contact metamorphic zone at a fault contact. This area is a mile or two north of the Cleopatra. Some of the broad lows could represent altered intrusive among other things, including broad rock formational changes.

Anomalies "D", "E" & "F". Record #6. Two to three miles southwest of point 13. Isolated highs of 125-150 gammas each. Probably fault and/or contact zones. Definitely caused by magnetite. Depths of 100 to 200 feet or less. Other mineralization in area unknown. Would bear more investigation.

Anomaly "G". Record #18. West of Lomalino's (spelling?) claims and west of air strip, approximately a mile. Broad zone of erratic, high anomalism. About 2/3 of a mile as driven, probably at least 2000 feet wide. Must have high but erratic magnetite content. As reported later by Mr. Olmstead, may be a

diabase or diorite intrusion. If not itself mineralized, the contacts or borders of it might be.

Anomaly "H". Record #18. A symetrical anomaly of 300 gammas. Probably fault contact with high magnetite. Nearly vertical with slight dip to south. Near and just north of limestone beds tilted nearly vertical. Mineralization in area unknown but worth ground checking.

Anomaly "I". Record #19 & #25. In wash south of landing strip. Probably crossed nearly normal to strike. Anomalous zone of 1500 feet width. Erratic record suggests varying magnetite contant. Variation to 350 gammas. May be diorite or diabase intrusion. Other mineralization in area unknown.

Anomaly "J". Record # 20 & #23. A pocket in low hills in a wash. In driving there were several direction changes right over the anomaly so it is a narrower feature than shows on the record. 500 gamma deviation. May be a nearly vertical feature and may also be the diorite or diabase intrusion. Some minor old prospect holes on or nearby.

Anomaly "K". Record # 31. Several miles east of the Cleopatra area and east of the Kennecott group. Road following a gap between hills so might be following a fault and therefore the anomaly crossed at shallow angle to strike. 400 gamma deviation. Near surface cause and appears possibly to be rather vertical. Good copper showings in workings a few hundred feet south. Close

examination here might aid in interpreting other anomalies closer to the Cleopatra.

Of the various broad highs and lows, one might be mentioned at this time as having possible significance, this centers about at point 13 and is on the order of 75 gammas at its highest. From here the level drops slowly and gradually in all directions for many hundreds of feet. This is an open area of essentially alluvial cover. Among several things, a basement high may be indicated, possibly a relatively deep intrusive, a pediment zone or merely interformational variation.

Finally, it must be emphasized again that many other anomalous areas on the records might become more significant as more information on the area becomes available in the future.

PROCEDURES

Most of the roads in and around the Cleopatra area were driven as well as some bulldozed trails and large washes. Occasional cross-country runs were made but the terrain is in general too rough for much grid-type coverage. Due to frequent constant changes of direction it was not possible to keep much better track of direction than the approximate quadrant. Distances were obtained by the foot survey meter which is connected to the vehicle speedometer drive. Road intersections were noted as well as section corner and quarter corner markers where encountered. When it became obvious that ground location was to be a serious

problem, because of inadequate maps of the area, an improvised system of tying numbered flags at certain points was used. These were keyed to the record and Mr. Olmstead prepared a Brunton and tape surveyed map locating many of these points.

The first record was made on our customary reconnaissance scales of 400 gammas to the inch vertically and 400 feet to the inch horizontally, which was found not to give sufficient detail. Therefore all other records were made at scales of 100 gammas per inch vertically and 200 feet per inch horizontally. The records were numbered consecutively and are labeled at the start of each one. Arrows indicate the direction run. High values are to be the right or top of the paper, low to the left or bottom. Traverses are shown very approximately on Map #2 which is blown up reproduction of an unpublished Darton quadrangle. Changes in values are plotted in a color code on Map #1 which thereby also shows the traverses in the vicinity of the Cleopatra Mine more accurately plotted.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

