

October 19, 1966

Miami Copper Company
Aerial Magnetic Survey

Area A

Line 2 N

Geology:

~~POSSIBLE - POWERFUL MAGNETIC PERFORMANCES
AND MISCELLANEOUS~~

The southeastern pediment of the Cerbat Mountains and north end eastern pediments of the Hualapai Mountains warrant interest. These areas are characterized by much shallow alluvium, good proximity to mineralization and frequent structural variation is noted in sub-alluvial topography. Additional aerial coverage is recommended to outline areas of fault intersection amenable to geophysical prospecting.

Checkpoints:

- INTERPRETATION
- 0.35 Possible fault.
 - F1.05 Possible fault.
 - 1.1-4.0 Apparent shallow alluvium. Topography indicates E-W structural trend showing mineralization to the west. Magnetics indicate faulted sub-alluvial topography.
 - F1.4 Possible fault and/or contact.
 - F1.6 Possible fault and/or contact.
 - F2.0 Possible contact between granite gneiss to North and Quaternary basalt to south.
 - F2.4 Possible fault and/or contact.
 - 3.5 Possible fault and/or contact.
 - 4.3 Probable fault and/or contact.
 - 4.7 Probable fault and/or contact.
 - 5.0 Probable fault and/or contact.
 - 5.2 Probable fault.

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Area A

Line 2 N continued

F6.35-7.4 Possible basalt flows.
F9.0 Probable basalt.
F10.7 Probable fault.
F10.8 Probable fault.
F10.9 Probable fault.
11.7 Low possibly related to railroad.
12.1 Possible NE trending faults. Possible basalt flows.
12.3 Possible NE trending faults. Possible basalt flows.
12.5 Possible NE trending faults. Possible basalt flows.
12.7 Possible NE trending faults. Possible basalt flows.
13.5 Probable fault contact.
13.5-End Apparently granite gneiss.
15.1 Probable fault.
15.7 Probable fault.
16.0 Probable fault.
16.7 Probable fault.

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Area A

Line 2 S

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC~~
MISCELLANEOUS INTERPRETATION

- | | |
|---------|---|
| 0-2 | Shallow alluvium (mineralization noted to west on U.S.G.S. 1:250,000 topography). |
| 0.2 | Probable fault and/or contact. |
| 3.4 | Probable fault. |
| 3.8-4.2 | Probable laramide granite. |
| 4.2 | Contact between gneiss to south. |
| 4.6 | Probable fault. |
| 5.4 | Probable fault. |
| 6.2 | Deep seated fault. |
| 6.9 | Probable fault. |
| 7.4 | Probable fault in gneiss. |
| 8.5 | Probable basalt dike. |
| 10.3 | Probable fault and/or contact. |

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Area A

Line 3

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS~~ INTERPRETATION

<u>CHECKPOINT</u>	
	Checkpoint 3 is of interest.
1.0	Probable contact between Precambrian granite and gneiss.
1.6	Probable basalt flow.
1.7-5.2	Probable schist; shallow to surface alluvial depths.
2.7	Probable fault.
3.0	Mineralization appears on U.S.G.S. topo 1:250,000 series. Several small fluxuations are noted on magnetic record which may be traceable with ground magnetics. A ground check by geologist with magnetic capability is recommended.
5.3	Probable contact of Precambrian gneiss with granite or schist.
5.35	Possible Tertiary Rhyolite.
5.45	Probable fault contact between Precambrian gneiss to south and granite to north.
F.6	Possible contact.
F6.6	Possible fault and/or contact.
7.2	Probable fault and/or contact.
F8.8	Probable fault with basin probably becoming deep to the North.

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Area A

Line 4

CHECKPOINT

- 0-3 Shallow alluvium.
- F1.45 Probable basalt flow; possible contact between Quaternary basalt and Precambrian granite.
- F2.4 Probable contact between older Precambrian granite and schist.
- F2.95 Contact between Tertiary andesite and probable older Precambrian schist to north.
- 3.2 Probable fault in andesite.
- 3.5 Possible fault, contact, or dike.

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Area A

Line 5

~~POSSIBLE DIFFERENT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

<u>CHECKPOINT</u>	
	Checkpoints 9.9 and 10.0-10.4 are of interest.
0.35	Probable fault. ^{9.7 and 9.9-10.0 are of interest}
2.3	Probable contact between Precambrian gneiss and schist.
6.5-F7.6	Possible Precambrian gneiss or Laramide granite under alluvium.
8.3	Apparent deep fault and/or contact.
8.8-8.9	Approaching outcrop.
8.8	Probable fault.
9.7	Probable fault (shallow).
9.9-10.0	Probable fault apparently associated with Music Mountain Mine. Geology is recommended to correlate mineralization with structure and possibly to trace this structure with ground magnetics. Warning: this mag low may simply reflect a topographic high. The gneiss between 10.0 and 10.2 should, however, be checked for hydrothermal alteration.
10.5	Probable deep seated fault.
10.7-10.9	Shallow, faulted sub-alluvial topography.
End of line	Magnetic high likely due to topography.

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Area A

Line 6 A

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

0.0-0.02	Probable basalt dike.
0.1-0.19	Probable granite overlain by shallow alluvium.
0.25	Probable contact between basalt to north and granite to south.
0.37	Probable fault and/or contact.
0.52	Probable fault.
0.56	Probable fault in basalt.
0.77	Probable contact between granite to north and basalt to south.
0.9	Probable fault in Precambrian granite.

Area A

Line 6 B

CHECKPOINT

POSSIBLE SIGNIFICANT MAGNETIC FEATURES
AND MISCELLANEOUS INTERPRETATION

According to topography, faults at 1.4, 1.55, and 1.85 seem to be projecting from Hualapai Mountains to the west.

Laramide granite and mineralization in Hualapai Mountains between points 1 and end of line may add interest to this area.

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Area A

Line 6 B continued

Start	Possible fault and/or contact.
1.0	Probable fault in gneiss.
1.25	Probable fault in gneiss.
1.4	Probable fault in gneiss.
1.55	Probable fault in gneiss.
1.85	Probable fault in gneiss.
3.0	Probable fault in gneiss.
3.15	Probable fault in gneiss.
3.4	Probable fault in gneiss.

Area A

Line 6 C

CHECKPOINT

~~LOGGING STATION DATA SHEET~~
~~AND MISCELLANEOUS INTERPRETATION~~

1.4	Probable fault in gneiss.
2.4-2.45	Probable basalt dike.

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Area A

Line 7

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND POSSIBLE GEOSUS INTERPRETATION~~

CHECKPOINT Checkpoint 8.99 is of interest.

- 0.0 Probable fault contact between Tertiary and rholite to north and Cretaceous Gold Road volcanics to south.
- 0.3 Possible fault and/or contact between Gold Road volcanics to north and Precambrian gneiss to south.
- 0.8 Probable fault in Precambrian gneiss.
- 1.4 Probable fault in Precambrian gneiss.
- 1.9 Probable fault in Precambrian gneiss.
- 2.4 Probable fault in Precambrian gneiss.
- 4.0 Probable fault.
- 4.6 Shallow alluvium (possibly Gold Road volcanics).
- 5.0-5.6 Shallow alluvium. Apparent reflection of structure extending from NW topographic and geologic lineation.
- 5.1 Probable fault and/or contact.
- 5.55 Probable fault and/or contact.
- 8.18 Relative maximum depth 1700. Apparent projection of fault contact from NW.
- 8.49 Apparent shallow alluvium.
- 8.89 Possible fault and/or contact.
- 8.99 This possible fault and/or contact is associated with magnetic low NE of NE trending structure apparently

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Area A

Line 7 continued

associated with mineralization. Possible magnetic interference from the railroad. A ground check of area by geologist is recommended to determine if mineralization or structure associated with mineralization is traceable magnetically. Hydrothermal alteration should be noted.

