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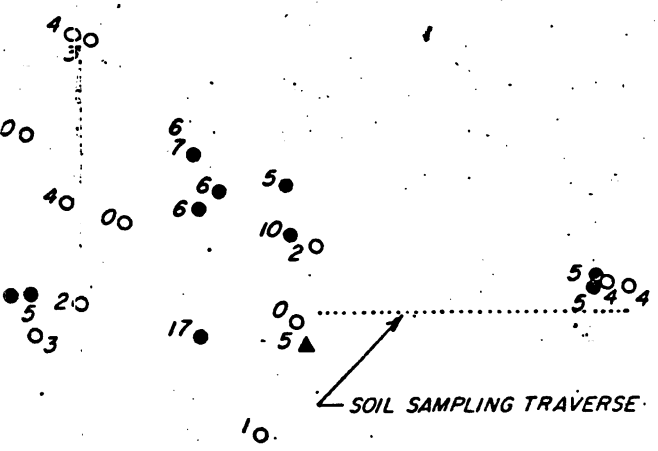
EXPLANATION

SAMPLE LOCATION - ROCK CHIP, △ STREAM SEDIMENT

O4 — PPM MOLYBDENUM, O < 5 PPM, ● 5 PPM OR MORE

6 — DATA FROM "EXAMINATION OF THE PENNY MINE" J.C. BALLA, 1964



BEAR CREEK MINING COMPANY - ARIZONA DISTRICT

PROJECT AREA: ROSKRUGE PEDIMENT

STATE: ARIZONA

COUNTY: PIMA

TITLE: GEOCHEMICAL MOLYBDENUM MAP

TOWNSHIP, RANGE:

GEOLOGIST, ENGINEER: D W. BLAKE

REVISIONS BY DATE

DATE: 6/25/65

CRAFTSMAN: JK

0612-580
C6721

0 1 2 3
MILES

PLATE 4

R. 9 E

T 12 S

T 13 S

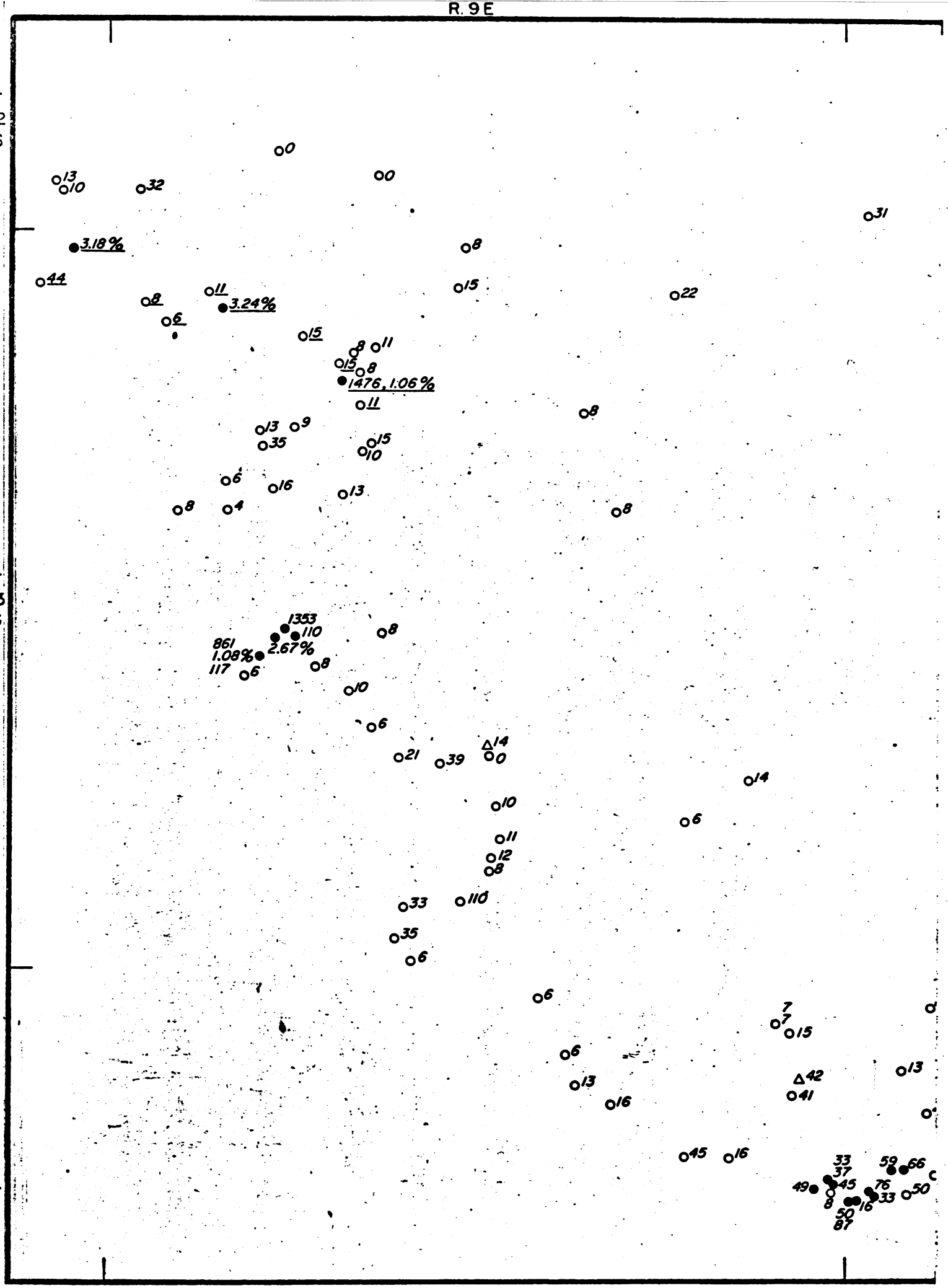
T 14 S

R. 9 E

T 12 S

T 3 S

T 4 S

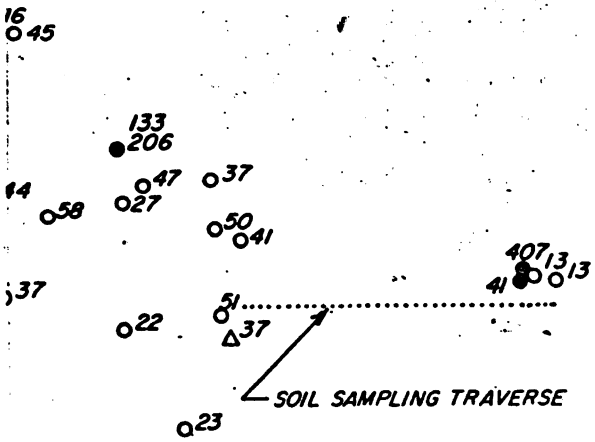


EXPLANATION

SAMPLE LOCATION-ROCK CHIP, △ STREAM SEDIMENT

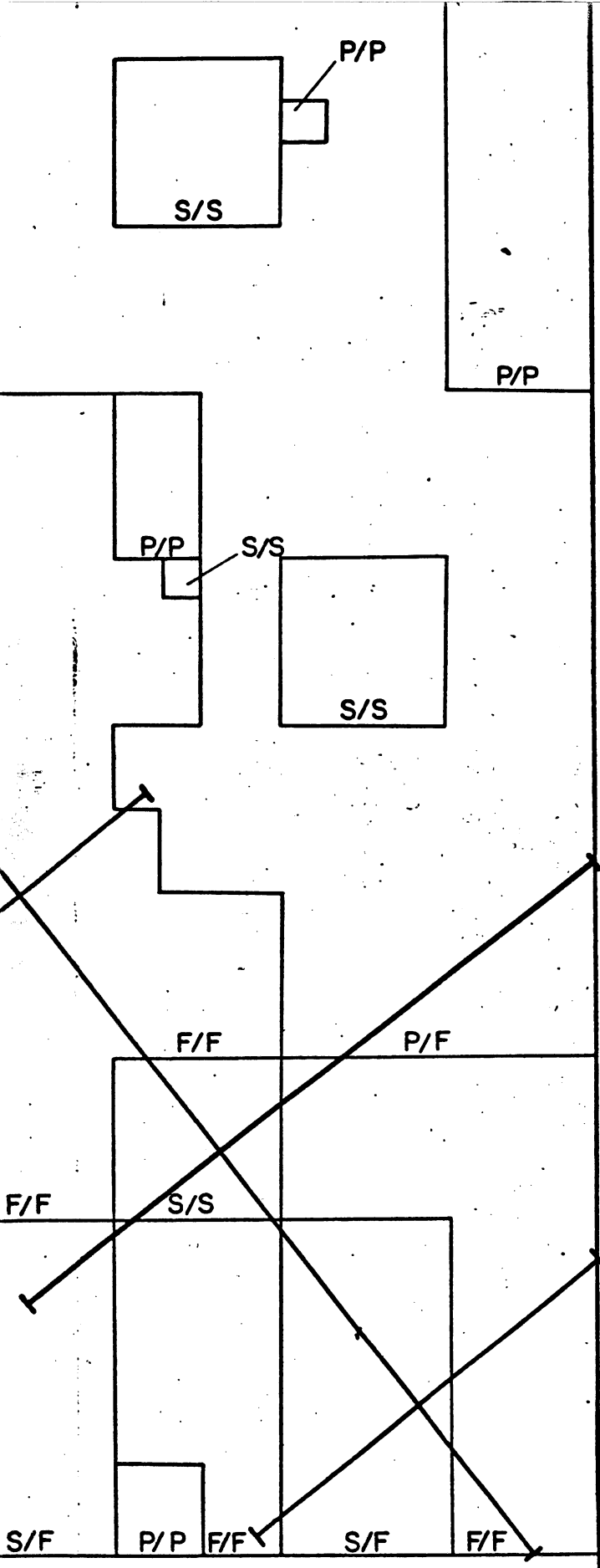
O15 — PPM COPPER ● ANOMALOUS VALUES

44 — DATA FROM "EXAMINATION OF THE PENNY MINE" J.C. BALLA, 1964



BEAR CREEK MINING COMPANY- ARIZONA DISTRICT

PROJECT-AREA: ROSKRUGE PEDIMENT	STATE: ARIZONA
	COUNTY: PIMA
TITLE: GEOCHEMICAL COPPER MAP	TOWNSHIP, RANGE:
GEOLOGIST-ENGINEER: D.W. BLAKE	REVISIONS BY / DATE
DATE: 6/25/65 / DRAFTSMAN: JK	0612-580 / C6720
0 1 2 3 MILES	PLATE 3



EXPLANATION

P/S

SURFACE OWNERSHIP

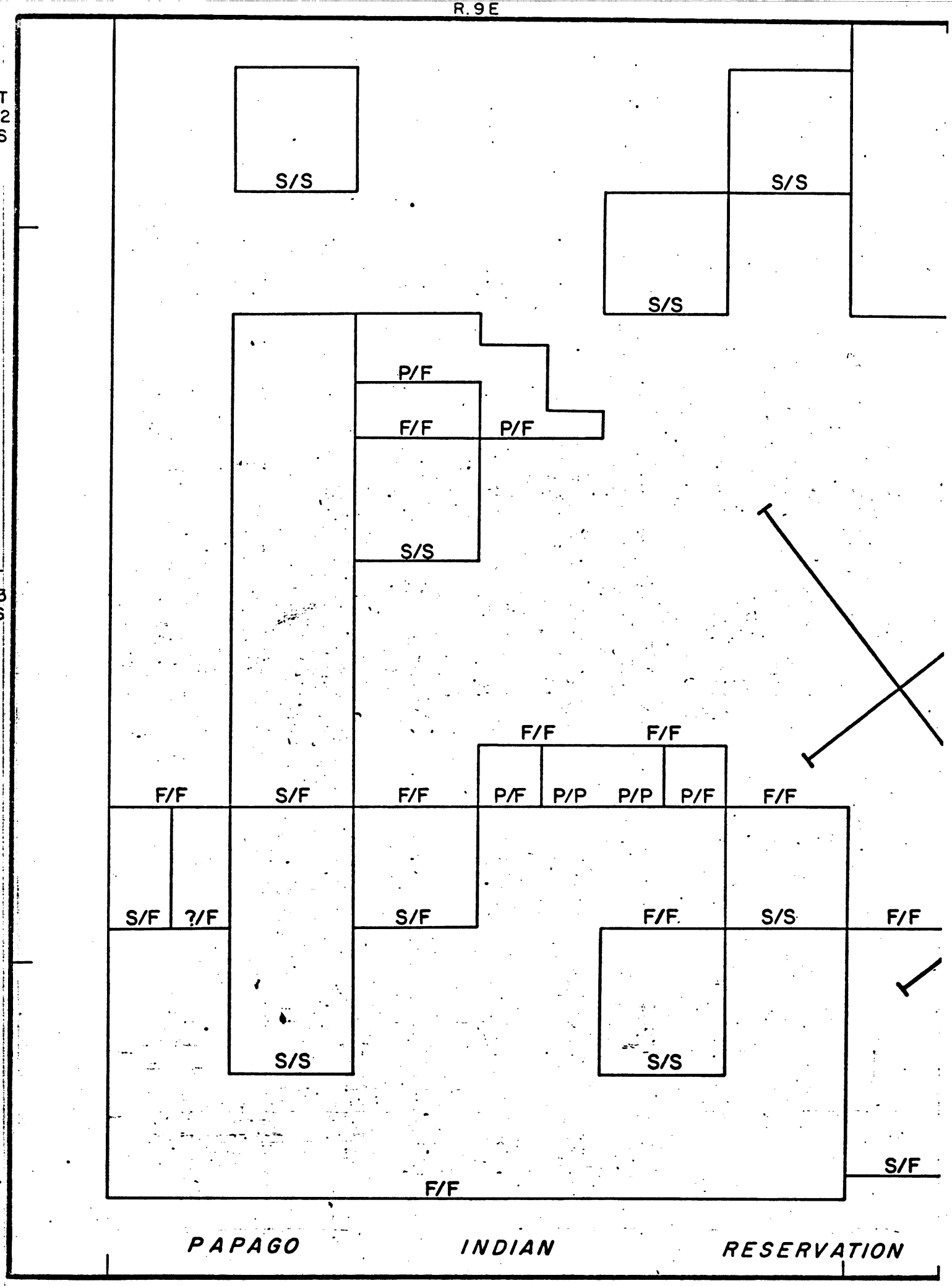
(P = PRIVATE)
(S = STATE)
(F = FEDERAL)