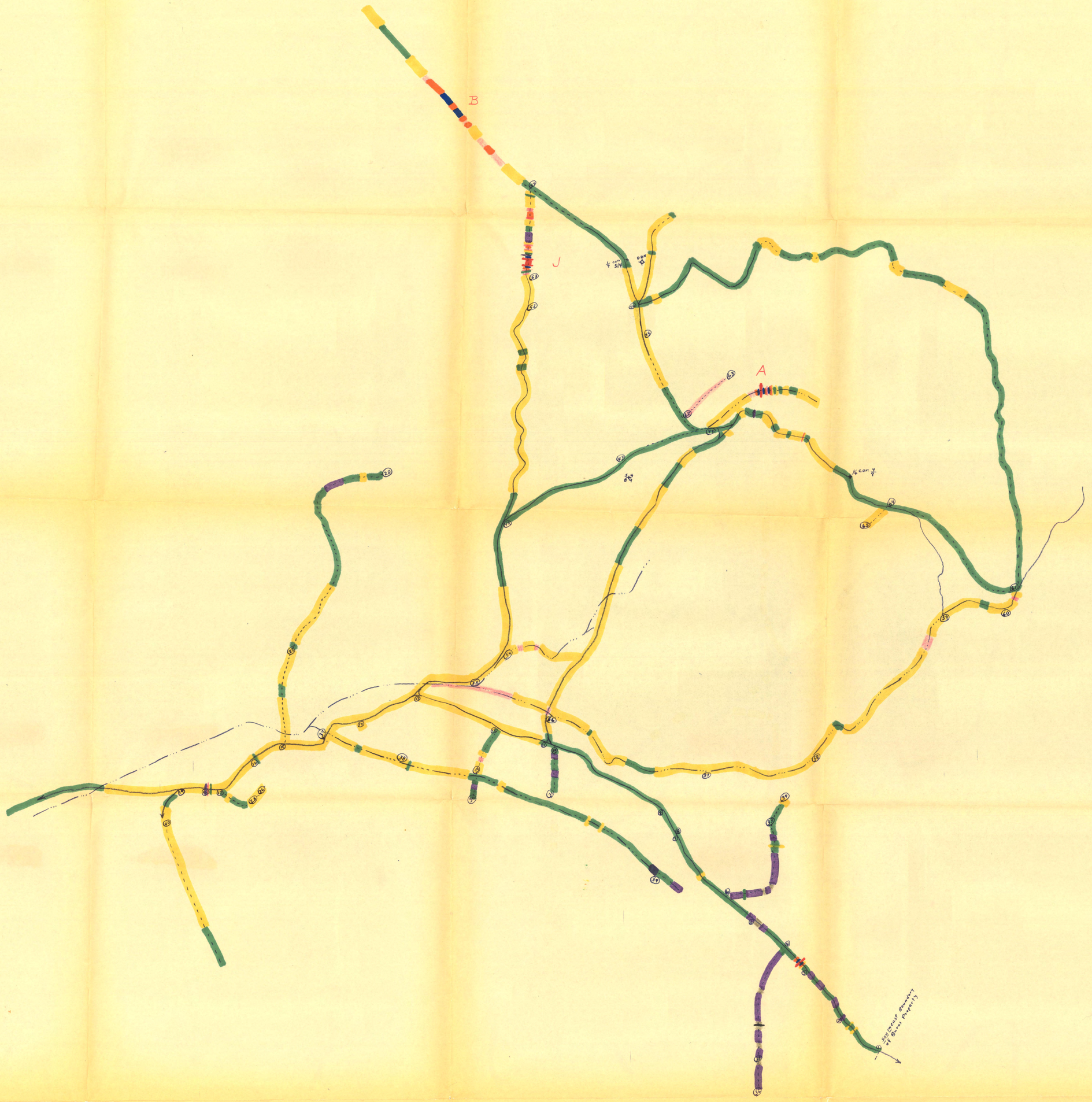
John W. Marlatt

J. W. Marlatt, Geologist

Revised & Approved:

Registered Professional Engineer (Mining) CERTIFICATE EXPIRES DEC. 31, 1961 WALTER E. HEINRICHS, JR. ARIZONA U.S.A.

Walter E. Heinrichs, Jr.
President & General Manager



Information

BELOW 850 GAMMAS
850 - 900
900 - 950
950 - 1000
1000 - 1050
1050 - 1100
1100 - 1150
1150 - 1200
ABOVE 1200 GAMMAS

A — INDICATES ANOMALY OF MAJOR IMPORTANCE
20 — INDICATES REFERENCE POINT

Base map by Brunton & Pace methods
by
Hugh Olmstead
Scale 1" = 500'
Interpretation by J.W. Marlatt
HEINRICHS GEOEXPLORATION CO.