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Area A

Line 8

CHECKPOINTS:

Checkpoint:
1.0

~~POSSIBLE SHALLOW CONTACTS~~
~~AND~~

Shallow alluvium is noted south and east of mineralization in the southern portion of the Black Mountains.

INTERPRETATION

- 1.0 Possible fault and/or contact.
- 1.75 Possible fault and/or contact shallow alluvium.
- 2.0 Topographic low probably coincident with fault; shallow alluvium.
- 2.1 Probable SW extension of SW trending fault noted on county geology.
- 2.25&2.35 Shallow alluvium; probable faults and/or contacts.
- 2.6 Shallow alluvium; probable near surface Rhyolite.
- 2.75 Possible basalt flow.
- 2.9 Probable fault and/or contact.

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Area A

Line 9

CHECKPOINT:



Checkpoint 0.45 and 2.0-6.0 are of interest.

Checkpoint:

0.45

INTERPRETATION
Probable contact between Precambrian gneiss to north and Cretaceous andesite to south possibly associated with Laramide intrusive. A ground check for hydrothermal alteration is recommended.

0.55 Probable fault in Cretaceous andesite.

0.75 Probable fault in Cretaceous andesite.

0.7-1.5 Continued andesite with characteristic flow or fault boundaries at 0.9, and 0.95.

2.0-6.0 Opposite mineralization. Many individual flows, faults, and contacts are magnetically traceable. A geologic check to determine value of this information is recommended.

7.05 Probable contact between volcanics to the north and basalt to the south.

7.1 Probable contact between volcanics to the south and basalt to the north.

8.0 Possible contact volcanics to the north, basalt to the south.

8.7 Possible contact basalt to the north, volcanics to the south.

F9.1 Possible contact basalt and volcanics.

F9.65 Possible fault.

10.0 Possible fault.

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Area A

~~POSSIBLE SIGNIFICANT MINERALIZATION~~
~~AND MISCELLANEOUS~~

Line 10 ←

CHECKPOINTS

Checkpoint 2.75 in the vicinity of Boulder Mine is of interest. Checkpoint 8.28 in the vicinity of mineralization.

Checkpoint:

- 2.3 INTERPRETATION Shallow alluvium.
- 2.5 Probable fault.
- 2.75 Possible fault or intrusive apparently associated with Boulder Mine, may be associated with andesite. A ground check is recommended to correlate geology with magnetics.
- 3.0 Probable fault.
- 3.15 Probable fault and/or contact.
- 7.0-8.5 Basalt noted on county geology probably very thin.
- 7.15 Possible contact between gneiss to NW and basalt to southeast.
- 8.28 Probable near surface fault and/or contact (mineralization noted near 8.2 on U.S.G.S. 1:250,000 series).
- 7.15-8.45 Apparent basalt.
- 8.45-end Probable schist.

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Area A

Line 11

POSSIBLE SIGNIFICANT MAGNETIC FEATURES
AND MISCELLANEOUS INTERPRETATION

CHECKPOINT

- 0-F3.0 Shallow alluvium in conjunction with varied geology regionally associated with Ithaca Peak mineralization merits a primary recommendation for additional aerial magnetic coverage.
- 0.3 Fault and/or contact possibly associated with Laramide granite.
- 0.4-0.5 Apparent shallow alluvium.
- 0.45 Fault and/or contact.
- 0.9 Magnetic high indicates possible shallow alluvium opposite significant mineralization to east.
- F3.1 Possible fault and/or contact.
- F3.9 Shallow alluvium.
- 40.5 Probable contact between Quaternary basalt to south and older Precambrian gneiss to north.
- 5.3 Probable basalt under shallow alluvium.
- 5.7 Possible contact between basalt to north and younger Precambrian granite to south.
- 5.95 Probable contact between Tertiary Rhyolite to south and younger Precambrian to south.
- 6.25 Shallow alluvium, probable contact; possible basalt.
- 7.8 Shallow alluvium.
- 8.0 Possible fault and/or contact.
- 8.5 Possible fault and/or contact in granite gneiss shallow alluvium.

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Area A

Line 11 continued

- 8.87 Probable contact between granite and gneiss.
- 9.0 Near surface to surface fault and/or contact.
- 9.3 Contact between granite gneiss and granite.
- F10.8-11.3 Probable granite covered by shallow alluvium.
- 12.5 Probable fault in granite.
- 12.7 Probable fault in granite.
- 13.0 Probable fault in granite.
- 13.2 Shallow alluvium.
- 14.9 Shallow alluvial cover, possible dike or fault.
- F15.4 Probable contact between granite gneiss and granite to north.
- 17.5 Probable fault and/or contact.
- 17.8-F19.0 Shallow alluvium.
- F19.3 Probable fault.

AREA B

SUMMARY CONCLUSIONS, RECOMMENDATIONS AND DETAIL INTERPRETATION

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Area B

Line 1

<u>CHECKPOINT</u>	POSSIBLE GEOMORPHIC FEATURES AND MEASUREMENTS INTERPRETATION
0.05	Possible fault and/or contact.
0.3	Possible fault and/or contact.
1.1-2.8	Probable basalt.
4.2	Probable fault and/or contact.
4.75	Probable fault and/or contact.
5.7	Probable fault in gneiss.

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Area B

Line 2

CHECKPOINT

~~POSSIBLE SIGNIFICANCE~~
~~AND UNCERTAINTY~~ INTERPRETATION

- | | |
|------|---|
| 1.35 | Probable fault and/or contact. |
| 2.2 | Probable contact between older Precambrian granite gneiss to the NW and Mesozoic granite to the SE. |
| 2.7 | Probable fault in Mesozoic granite. |
| 2.85 | Probable fault in Mesozoic granite; or possible fault contact between Mesozoic granite to the NW and older Precambrian granite to the SE. |

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Area B

Line 3

CHECKPOINT

~~POSSIBLE CHECKPOINT MAGNETIC~~
AND MISCELLANEOUS INTERPRETATION

Area from 5.4 to end of line merits consideration.

- 2.1 Probable fault in older Precambrian granite gneiss.
- 2.8 Probable fault in older Precambrian granite gneiss.
- 5.0 Probable contact between Mesozoic sediments to the NE and Mesozoic intrusive to the SW. Possible dike.
- 5.4 Probable contact between Mesozoic intrusive to the NE and Cretaceous andesite to the SW. Note: andesite is mineralized to the south.
- 5.8 & 5.92 Probable basalt dikes; however, if magnetite content of mineralization in andesite is high, these anomalies could be significant.

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Area B

Line 4

CHECKPOINT

~~POSSIBLE GROUND POINT MAGNETIC FEATURES~~
~~AND MESSAGE~~ INTERPRETATION

- 2.1 Probable contact between Laramide granite to east and older Precambrian gneiss to the west.
- 2.35 Projection of granite under alluvium.

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Area B

Line 5

CHECKPOINT

~~POSSIBLE STRATIGRAPHIC RELATIONS~~
~~AND MISCELLANEOUS INTERPRETATION~~

- 1.3 Contact between Cretaceous andesite to the east and older Precambrian gneiss to the west.
- 2.5 Probable contact between Cretaceous andesite and older Precambrian gneiss.
- 3.02 Probable contact; Cretaceous andesite to the east and older Precambrian gneiss to the west.