MINERAL OWNERSHIP

PROPOSED I.P. LINES

BEAR CREEK MINING COMPANY - ARIZONA DISTRICT

PROJECT AREA: ROSKRUGE PEDIMENT	STATE: ARIZONA
TITLE: LAND STATUS MAP	COUNTY: PIMA
	TOWNSHIP, RANGE:
GEOLOGIST - ENGINEER: M. MILLER	REVISIONS BY / DATE
DATE: 7/6/65 / DRAFTSMAN: JM	0612-580 / A6662
0 1 2 3 miles	PLATE 5

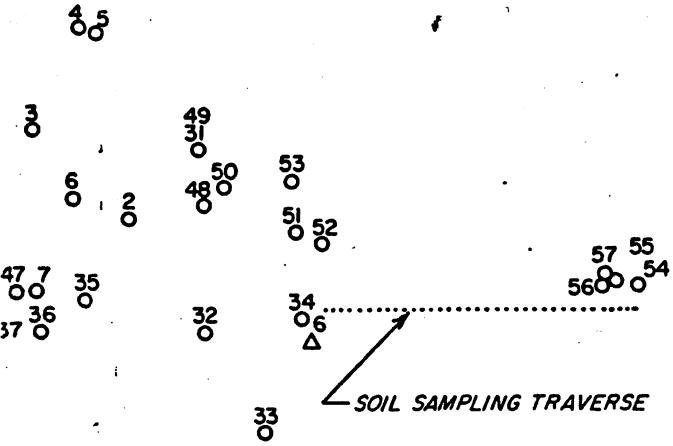

R. 9 E
T 12 S
T 13 S
T 14 S
S/S
S/S
S/S
P/F
F/F
P/F
S/S
F/F
F/F
F/F
S/F
F/F
P/F
P/P
P/P
P/F
F/F
S/F
?/F
S/F
F/F
S/S
F/F
S/S
S/S
S/F
F/F
PAPAGO INDIAN RESERVATION

EXPLANATION

SAMPLE LOCATION - ROCK CHIP, △ STREAM SEDIMENT

O77 — SAMPLE NUMBER

11 — DATA FROM "EXAMINATION OF THE PENNY MINE" J.C. BALLA, 1964



BEAR CREEK MINING COMPANY - ARIZONA DISTRICT

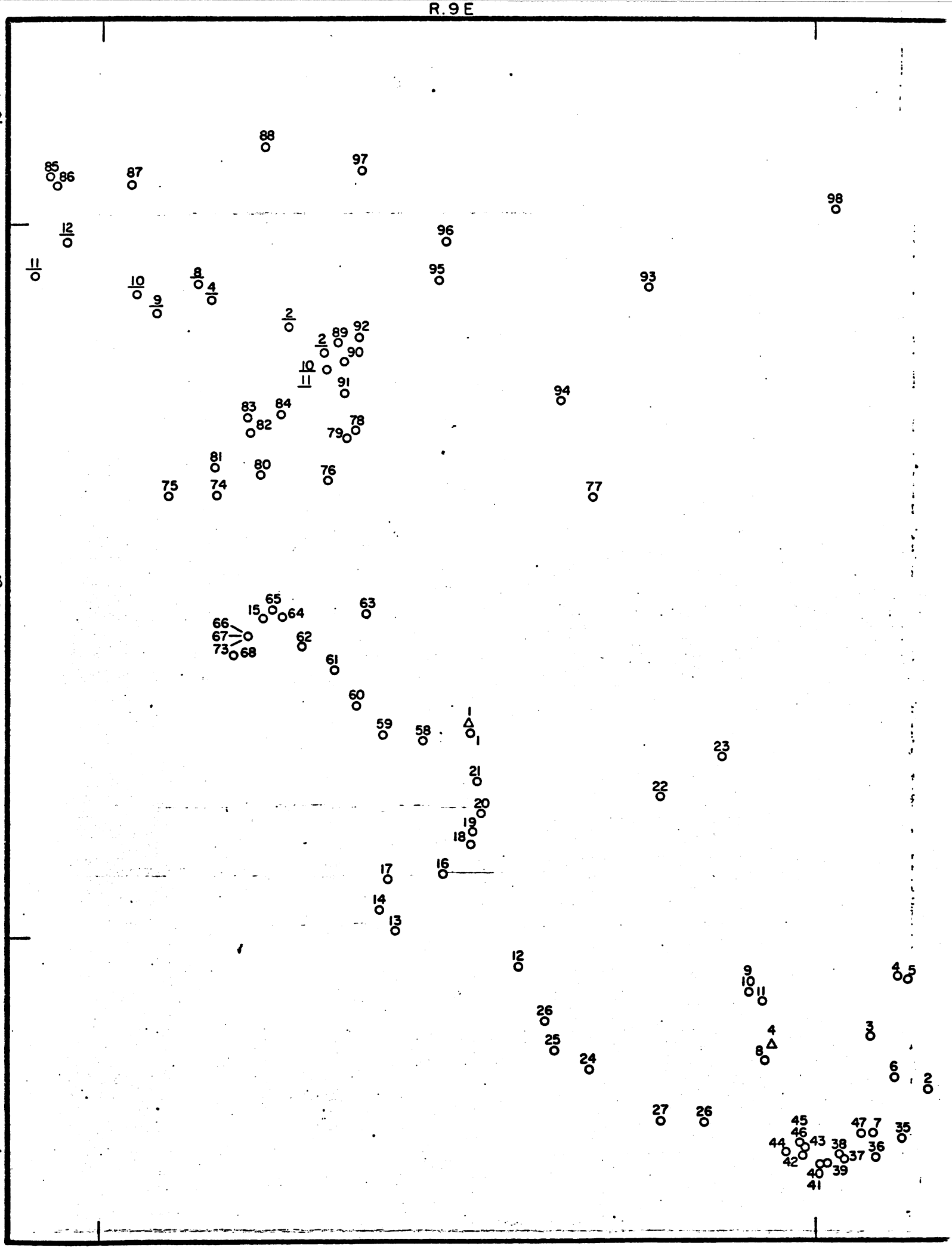
PROJECT - AREA: ROSKRUGE PEDIMENT	STATE: ARIZONA
	COUNTY: PIMA
TITLE: GEOCHEMICAL SAMPLE LOCATION MAP	TOWNSHIP, RANGE:
GEOLOGIST - ENGINEER: D.W. BLAKE	REVISIONS BY / DATE
DATE: 6/25/65 / DRAFTSMAN: JK	0612-580 / C6719
0 1 2 3 MILES	PLATE 2

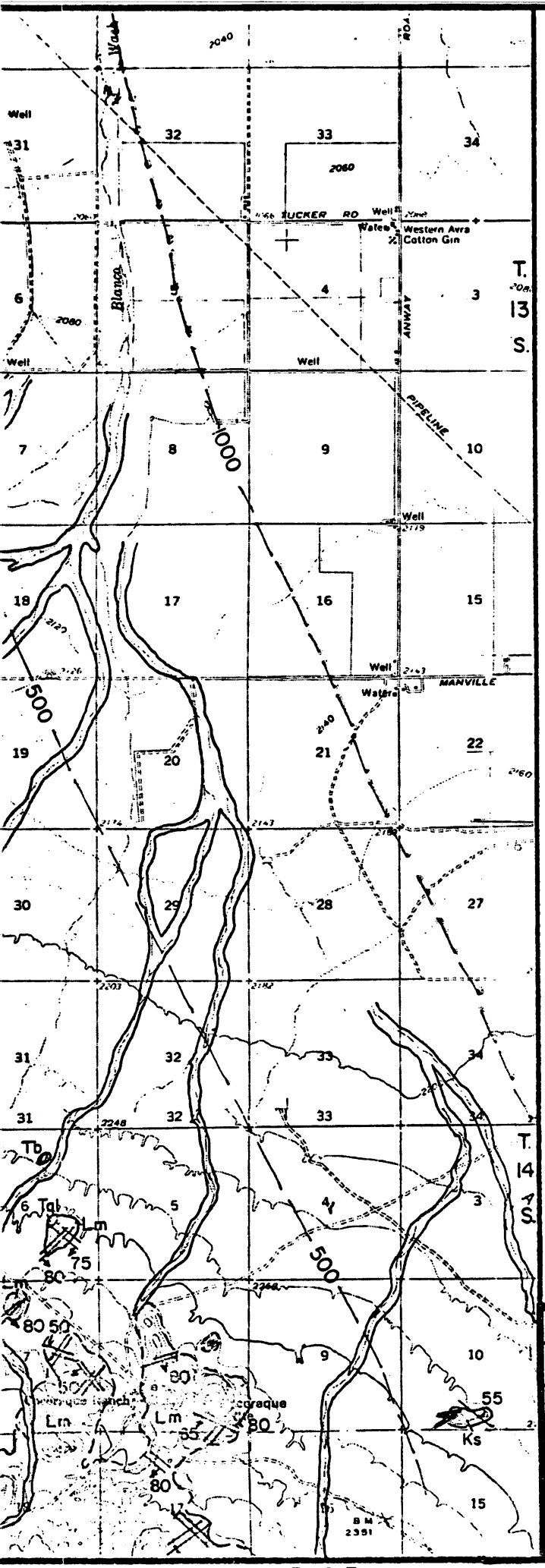
R. 9 E

T 12 S

T 13 S

T 14 S





EXPLANATION

Quaternary

- Qal — Alluvium
- Qg — Gravels
- Qb — Basalt dikes

Tertiary

- Tv — Acid to intermediate volcanics
- Tr — Rhyolite flows, dikes and plugs
- Tql — Quartz latite plugs ?
- Tt — Tuff

Lamide

- Lm — Monzonite

Cretaceous

- Kv — Volcanics mostly andesite
- Kls — Kls Limestone
- Ks — Kqtz Quartzite
- Kqtz — Ks Sediments and volcanics including andesite agglomerate, shaly sandstone, and arkosic sandstone with some interbedded volcanic flows.