CLEOPATRA MINE AREA
MOHAVE COUNTY, ARIZONA
MAGNETIC SURVEY
by
MOBILE MAGNETOMER
DECEMBER, 1960

MAP Nº 1

INFORMATION

INDICATES MAGNETOMETER TRAVERSE

A INDICATES MAJOR MAGNETIC ANOMALY

INDICATES MINOR MAGNETIC ANOMALY

NOTE

LAUSON & DARTON 1923 MAP SOURCE

N

CLEOPATRA MINE & CLAIM GROUP

ARTILLERY MTNS. MINING DISTRICT
MOHAVE COUNTY, ARIZONA

MAGNETIC SURVEY

(TOTAL INTENSITY , BY MOBILE MAGNETOMETER)

FOR

INSPIRATION CONSOLIDATED COPPER CO.

BY

HEINRICHS GEOEXPLORATION CO.

SCALE 1" = APPROX. 1 MILE TUCSON, ARIZONA

DECEMBER, 1960

ANALYSIS OF GEOPHYSICAL DATA

ROADSIDE MINE AREA

PIMA COUNTY, ARIZONA

January 1960

for

INSPIRATION CONSOLIDATED COPPER COMPANY

Inspiration, Arizona

by

HEINRICHS GEOEXPLORATION COMPANY

P. O. Box 5671 Tucson, Arizona

INTRODUCTION

In response to a letter request from Mr. E. F. Reed dated 11 December 1959, maps and data of geophysical results from the property were borrowed from Mr. Edwin A. Stone on 12 December 1959. At this time Mr. Stone also discussed his knowledge and ideas about the area and the work that had been done.

On 28 December 1959, after pencil recontouring and profiling part of the magnetic data and rendering to a common scale for overlay purposes, a study was made of the information and a further short discussion held with Mr. Stone. The following day, Bill Marlatt of GEOEX, briefly inspected part of the property while enroute returning from other work in the vicinity.

CONCLUSIONS AND RECOMMENDATIONS

One area of magnetic anomalies indicates a zone, or several stringers, of magnetite concentration, tops of which are less than 300' deep as a group, or very near surface in individual cases, and dipping southerly on a fault zone. This is near and along the only known limestone exposures on the property and probably on the lime hanging wall. Occurrence of lime and metamorphic rocks suggest possibility of a contact metamorphic origin for the magnetite. A few random surface grab specimens of epidote-andesitic-basaltic rocks containing native, oxide and sulfide copper are occasionally more magnetic than other surface rocks in this zone. However, time did not permit obtaining a representative complete or comprehensive suite of samples from the area, which might provide more definite and positive interpretation and correlation., of magnetics versus copper mineralization.

Essentially the magnetic results are encouraging and alone, if the geological aspects are considered sufficiently favorable, they would warrant additional evaluation. Phelps Dodge resistivity and metal factor (induced potential or I. P.) results are, for the most part, negative, especially when interpreted in an absolute sense (probably partly why P. D. was not further interested). However, experience shows that absolute geophysical interpretations are usually risky and seldom possible. On a relative basis, both the resistivity and I. P. indicate a slightly decreasing over all resistance and increasing sulfide content with depth. In any mineralized area this is the normal expectation, but with some geological and magnetic correlation with the weak electrical anomalies indicated, the resistivity and I. P. results may justifiably bear more consideration. Although the electrical maps refer to "apparent depths" of 1000', 1500' and 2000' it is doubtful that effective penetration depths exceed 500' - 750' or 1000'. This interpretation is further substantiated by the deep oxidation reported in drilling results which would tend to cause poorer indications at shallower depths, especially in I. P. work.

The rather persistent occurrence of copper in the considerable amount of epidote rocks reported, is interesting and raises the question whether its source might represent an economic target. The geophysical data neither confirms or denies the existence of a disseminated intrusive in the mapped area, except that the I. P. work and the drilling infer smaller chance above 1000'. Geophysically, the relative throw on the magnetic fault zone could be either normal or reversed. Depending on the best geological

consensus, a logical procedure for further exploration, would be to explore this relatively shallower zone first, to try and develop a better lead which might then provide greater incentive for deeper work.