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Area B

Line 6

CHECKPOINT

~~POSSIBLE CONTACT BETWEEN~~
~~AND MESOZOIC GRANITE~~ INTERPRETATION

- 2.4 Checkpoint 6.3 has significance.
- 2.4 Probable faults - gneiss.
- 2.9 Probable faults - gneiss.
- 4.4 Probable fault in older Precambrian gneiss.
Possible contact with Laramide granite.
- 4.8 Probable fault or contact.
- 5.3 Probable contact between Laramide granite to the
SW and older Precambrian gneiss to the NE.
- 6.3 Probable fault topographically expressed by
Cunningham Pass. Laramide granite and numerous
small mines to the northwest. Recommend geologic
check.
- 10.6 Probable fault in gneiss.
- 11.95 Possible projected contact between Laramide
granite to the north. Mesozoic granite to the south.

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Area B

Line 7

CHECKPOINT

~~POSSIBLE SHALLOW CRETACEOUS ANDESITE~~
~~AND PRECAMBRIAN GRANITE~~
POSSIBLE SHALLOW CRETACEOUS ANDESITE

0.8-1.3 Possible shallow Cretaceous andesite.

End Probable contact between Cretaceous andesite
and Precambrian granite. Prospect pits noted
on U.S.G.S. 1:250,000 series topographic sheet.

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Area B

Line 8

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND UNRESOLVED INTERPRETATION~~

- F1.0 Probable fault.
- 3.0 Probable fault trending NW in gneiss. Laramide granite associated to the SE.
- 4.9 Probable fault. Laramide granite outcrop to the SE of the fault. Mineralization noted regionally. Possible magnetite in fault.
- 5.6 Shallow alluvium.

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Area B

Line 9

CHECKPOINT

~~PROBABLY CONTACT BETWEEN PALEOZOIC AND MESOZOIC~~
AND MESOZOIC INTERPRETATION

- 2.8 Probable contact between schist to the east and Mesozoic and Paleozoic undivided to the west.
- 3.3 Possible fault associated with mineralization at Hidden Treasure Mine area. Recommended ground check to correlate magnetics with geology at Hidden Treasure Mine.

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Area B

Line 10

CHECKPOINT

~~POSITIVE IDENTIFICATION OF MAGNETIC FEATURES~~
~~AND MEANINGFUL INTERPRETATION~~

- 1.03 Probable fault.
- 1.18 Probable contact between Laramide granite to the SW and Precambrian gneiss to the NE.
- 1.3 Probable contact between Precambrian gneiss to the SW and Laramide granite to the NE.
- 1.55 Probable fault.
- 1.6-1.9 Shallow alluvium.
- 1.83 Probable contact between Precambrian schist to the SW and gneiss to the NE.

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Area B

Line 11 *SUMMARY: Checkpoints*

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND DISCUSSIONS~~ INTERPRETATION

4.2 and 6-end are of interest.

- 0.2 Probable andesite flow.
- 0.4 Contact between Quaternary basalt to the NW and Cretaceous andesite to the SE.
- 0.6q Contact between Cretaceous andesite to the NW and Quaternary basalt to the SE.
- 0.9 Possible fault and/or contact.
- 3.1-4.0 Probable shallow andesite.
- 3.25 Probable fault.
- 3.55 Probable fault and/or contact.
- 3.8-3.9 Flow or dike like feature.
- 4.2 Contact between Cretaceous andesite to the SE and Mesozoic granite to the NW. The Southern Cross Mine and Tough Nut Shafts appear associated with this feature about two miles SW of flight line. A ground check is recommended to correlate geology and magnetics.
- 5.0 Probable contact between Tertiary undivided sediments to the north and Mesozoic granite to the south.
- 5.9 Probable contact between Cretaceous andesite to the south and Laramide dikes and plugs to the north.

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Line 11 continued

- 6.0-8.6 Shallow alluvium, mineralization and magnetic variation are evident. A ground check is recommended, to correlate magnetics with geology.
- 6.0 Probable contact between Laramide dikes and plugs to the south and Mesozoic granite to the north.
- 6.4 Possible Tertiary dike or fault containing magnetite.
- 6.8 Probable fault - Mesozoic granite.
- 7.4 Probable fault and/or contact.
- 8.0 Probable fault and/or contact.
- 8.5 Probable fault and/or contact.
- 9.8 Possible dike, or fault containing magnetite.

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Area B

Line 12

SUMMARY:

CHECKPOINT

~~POSSIBLE SIGNATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

Checkpoint 5.75-5.85 is of interest.

- 1.0 Probable contact between Quaternary basalt to the SE and Cretaceous Kofa volcanics to the NW.
- 2.9 Probable dike.
- 5.2 Probable contact between Quaternary basalt to the SE and Cretaceous andesite to the NW.
- 5.75-5.85 Laramide intrusive. Contacts at 5.75 and 5.85 are associated with mineralization noted on Vicksburg quadrangle. These contacts should be traceable with ground magnetics. A geology check is recommended.

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Area B

Line 13

CHECKPOINT

~~PROBABLE - QUATERNARY MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

- 0.5 Probable fault and/or contact.
- 0.9 Probable Quaternary intrusive.
- 1.85 Probable basalt dike.
- 2.1-2.35 Probable basalt.
- 2.9 Probable fault in Quaternary basalt.
- 2.9-end Probable basalt.

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Area B

Line 14

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

- 0-0.7 Many structures (faults, contacts or dikes) should be traceable with ground magnetics. Geology check is recommended to correlate structures and mineralization with magnetics, particularly near the start of the record.
- 0.03 Fault and/or contact in the vicinity of Little Butte Mines area.
- 0.12 Possible dike - shallow alluvium, Little Butte Mines area.
- 0.21 Possible fault and/or contact, shallow alluvium, Little Butte Mine area.
- 0.45 Probable fault.
- 0.7 & 0.95 Probable faults.
- 3.0-4.0 Shallow alluvium.
- 3.7 Probable shallow fault.
- 4.1 Area of possible contact between Cretaceous andesite to the south and Mesozoic sediments to the north.
- 4.2-4.4 Possible faults in andesite.
- 4.6-4.8
- 5.25 Possible fault in andesite.
- 5.45, 8.0, Probable faults.
13.1, 13.44,
10.9, 13.54
- 13.64 Contact between basalt to the south and andesite to the north

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Line 15

CHECKPOINT

~~POSSIBLE SIGNIFICANCE~~
~~AND~~ ~~INTERPRETATION~~

- | | |
|----------|--|
| 1.35-2.9 | Probable basalt flows. |
| 5.1 | Probable basalt flow. Possible fault and/or contact. |
| 5.7&5.9 | Probable basalt flows. |
| 6.5 | Projection of Mesozoic gneiss. |
| 7.3 | Possible fault. |
| 8.7 | Possible fault and/or contact. |

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Line 16

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC ANOMALIES~~
~~AND MISCELLANEOUS INTERPRETATION~~
~~_____~~

Line 16 is characteristic of volcanics without
apparent significant anomalism.

- 1.1 Possible fault and/or contact.
- 1.3 Shallow fault and/or contacts.
- 1.4 Shallow fault and/or contacts.
- 1.56 Shallow fault and/or contacts.
- 1.71 Shallow fault and/or contacts.
- 2.55 Probable dike.
- 2.6 Probable fault and/or contact.
- end Probable fault and/or contact.