Paleozoic

- Pal — Limestone, undifferentiated

Contact

70 Fault, dip

50 Bed, dip

70 Fractures, which contains mineralization or alteration

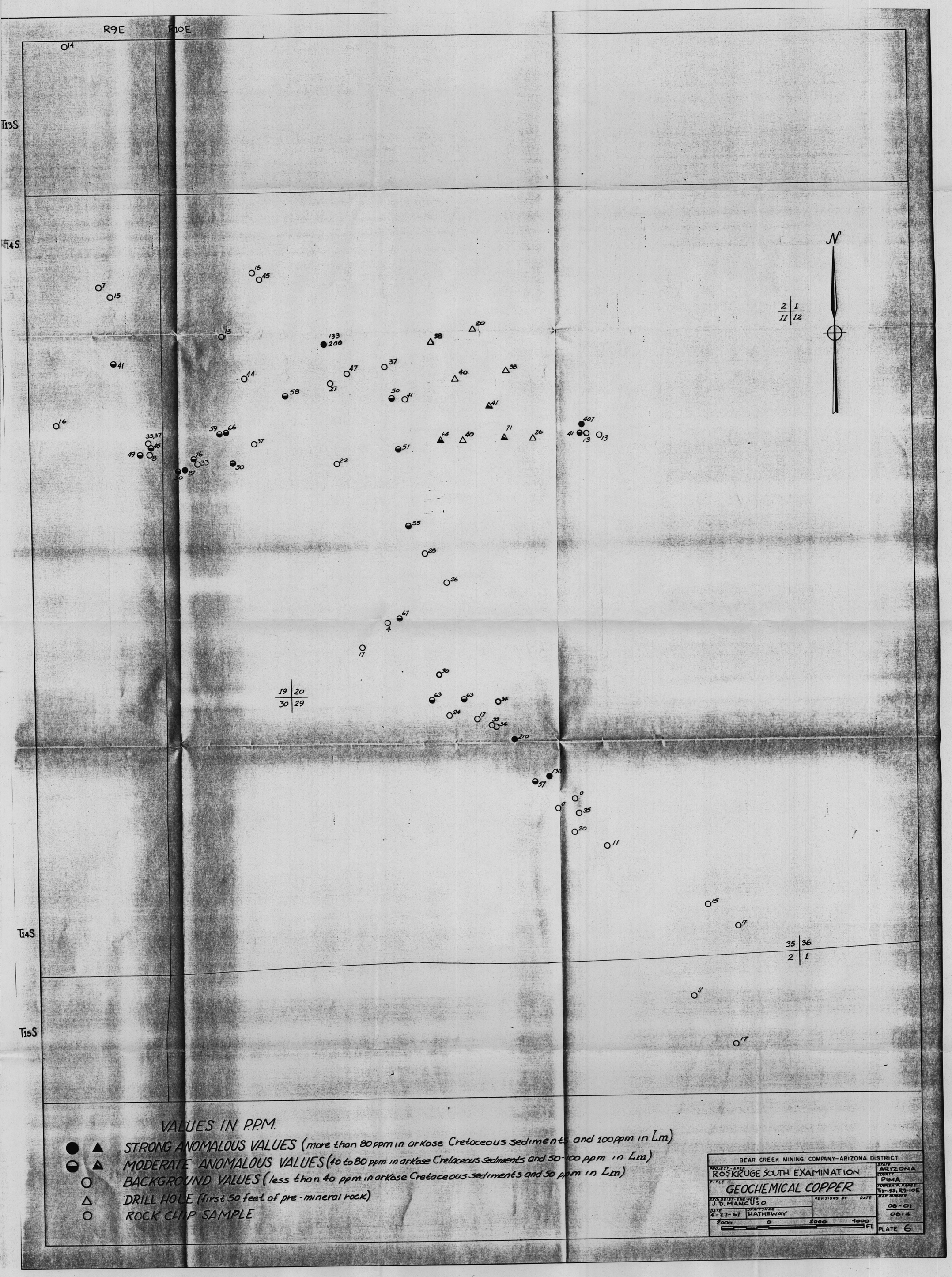
60 75 Fractures, dip

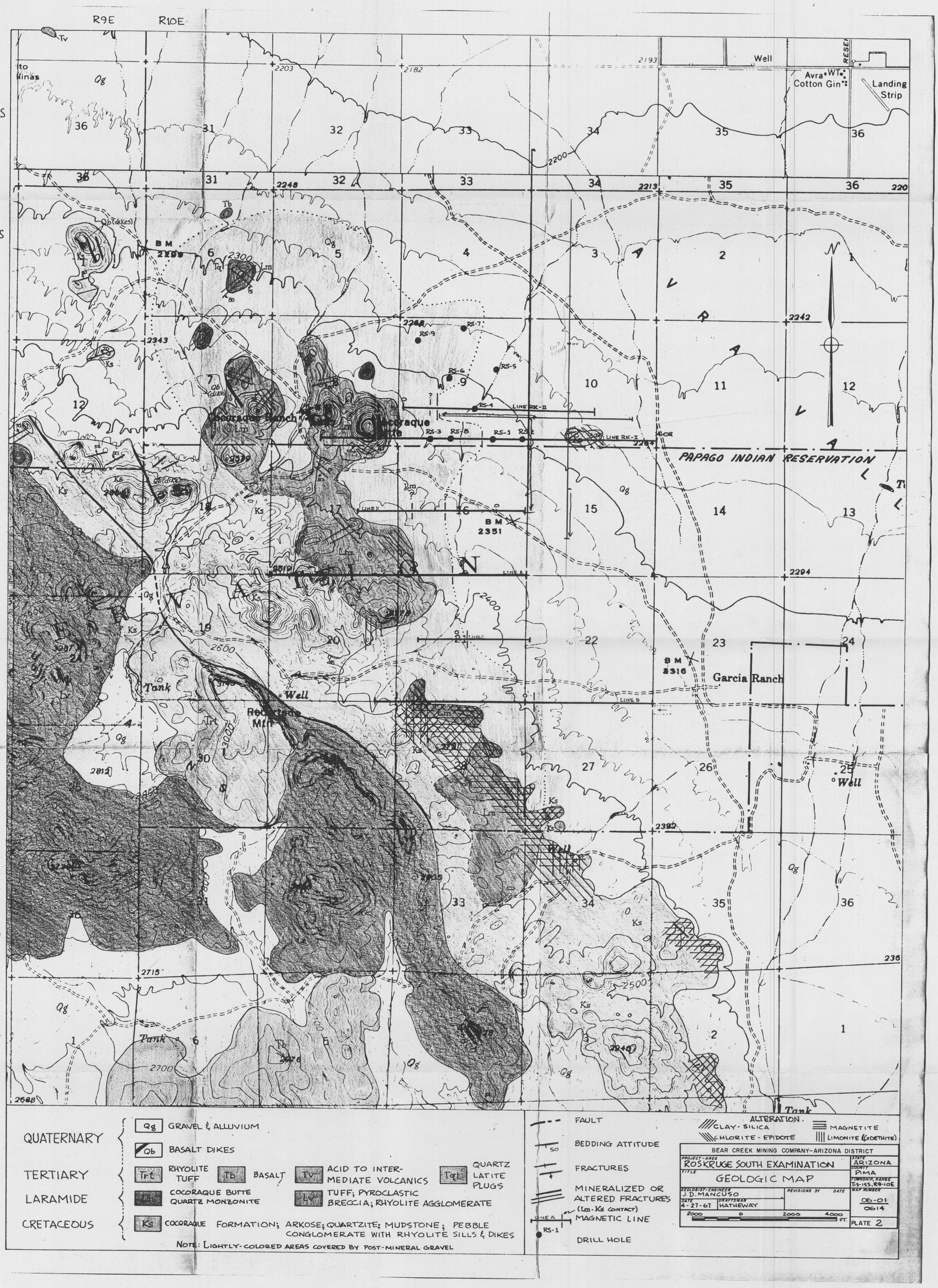
Quartz vein

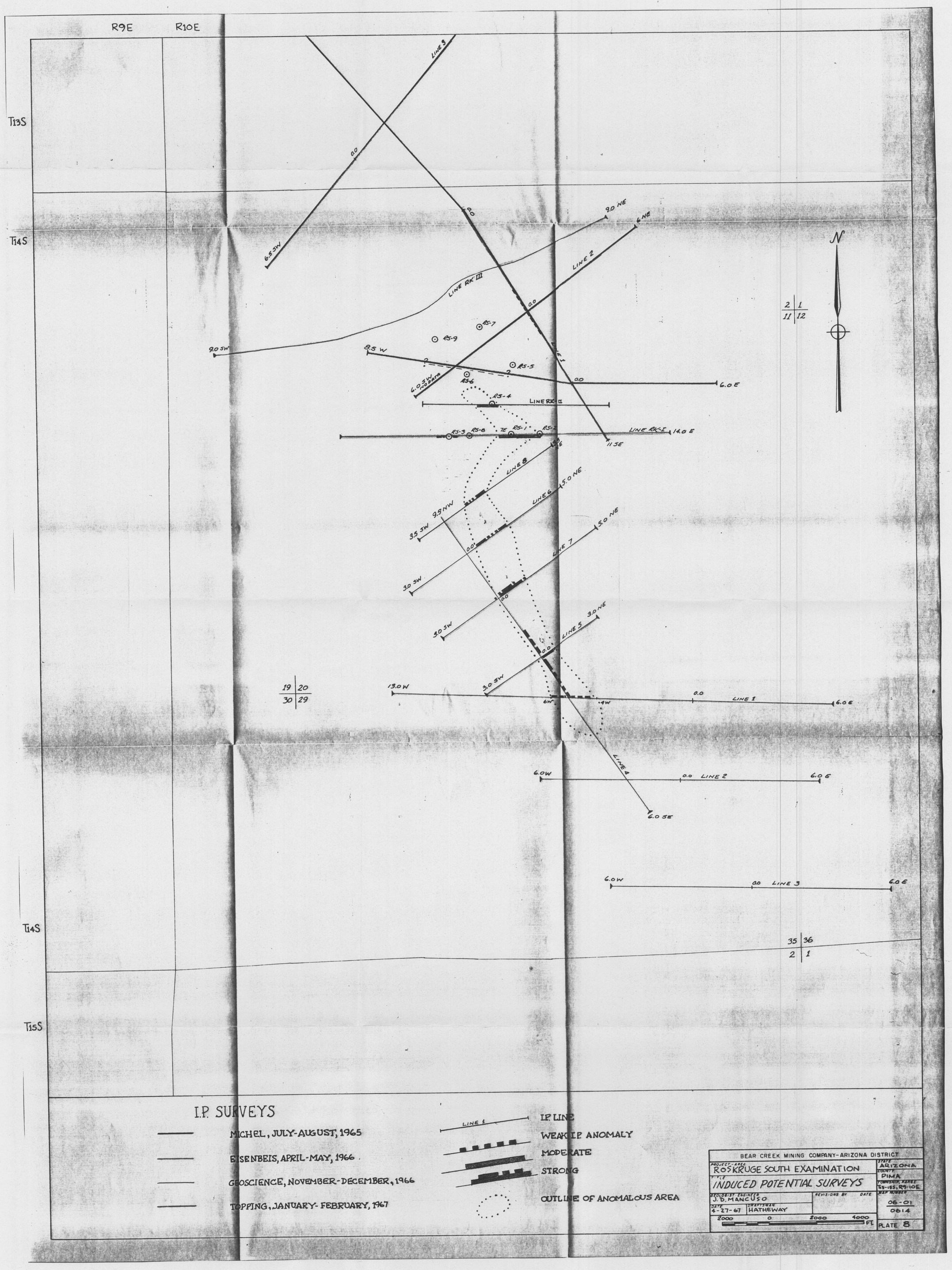
500 Depth to bedrock

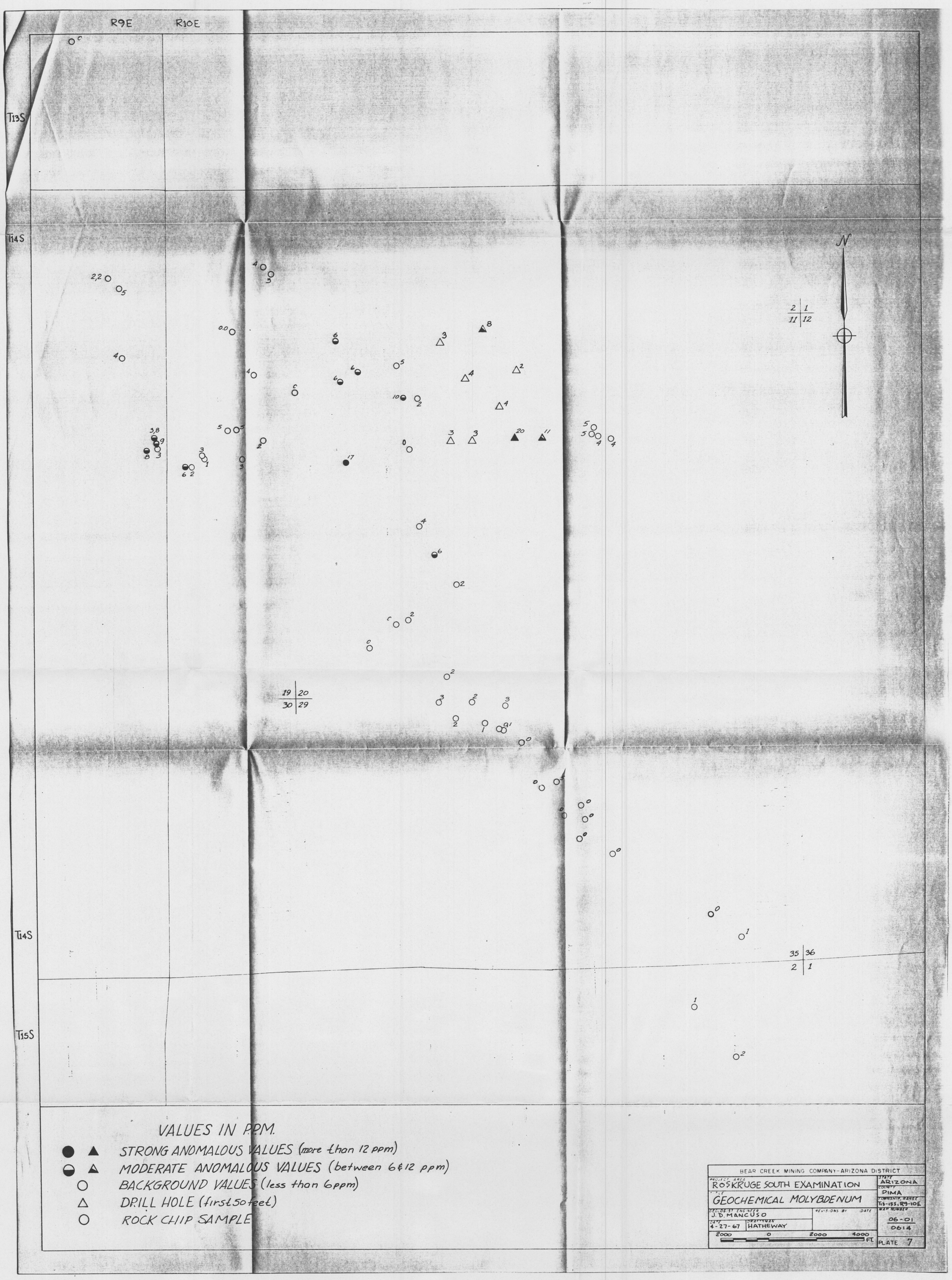
BEAR CREEK MINING COMPANY— ARIZONA DISTRICT