Before any substantial drilling expendature is made, additional geophysical work is recommended. This should consist of a few days momag and/or hand mag checking and fill in, and a few reconnaissance profiles of self potential work across the more favorable geologic-magnetic trends. Cost for such work could range from $1,000.00 to $2,500.00 and should be based in part on the sponsors favorability opinion and desired over all expendature. With further study, geochemical and electromagnetic recon tests might also be worthwhile.

If any further interest is contemplated, it is first strongly recommended that a joint geological-geophysical discussion be held to review all available ideas and data and eventually with Mr. Stone included. This would provide the best practical over all economical evaluation of objectives, problems, possible solutions, costs and potential.

APPARENT GEOPHYSICAL-SURFACE GEOLOGICAL CORRELATIONS

LIME BELT AREA:

The northwest-southeast trending limestone belt from Sections 2 to 12 across the northeast corner of Section 11, appears to coincide roughly with the two main Western Geophysical Co.'s magnetic lows and very well with an average - 850 gamma low shown on the P. D. magnetic data. Immediately southwest is an adjoining

parallel and related high, averaging about 1300 gammas from the P. D. data, which shows up roughly similar on both the Western and P. D. magnetic plots. Exact geographical correlation is only approximate because of apparent mapping inaccuracies, discrepancies and lack of map overlay ties. To be certain, field check work would be necessary.

Customarily, magnetic highs are often considered with prefered value over lows, however, lows can be equally or more economically significant, as can also the boundary-intercept-zone between highs and lows. Similarly the significant geologic zone may be in the limestone, along either contact or in the adjoining formation near either limestone contact.

Almost invariably, andesitic volcanics will give a much higher and more erratic magnetic level than limestones. Since most of the magnetic observations are over andesite and are not quite as anomalous as in this area, a concentration of magnetite in or near the andesite-limestone contact is indicated. The reported and mapped concentrations of metamorphic minerals and copper oxide, which in part, are rudely parallel to this zone on the southwest, could be indicative of a contact metamorphic origin for the magnetite concentration, but it could also be due to contact segregation solely in the andesite.

The P. D. resistivity data show a broad-general correlation between 100 and 120-unit resistivity highs (?) and this general area. Usually resistivity lows are preferred correlation to metallic mineralization, but diametric exceptions are possible

for example, in highly dry and silicated zones. There is room for some doubt in reviewing the available data that signs could have been erroneously reversed, in which case the highs would be lows.

The I. P. results show very little metal factor relief, particularly in this part of the area. On the 1000' and 1500' apparent depth plots, there is a very slight vague correlation in this area with weak plateaus or highs in the range of metal factor values between 1 to 10, which theoretically, commonly relate to unmineralized basic rocks. On the 2000' apparent depth plot, this area shows a metal factor low in a slightly higher range of values theoretically approaching rocks containing finely disseminated sulfides.

METAMORPHIC ZONE APPROXIMATELY 1500' NORTH OF COMMON CORNER SECTIONS 2, 3, 10 & 11:

This zone correlates with a P. D. magnetic high, but was not quite covered by the Western Geophysical Co. data. P. D. resistivity results show very little anomalism in this area, as do the P. D. 1000' and 1500' apparent-depth I. P. plots. However, on the 2000' I. P. plot, this zone represents the highest metal factor-theoretical-sulfide values shown on the P. D. I.P. data. This lineation also coincides with the NE trending wash immediately west of the old Roadside Mine site.

Together, the geology, the wash and the I. P. anomaly, imply some structural correlation, most likely a fault, or at least a water course. Although the magnetic trends are generally normal to

this, there is some suggestion of magnetic offset along this trace, with additional anomalism, both the highs and lows, along it to the southwest. This would include the respective high and low at stations 28 and 37 on the Western Geophysical Co. map.

MISCELLANEOUS:

The single station #50 high on the Western Geo. magnetic map, without additional readings, can only be assumed to be caused by the Bell Mt. basalt and of no other significance. Mr. Stone's statement that this is why Western took no more readings here is reasonable, but their contouring of this area without more data, is subject to question. P. D. results show no coverage obtained in this area.

Other readings presented are too meagre to justify further interpretation without additional data.

ADDED COMMENTS:

P. D. geology was fairly broad and general and did not provide too much correlation. Ed Stone's geology was more detailed and specific and seemed to be less academic and more accurate and reliable, especially regarding structure and, to a certain extent, alteration. Detailed stratigraphy admittedly would be quite difficult in this area without further study and information.