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Line 18

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MEASUREMENTS~~ INTERPRETATION

- 0.7 Probable dike.
- 2.1 Probable contact between basalt to the east and andesite to the west.
- 2.3 Probable volcanic flow.
- 2.9 Probable contact between basalt to the east and Precambrian granite to the west.
- 5.2 Probable contact; Precambrian gneiss to the east and Precambrian granite to the west.
- 5.8 Probable contact between Precambrian granite to the east and Cretaceous andesite to the west.
- 7.3 Probable fault.
- 8.4 Probable contact between Cretaceous andesite to the east and Tertiary-Cretaceous sediments to the west.
- 9.7 Possible contact between Cretaceous-Kofa volcanics to the east and Quaternary basalt to the west.
- 9.7-12.5 Record is anomalously quiet reflecting a very thin layer of volcanics.
- 12.6 Probable contact between Quaternary basalt to the east and Cretaceous-Kofa volcanics to the west.

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Line 19

CHECKPOINT

~~POSSIBLE~~
~~AND MISCELLANEOUS~~ INTERPRETATION

The entire length of Line 19 with the exception of Checkpoints 0.1, 4.2-4.7 and 6.7-end, either is very deep alluvium or is a very thin layer of basalt.

- 0.1 Probable basalt dike.
- 1.25 Probable fault and/or contact.
- 2.75 Probable fault and/or contact.
- 4.2-4.7 Probable thickening or shallowing of basalt.
- 6.7-end Shallow alluvium.

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Area B

Line 20

CHECKPOINT

~~POSSIBLE SIGNIFICANT INTERPRETATION~~
~~AND MEASUREMENTS~~ INTERPRETATION

- | | |
|---------|---|
| Start | Probable basalt dike. |
| 1.15 | Probable fault and/or contact. |
| 1.45 | Probable contact between Quaternary basalt to the SE and Cretaceous-Kofa volcanics to the NW. |
| 1.67 | Possible contact between Cretaceous-Kofa volcanics to the west and Quaternary basalt to the east. |
| 1.98 | Possible basalt dikes. |
| 2.0-end | Probable thin layer of basalt. |
| 3.2 | Possible basalt dikes. |

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Line 23

CHECKPOINT

~~POSSIBLE~~
~~AND~~ INTERPRETATION

Checkpoint 4.05 has a priority recommendation.
Checkpoint 3.5 is of interest.

- 0.85 Probable basalt.
- 1.0-1.4 Probable basalt.
- 1.8 Probable contact between Quaternary basalt to the NW and Cretaceous-kofa volcanics to the SE.
- 3.0 Probable contact between Cretaceous-kofa volcanics to the NW and Cretaceous andesite to the SE.
- 3.5 Probable contact between Cretaceous andesite to the NW and Mesozoic sediments to the SE. Possible mineralizer in contact with older host. Contact should be traceable with ground magnetics if geology shows this is warranted. Recommend a geologic check.
- 4.5 Probable contact between Mesozoic sediments to the NW and Cretaceous andesite to the SE. Mineralization (King of Arizona Mine, Rob Roy Mine, etc.) about 2 miles to NE is associated with andesite breccia. This magnetic high may be due to andesite on or near the contact. Although this is possibly only an isolated volcanic flow, a priority recommendation is given for area.
- 4.98 Probable Cretaceous volcanics.
- 5.7-5.93 Probable near surface this basalt.

October 24, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 23

CHECKPOINT [REDACTED]
[REDACTED] INTERPRETATION

Checkpoint 4.5 has a priority recommendation.
Checkpoint 3.5 is of interest.

- 0.85 Probable basalt.
- 1.0-1.4 Probable basalt.
- 1.8 Probable contact between Quaternary basalt to the NW and Cretaceous-kofa volcanics to the SE.
- 3.0 Probable contact between Cretaceous-kofa volcanics to the NW and Cretaceous andesite to the SE.
- 3.5 Probable contact between Cretaceous andesite to the NW and Mesozoic sediments to the SE. Possible mineralizer in contact with older host. Contact should be traceable with ground magnetics if geology shows this is warranted. Recommend a geologic check.
- 4.5 Probable contact between Mesozoic sediments to the NW and Cretaceous andesite to the SE. Mineralization (King of Arizona Mine, Rob Roy Mine, etc.) about 2 miles to NE is associated with andesite breccia. This magnetic high may be due to andesite on or near the contact. Although this is possibly only an isolated volcanic flow, a priority recommendation is given for area.
- 4.98 Probable Cretaceous volcanics.
- 5.7-5.93 Probable near surface this basalt.

October 24, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 23 continued

- 5.93 Probable contact between Quaternary basalt to the NW and Kofa Cretaceous volcanics to the SE.
- 6.1 Probable contact between Kofa volcanics to the NW and Mesozoic granite to the SE.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 26

CHECKPOINT

~~PROBABLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS~~ INTERPRETATION
~~FEATURES~~

Checkpoint 4.8 is a priority recommendation.

- 1.1 Probable contact between Cretaceous andesite to the north and Cretaceous-kofa to the south.
- 1.1-4.7 Typical record over thick sections of volcanics.
- 1.8 Probable fault in Cretaceous-kofa volcanics.
- 3.1 Probable thick basalt flow with high magnetite content.
- 4.0 Probable fault.
- 4.8 Probable fault or contact between Cretaceous-kofa volcanics to the north and Mesozoic sediments to the south. Feature should be traceable with ground magnetics and is associated with known mineralization (Hall Mine). Priority recommendation is given for a reconnaissance geologic check with ground magnetic facility.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 27

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND UNCONVENTIONAL~~ INTERPRETATION

- 0.1 Probable fault in Cretaceous andesite.
- 0.78 Possible fault.
- 1.6 Probable contact between Cretaceous andesite to the north and Quaternary Rhyolite to the south.
- 2.5 Probable contact between Quaternary Rhyolite to the north and Cretaceous andesite to the south.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 28

CHECKPOINT ~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

1.6 Possible fault.
1.85 Possible fault.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 29

CHECKPOINT

~~POSSIBLE STONE POINT MAGNETIC FEATURES
AND MESOZOIC INTERPRETATION~~

- 0.4 Possible fault and/or contact.
- 2.05 Probable fault in Mesozoic gneiss.
- 2.36 Probable contact between Mesozoic gneiss to the north and Cretaceous andesite to the south.
- 2.65 Probable contact between Cretaceous andesite to the north and Mesozoic schist to the south.
- 3.0 Probable contact between Cretaceous andesite to the south and Mesozoic schist to the north.
- 4.5 Probable fault in andesite.
- 5.35 Probable contact between Cretaceous andesite to the north and Mesozoic gneiss to the south.
- 7.1 Probable contact between Mesozoic gneiss to the north and andesite to the south.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 30

CHECKPOINT

~~POSSIBLE STRENGTH PROFILES~~
AND MISCELLANEOUS INTERPRETATION

Line 30 was flown in two segments due to rough topography. Between Checkpoints 6.0 and 7, no record was flown.