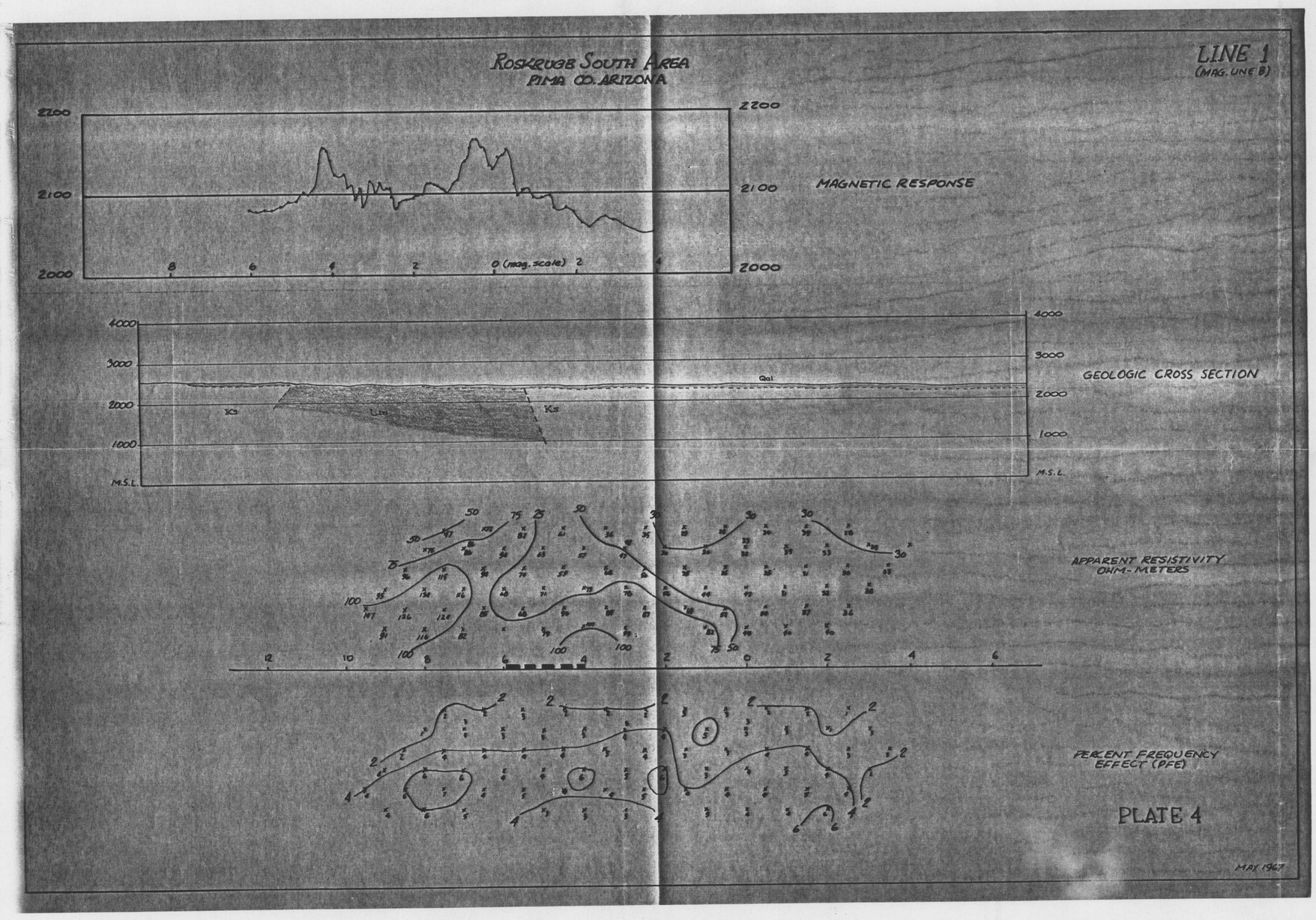
PROJECT - AREA: ROSKRUGE PEDIMENT	STATE: Arizona
	COUNTY: Pima
TITLE: GEOLOGIC MAP	TOWNSHIP, RANGE: T.13,14 S., R.9,10 E.
GEOLOGIST - ENGINEER: D. W. Blake	REVISIONS BY / DATE
DATE: 6/25/65 — DRAFTSMAN: T.L. Mayhall	0612-580 / B 6649
0 1 2 3 mi. 1:62,500	PLATE I

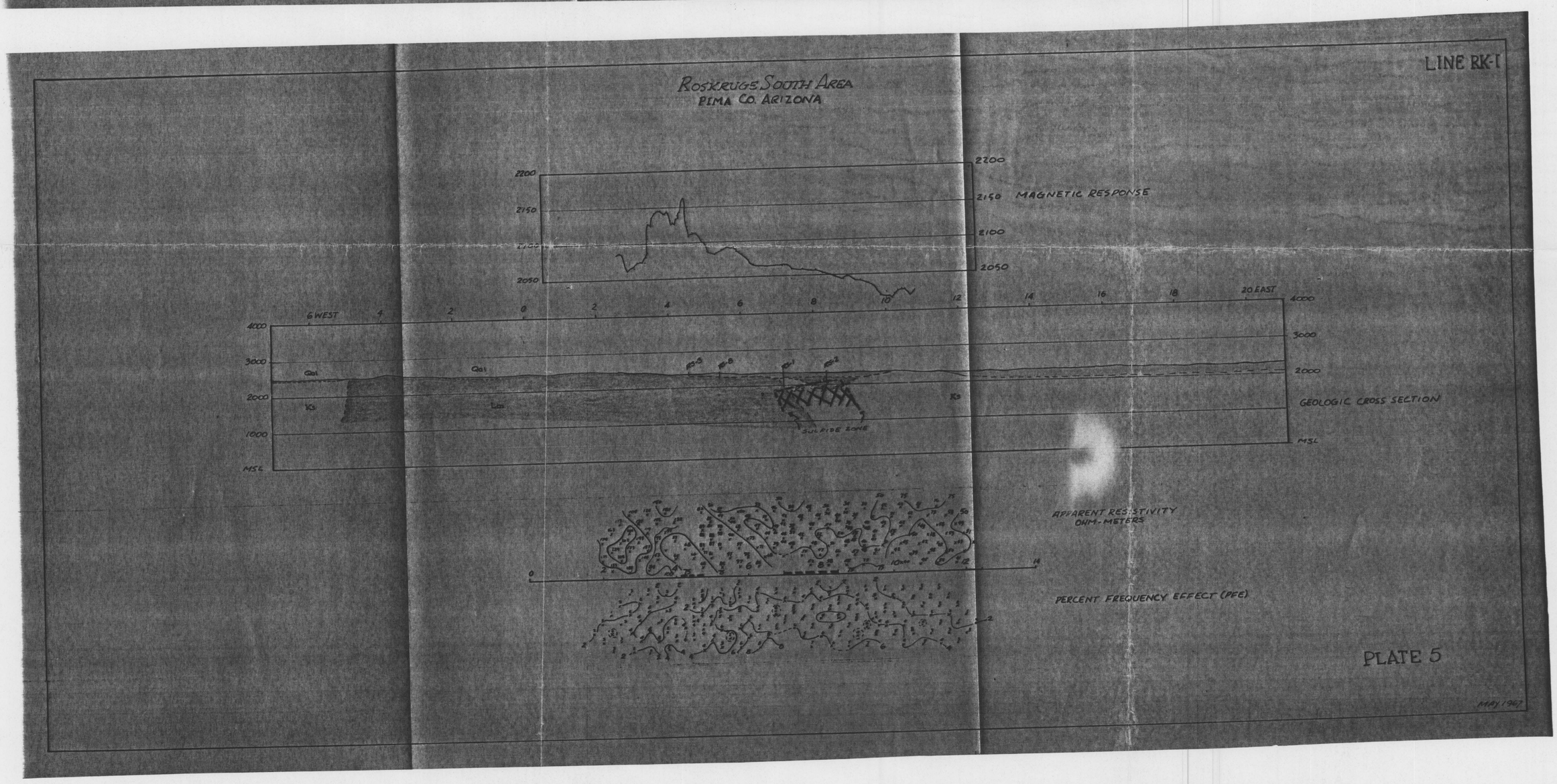

R9E
R10E
T13S
T14S
T15S
N
2 | 1
11 | 12
19 | 20
30 | 29
35 | 36
2 | 1
VALUES IN P.P.M.
STRONG ANOMALOUS VALUES (more than 80 ppm in arkose Cretaceous sediments and 100 ppm in Lm)
MODERATE ANOMALOUS VALUES (40 to 80 ppm in arkose Cretaceous sediments and 50-100 ppm in Lm)
BACKGROUND VALUES (less than 40 ppm in arkose Cretaceous sediments and 50 ppm in Lm)
DRILL HOLE (first 50 feet of pre-mineral rock)
ROCK CHIP SAMPLE
BEAR CREEK MINING COMPANY-ARIZONA DISTRICT
PROJECT-AREA
ROSKRUGE SOUTH EXAMINATION
TITLE
GEOCHEMICAL COPPER
GEOLOGIST-ENGINEER
J. D. MANCUSO
DATE
4-27-67
DRAFTSMAN
HATHEWAY
REVISIONS BY
DATE
2000 0 2000 4000 FT
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T13-15S, R9-10E
MAP NUMBER
06-01
0614
PLATE 6

