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inquiries@azgs.az.gov

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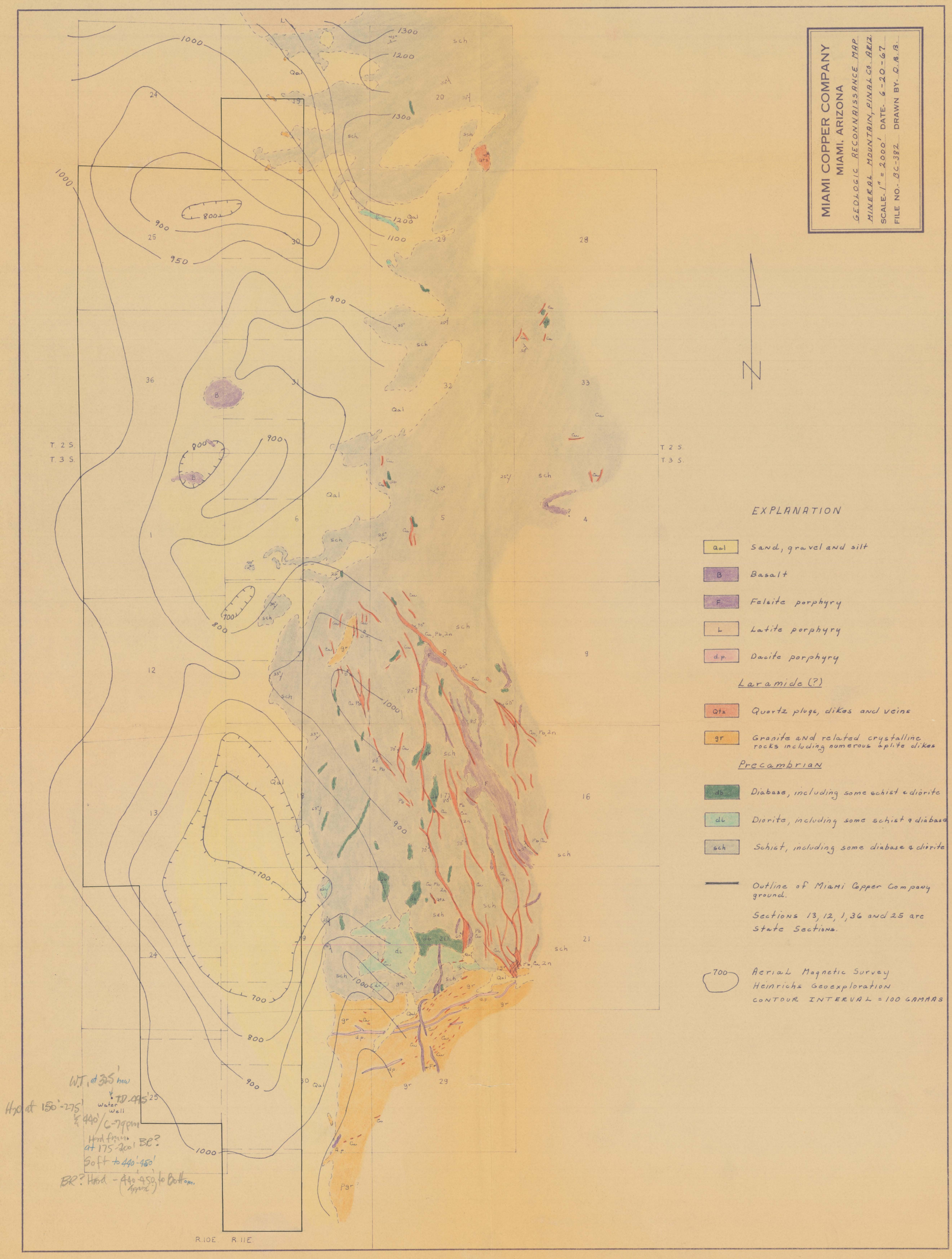
MIAMI COPPER COMPANY
MIAMI, ARIZONA
GEOLOGIC RECONNAISSANCE MAP
MINERAL MOUNTAIN, PINAL CO. ARIZ.
SCALE- 1" = 2000' DATE- 6-20-67
FILE NO.- BC-382 DRAWN BY- D.B.B.
EXPLANATION
Qal Sand, gravel and silt
B Basalt
F Felsite porphyry
L Latite porphyry
d.p. Dacite porphyry
Laramide (?)
Qtz Quartz plugs, dikes and veins
gr Granite and related crystalline rocks including numerous aplite dikes
Precambrian
db Diabase, including some schist & diorite
di Diorite, including some schist & diabase
sch Schist, including some diabase & diorite
Outline of Miami Copper Company ground.
Sections 13, 12, 1, 36 and 25 are State Sections.
700 Aerial Magnetic Survey Heinrichs Geoexploration
CONTOUR INTERVAL = 100 GAMMAS
T. 2 S.
T. 3 S.
R. 10 E.
R. 11 E.
W.T. at 325' new
TD 495'
water well
H2O at 150'-275' & 440'/6-7 gpm
Hard from at 175'-200' BR?
Soft to 440'-450'
BR? Hard - 440'-450' (Approx.) to Bottom.
LIETZ NO. 1118 TOPFLIGHT 100 6-60