With the extremely wide spacing used, the Western mag data barely confirmed the groad-general features, but it could easily have been misleading without further detail. Station #50 value should be 10730 rather than 10231 and #49 should be 10221 rather than 10881,

but the contouring as shown was more or less satisfactory.

P. D. mag contouring is strictly interpretative of only the broad-deeper features and not their actual results. This was probably done on purpose because of a tendency of being interested solely in direct detection of large deposition. Unfortunately this is extremely difficult and a better approach is probably to hope to be able to expand the large from one of a group of smaller successful leads. In this case, as in most, the data can be contoured consistent with the detail obtained. This provides maximum interpretation value of all features simultaneously, without excluding any of possible importance. Because of the rougher gradients observed on line 350S, between G & K it would be helpful to extend line H north to about 200 South, and lines J & L from 200 South to 500 South.

No I. P. data nor resistivity results for the 1500' and 2000' apparent depth plots were included on the P. D. (John Sumner, chief geophysicist) affidavit of labor.

Respectfully submitted,
HEINRICHS GEOEXPLORATION COMPANY

by: Walter E. Heinrichs, Jr.
Walter E. Heinrichs, Jr.
President & General Manager

8 January 1960
P. O. Box 5671
Tucson, Arizona

DATA REVIEWED

TITLE	SCALE	BY
1 Colored Surface Geology Map	1" = 2640' ±	Ed Stone ?
1 Surface Geology Map	1" = 500'	P. D.
3 Apparent Metal Factor (Induced Potential) contour maps apparent depths 1000', 1500' and 2000'	1" = 500'	P. D.
3 Apparent resistivity Contour maps. Apparent depths 1000', 1500' and 2000'	1" = 500'	P. D.
1 Vertical Intensity magnetic contour map	1" = 500'	P. D.
1 Vertical Intensity magnetic map (contour) (superimposed on geologic structure	1' = 1000'	Western Geophysical Company
24 Aerial Photos	1' = 1000'	-----
1 Affidavit of Labor 1959 Incl. 8 pages of tabulated mag. & resistivity data.		P. D. (John Sumner)
Southern Arizona Guidebook II		Arizona Geol. Society 1959
Drill hole log	?	Ed Stone ?

August 14, 1959

Mr. Hugh Olmstead
Inspiration Copper Corp.
Inspiration, Arizona

Re: Jerome-Prescott Area

Dear Hugh:

This will acknowledge your letter of 5 August 1959 relative to Mr. Reed's letter to me of 27 July, our reply to you of 3 August and the above.

A thorough check with various sources at the University of Arizona, including the Arizona Bureau of Mines and the Library, reveals only the original preliminary total intensity aeromagnetic contour data released to the Bureau for open file in 1950. This is the same data of which we have copies in our files. I have found no reference to any corrected maps being released, or any supplemental data of any kind being locally available.

Regarding the available data, we are attaching herewith, a photostat of the aeromagnetic results of the area. The most prominent obvious relationship noted, is a broad-general correlation, as would be expected, between the Mingus Mountain basaltic capping and an area of higher magnetic relief. At least in part, there are several exceptions and modifications to this all inclusive statement as follows:

1. A slightly flatter and lower magnetic level along the SE leg of the claims area as shown on the sketch, SE of the highway. Reason for this is obscure, but it may be die to thinner basalt, and/or. less magnetic sub-basalt formation, which regionally appears to rest as a shallow NW plunging syncline.

2. The slightly low or flat magnetic margins which generally bound the area on the east and west, reflect the two N-S sedimentary exposures on each side. They are also affected by a granite and schist ridge to the west in Chino Valley, the basalt high in the middle and the down faulted basalt on the eastern hanging wall limb of the Verde Fault to the east. Probably the required high elevation gradient of the airplane attempting to maintain 1000' above the surface, and the flying E-W traverses, also had considerable effect on these two zones, as the basalt over the UVX area does not show up very strongly.