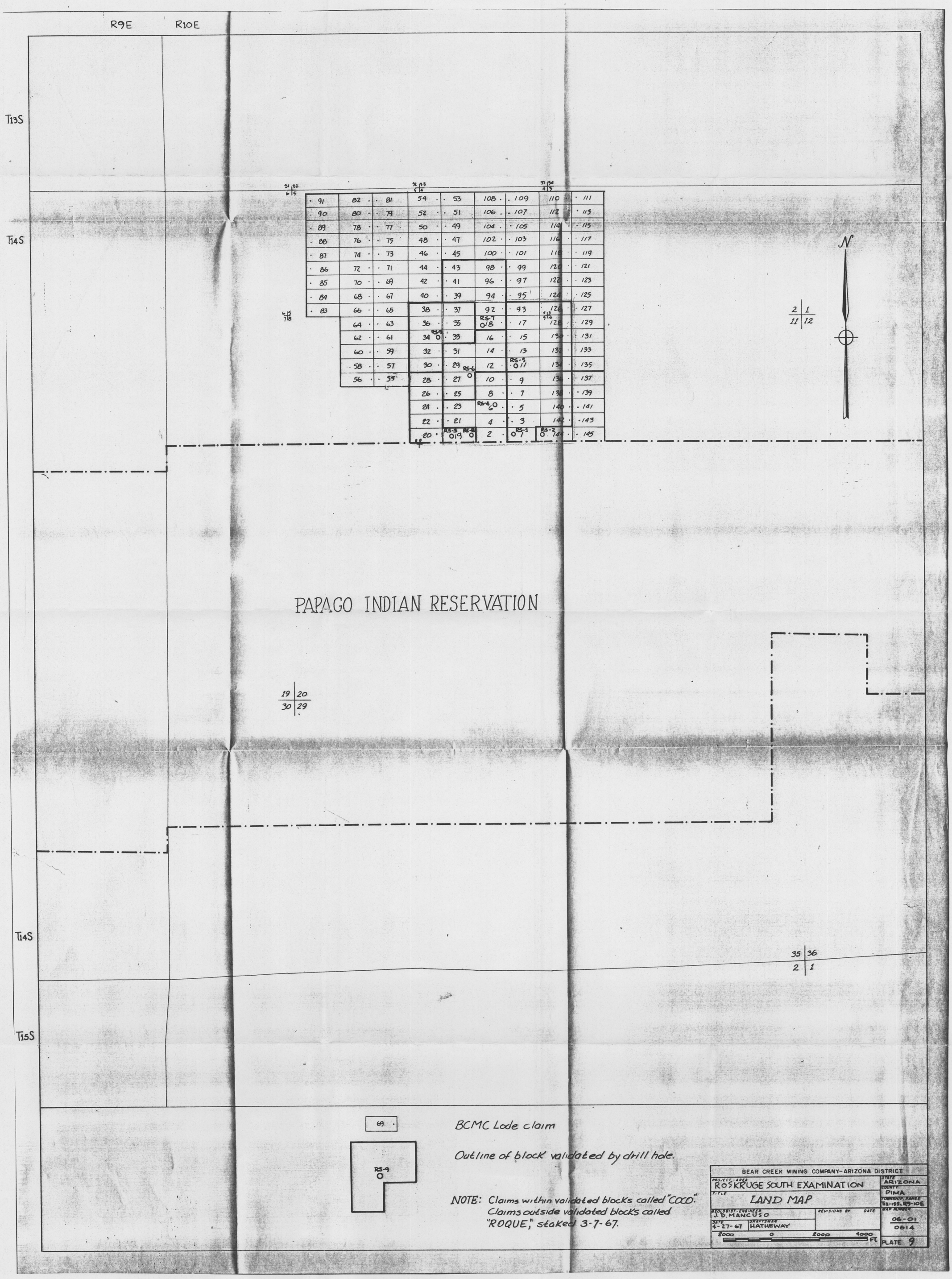

R9E
R10E
T13S
T14S
T15S
Tv
to Ninas
Qg
Well
Avra WT
Cotton Gin
Landing Strip
RESER
Qb (dikes)
Ks
Lm
Tb
Tql
Trt
Cocoraque Ranch
Cocoraque
PAPAGO INDIAN RESERVATION
LINE RK-II
LINE RK-I
LINE D
LINE A
LINE C
LINE B
RS-1
RS-2
RS-3
RS-4
RS-5
RS-6
RS-7
RS-8
RS-9
BM 2351
BM 2316
Garcia Ranch
Tank
Well
Roskruge Mtn
N
QUATERNARY
Qg GRAVEL & ALLUVIUM
Qb BASALT DIKES
TERTIARY
Trt RHYOLITE TUFF
Tb BASALT
Tv ACID TO INTERMEDIATE VOLCANICS
Tql QUARTZ LATITE PLUGS
LARAMIDE
Lm COCORAQUE BUTTE QUARTZ MONZONITE
Lv TUFF; PYROCLASTIC BRECCIA; RHYOLITE AGGLOMERATE
CRETACEOUS
Ks COCORAQUE FORMATION; ARKOSE; QUARTZITE; MUDSTONE; PEBBLE CONGLOMERATE WITH RHYOLITE SILLS & DIKES
NOTE: LIGHTLY-COLORED AREAS COVERED BY POST-MINERAL GRAVEL
FAULT
BEDDING ATTITUDE
FRACTURES
MINERALIZED OR ALTERED FRACTURES
(Lm-Ks CONTACT)
MAGNETIC LINE
DRILL HOLE
ALTERATION.
CLAY-SILICA
CHLORITE-EPIDOTE
MAGNETITE
LIMONITE (GOETHITE)
BEAR CREEK MINING COMPANY-ARIZONA DISTRICT
PROJECT-AREA
ROSKRUGE SOUTH EXAMINATION
TITLE
GEOLOGIC MAP
GEOLOGIST-ENGINEER
J. D. MANCUSO
DATE
4-27-67
DRAFTSMAN
HATHEWAY
REVISIONS BY
DATE
2000 0 2000 4000 FT.
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T13-15S, R9-10E
MAP NUMBER
06-01
0614
PLATE 2


R9E
R10E
T13S
T14S
T15S
LINE 8
LINE 2
LINE RK III
LINE 1
LINE RK II
LINE RK-I
LINE 6
LINE 7
LINE 5
LINE 4
LINE 3
RS-1
RS-2
RS-3
RS-4
RS-5
RS-6
RS-7
RS-8
RS-9
N
2 | 1
11 | 12
19 | 20
30 | 29
35 | 36
2 | 1
I.P. SURVEYS
MICHEL, JULY-AUGUST, 1965
EISENBEIS, APRIL-MAY, 1966
GEOSCIENCE, NOVEMBER-DECEMBER, 1966
TOPPING, JANUARY-FEBRUARY, 1967
I.P. LINE
WEAK I.P. ANOMALY
MODERATE
STRONG
OUTLINE OF ANOMALOUS AREA
BEAR CREEK MINING COMPANY-ARIZONA DISTRICT
PROJECT-AREA
ROSKRUGE SOUTH EXAMINATION
TITLE
INDUCED POTENTIAL SURVEYS
GEOLOGIST ENGINEER
J. D. MANCUSO
DATE
4-27-67
DRAFTSMAN
HATHEWAY
REVISIONS BY
DATE
2000 0 2000 4000 FT
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T13-15S, R9-10E
MAP NUMBER
06-01
0614
PLATE 8


R9E
R10E
T13S
T14S
T14S
T15S
N
VALUES IN P.P.M.
STRONG ANOMALOUS VALUES (more than 12 ppm)
MODERATE ANOMALOUS VALUES (between 6 & 12 ppm)
BACKGROUND VALUES (less than 6ppm)
DRILL HOLE (first 50 feet)
ROCK CHIP SAMPLE
BEAR CREEK MINING COMPANY-ARIZONA DISTRICT
PROJECT AREA
ROSKRUGE SOUTH EXAMINATION
TITLE
GEOCHEMICAL MOLYBDENUM
GEOLOGIST ENGINEER
J. D. MANCUSO
DATE
4-27-67
DRAFTSMAN
HATHEWAY
REVISIONS BY
DATE
2000 0 2000 4000 FT.
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T13-15S, R9-10E
MAP NUMBER
06-01
0614
PLATE 7


ROSKRUGE SOUTH AREA
PIMA CO. ARIZONA
LINE 1
(MAG. LINE B)
MAGNETIC RESPONSE
GEOLOGIC CROSS SECTION
APPARENT RESISTIVITY
OHM-METERS
PERCENT FREQUENCY
EFFECT (PFE)
PLATE 4
MAY 1967

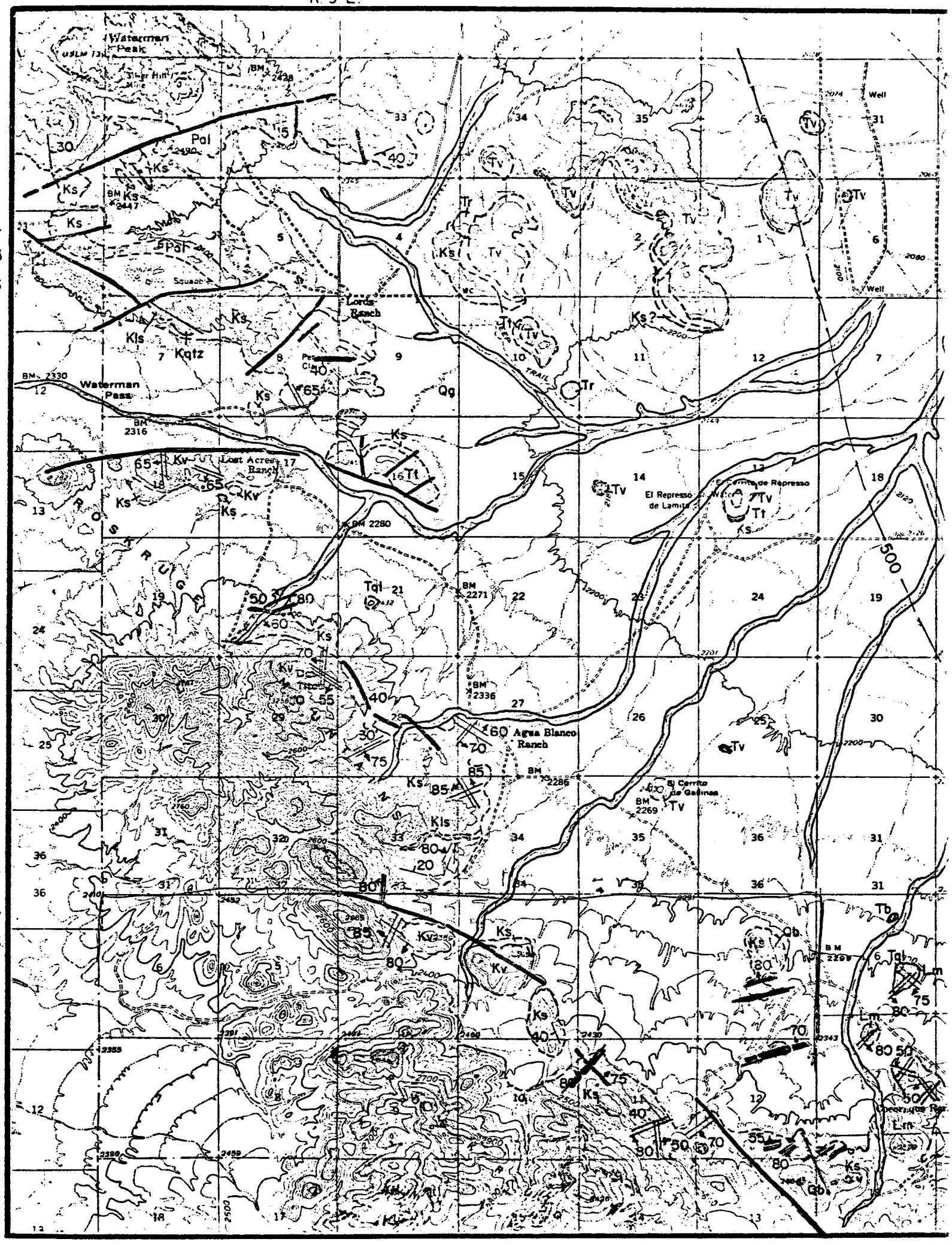

ROSKRUGE SOUTH AREA
PIMA CO. ARIZONA
LINE RK-1
MAGNETIC RESPONSE
GEOLOGIC CROSS SECTION
SULFIDE ZONE
APPARENT RESISTIVITY
OHM-METERS
PERCENT FREQUENCY EFFECT (PFE)
PLATE 5
MAY 1967


R9E
R10E
T13S
T14S
T14S
T15S
PAPAGO INDIAN RESERVATION
N
BCMC Lode claim
Outline of block validated by drill hole.
NOTE: Claims within validated blocks called "COCO".
Claims outside validated blocks called
"ROQUE," staked 3-7-67.
BEAR CREEK MINING COMPANY-ARIZONA DISTRICT
PROJECT-AREA
ROSKRUGE SOUTH EXAMINATION
TITLE
LAND MAP
GEOLOGIST-ENGINEER
J. D. MANCUSO
DATE
4-27-67
DRAFTSMAN
HATHEWAY
REVISIONS BY
DATE
2000 0 2000 4000 FT.
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T13-15S, R9-10E
MAP NUMBER
06-01
0614
PLATE 9

R. 9 E.

T. 13 S

T. 14 S.



Kennecott Exploration, Inc.
Exploration Services Department

Geophysics Division Operations

NOV 3 1969
B. C. M. C.
TUCSON

October 30, 1969

Mr. R. E. Lehner
Bear Creek Mining Company
1714 West Grant Road
Tucson, Arizona 85705

Dear Bob:

Re: Roskruge South, Pima County, Arizona--Vector IP Survey

Attached is a report by Dave Haupt on our VIP survey of the captioned area. As you recall the work was done to verify a previously-discovered IP anomaly, and to re-establish rights to abandoned BCMC-Arizona District claims there.