INDUCED POLARIZATION SURVEY

AREA #1 (FLORENCE)

PINAL COUNTY, ARIZONA

For

Miami Copper Company

April - June, 1967

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703
Phone: 623-0578 Area Code: 602

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BASIS OF INDUCED POLARIZATION METHOD	1a

IN MAP POCKET: (Total 16 pieces)

Induced Polarization Location and Interpretation Plan
Sectional Data Sheets
Lines 1 through 15

GENERAL LOCATION OF

MIAMI COPPER CO.
(AREA 1)

ARIZONA

INTRODUCTION

At the request of Mr. Simmons of Miami Copper Company, Miami, Arizona, Heinrichs Geoexploration Company of Tucson, Arizona conducted and completed a reconnaissance induced polarization survey over parts of Area 1 of the earlier aerial magnetic survey west of Mineral Mountain near Florence, Pinal County, Arizona. This field work was accomplished during the interim April 24 to June 8, 1967.

A total of 15 lines were surveyed, all on a 1,000 foot dipole spacing giving a total surface coverage of 180,000 feet of which 105,000 feet is "subsurface" plotted data. The lines are all oriented E-W and separated about 1/2 mile apart with their centers 1,500 feet west of the range line between R10E and R11E. The lines are numbered consecutively south from Line 1 through the center of Section 19, T2S, R10E, to Line 15 through the center of Section 25, T3S, R10E.

This induced polarization survey used the dual frequency technique employing sending frequencies of 0.05 and 1.0 hertz (cps). The electrode array was the conventional collinear dipole-dipole configuration with 1,000 foot dipoles spaced from 2,000 feet to 7,000 feet between dipole centers, which typically gives resolvable penetration in the zone from about 300 feet to 1,200 feet below surface.

The purpose of the survey was to locate any sizeable sulfide bodies in a reconnaissance fashion over an area of possible interest previously indicated in the Geoex aerial magnetic survey done for Miami Copper Company. Of particular interest was a broad 400 gamma magnetic low in the southern portion of the area.

Results are presented on sectional data sheets, one for each line, showing resistivity, percent frequency effect (PFE) and metallic conduction factor (MCF) contoured in section with self potential (SP) in profile form. An Induced Polarization Location and Interpretation Plan is included also. See the Basis of Induced Polarization Method appended to the report for additional details on theory, presentation, and interpretation of the technique.

Heinrichs personnel involved in the field work were R. Palmer, geophysical crew chief, B. Terrell, L. Turner, J. Kozacki, A. Frost, and S. Cruze, technical assistants and electrode and wire layout crew. Report, compilation, computation and interpretation by the Geoex Tucson staff under the supervision of Chris S. Ludwig, Senior Geophysicist.

CONCLUSIONS, RECOMMENDATIONS, AND INTERPRETATION

Of the fifteen lines, only Lines 11, 12, 13 and 14 show anomalism of such type as to possibly be sulfide related. The other eleven lines show only typical background response of alluvium and unmineralized crystalline bedrock; although there are anomalous appearing polarization effects in many places on the lines owing to non-sulfide caused inductive coupling interference because of low resistivity.

Line 13 has the strongest appearing anomaly of the four anomalous lines and shows it to start near 20W and extending indefinitely to the west. There is a minor 50 millivolt self potential low at the east edge of the anomaly which could be coincidental or perhaps reflects oxidizing sulfides related to the I.P. anomaly. The anomaly is around 750 feet below surface on an apparent bedrock high although the possibility also exists that the source arises from an anomalous clay response entirely within the alluvium or Gila conglomerate. The sulfide cause is considered more likely and the anomalism would indicate an integrated zone effect of 1 or 2 percent total sulfide by volume.