- 0.3 Probable fault in Quaternary rhyolite.
- 0.55 Probable fault in Quaternary rhyolite.
- 0.95 Rholite flow.
- 1.3 Probable fault in Quaternary rhyolite.
- F2.5 Possible contact between Quaternary rhyolite and Cretaceous andesite.
- 3.4 Probable contact between Quaternary rhyolite to the north and Cretaceous andesite to the south.
- 4.0 Probable contact between Cretaceous andesite to the north and Quaternary rhyolite to the south.
- 5.1 Probable contact between Mesozoic gneiss to the north and Cretaceous andesite to the south.
- 5.45 Probable contact between Cretaceous andesite to the north and Mesozoic gneiss to the south.
- 5.7 Probable contact between Mesozoic sediments to the north and Cretaceous andesite to the south.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 30 continued

- 11.4 Probable contact between Mesozoic gneiss to the north and Mesozoic granite to the south.
- 11.7 Probable fault in Mesozoic gneiss.

October 25, 1966

Miami Copper Company
Aerial Magnetic Survey

Area B

Line 31

CHECKPOINT

~~POSSIBLE SIGNIFICANT TRENDS~~
~~AND MISCELLANEOUS~~ INTERPRETATION

- 4.3 Probable NW trending fault contact between Mesozoic schist to the north and Mesozoic gneiss to the south.
- 4.8 Probable fault in gneiss.

AREA C

SUMMARY CONCLUSIONS, RECOMMENDATIONS AND DETAIL INTERPRETATION

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 1

CHECKPOINT

~~REDACTED~~
~~REDACTED~~ INTERPRETATION
~~REDACTED~~

- 0.3 Probable andesite at, or near surface.
- 0.8-2.8 Probably rhyolite beneath thin alluvial cover. Magnetic highs probably related to variations within the flow and/or topography.
- 3.1 Contact or fault.
- 3.7 Probable fault and/or flow structure in andesite.
- 6.05 Possible andesite flow near surface.
- 10.0 Probable fault.
- 10.2-11.0 Probable andesite under shallow alluvium.
- F11.9 Possible fault or contact at shallow depth.
- 13.0-17.0 Continued magnetic relief characteristic of volcanics.
- 17.0-25.0 From here to end of line, the magnetic profile shows subdued relief, which is not consistent with basalt noted on county geology. Basalts may mask more interesting rock type and be thin. Additional aerial magnetic coverage extending SW from the area of known mineralization immediately to the NE may delineate an area of further interest. A geologic check is recommended to determine merit of this area.

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 2

CHECKPOINT

~~POSSIBLE SIGNATURE~~

~~INTERPRETATION~~

Record typical of volcanics under shallow alluvium.

10.3-10.7 Quaternary basalt at or near surface.

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 3

CHECKPOINT ~~POSSIBLE STRONG~~
~~AND WEAK~~ INTERPRETATION

Record shows no apparent areas of interest.

- 0.7 Probable andesite.
- F1.3 Possible fault and/or contact.
- 2.2 Possible fault and/or contact.
- 5.8 Probable fault in basalt.
- 6.8 Fault contact between Quaternary basalt to east and Tertiary rhyolite to west.

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 7

CHECKPOINT

~~FOOTPRINT OF MAGNETIC TENDENCIES~~
~~AND INTERPRETATION~~

- 0.3 Possible contact or fault; shallow alluvium.
- 3.8 Probable contact between Cretaceous andesite to south and Precambrian granite to the north.
- 4.0 Probable shallow andesite.
- 4.6 Probable fault and/or contact.
- 5.0-5.5 Magnetic highs possibly due to topography and structure within the rhyolite.
- 5.5 Possible fault or contact; shallow alluvium.

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 8 continued

and Precambrian granite to the SE. Mineralization noted along topographic lineation four miles to NE.

- 8.75 Possible faults in granite.
- 8.9 Possible faults in granite.
- F9.2 Possible fault and/or contact.
- F9.7 Possible northern contact of schist.
- F9.9 Probable fault structure in schist, shallow alluvium.
- 10.5 Possible southern contact of Precambrian schist.

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 9

CHECKPOINT

INTERPRETATION

- | | |
|------|--|
| 0.7 | Probable fault and/or contact. |
| 1.9 | Probable fault and/or contact. |
| F4.8 | Probable fault and/or contact. |
| 6.25 | Probable contact between Precambrian granite to west and Precambrian gneiss to east. |
| 6.9 | Probable fault in Precambrian gneiss. |

October 28, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 10 continued

lends itself particularly well to a low level aerial magnetic survey which could then outline specific areas for continued exploration.

28.2 Anomaly in the vicinity of Grace Mine; a small lead prospect, 50-60 tons total production, unknown grade, limestone or dolomite replacement deposit with volcanics adjacent to the sedimentary strip to the south. As the Grace Mine projection is on northern extension of anomaly, this magnetic high may relate to an andesite-limestone contact near which mineralization occurs. An evaluation of this relationship including normal gamma variation along contact bears examination by a geologist with hand magnetic facility.

27.0-62.0 No apparent significant magnetic features.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 11 continued

- 13.2 Possible shallow subsurface projected contact of carboniferous and Devonian sediments with Laramide volcanics.
- F13.7 Collectively, these features indicate shallow
14.65 alluvium in an area of projected volcanics which
14.95 are associated with mineralized zones to the east.
F15.0
F15.6
F15.9
- 16.6 Probable near surface fault and/or contact.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 12 North

CHECKPOINT ~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MEASUREMENTS~~ INTERPRETATION.

- 0.45 Probable fault in Tertiary rhyolite.
- 1.0 Probable fault in Tertiary rhyolite.
- 1.4 Probable fault in Tertiary rhyolite.
- 2.0-3.0 Shallow alluvium.

Area C

Line 12 South

CHECKPOINT ~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MEASUREMENTS~~ INTERPRETATION.

- 2.2 Probable fault and/or contact.
- 3.05 Probable fault and/or contact.
- 8.8 Possible near surface rhyolite flow.
- 10.2 Probable faults in rhyolite.
- 10.4
- 10.6
- 11.0-11.6 Probable basalt dikes.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 15

Summary →

CHECKPOINT

~~POSSIBLE STONE~~
~~AND~~ INTERPRETATION

Magnetic anomalism from about Checkpoint 17 to the end of the line may tie in with Tiger-Copper Creek-Arivaipa district magnetic-mineral lineation. Although no specific anomaly can be correlated with known mineralization. An aerial magnetic grid connecting these districts may delineate more specific zones of interest.

- 0.4 Possible projection of Tertiary andesite beneath shallow alluvium.
- 4.4 Probable contact between Tertiary andesite to north and Tertiary rhyolite to south.
- 6.0 Probable near surface basalt.
- 6.9 Fault or contact.
- 7.9 Possible fault and/or contact.
- 8.8 Probable rhyolite.
- 10.4-16.5 Basalt outcrop/ volcanics present at or near surface.
- 14.8 Probable basalt flow.
- 15.9 Probable basalt flow.
- 16.7 Probable contact between Quaternary basalt to south and Tertiary andesite to north.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 15 continued

- 17.8 Fault or contact having 400-500' of relative maximum alluvial depth. 600 gamma relief.
- 19.0 Possible fault or contact on stream trending NE.
- 19.0-20.0 Possible Tertiary intrusive.
- 20.15 Possible projection of Tertiary intrusive beneath shallow sediments along projected zone of weakness from Copper Creek lineation (?). (Possible fault.)
- 20.3 Possible fault and/or contact.
- 20.5 Possible fault and/or contact.
- 20.75 Possible volcanic dike.
- 20.95 Possible fault.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 19 North

Summary: ↖

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND INTERPRETATION~~

Checkpoint 6 to 8.7 is included on U.S.G.S. Aeromagnetic map of the Mammoth quadrangle, Pinal and Pima Counties (map GP-419, 1963). Because San Manuel and Tiger mineralization occur on strong aerial magnetic lineation intersections and similar intersections are regionally evident (Ref: GP-419), consideration should be given to a detailed evaluation of published data as well as additional aerial magnetic coverage to the north and east.