Dave intends to write a comprehensive report on all geophysical data in the area in the near future. Meanwhile, the IP anomaly has been verified. The present survey did not determine much about body geometry, however, due to the fact that only three lines were run. The VIP work did indicate that we can obtain meaningful data in the more deeply covered areas--there is the possibility that a deep IP response was detected east of an interpreted fault on Line 12. As we have previously discerned, the area could use more VIP work if and when we are able to get on the Papago Indian Reservation again.

Sincerely,

Mike

Phillip M. Wright

PMW/jc

Attachment

cc: C. H. Burgess
L. B. Moon
H. L. Bauer, Jr.
A. Weiss
R. C. Holmer
G. D. Van Voorhis
J. C. Wilson
D. L. Haupt
Geophysics Division,
U.S. Operations Files (3)

2300 West 1700 South, Salt Lake City, Utah 84104 • Phone 801-486-6911 • TWX 910-925-5624

ROSKRUGE SOUTH
PIMA COUNTY, ARIZONA
VECTOR IP SURVEY

by

David L. Haupt

October 21, 1969

CONCLUSIONS AND RECOMMENDATIONS

There is a weak IP response associated with the bulk of the quartz monzonite porphyry where tested. This weak response was below the limit of detectability of the instruments used in earlier surveys. The weakness of this response does not diminish its importance especially when one recalls that drilling shows sulfide mineralization in some of this weakly responsive ground. Moreover, the limited amount of vector data and previous data show that there are IP response highs over the intrusion and these need to be studied further--a task for which vector IP is much more suitable than older conventional equipment.

Furthermore, the deep potential of the target area has not been evaluated by previous surveys, and again vector IP should be able to do this. There is a very large area, especially considering the possibilities under cover and in possible areas of down-faulting, in which further geophysics and drilling might turn up a substantial deposit. The author will explore these possibilities further in a future report in which detailed consideration will be given to all geophysical and geological data.

In the near future, the author would like to complete Line 11 and get a few lines across the northern end of the Roskruge intrusive in order to check some possibilities suggested by Michel's IP data. Moreover, in the event of successfully leasing the property from the Papago Indian Tribe, work might be necessary on the reservation.

INTRODUCTION

Location and Access

The Roskruge South area is located in Pima County, Arizona, approximately 25 miles west of Tucson, Arizona, in T. 14 S., R. 10 E. The area is best reached via paved road leading from Tucson to Tucson Mountain Park and the Arizona Sonora Desert Museum. Partially paved county roads and unpaved ranch roads lead from the museum to the area. Access should be good in all but the wettest weather. However, much of the area is presently inaccessible to geophysical exploration because it lies on the Papago Indian Reservation, and an agreement with the Indians for access does not exist at this time.

Previous Work

Kennecott and Bear Creek have been active in the Roskruge area since 1965. The area was selected for exploration during the Pediment Program and is considered to be fundamentally a geophysical target. As a result, a

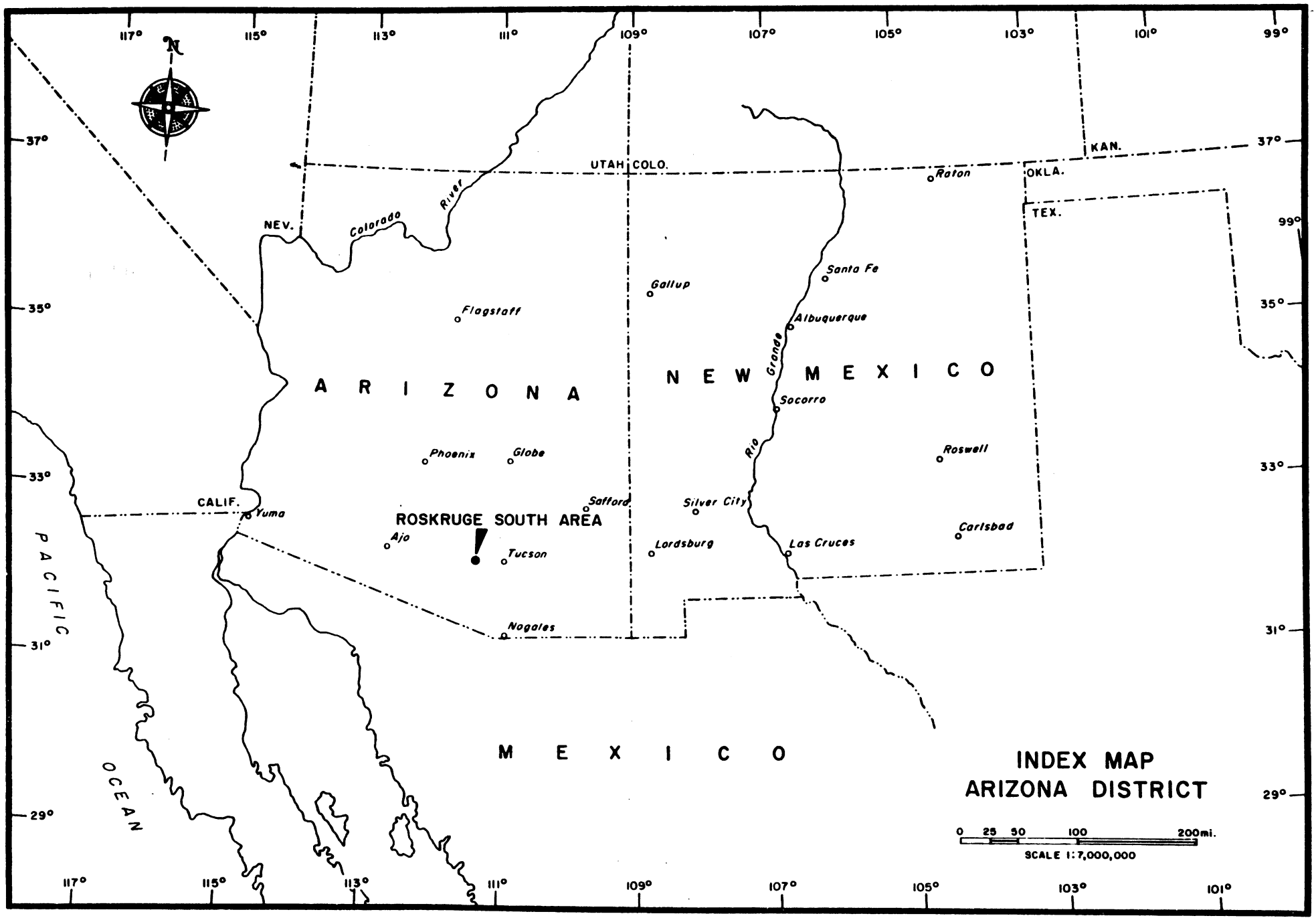

INDEX MAP
ARIZONA DISTRICT
SCALE 1:7,000,000
0 25 50 100 200mi.
ARIZONA
NEW MEXICO
MEXICO
PACIFIC OCEAN
ROSKRUGE SOUTH AREA
NEV.
UTAH
COLO.
KAN.
OKLA.
TEX.
CALIF.
Colorado River
Rio Grande
Flagstaff
Phoenix
Globe
Yuma
Ajo
Tucson
Safford
Nogales
Gallup
Lordsburg
Silver City
Santa Fe
Albuquerque
Socorro
Las Cruces
Raton
Roswell
Carlsbad
117°
115°
113°
111°
109°
107°
105°
103°
101°
99°
37°
35°
33°
31°
29°
N

FIGURE I

considerable quantity of geophysics exists for the area, much of it at the moment conflicting. In a later report (currently in preparation) the author will try to consolidate this somewhat unwieldy collection under a consistent interpretation. Unfortunately, problems with illustrations prevent getting this report out at the present time and under present circumstances. Be that as it may, previous geophysical work consists of:

1) Roskruge Pediment, Pima County, Arizona, F. A. Michel, October 1965.

2) Roskruge South Area, Pima County, Arizona--Preliminary IP Results, H. R. Eisenbeis, October 1966.

3) Roskruge Area, Pima County, Arizona, Induced Polarization Survey, C. E. Topping and Robert A. Sultzbach, April 1967.

4) Roskruge Area, Pima County, Arizona--Ground Magnetic Survey, Carl G. Schwenk, May 1967.

5) Bouguer Anomaly Map No. 32-111-SE.

In addition to the foregoing reports, a geophysics report by Newmont Exploration, Ltd., is on file. This report is especially valuable because it contains the only comprehensive magnetic map of the area and provides IP coverage on the southernmost parts of the area to which our own coverage does not extend.

The geology of the Roskruge area has been presented in two Bear Creek reports: 1) Roskruge Pediment by David Blake, June 1965; and 2) Progress Report, Roskruge South Examination, Pima County, Arizona, by James D. Mancuso, May 1967. For a detailed description of the geology at Roskruge, the reader should consult these reports. For the work to be discussed in this report, Mancuso's report is more germane.

GEOLOGY

A quartz-monzonite porphyry of Laramide age (actually dated at 65 m.y. B.P.) crops out on the west side of the Roskruge South area. The mass intrudes Cretaceous sediments and volcanics of the Cocoraque Formation. Based on outcrop and Newmont's magnetic interpretation, the intrusive is roughly 5-6 miles long by 2-1/2 - 3 miles wide. The major axis appears to bear roughly N. 30° W. The intrusion may possibly extend westward beneath a cover of sediments and volcanics. Mancuso studied

the alteration of the intrusion in fair detail. He noted silicification, principally in the form of quartz veins, and propylitic alteration in the southern end of the mass (secs. 27, 28 and 34) and in the northern end (secs. 10 and 16). Limonite is scarce.

Recently the author accompanied Bear Creek geologists (A. Cook, R. Lehner, and J. Swinderman) to the area to look at the features cited by Mancuso. The consensus was that some of the propylitic alteration of Mancuso might be deuteric; the quartz veining was fairly evident. There was a notable lack of metallic mineralization other than magnetite. However, a copper and magnetite-bearing skarn had been uncovered in a bulldozed discovery pit; the work is presumably Newmont's and substantiates their claim that magnetic skarns are associated with the intrusion. Still, the geologic evidence was discouraging to the geologists. However, Mancuso stated that the alteration "is not the quantity or strength alteration and limonite expected over an orebody....., but could well represent a halo zone around a buried deposit." This latter possibility remains viable. As unpromising as outcrop is, the fact that there is a copper-bearing skarn and copper mineralization in section 10 disclosed in drill holes ought to keep interest and activity in the area alive; there is still a very large area, especially if one considers the cover on the west side, which has not been explored using improved geophysical techniques.

The Recent Vector IP Survey

In February 1969, KEI performed a brief VIP survey on the Roskruge area for the purpose of establishing the validity of anomalies interpreted from previous surveys. Unfortunately, at the time we did not have the unlimited access to the area which had obtained during the previous surveys. We were not able to plant electrode stations on the reservation although we could get receiver stations there. The result was that we could only reach across the fence the relatively short distance of 5,000 feet. Because of the shape and position of the intrusion, this limited access did not allow us to check very much of the previous work.

The survey consists of three lines, all of 1,000-foot dipoles. Two of the lines, Lines 10 and 12, are north-south; the third line, Line 11, is east-west, parallel to the reservation boundary (a steel fence) about 1,500 feet north of it. The location of these lines is shown on Plate I. The data are shown on Plate II.

Line 10

Line 10 shows an abrupt increase in response commencing near station 4.0 S. and continuing a somewhat indeterminate distance to the south. The author believes the responsive zone may continue at least from 4.0 S. to 8.0 S.

for the following reason. If one assumes that the responsive zone is 1,000 feet across or less and located say in the interval 5.0-6.0 S. then on the basis of models, the diagonals from 6-7 S. and 7-8 S. should show successively lower response from north to south and a more pronounced decrease in response with separation; whereas, the response within a diagonal remains relatively constant and the gradient of response in the profile increases in this interval. Of course, with such incomplete data it is very difficult to tell what the geometry of the causative body is.

The northern portion of the line crosses ground which most likely consists of moderate to steeply dipping Cretaceous sediments. This portion of the line, north of station 4.0 S., is very dead in terms of IP response except for an apparently weakly responsive middle layer. If our understanding of the geology in this area is even crudely correct, a geological reason for this middle layer can scarcely be conjectured at this time. It does not lend any real assistance to the formation of an ore target concept.

Assuming that the response observed on the south end of the line is associated with the monzonite material, the intrusive should be at a fairly shallow depth. That the response may be assignable to the monzonite is based on the ground magnetic data of Newmont and the anomalies on the other two lines (see below).

The resistivity profile suggests alluvium and sediments north of 0.0. Slightly higher resistivity ground between 0.0 and 6.0 S. may represent a different resistivity unit of the Cretaceous; the line apparently descends through the dipping Cretaceous section going from north to south. The high resistivity material south of 6.0 S. should represent the monzonite.