3. A pronounced E-W magnetic low trends westerly from a low which partially may coincide with the major Jerome production area. It also coincides somewhat with the Haynes Fault which evidently is an important structural feature of the District. These features are probably the most significant of those immediately apparent on the aerial magnetic map, which conceivably could have some economic, though highly speculative, bearing on the area of the claims involved. It is entirely possible that the combination of basalt, faulting, and topography are merely geographically coincidental and are not otherwise related to the orogenesis.

4. The low SE of Woodchute Mtn., across the N portion of the claims area appears to be most likely caused by thinning and narrowing of the basalt between Woodchute and Mingus Mts. as there is a similar low on the west side which more or less coincides with Martin Canyon. The Warrior Fault will also play a part in this area of claims.

If any of the more pronounced lows are more directly related to ore, this would be the most likely area on the claims for further investigation from the standpoint of the aeromagnetic results. If further investigation, based on these results were contemplated, the results should first be checked by reconnaissance ground magnetics for accurate position and more detailed character. From Section B-B^1 in P. P. #208 and the magnetic anomalism, depth of exploration, should penetrate into the Grapevine Gulch Formation and should be 1000' plus-deep.

Geologically, it is difficult to predict how much of the mapped geology is due to the mining and how much of the ore is due to the geology observed. Probably there is considerable more structure than that so far exposed, or mapped underground.

As to other geophysical applications, the terrain, and somewhat complex geology are a disadvantage. The possibility of more massive sulfide is a distinct advantage for an assumed target. Size of the area is such that geology should first be used to narrow the preferred potential target areas rather than blanket geophysical coverage.

The new airborne AFMAG system, could eventually be an exception to this if the equipment works at all as claimed and has good depth response over massive sulfide. To date the instrument, both ground and air, is relatively unproven and is not recommended except on an experimental or research basis. In this connection, we enclose herewith, for your information, a copy of three promotional letters recently received from Fairchild Aerial Surveys. In response to their proposal, I am told only P.D., DuPont and one other eastern company showed any interest. To my knowledge, this will be the

first aerial try outside of Canada. We have been using the ground instrument, but have not had a good massive sulfide test deposit away from artificial effects to make a really conclusive test. A few others have also made some ground tests with the same results, which only show some future promise. The Jerome U.V. massive sulfide might make a fair test and I believe P.D. may have in mind trying it there, with the aerial and/or a ground unit--which can be rented for about $600.00 per month. Three pieces of AFMAG literature are attached for your files.

Self potential would have some application in following up initial geology, and electromagnetics for final detail if suitable target areas were delineated. Gravity and geochem are very doubtful for this area.

Previous work by Verde Ex. under Brant, was mostly over U.V. and U.V.X. ground and in a few other random or spot areas. Much of this work was experimental and was not properly coordinated with the geology and geologists. Nor was much lateral area covered in a systematic and methodical fashion. In lieu of preferred zones of more favorable geology being designated, the latter is the only realistic statistical approach, even though extremely expensive. Attached copy of letter to Bob Searls relates to the Verde Ex. data. We will notify you of his response when it is received.

Let us know if I have left out any important points you would like covered, or if there are any questions.

Our statement is attached.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

by: _____
Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

Encl: 9
cc: 2 extra copies
(text only, without attachements)

August 14, 1959

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Inspiration Copper Corp.
Inspiration, Arizona

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Our statement is attached.

Respectfully submitted,

HEINRICHS GEOEXPLORATION CO.

by: _____
Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

Encl: 9
cc: 2 extra copies
(text only, without attachements)

August 14, 1959

Mr. Robert J. Searls
Newmont Exploration Limited
300 Park Avenue
New York 22, New York

Dear Bob:

Several times, during the past few years, when recalling Verde Ex's efforts in the Jerome area, the question has come up regarding what, if anything, was done under the Mingus Mt. basalt cover to the West and SW. At the time I was still involved, there was various and intermittent speculation of one sort or another, but nothing ever materialized. Later on, recollection has it, that some geophysics, and possibly some drilling, was done, with reportedly, essentially negative results. Without benefit of any details, Maillot of P. D. more or less confirms this. However, in view of P. D.'s apparent slightly recalcitrant, or negative, attitude about the whole project, I wondered if all results were as entirely bad as inferred, and if any sort of follow up might be warranted.

If you would care to shed any factual light on this subject and/or, render a personal opinion about the area, it would be very much appreciated. If actually some work was done, what would be involved in obtaining some details of the results?

All best wishes,

Sincerely,

Walter E. Heinrichs, Jr.