Checkpoint:

- 0.1 Probable fault and/or contact between diabase and Apache.
- 0.3 Possible fault and/or contact with Apache group.
- 1.8 Possible Tertiary andesite.
- 2.8 Magnetic high possibly related to projection of Tertiary intrusions along zone of weakness.
- 3.9 Possible fault and/or contact.
- 4.i Small low on trend indicated by U.S.G.S. aeromagnetic map to the southwest which may be traceable to small mine three miles northeast.
- 4.8-6.8 Same magnetic feature on magnetic lineation trending northeast from San Manuel and Tiger complex as shown on GP-419. Feature thought to have been drilled by Bear Creek Mining Company to depth of 1700' in acidic (?) volcanics. Recommend research for conformation of drilling, also continued aerial magnetic grid to north and east of GP-419 to further define Tiger-Copper Creek lineation.
- 8.6-9.0 Magnetic high on E-W projected fault or contact extending through San Manuel Mine Area (Ref. GP-419).
- 9.1-9.7 Tertiary andesite at or near surface.
- 9.7-14.2 Shallow alluvium.
- 10.6,11.5,12.3 Probable fault and/or contact.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 21

CHECKPOINT ~~POSSIBLE FAULTS~~
~~AND MISCELLANEOUS~~ INTERPRETATION

0.5 Probable fault and/or contact.

F2.8 Possible fault.

9.2 Possible fault and/or contact.

9.8 Possible fault and/or contact.

13.8 Possible fault and/or contact.

End of Line Probable fault.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 24

CHECKPOINT ~~POSSIBLE SWIFT POINT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

Checkpoint 9.4 is a priority recommendation.

- 0.5 Profile confused by artificial effects including railroad. May reflect crystalline rock at depth. (?)
- 7.5 Possible fault and/or contact.
- 9.4 Possible fault and/or contact could be a westward extension of zone of weakness on which Bisbee occurs. Recommended ground magnetic followup.
- 15.7 Probable fault and/or contact.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 27

CHECKPOINT

~~POSSIBLE CONTACTS BETWEEN PRECAMBRIAN~~
~~AND METAMORPHIC ROCKS INTERPRETATION~~

Mineralization is noted to the west between
Checkpoints 1.8 and 3.5.

- 0.2 Possible fault and/or contact near projection of
fault contact noted on Cochise geology map.
- 0.95 Possible contact between Precambrian granite to the
north and Precambrian schist to south.
- F2.0 Apparent fault in Precambrian schist possibly
associated with Lone Star Mine mineralization to
west. Recommended ground check to correlate magnetics
with geology. With favorable results, additional
aerial magnetic coverage should be considered.
- 4.1 Possible fault and/or contact.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 30

CHECKPOINT

INTERPRETATION

Strong magnetic relief in area of San Manuel-Tiger mineralization suggests a detailed evaluation of GP-419. Of note are broad magnetic features to the north indicating possible extensions of favorable broken geology.

- 0.2 Possible granite underlying gneiss.
- 1.5-3.5 Probable Laramide granite.
- F8.85 Apparent dike; very slight possibility of this being an artificial feature associated with the railroad, not the track.
- 10.15 Possible fault and/or contact.
- 12.4 Basement rock apparently under shallower alluvium. Maximum relative depth 2000'+. If area warrants interest, additional magnetic profiles may indicate feature is nearer surface.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 32

CHECKPOINT [REDACTED]
[REDACTED] INTERPRETATION

Checkpoint 4.7 to 4.78 and 7 to end merit interest.

- 1.4-3.0 Apparent shallow alluvium over older Precambrian granite.
- 2.0,2.2,2.3 Probable faults.
- 4.0 Possible fault and/or contact.
- 4.65 Possible fault and/or contact.
- 4.7-4.78 Possible projection of Laramide granite from east which is associated with mineralization as noted on Pinal County geology map.
- 5.25 Possible fault.
- 5.6 Probable dike.
- 5.8 Possible fault.
- 7.0 & 7.3 Major faults and/or contacts bracketing a 300 gamma low. Mineralization noted to east at Mineral Mountain and to the SE in Laramide granite. Additional aerial magnetics are recommended to determine character and possible association of this feature with known mineralization.
- 7.64 Fault and/or contact.
- 8.5 Fault and/or contact.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 33

CHECKPOINT

~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND MISCELLANEOUS INTERPRETATION~~

Record ends in shallow alluvium. Much structural variation, probably volcanics, is indicated in an area of favorable regional geologic projections.

- 0.38 Probable fault in Laramide granite .
- 1.35 Possible fault and/or contact.
- 4.2 Possible contact between Tertiary volcanics to the north and Laramide granite to south.
- 4.2-9.35 Record shows characteristic magnetic relief for volcanics.
- 4.5-4.75 Probable fault and/or contacts.
- 5.75-F6.05-
F7.1-F7.45-
F7.7
- 8.6 Surface outcrop of basalt.
- 9.1 Possible projected fault.
- 9.35 Possible projected fault and/or contact.
- 9.35-10.2 Possible Cretaceous sediments.
- 10.3 Probable fault or contact.
- 10.9 Probable near surface ⁸³ fault and/or contact. No obvious geological explanation noted.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 34

CHECKPOINT ~~POSSIBLE SIGNIFICANT MAGNETIC FEATURES~~
~~AND DISCUSSIONS~~ INTERPRETATION

No apparent anomalies of interest.

0.4 Probable fault in Laramide granite.

0.7 Probable fault in Laramide granite.

October 31, 1966

Miami Copper Company
Aerial Magnetic Survey

Area C

Line 36

CHECKPOINT

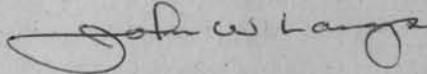
~~POSSIBLE GEOMORPHIC TRENCH~~
~~ADJACENT TO~~ INTERPRETATION

No apparent anomalies of interest.

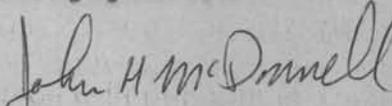
3.9 Probable fault and/or contact in Laramide granite.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY



**John W. Langa
Geophysicist**



**John H. McDonnell
Geologist**

APPROVED:

Walter E. Heinrichs, Jr.

**November 18, 1966
P. O. Box 5671
Tucson, Arizona**

November 21, 1966

INVENTORY OF TOTAL JOB MATERIAL FOR REPORT ON AREAS A, B, & C
and REPORT ON AREA D

- I. Report: (Areas A, B & C) One original and two copies.
- II. Final Maps: Plan location on county geology scale 1:250,000
Three reproducibles (one each Area A, B, C
in map tube)
Nine copies (one each Area A, B, C folded
and attached to each report)
- III. Work Maps (15" & 7.5" U.S.G.S. topographic series quad-
rangles)

Area A (none)

Area B Line Number

Name of Quad Sheet

1 & 2 in part

Black Peak, Ariz. Calif.

1

Buckskin Mts. W, SW Ariz.

4, 6 & 8

Aquila, Ariz.

9

Lone Mt. Ariz.

10

Aquila, Ariz.

11

Utting, Ariz.

12 & 13

Little Horn Mts., Ariz.

14

Livingston Hills, Ariz.

15

Cortez Peak, Ariz.

16 & 17

Eagletail Mts. Ariz.