The rough correlation of the IP response with the high resistivity material coupled with Newmont's magnetic data and available geologic data leads the author to conjecture that the IP response on Line 10 is assignable to mineralization in the monzonite. This assertion is especially supported by the fact that in Bear Creek's drill holes significant sulfides occur only in the monzonite (and may have been leached out elsewhere).

Line 11

Line 11 was only partially completed. The danger of interference from the nearby grounded reservation fence which parallels the line was overestimated at the time and the line was halted. The data are now seen to fit well into the overall picture.

The IP profile shows broad rather weak anomaly similar to that of Line 1 anomaly commencing near station 1.0 E. and continuing to perhaps 4.0 W.

The diagonal from 2.0-3.0 W. is relatively strong and corresponds almost precisely to the long narrow anomaly mapped by Eisenbeis, Topping, and Sultzbach. The sudden reversion "under" this diagonal, to the magnitude of response that prevails east of this zone, suggests that the source is near-surface and of quite limited depth extent. This line serves excellently to show the greater sensitivity and resolution of vector IP in that the conventional surveys could not distinguish the weaker response which the author attributes to the bulk of the intrusive.

The resistivity values in the 80's belong to the intruded sediments; the intrusive is represented by the higher values at depth.

Line 12

The IP profile shows the response associated with the intrusive commencing near station 6.0 S. Again, there is a pronounced increase at Newmont's proposed boundary. However, weak near-surface response starts farther north near station 3.0 S. This 3,000-foot interval may represent a zone of weak contact mineralization. An interesting feature occurs in the profile between 2.0 N. and 2.0 S. In this interval, a responsive body at depth is indicated. Such a feature might arise if the intrusion had been down-faulted on the east along Newmont's magnetic boundary. This is a possibility which should be studied by future geophysics.

The resistivity profile shows bedrock essentially on the surface between 4.0 and 5.0 S. This implies a slight conflict of roughly 1,000 feet between the IP boundary and the resistivity boundary of the intrusion. The IP boundary is probably the least precise. Moreover, with the dipole-dipole array, sampling is done on discreet 1,000-foot intervals with the result that occasionally an imprecision of 1 dipole length may arise about the position of a near-surface feature. Future work may clear up this difficulty.

A somewhat more puzzling feature of the resistivity profile is the fact that the resistivity south of 4.0 S. drops back to sediment values. This almost implies that the line crossed over the rim of a dish-shaped body. Again, more work is necessary if this matter is worth settling.

It must be pointed out that all three of the lines approached the intrusive contact at angles of 30 to 45 degrees. This fact could have created the transitional nature of the IP response towards the contact. If, in future work, the lines can be kept more nearly at right angles to this contact, the interpretation might be somewhat different.

Enclosures:

Figure 1	Index Map
Plate I	Vector IP Plan Map, Roskruge South Area, Pima County, Arizona (A99-504)
Plate II	Vector IP Profiles, Roskruge South Area, Pima County, Arizona (A99-505)

Squabble Mine Area
Pima Co.

G. C. Bates
1964

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Paleozoic limestones are overlain by Cretaceous red beds, which are overlain by Tertiary andesite agglomerate.

Copper mineralization (chrysocolla and malachite) is confined to a northwest trending fault. There were no signs observed of any pervasive alteration or mineralization in the area.

It is recommended that no further work be done in the area.

INTRODUCTION

The Squabble Mine (A-5) color anomaly is located about seven miles south of Silver Bell, Arizona. Half of the anomaly is on the Papago Indian Reservation. Two days were spent examining the anomaly.

GENERAL GEOLOGY

The oldest rock in the area is a wedge of Paleozoic limestone (Naco group?) occuring in the northern part of the anomaly. Overlying the limestone, apparently conformably, is an alternating sequence of red sandstone and shales, with occasional thin beds of volcanics and limestone. The total thickness of these rocks is about 500 feet. They are probably Cretaceous in age.

Overlying the red beds is the Tertiary Silver Bell formation, an andesite agglomerate. A plug of Turkey Track andesite (Miocene?) occurs in the northern part of the anomaly. Recent alluvium surrounds the area.

The dominant structural feature in the area is a N60W trending fault. It is along this fault that most of the mineralization is concentrated. Copper mineralization, in the form of chrysocolla and malachite, assaying up to 1.6 percent, occurs where this fault is cut by a northwest fault (The Carlo Mine).

At the Squabble Mine, chrysocolla and malachite, assaying up to 4.5 percent copper, occurs in a northeast trending fault zone.

At the Penny Mine, chrysocolla occurs coating fractures and

fault gouge in a limited area in andesite agglomerate.

There were no signs observed of any pervasive alteration or mineralization in the area.

CAUSE AND APPRAISAL OF THE ANOMALY

The anomaly is caused by the oxidized iron in the sandstone and shale. The iron is indigenous to the rock, and is not due to the introduction of sulfides.

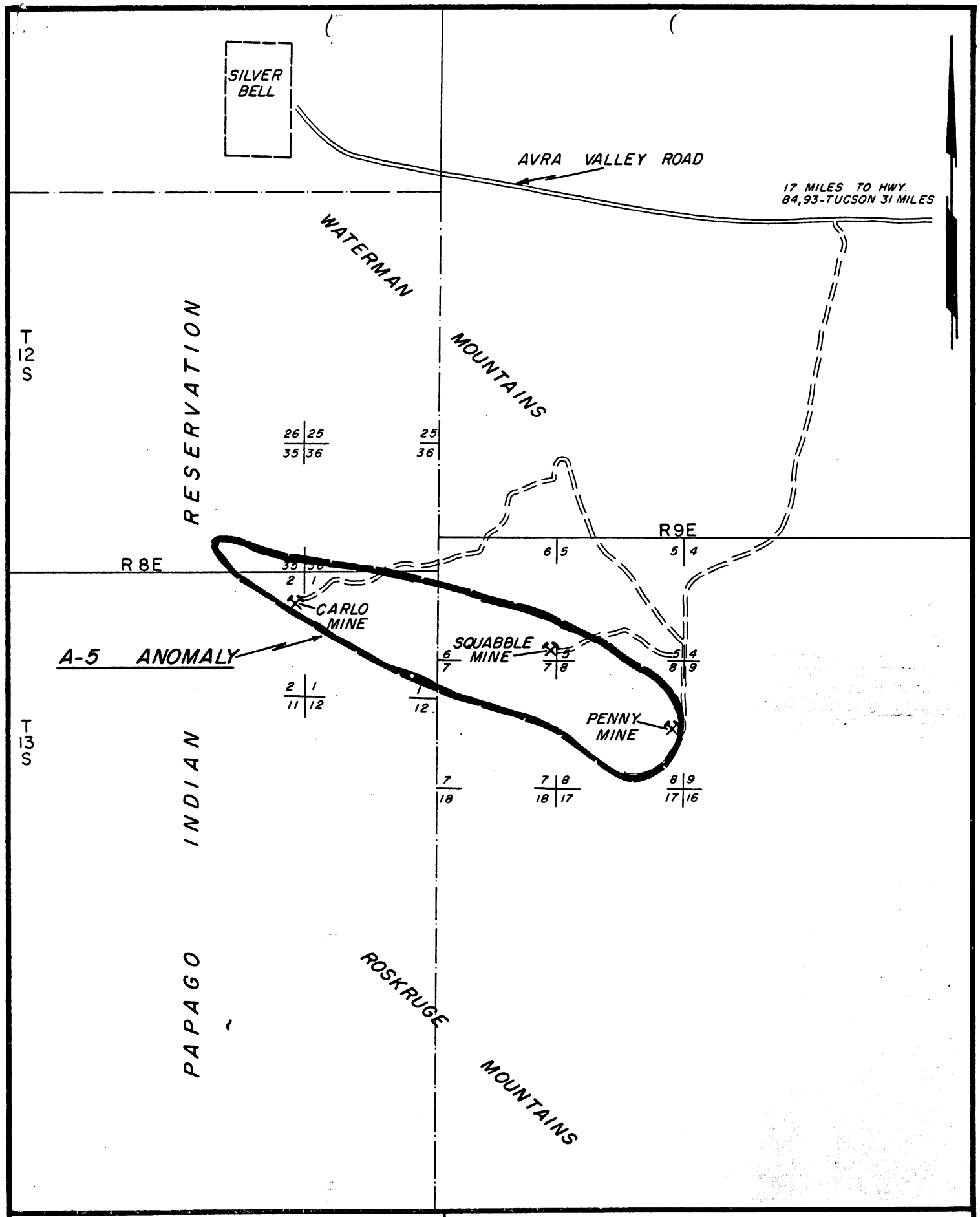
APPRAISAL OF THE SURROUNDING AREA

Nothing was observed in the area that indicated that the surrounding area contains a possible mineral deposit.

GEOCHEMISTRY

Six analyses of the andesite averaged 33 ppm copper and 2 ppm molybdenum. The faults, where exposed by mine operations, averaged 3.1 percent copper.

All of the assays of the various rocks gave background values, except where copper was observed.



AREA SQUABBLE MINE (A-5)	BEAR CREEK MINING COMPANY — SOUTHWEST DISTRICT		
TITLE LOCATION MAP	DATA BY J.C. BALLA, D.W. BLAKE	STATE ARIZONA	MAP NO. 0602-524 A933
0 1 2 Mis. SCALE 1" = 1 MILE	DR. BY S. HUGHES / DATE 1 APR. 1964	COUNTY PIMA	
	REVISIONS	TOWNSHIP, RANGE T11-12S, R8-9E	PLATE I

IN REPLY REFER TO:

Real Property Mgt.
331-Papago
(Mineral Ad.)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
Papago Indian Agency
Sells, Arizona 85634

OCT 24 1967

Mr. Robert E. Lehner
Exploration District Manager
Bear Creek Mining Company
1714 West Grant Road
Tucson, Arizona 85705

Dear Mr. Lehner:

This will confrim your October 24 telephone conversation with Agency Realty Officer Sekayouma regarding the proposed mineral advertisement for the main Papago Reservation.

We and the Papago Tribe had hoped to issue the advertisement in the first part of September, but, as Mr. Sekayouma advised you, the tracts which were nominated have been withdrawn by the nominating company.

However, we are presently engaged in planning an advertisement which, we anticipate will be issued soon. Your name is on our mailing list to receive any future mineral notices for the Papago Reservation.

We appreciate Bear Creek's position on negotiating rather than bidding on leases, and we hope that there are areas in the Papago mining situation that will permit the Papago Tribe to take advantage of your policy.

Sincerely yours,

for Superintendent

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
PAPAGO AGENCY
SELLS, ARIZONA 85634

May 31, 1967

Bear Creek Mining Co.
2601 N. 1st Avenue
Tucson, Arizona 85719

Gentlemen:

The Papago Indian Tribe and the Bureau of Indian Affairs is planning to issue a nationwide advertisement for the sale of exclusive mineral prospecting permits with option to lease for mining purposes within approximately 90 days.

Certain lands within the main Reservation have been selected for inclusion in the notice of sale, but we will be pleased to receive nominations of areas that are of interest to you. Of course, the identity of any nominee will be held in the strictest confidence.

If you wish to inspect the Reservation, general reconnaissance survey permits are still available at this office. The permit allows geological, geophysical, geochemical, etc., studies. Core drilling privileges are not included, however. The cost is $10 for a four-month permit, and extensions may be obtained at the rate of $500 for each month over the initial period. The tracts featured in the advertised sale will be withdrawn from the prospecting area on the date of the bid opening.

Your nomination of lands for inclusion in the advertisement or requests for general survey permits may be directed to:

Mr. John Artichoker, Jr.
Superintendent
Papago Indian Agency
Sells, Arizona 85634

Sincerely yours,

John Artichoker, Jr.
Superintendent

BEAR CREEK MINING COMPANY

2601 NORTH FIRST AVENUE
TUCSON, ARIZONA

TO R.E. Lehner DATE October 3, 1967

FROM D.E. Hintzman

SUBJECT: Papago Indian Reservation

On Tuesday, October 3rd, Vernon Smith and I met here at our office to discuss further the possibility of negotiations for exclusive prospecting permits on the Papago Indian Reservation. The main purpose of this meeting was to probe further Smith's convictions that he would be able to by-pass local BIA authority in securing approval to any permits thus negotiated. First of all, he was successful in having a resolution passed by the Tribal Council authorizing him and Ed Berger to conduct exclusive negotiations. He seems to feel that in view of the conflict at present between the Papago Superintendant and the Indians that there may be some elements of probability that by-passing the local authorities could work. I have asked Leo Smith to approach Ed Berger informally to get Berger's impressions and comments concerning these exclusive negotiations.