WEH:jh

bcc: Inspiration Cons. Copper Co.

August 3, 1959

Mr. Hugh Olmstead
Inspiration Consolidated Copper Co.
Inspiration, Arizona

Dear Hugh:

We are in receipt of Bert's letter of 27 July 1959 regarding the Jerome area. The slight delay in response is due to my being out of town last week.

My analysis of the available data of the area indicated in the sketch would be done at the rate of $125.00 per day, prorated to the nearest 1/4 day, plus related expenses, if any. We have copies of the original U.S.G.S. aeromagnetic data in our files, but no corrected data. I was not aware the latter might be available. Depending on your detailed needs, desires and objectives, and unless there is considerably more material involved than I anticipate, it is doubtful that more than one day would be required, especially if a simple "letter report" would suffice. If you prefer a more formal treatment, requiring preparation of overlay maps, sections, etc., or whatever might be appropriate, this could be done at $10.00 per hour or $80.00 per day, plus reproduction expenses, etc., if any. Off hand, I wouldn't visualize your consideration at this point justifying very much of this, if your status is only in the nature of an initial preliminary investigation.

I was Brant's assistant on Newmont's early work at Jerome in 1947-48. At that time, there was speculation about work over the basalt capping on Mingus Mt. but nothing was done. Most of their effort was concentrated near Jerome and along the Verde fault extensions to the Nw & Se. Later on, I vaguely recall hearing that some type of coverage may have been extended that far SW, but have no direct knowledge of any results. It is only barely possible that some of these data might be available. In any event, I would guess some time and red tape would be necessary to find out. I am occasionally in touch with Bob Searls, Asst. to President of Newmont, and a casual inquiry to him would probably reveal the probabilities if you would like me to investigate.

Let me know if there are any further questions.

All best regards,

Sincerely,

Walter E. Heinrichs, Jr.

WEH:jh
Enc: 2 extra copies.

July 17, 1959

Mr. E. F. Reed, Chief Geologist
Inspiration Consolidated Copper Co.
Inspiration, Arizona

Dear Bert:

Under separate cover we are mailing to you two maps listed as follows:

1. Original West Adams Claim Group Map as furnished by I. Con. Copper.

2. Sepia map of mobile magnetic survey unfolded and suitable for reproduction purposes if needed.

Very truly yours,

E. Grover Heinrichs

EGH:jh

July 16, 1959

Mr. E. F. Reed, Chief Geologist
Inspiration Consolidated Copper Company
Inspiration, Arizona

Re: West Adams Claims Area, San Simon District
Hidalgo County, New Mexico

Dear Bert:

We transmit herewith, in duplicate, our report of mobile magnetic results on above prospect, together with our statement for these services.

As it turned out, the going was quite good, and we were able to get considerably more coverage than originally anticipated. As a result of this and additional information, it seemed advisable to summarize all of the data on one map at 1" = 1000'. This involved more compilation than I had estimated which offset the reduced operation time required. However, this seemed justified in view of the extra information obtained. We could have gotten up on the ridge to the east with one or two lines further in that direction. But the extra time and effort required, would have sacrificed considerable reduction of coverage on the easier going to the west. Therefore, the lines that were run, seemed to be the best over all compromise. Trust you will find this satisfactory.

It was a distince pleasure to work with you for the first time on this job and we definitely will look foreward to the next opportunity of serving you.

Meanwhile, do not hesitate to discuss with us, any problems or questions which may arise. Even if only hypothetical, we appreciate being appraised of your thoughts and are always happy to render opinion or suggestions if we can.

Sincere regards,

HEINRICHS GEOEXPLORATION CO.

by: _____
Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

Encl: 2 Reports
2 Statements
cc: Encl.

HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

PHONE: MAIN 2-4202
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

July 1, 1959

Mr. E. F. Reed, Geologist
Inspiration, Consolidated Copper Co.
Inspiration, Arizona

Re: Steins Pass Area

Dear Bert:

This will serve as a report of the results of 29 June 1959 field examination with you.

Summarizing the basic information as I understand it, the following factors are listed:

1. Broad area of volcanic rocks, generally mapped on the surface as mostly andesite, with a considerable amount of conglomerate and quartz latite. These formations appear to be extrusive flows and/or sediments, presumably tertiary or cretaceous, and are interbedded with and/or are cut by dikes and/or sills of various composition including quartz monzonite, diorite, agglomerate and breccias. The youngest extrusive facies tends to be more basic possibly toward a diabase.