Lines 11, 12 and 14 show anomalism similar to Line 13, but beginning further west on the line and not quite as strong.

It is recommended that at least Line 13 be extended an additional spread to the west to determine the extent of the anomaly and hopefully finding shallower or stronger projections for drill targets. If encouraging results are seen, the other three lines can be likewise extended. Line 12 may prove interesting if extended a mile and a half west out to a minor magnetic high (#5 on magnetic map).

The I.P. anomalism appears to be related to the west flank of the main magnetic low that was one of the prime targets. Based on the electrical results, it is considered most likely that this magnetic low itself is caused by a major bedrock depression - alluvium and Gila conglomerate being in excess of 1,500 feet thick in the vicinity of the low.

All 15 lines show fundamentally a three layer resistivity condition west of the schist or granite-alluvium contact. This three layer effect indicates a more resistive surface layer underlain by a more conductive middle layer in turn underlain by a resistive lower layer. This suggests dry or sandy alluvium on top of wet or clayey alluvium or Gila conglomerate, on top of crystalline bedrock. In places, the upper two layers are so thick (in excess of 1,200 feet) as to not allow definitive penetration into the bedrock as on Line 14 and particularly 15.

Many of the lines show a strong electrical interface representing the alluvium-schist or granite contact on the east half of the lines. This is shown on the plan and sections and correlates quite well with the surface geology except for Line 3 where a buried pediment is indicated out to 5W.

The alluvial resistivity ranges from about 11 to 130 showing a wide variation in salinities with the lower resistivity alluvium being the most saline. The resistivities obtained on the exposed granite and schist are quite typical of these rock types. However, to the west, below the alluvium, bedrock resistivities are considerably lower suggesting perhaps a different rock type (andesite) west of the main alluvium-crystalline interface.

In general, the self potentials show quite minor variations typical of normal background response.

In summary, the anomalism found on this survey to date is not strong but could be significant and being on the ends of the lines makes it more difficult to evaluate. We feel it is necessary to extend several lines westerly to determine just how significant and extensive this possible sulfide zone is. We believe the district to have considerable merit particularly in a regional sense, and feel that any anomalism should be pursued to a determination of cause.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig
Senior Geophysicist

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

July 12, 1967
Tucson, Arizona

RECEIPT FOR CERTIFIED MAIL—30¢

No. 636220

SENT TO W. W. Simmons Miami Copper

STREET AND NO. P.O. Box 100

P. O., STATE, AND ZIP CODE Miami, Ariz.

POSTMARK OR DATE 7/12/67

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt: Shows to whom and date delivered — ☑ 10¢ fee; Shows to whom, date, and where delivered — ☐ 35¢ fee

Deliver to Addressee Only — ☐ 50¢ fee

POD Form 3800 Mar. 1966 NO INSURANCE COVERAGE PROVIDED—NOT FOR INTERNATIONAL MAIL (See other side)

July 12, 1967

Mr. W. W. Simmons
Chief Geologist
Miami Copper Company
P. O. Box 100
Miami, Arizona

Dear Mr. Simmons:

Enclosed is an original and two copies of the report on the Induced Polarization Survey, Area #1 (Florence), Pinal County, Arizona.

Reproducible sepias will follow under separate cover.

The crew has started on the second phase work and we hope something significant comes from it.

If you have any questions, please let us know.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Christopher S. Ludwig
Senior Geophysicist

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SHOW WHERE DELIVERED (only if requested)

c55—16—71548-9 GPO

Grover | [illegible]
Dorothy | [illegible]
Chris | [illegible]

1 & 2 cc, Extra cc encl.

Miami Copper Company,
Miami, Arizona

Attn: Mr. W. W. Simmons, Ch. Geologist

Re: Your letter 3 July 1967 regarding proposed additional electrical geophysics at Mineral Mountain, northeast of Florence, Ariz.

Gentlemen:

Confirming above reference and telephone communication with Mr. Simmons of the same date, we herewith propose for our mutual understanding and agreement as follows:

Beginning on or about Monday, July 10, 1967, GEOEX will furnish one basic induced polarization electrical geophysical crew and equipment. Initially, and ~~where~~ as feasible, we intend to ~~use~~ utilize ~~our~~ an extra ~~heavy duty or~~ high powered sender. Based on experience from the earlier work, this is considered desirable and recommended for maximum information and reliability.