18 part

Dendora Valley, Ariz.

19, part 18

Eagletail Mts. Ariz.

20

Polomas Mts., NW Ariz.

23 part 22 all

Stoval, Ariz.

23 & 24 part

Kofa Butte, Ariz.

24

Castle Dome Mts. SE Ariz.

26

Castle Dome Mts. SW Ariz.

27 & 28

Laguna, Ariz. - Calif.

29

Picacho, Ariz. - Calif.

30 & 31

Trigo Peaks, Ariz.

Area C

1

Fort Thomas, Ariz.

1 & 2

Guthrie, Ariz

3

Bowie, Ariz

3

Duncan SE Arizona.

5

Tanque, SW Ariz.

4 & 8

Sierra Bonita Ranch, Ariz.

5,6,7, & 9

Willcox, Ariz.

10

Apache, Ariz. - N. Mex.

10 & 11

Dos Cabezas, Ariz.

12

Pedregosa Mts. Ariz.

13, 14

Pedragosa Mts., Ariz.

15

Winchester Mts. Ariz.

16, 17, 18

Draoon, Ariz

19

Reddington, Ariz.

Inventory (Cont'd)

Area C (Cont'd) Line Number	Name of Quad Sheet
20,21,22	Gleeson, Arizona
23	Bisbee, Ariz.
24	Herford, Ariz.
25	Wrightson, Ariz. (south end only)
25 (N.part)	Wrightson, Ariz
26 & 27	" "
28 & 29	Happy Valley, Ariz.
29 & 30	Bellota Ranch, Ariz.
31	Oracle, Ariz.
33,34,35,36	Presumido Peak, Ariz.

- IV Master Maps, U.S.G.S. Topography scale 1:250,000 on Linen
 Area A, Lines 1 - 11
 Area B, Lines 1 - 31 (Line 25 omitted because it was
 in a restricted military zone.)
 Area C. Lines 1 - 36

V. Final aerial magnetic flight record by area.

AREA A

Line Number	Date flown
1	9/6/66
2 North	8/8/66
2 South	8/8/66
3	8/8/66
4	8/8/66
5	8/8/66
6a	9/29/66 Rerun
6B	9/29/66 Rerun
6C	9/29/66 Rerun
7	8/9/66
8	8/9/66
9	9/29/66
10	9/22/66 Rerun
11	8/8/66

AREA B

1	8/9/66
2	8/9/66
3	9/28/66 Rerun
4	9/28/66 Rerun
5	9/28/66 Rerun
6	9/28/66 Rerun
7	9/28/66 Rerun
8	9/2/66
9 & 10	9/2/66
11	9/28/66 Rerun

Inventory (Cont'd)

AREA B (Cont'd)

<u>Line Number</u>	<u>Date Flown</u>
12	9/2/66
13	9/2/66
14	9/28/66 Rerun
15	9/2/66
16	9/2/66
17	9/2/66
18	9/2/66
19	9/28/66 Rerun
20	9/2/66
21	9/2/66
22	9/2/66
23	9/2/66
24	9/28/66 Rerun
25	Not flown (Military restricted zone.)
26	9/28/66 Rerun
27 & 28	9/2/66
29	9/2/66
30	9/2/66
31	9/2/66

Area

AREA C

1	5/23/66
2	10/3/66 Rerun
3	5/23/66
4	10/3/66 Rerun
5	5/23/66
6	5/13/66
7	5/18/66
8	10/3/66 Rerun
9	10/3/66 Rerun
10	5/19/66
11	5/23/66
12	10/3/66 Rerun
13	5/23/66
14	5/14/66
15	5/17/66
16	5/17/66
17	5/17/66
18	5/17/66
19	5/18/66 Rerun
20	5/14/66
21	5/14/66
22	5/14/66
23	10/3/66 Rerun
24	5/14/66
25	7/23/66
26	7/23/66
27	5/14/66
28	5/18/66

Inventory (Cont'd)

<u>Area C (Cont'd)</u>	<u>Date Flown</u>
29	7/23/66
30	10/28/66 Rerun
31	8/7/66
32	10/28/66 Rerun
33	5/13/66
34	5/13/66
35	5/13/66

VI Report (Area D)
One original and two copies

VII Final Maps: Plan location on county geology scale 1:250,000
One original and two copies

VIII Work Maps (15" and 1:250,000 U.S.G.S. topo Series)

<u>Area D</u>	<u>Name of Map</u>
1 - 3 & 6 part	Tortolita Mts. Ariz.
3, part 4	Cortaro, Ariz.
part 4 & 5	Mt. Lemmon, Ariz.
Part 5 & 6	Oracle, Ariz.
7,8,9,10	Tucson, Ariz. 1:250,000

IX. Final Aerial Magnetic Flight Records

<u>Line Number</u>	<u>Date Flown</u>
1 - 3	6/10/66
4,5,6,	9/10/66
7	9/10/66
8	9/10/66
9	9/10/66
10	9/10/66

grover - Contact below if Woody can't be contacted
- Joe Fowells
Bob Donegan

February 2, 1967

Mr. W.W. Simmons
Miami Copper Company
P.O. Box 100
Miami, Arizona 85539

re: Proposed air mag., southern
Arizona.

Dear Woody:

Thank you for your letter of January 25, 1967.

I have outlined the areas described in your letter by priority and have separated the areas by option depending on how you want the job done.

Option I:

Any one area is flown and processed separately, and each figured as a separate project, to be executed and paid separately. This offer is good for a six month period from the date of this letter.

Option II:

Selected → All considered as a total project to be processed continuously, each area to be billed as completed. Each area to be flown and processed in order of priority.

To fly and process each area will take approximately two weeks per area except areas no. 4, 6, 7, 8, & 9, which can be completed in one week each. This adds up to a total elapsed time of thirteen weeks to complete the entire project.

fly & Report - Report Dates.
- complete project or

Area 1, N.E. Florence:

Estimated mileage including ties, 262 miles.

Option I: \$2165.00

Option II: As shown below.

Area 2, Aravaipa:

- a) 336 miles including ties.
b) 287 miles including ties.

Option I: \$2720.00

Option I: \$2353.00

Area 3, S. Florence:

Estimated mileage including ties, 164 miles.

Option I: \$1430.00

Area 4, E. Florence:

Estimated mileage including ties, 62 miles.

Option I: \$965.00

Area 5, B. Dos Cabezas:

a) Estimated total mileage in letter proposal including ties, 116 miles.

Option I: \$1120.00

b1) As shown in Miami letter proposal, including ties, estimated 128 miles. Fly NE-SW direction.

Option I: \$1210.00

b2) Revised alternate by GEOEX, 1 mile spacing, estimate mileage, including ties 130 miles. Fly NW-SE direction.

Option I: \$1225.00

b3) Revised alternate by GEOEX, 1/2 mile spacing, estimated 229 miles including ties. Fly NW-SE direction.

Option I: \$1960.00

choice
of one

c1) As shown in Miami letter proposal, estimated mileage, including ties, 110 miles. Fly NE-SW direction.

Option I: \$1075.00

c2) Alternate NW direction revised by GEOEX with 1 mile spacing, estimated mileage, including ties, 118 miles.

Option I: \$1135.00 choice of one

✓ c3) Alternate NW direction as revised by GEOEX with 1/2 mile spacing, estimated mileage including ties, 202 miles.

Option I: \$1765.00

Area 6, E. Chiricachua Mts:

a) Estimated total mileage, including ties, 54 miles.

Option I: \$905.00

b) Estimated total mileage, including ties, 114 miles.