2. Pyritic mineralization and hematite-limonite alteration appears mostly as dissemination in the monzonite, latite and diorite, and as seams concentrated along joints and fractures in the latite and diorite. Submarginal copper was encountered in one known drill hole and weak copper assays are reported from the pyrite and alteration material and several copper oxide stained fissures were noted. Though not extremely strong except locally, the mineralization is exposed in a manner which suggests it to be quite pervasive over a rather large area.

3. A thinly covered pediment, exposed in several washes, is the dominant structure noted. Two definite faults trend toward an apparent intersection in the central portion of the area. Local brecciation, and kaolin zones seemed to accompany faulting.

4. Mineralized formation usually showed considerable shearing.

5. Water table and sulfide in old shaft very shallow.

Based on these data, the geophysical ramifications are as follows:

1. Amount of available information and presumed favorability potential, almost exclusively dictates a cheap broad reconnaissance approach in an effort to localize possible targets.

2. For several years now, a fairly common exploration practice, particularly among the larger concerns, has been to initially obtain aerial magnetic coverage regardless of apparent applicability. We do not entirely concur in the advisability of this approach, either from a cost or information standpoint.

3. If cost were no object, there is little doubt that a pulse or induced potential survey would be the best geophysical method, and possibly the best over all method, to absolutely appraise this type of prospect. The method is used to delineate variations in relatively low grade disseminated mineralization and is effective to considerable depth--500' - 1000' under average conditions. Of course, it will not ordinarily discriminate between different sulfides. Therefore, the most common result is to map pyrite. This may or may not always be useful information.

Apparently Bear Creek Mining, and a few others, have been using the method somewhat universally and indiscriminately. Costs are estimated at about $300.00 per profile mile.

4. Geochemical soil sampling is one of the cheapest methods vs. areal coverage. Cost is about $5.00 to $10.00 per station-sample-observation, but applicability in the southwest is still somewhat experimental.

5. Assumed lack of massive sulfide precludes electrical techniques including the relatively new, rapid and cheap AFMAG system.

6. Self or natural potential is fast and economical, but only occasionally works on this type of mineralization.

7. Surface magnetics will reveal with greater resolution than aerial work, the presence or absence of concentrations of magnetite. Indirectly, this will usually delineate the broad rock types, major faulting, and the deeper pasement structure. A broad smooth low, surrounded by erratic highs, particularly over relatively thicker sections of the more basic volcanics such as andesite, could be caused by mineralization effects and the resultant alteration and destruction of the magnetic properties of the contained magnetite. The feasibility of this latter approach may be indicated by a few long profiles across the general area of interest.

8. Unfortunately, each of the above procedures will only evaluate one separate aspect which may or may not be completely pertinent. Results from a single technique, and often even several methods, will never catagorically write off a prospect completely. As in geology, the whole evidence must be weighed in the light of over all economic probability.

For your information, our charges are based on $125.00 per day for my exclusive professional services on a short term daily basis. For some clients, we stipulate a minimum single job charge of $200.00 per day. For other personnel, the rate is either $75.00 or $100.00 per day. On short term jobs we charge the usual normal living expenses and a daily rate of $7.50 plus 10 cents per mile for any vehicles involved. For mobile magnetometer work, the usual charge is $100.00 per day travel and $300.00 per day operating plus $80.00 per day compilation, drafting and report. However on your present job we propose absorbing the travel if done at our convenience when passing near the area in connection with other work, and I am sure presentation of the results will not require over one day. Thus our total charges to you will not exceed $550.00, and may be somewhat less depending on the actual time required to cover the two or three desired profiles. I am sure it will not require more than one day and in any event if it did, it is understood we will not charge more than the equivalent of one day work.

At the moment, it is still indefinite whether we will be able to work the end of this week or the end of next week.

Hope you find this useful and informative and trust it will meet with your approval. Please do not hesitate to contact us if any questions arise, or if further recommendations, suggestions, or discussion might be helpful.

Faithfully,

HEINRICHS GEOEXPLORATION COMPANY

by: _____
Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

cc: Extra enclosed.