It is understood that tentatively Lines 11, 12, 13 and 14 are to be tied to and extended to the west, with one -5- electrode, 1,000 ft. dipole setup each. Line 13 will be run first, and depending on results, alternatives to extending Line 11 will be considered and invoked if mutually considered preferable.

Charges will be at the base rate of $350.00 per work day utilizing the extra high powered equipment and a 5 man crew. Vehicle charges will be at the rate of $11.00 per day plus $0.12 per mile per vehicle and ~~[illegible]~~ two vehicles will be used. Directly incidental supplies, communications and living expenses at our cost. Final compilation, interpretation and report ~~we~~ will be $120.00 per Tucson staff day.

Total charges are estimated $4400.00 including report. ~~[illegible]~~

Mobilization and demobilization travel, excessive

~~If different size crew is used the following Rates will be for~~
3 man crew 300.00/day
4 men 325.00/day
6 men 375.00/day

weather delay and standby charges all will be one half the daily rate. Breakdown of our equipment in excess of one hour per day will be made up or not charged.

Personnel will be Kieth Henson, party chief in charge of crew. Others of our technical staff will be available as needed and/or requested.

All property permits, brushing and trespassing - liability and related costs incurred on behalf of Miami are assumed by Miami.

Charges for extra equipment and personnel ~~employed~~ ~~if~~ mutually desired, will be extra.

GEOEX will hold Miami harmless from all Workmen's Compensation, public liability and property damage liability incurred by GEOEX employees.

Preliminary reports or copies of rough field plotting sheets will be available as work progresses. ~~Anticipation of~~ Field work completion is anticipated on or about 20 July, 1967 and final report on or about 28 July 1967.

Billings may be submitted periodically, with final billing after delivery of final report.

Indication of your understanding and approval of the above ~~may be made~~ by executing ~~sighing and returning~~ the attached carbon copy as provided below and returning same to us, ~~which~~ will be most appreciated.

encl: extra cc.
cc: encl.

Accepted: _____ date

Miami Copper Company

by: _____

title.

Faithfully,

HEINRICHS GEOEXPLORATION CO.

Walter E. Heinrichs, Jr.

July 3, 1967

Mr. W. W. Simmons
Chief Geologist
Miami Copper Company
P. O. Box 100
Miami, Arizona

Dear Mr. Simmons:

Enclosed is an original and three copies of the report on the Mobile Magnetometer Reconnaissance, Northeast Side of Chiricauhua Mountains, Cochise County, Arizona, and one set of mobile magnetometer records.

Sepias will follow.

If you have any questions, please let us know.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

John H. McDonnell
Geologist

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MIAMI CU

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MOBILE MAGNETOMETER RECONNAISSANCE

NORTHEAST SIDE OF CHIRICAUHUA MOUNTAINS

COCHISE COUNTY, ARIZONA

For

Miami Copper Company

June 1967

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703
Phone: 623-0578 Area Code: 602

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IN MAP POCKET: (1 piece)	
Location, Traverse and Profile Plan	

INTRODUCTION

Heinrichs Geoexploration Company conducted and completed a mobile magnetometer survey on the east side of the Chiracauhua Mountains, Cochise County, Arizona, for Miami Copper Company, as a magnetic reconnaissance of the area involved. A number of mines are known to be within or close to the area. The reconnaissance magnetic coverage obtained was in Townships 15, 16, and 17, Ranges 30 and 31. Data was obtained in March and June of 1967, and includes 85 total miles of profile. The survey was conducted in conjunction with an aerial magnetic survey of Area 6 in order to obtain some additional coverage in a favorable area that was not quite as suitable for flight coverage to obtain the detail considered necessary and desirable.

CONCLUSIONS AND RECOMMENDATIONS

Three areas of interest are indicated, based on magnetic anomalism or deviation from general background. Location and size are determined by the amount of correlation that could be safely made between lines of relative anomaly strength and apparent geological relation with anomalism. Relative importance is of course subject to change, pending geologic reconnaissance of the area, or any other pertinent information that becomes available.

Provided geologic interest is confirmed by field examination, we recommend sufficient additional hand magnetic reconnaissance to allow for preliminary contour compilation, interpretation, and especially correlation with the geology as known. This should be done before much further effort is expended.