Option I: \$1105.00

c) Estimated total mileage, including ties, 30 miles.

Option I: \$707.00

Area 7, W. Swisshelm Mts:

Estimated mileage, including ties, 104 miles.

Option I: \$1050.00

Area 8, E. Mule Mts:

Estimated mileage, including ties, 24 miles.

Option I: \$780.00

Area 9, W. Mule Mts:

Estimated mileage, including ties, 24 miles.

Option I: \$780.00

TOTAL COST OF OPTION II:

All areas as one project based on estimated mileage including ties as shown above per each individual area, including Area 5. Total as outlined on following page.

All areas including,
Area 5:

→ b1 and c1, 1821 miles.	\$13657.50	choice of <u>one</u>
b2 and c2, 1831 miles.	\$13732.50	
b3 and c3, 2014 miles.	\$15105.00	

GENERAL INFORMATION

Reflights will be at our expense and certain lines may be longer or shorter than scheduled in order that a good navigation point will be utilized. This increases the data reliability and is in your interest, therefore will be prorated accordingly but will not exceed 5% overall in the charges.

We have recently included a 35mm flight path recovery system on our plane which we plan to use on this project. These films will be your property upon completion of the project and may have some additional use at a later date in areas where further ground work is contemplated.

In Area 5, b and c, we feel the lines should be oriented NW-SE to maintain continuity of data and on 1/2 mile spacing for better overall resolution. This amount is reflected in the \$15105.00 figure. If one mile spacing is still desired but orientation of NW-SE is acceptable, the figure of \$13732.50 will apply. If flown as indicated in your letter of January 25, 1967, the \$13657.50 figure will apply.

A scintillation detection system may be available if desired. Terrain clearance will be maintained at no greater than 500 feet, as safe practice allows, unless otherwise specified.

We can start on your project immediately upon receipt of your authorization to proceed. Some delay may be incurred on our part awaiting photo mosaics. However, we can proceed to order these upon notification from you prior to receipt of a purchase order from your accounting department.

The final report will consist of:

1. Magnetic contour map at a scale of 2" = 1 mile. —
2. Photo mosaics when available through government sources.
3. Interpretation and recommendations based on published geology, (usually the County Geology Series).
4. 35mm strip film.
5. Magnetic profiles.

Cont *

If Option I is exercised, 1/2 the stated rate will be required in advance and balance due on completion of the report.

If Option II is exercised, an initial charge of ^{\$4000.00}~~\$40000000~~ will be required for advance on account and an additional \$4000.00 on completion of flying and the balance due on completion of the report.

If you have any questions, we will be happy to try and answer them.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

EGH: pmcd

E. Grover Heinrichs
Vice President

Miami Copper Company

Division Tennessee Corporation

Miami, Arizona

B. R. Coit

Vice President and General Manager

P.O. Box 100
Zip Code 85539

January 25, 1967

Mr. Walter E. Heinrichs, Jr.,
President,
Heinrichs Geoexploration Company,
P. O. Box 5671,
Tucson, Arizona 85703.



Dear Walt:

We plan to make additional airborne magnetic surveys as outlined below. As we have modified your recommendations a bit, I think it well that you give us a new proposal. I gather from a telephone conversation with Grover that the better procedure is to complete the flying in all areas, but report on the various areas as study is complete. We do want to receive the reports as completed, and time is of some importance. I ask that your proposal give costs for the individual areas and an estimated time of completion for each. If there is something to be gained in completing all flying as quickly as possible rather than doing it piece-meal, your estimate can reflect this procedure. We ask that you bill us as you submit your report on each area. If advance payment is required, you should so state. The areas are listed in order of our priority.

Area 1. Northeast Florence

5 miles wide, 12 miles long, lines one-quarter mile apart, 21 lines. Flight lines at one-half mile spacing in all other areas.

Area 2. Aravaipa

A. 6 miles wide, 24 miles long, 13 lines.

B. 11 miles wide, 12 miles long, 23 lines.

Area 3. South Florence

7 miles wide, 10 miles long, 15 lines.

Area 4. East Florence

4 miles wide, 6 miles long, 9 lines.

Area 5. South Dos Cabezas

A. 4 miles wide, 12 miles long, 9 lines.

B. 9 miles wide, 11 miles long, 10 lines.

C. 6 miles wide, 14 miles long, 7 lines.

Area 6. East Chiricahua Mountains

A. 2 miles wide, 10 miles long, 5 lines.

B. 2 miles wide, 22 miles long, 5 lines.

C. MoMag coverage. 3 miles wide, 5 miles long.

Area 7. West Swisshelm Mountains

3 miles wide, 14 miles long, 7 lines.

Area 8. East Mule Mountains.

2 miles wide, 4 miles long, 5 lines.

Area 9. West Mule Mountains

2 miles wide, 4 miles long, 5 lines.

I enclose a map showing the outlines of the various areas. We lean toward the proposed flight lines being essentially parallel to the original lines. If you have strong opinions to the contrary, we will appreciate having your thoughts.

Mr. Walter E. Heinrichs, Jr.

-3-

January 25, 1967

This letter is a request for a proposal. If we ask you to make the surveys, a Purchase Order will be sent you as before.

Very truly yours,



W. W. Simmons
Chief Geologist

WWS:mes

cc: Mr. A. G. Philp

walt But has rep ?

Miami Copper Company

Division Tennessee Corporation

Miami, Arizona

B. R. Coit

Vice President and General Manager

P.O. Box 100
Zip Code 85539

January 25, 1967

Mr. Walter E. Heinrichs, Jr.,
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2

Area 1. Northeast Florence 16.4

5 miles wide, 12 miles long, lines one-quarter mile apart, 21 lines. Flight lines at one-half mile spacing in all other areas. (252) ✓

66

6

Area 2. Aravaipa

312 A. 6 miles wide, 24 miles long, 13 lines. 13.7

55

276 B. 11 miles wide, 12 miles long, 23 lines. 11.7

47

(588)

70
10
20

Area 3. South Florence

(150) 7 miles wide, 10 miles long, 15 lines. 10.9

44

Area 4. East Florence

(59) 4 miles wide, 6 miles long, 9 lines. 12.9

52

Area 5. South Dos Cabezas

108 A. 4 miles wide, 12 miles long, 9 lines. 18.8
 (306) 10/8 B. 9 miles wide, 11 miles long, 12 lines. 18.5
 (100) 9/0 C. 6 miles wide, 14 miles long, 15 lines. 20

75

RECOMMEND
N-15

72
LINES
THROUGHOUT

Area 6. East Chiricahua Mountains

50 A. 2 miles wide, 10 miles long, 5 lines. 25.2

101

(190) 110 B. 2 miles wide, 22 miles long, 5 lines. 27.9

112

N.B. 30 C. MoMag coverage. 3 miles wide, 5 miles long.

26.6
AIRMG
106

Area 7. West Swisshelm Mountains

(98) 3 miles wide, 14 miles long, 7 lines. 23.5

94

Area 8. East Mule Mountains.

(20) 2 miles wide, 4 miles long, 5 lines. 23.3

93

Area 9. West Mule Mountains

(20) 2 miles wide, 4 miles long, 5 lines. 18.9

76

I enclose a map showing the outlines of the various areas. We lean toward the proposed flight lines being essentially parallel to the original lines. If you have strong opinions to the contrary, we will appreciate having your thoughts.

TOTAL MILES 1678
 PLUS TIE LINES 10% 168
 SUB TOTAL 1846