If this is favorable, but not sufficiently conducive for directly drilling or sampling, or the area is covered by alluvium, induced polarization geophysics should be considered to check for the presence of sulfide mineralization and other valuable subsurface information.

Area A

This area is characterized by a broad 680 gamma high on Line 24, and smaller, but possibly related highs on adjacent lines. The field crew reported considerable iron stain in the area. The strong anomaly on Line 24 and the two moderate anomalies on Line 26 (within Area A) are positioned so as to suggest fault locations according to the generalized Cochise County geologic map. In a similar manner, the strong anomaly on the end of Line 14 may be caused by Laramide granite which could be a source rock if upper Paleozoic rocks are involved in the magnetic high on Line 24.

The highs on Lines 2 and 14 are not included in the area because there is a more apparent break in continuity between records than is shown between the lines in Area A.

Area B

Several areas to the west showing anomalism may be related to Area A such as a 780 gamma high on the southern most part of Line 20, along with adjacent moderate anomalism on the same line. These anomalies indicate a NE-SW trending structure, which is somewhat exemplified by a related topographic break.

The strong anomalies on Lines 20 and 14 are associated with different topographic breaks, however, the comparative strength of anomalism suggests a possibility of Laramide granite on Line 20 as well.

Strong anomalies (to 700 gamma +) on Lines 19 and 20 align with an apparent topographic break just north of the end of Line 20. These areas should be examined geologically and if indications are favorable, an induced polarization reconnaissance program should be conducted.

Area C

This area is considered because of proximity to known mineralization and an apparent relation between anomalism and structure. Topography suggests E-W trending structures which aligns with anomalies in the area.

The strong anomalism indicated at the west end of Line 9 warrants geologic investigation. The high may be reflective of structure, being near a topographic break. The rock type indicated on the county geologic map is Tertiary clastic sediments; the strong anomalism could be produced by exposure of gravels and conglomerates with abundant volcanic fragments. Some other possibilities are listed below:

Variations in intensity range from -200 gammas to +200 gammas on Line 25. Because of the 400 gamma spread, the area is called moderately anomalous. The anomalism, which may be indicative of faults, is of interest due to its proximity to known mineralization.

All areas of strong anomalism should be evaluated geologically in order to decide upon a program for further exploration.

PROCEDURE

Because two independent sets of traverses were made in these areas, anomalism is based on deviation from the background. They are classified strong if deviation is over 500 gammas; moderate if over 200 gammas, and weak if over 150 gammas.

Data was obtained by H. R. Moulinet, K. Henson, and D. Swanson, and was reduced and compiled by J. Langs, and J. McDonnell under the supervision of D. Cooley and assisted by other members of the Geoex technical staff.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

John H. McDonnell
Geologist

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

July 3, 1967
Tucson, Arizona

June 3, 1967

Mr. W.W. Simmons
Chief Geologist
Miami Copper Company
Miami, Arizona

Re: Progress Report - I.P. and
Air Mag.

Dear Woody:

The following progress has been made for the week ending June 2, 1967:

I.P. - Area 1

Line 1 through 11 completed. This past week, lines 10 and 11 done. The crew expects to work through the weekend and finish up around Wednesday P.M., June 7, 1967.

Air Mag. - Arizona

All areas complete and report written except: Area 2 - No reflighte necessary. All data recovered in drafting and report stage now. Expect to be completed the week of June 12, 1967. Area 5 - Final drafting stage expected to be completed the week of June 5, 1967, including the momag portion which is 50% complete now.

If you have any questions, please let me know.

HEINRICHS GEOEXPLORATION CO.
Very truly yours,

EGH:pmcd

E. Grover Heinrichs
Vice President

May 26, 1967

Mr. W. W. Simmons, Ch. Geologist
Miami Copper Co.
Miami, Arizona

10 - 11

Dear Woody:

I. P. lines one through nine have been completed in the field and all but Line 9 have been computed and rough plotted. Final interpretation and drafting are under way. Preliminary interpretation so far, shows no sulfide anomalism that can be reported at this time.

Line lay out has been put in through line 12 and layout crew reports noting "much" oxidized copper stain showing on Line 10 South and "iron stain" on Line 11, for whatever this information might be worth.

This report is as of May 26, 1967, p.m.

As mentioned on the phone this morning, as of yesterday all aerial magnetic areas have been completely flown with the possible exception of re-flights on Area 2 if necessary.

Sincerely yours,

Walt

Walter E. Heinrichs, Jr.

/jh