D. E. Hintzman

VERITY & SMITH
ATTORNEYS AT LAW
SUITE 902 TRANSAMERICA BUILDING
177 NORTH CHURCH AVENUE
TUCSON, ARIZONA 85701

VICTOR H. VERITY
LEO N. SMITH
JAMES E. MUELLER
JOHN C. LACY

AREA CODE 602
TELEPHONE 622-7446

October 12, 1967

Mr. Davis E. Hintzman
Tucson Land Man
Bear Creek Mining Company
1714 West Grant Road
Tucson, Arizona 85705

Re: Papago Reservation

Dear Dave:

As I mentioned in our phone conversation of earlier this week, I had the opportunity last Friday to discuss with Mr. Ed Berger, attorney for the Papago Tribal Council, the Council's reasoning behind the approach made to Bear Creek by Vernon Smith concerning negotiations for an exclusive permit and lease on Tribal lands.

I inferred from Mr. Berger's comments that the Council does not feel that it has been getting the wholehearted cooperation of the BIA in the Council's attempts to develop the mineral potential of the Tribal land, as well as in certain other areas of development. I inferred that the Council felt this was especially true with respect to the local and state BIA personnel. The Council thus passed a resolution instructing Mr. Smith to look into the possibility of approaching certain mining companies to see if they would be interested in entering negotiations with the Council for permits and leases on areas of interest to such companies.

Presumably, Bear Creek was selected as the first company to approach because of the fact that Bear Creek had indicated a definite interest in Tribal lands by bidding on the San Xavier sale and also in its exploration activities under its nonexclusive Prospecting Permit.

Evidently, the BIA, at the local and national level, feel that its position in requiring that Tribal land be put up for competitive bidding has been vindicated by the results of the San Xavier sale. The Council and their consultant, Vernon Smith, evidently feel that many areas further removed from prior exploration and mining activities are not suitable for competitive bidding sales.

The strategy of the Council is evidently based upon the theory that if they can present a permit and lease on such an area which has already been negotiated, that the Commissioner of the Bureau of Indian Affairs can then be persuaded to approve such a lease.

25 CFR § 171.2 reads as follows:

§171.2 Leases to be made by tribes.

> Indian tribes, bands or groups may, with the approval of the Secretary of the Interior or his authorized representative, lease their land for mining purposes. No oil and gas lease shall be approved unless it has first been offered at an advertised sale in accordance with § 171.3. Leases for minerals other than oil and gas shall be advertised for bids as prescribed in § 171.3 unless the Commissioner grants to the Indian owners written permission to negotiate for a lease. Negotiated leases, accompanied by proper bond and other supporting papers, shall be filed with the Superintendent of the appropriate Indian Agency within 30 days after such permission shall have been granted by the Commissioner to negotiate the lease. The appropriate Area Director is authorized in proper cases to grant a reasonable extension of this period prior to its expiration. The right is reserved to the Secretary of the Interior to direct that negotiated leases be rejected and that they be advertised for bids. All leases shall be approved by the Secretary of the Interior or his duly authorized representative. [Emphasis added]

Thus, what the Council proposes to do would not assure Bear Creek that it could obtain an agreement, even after negotiating it with the Council, and Ed Berger candidly admitted that there was no possibility at this time of obtaining written consent of the Commissioner to negotiate.

Ed Berger also realizes that if they negotiate an agreement, the party with whom they may negotiate may incur certain animosity from BIA sources, and the Council is in no position to guarantee success. However, the Council evidently feels that this is the best way to circumvent the stalemate presently existing.

The question as to whether Bear Creek wants to risk the possibility of alienating the BIA in hopes of obtaining first crack at areas selected by Bear Creek would appear to be a policy decision. One possibility might be sending a letter to Vernon Smith expressing an interest in negotiations and suggesting to Mr. Smith that perhaps the Commissioner's consent to negotiations could be obtained on an understanding that any agreement finally negotiated with the Council would still be subject to review by the BIA. From the Council's standpoint, however, such a method would bring the "local" BIA officials into the act at early stages under the provisions of 25 CFR § 171.3. Another possibility would be for Bear Creek, directly or indirectly, to approach the BIA and "feel out" the BIA on the practicability of a plan whereunder informal

direct negotiations are entered into with the Tribe on the understanding that the Commissioner's formal consent would be sought after completing such "informal" negotiations. At the outset it might be best to use an indirect approach to avoid raising any animosity. If the BIA were responsive to such an approach, Bear Creek would still have no guarantee of success but might avoid later hard feelings by any BIA personnel.

In summary, if Bear Creek chooses to negotiate with the Council without the prior consent of the BIA there is no guarantee that the BIA would even consider approving any such negotiated agreement. If Bear Creek does not choose to negotiate, it is certain that the Council, through Mr. Smith, will approach others interested in Tribal lands.

Very truly yours,

Leo

Leo N. Smith

LNS:md

Bear Creek Mining Company
Arizona District

1714 WEST GRANT ROAD
TUCSON, ARIZONA 85705

TELEPHONE: 602-624-5547
TWX: 910-837-0252

October 16, 1967

Mr. John Artichoker, Jr., Superintendent
United States Department of the Interior
Bureau of Indian Affairs
Papago Agency
Sells, Arizona 85634

Dear Mr. Artichoker:

On May 31, 1967, you issued a form letter to the mining industry wherein you stated that the Papago Indian Tribe and the Bureau of Indian Affairs is planning to issue a nationwide advertisement for the Sale of Exclusive Mineral Prospecting Permits with Option to Lease for Mining Purposes on certain lands which have been selected within the main Reservation within approximately 90 days. Inasmuch as it has been 4 1/2 months, I am curious as to when you expect to issue the advertisement, or, might I assume that you do not plan to issue such an advertisement and that certain parcels of the Reservation may now be negotiated with the Papago Indian Tribe subject to your approval.

I would appreciate hearing from you on this matter at your earliest convenience. For the matter of record, I would like to mention that Bear Creek Mining Company's attitude towards acquiring prospecting rights on the Reservation favors negotiation rather than bid.

Sincerely,

BEAR CREEK MINING COMPANY

Robert E. Lehner

Robert E. Lehner
Exploration District Manager

REL:kre

TERMS: PROSPECTING PERMIT

1. $10,000 bonus

2. 3-year exclussive prospecting period on 6,400 acres.

3. Can convert to a mining lease or leases (each not to exceed 2,500 acres).

4. Land to be leased must be surveyed by registered surveyor at Permittee's expense.

5. $10/acre/year of work expenditure is required ($64,000/yr.).

6. Permittee must file itemized statement of amount and character of expenditures every six months.

7. Location and construction of new roads must be approved in writing by BIA.

8. Must hire Indians if practicable.

9. BCMC must submit complete written reports within 90 days after termination of permit to BIA and Papago Tribal Council.

COMMENTS:

(1) Page 7. BIA has inserted new paragraph in Permit to allow third parties to make use of any roads in area, other than public, providing third party compensates on a pro-rat'd share the costs of road building. I believe BCMC should therefore be held harmless of damages or accidents by third parties and that third parties should be defined as either BIA representatives or Indians and that their use of such roads shall not interfere with our operations. I would prefer to see this stricken from the agreement, or at least put it in the context that it must be approved by BCMC.

(2) Page 9. Under section on Reports. I believe the new wording by BIA should be tied into factual data.

Bear Creek Mining Company
Arizona District

1714 WEST GRANT ROAD
TUCSON, ARIZONA 85705

TELEPHONE: 602-624-5547
TWX: 510-837-0252

April 11, 1969

Sent to H. Bauer for approval before we start negotiations with BIA & Papagos. REL

Mr. Herm L. Bauer, Jr.
Bear Creek Mining Company
1826 Kennecott Building
10 East South Temple
Salt Lake City, Utah, 84111

Re: Arizona - Roskruge South Area - Papago Proposal

Dear Herm:

I enclose one copy of the Prospecting Permit and a copy of the Mining Lease which is intended to be used in negotiating with the Papago Tribal Council and Bureau of Indian Affairs for obtaining a non-exclusive prospecting and mining lease in the Roskruge South area of the Papago Indian Reservation. The permit and the lease is the same one which the BIA distributed in March, 1968, for competitive bidding on the six tracts or parcels of land which were withdrawn for those interested in prospecting and mining. We have compared the wording of this permit and lease with the ones that we had with the Gila River Indian Reservation in 1963 on the Mineral Butte Examination, and which was cleared by New York Legal Council. We have marked with red pencil any new wording by the BIA in these agreements where it differs from former agreements that have been approved by New York.

I have summarized on the front of the Prospecting Permit and the Mining Lease the general terms as it relates to time and money. With regards to the Prospecting Permit, I understand that the Papago Tribal Council is expecting us to bid $25,000 as a bonus. However, I recommend that for the Roskruge South area that a $10,000 bonus be offered. With regards to the general terms of the Prospecting Permit, I believe that they are not too far out of line and we can live with them. Concerning the Mining Lease terms, however, the chief disagreeable item is the royalty schedule, which in all practicality is approximately a 10% NSR.

To fill you in on the general interest that we have in the area, the Roskruge South area was evaluated under the Pediment Program by Jim Mancuso in 1966 (see report by Mancuso dated May 26, 1967). The area was selected on the basis of its geological environment which led to the recommendation for an I.P. survey that turned out to be positive. The I.P. anomaly extends both inside and outside of the Papago Indian Reservation. We staked claims and drilled 9 holes outside of the Reservation to the north and found that sulfides occurred at and near an intrusive rock in Cretaceous sediments. The copper content was greatest in the southernmost hole (RS-1) with several assay values being as much as 500 ppm. Only about 20% of the I.P. anomaly has been tested by drilling. The remaining

portion of the anomaly with the best PFE value is to the south on the reservation.

Recently Jack Phillips has had the I.P. crews survey the area with the new vector equipment and the I.P. results support the previous I.P. data as being anomalous.

It appears that the mineralization is related to the contact zone between the two rock types and represents a linear target trending North-South for a distance of approximately three miles across the panhandle part of the Papago Reservation, and is about 1,000 - 2,000 feet wide. The alluvial cover appears to be relatively thin (±250' thick). A tentative prospecting program would appear to warrant the drilling of approximately six holes at equal spacing along the strike of the target area and should probably penetrate to a depth of a 1,000 feet for each hole. Assuming about $10/foot for 6,000 feet, and a bonus payment of $10,000, an initial exploration expenditure on the order of $70,000 is warranted. I would need to be assured that such an appropriation could be provided before I negotiated further with the BIA and the Papago Tribal Council for the Roskruge South area.

I therefore await your approval with the general exploration plans and the terms of the agreements before I make contact with the Papago Indian Agency to negotiate an exclusive right for prospecting the area.

Sincerely,

Bob

Robert E. Lehner

REL:bm

encl. as noted

References: Memo to R.E. Lehner from J.S. Phillips, "Roskruge South - Resumption of Exploration," February 3, 1969

Memo to Jack Phillips from P.M. Wright, "Roskruge and Roskruge South Areas, Pima County, Arizona -- Geophysical Data Review" February 3, 1969.

Report by J. Mancuso, "Progress Report on Roskruge South Examination," May 26, 1967.

BEAR CREEK MINING COMPANY

2601 NORTH FIRST AVENUE
TUCSON, ARIZONA

TO R. E. Lehner DATE March 13, 1967

FROM J.D. Mancuso and J. Kirkwood

SUBJECT: Roskruge South Examination Monthly Report, February, 1967

SUMMARY

Eight validation and peep holes were completed this month; 61 claims north of the Reservation border were perfected. Pyrite and anomalous copper and molybdenum were intersected associated with the contact between the quartz monzonite stock and the arkosic sediments. We are encouraged to test the covered I.P. anomaly on the Indian Reservation.

I. DRILLING

Eight holes totaling 2103 feet were completed this month, RS-2 through RS-9, located as shown on the attached map. The drilling was done to validate the block of claims outlined, and to "peep" through the post-mineral gravel cover. Holes were drilled by air-rotary to solid bedrock, where a short core was taken. Drill logs, attached, show rock type, alteration, and mineralization and Table 1 summarizes the drilling done to date, including the eight holes drilled this month, and hole RS-1 drilled previously.

TABLE I - ROSKRUGE SOUTH DRILLING

Hole No.	Depth	Total Cost	Cost/Foot	Alluvium Depth	No. of Claims Validated	Remarks
1	544'	4,615.50	8.31	135'	9	Mineralized arkose & qtz.monzonite.Sulfide @ 510'.
2	320'	2,335.15	7.30	180	6	Quartz monzonite.Pyrite from 285 to 320.
3	32'	294.25	9.20	10	3	Fresh qtz. monzonite.
4	270'	765.00	2.83	160	7	Mineralized arkose-oxide bottom.
5	400'	1,429.50	3.57	200	10	Quartzite.Traces of limonite.
6	230'	789.00	3.43	170	7	Fresh qtz. monzonite
7	480	1,127.00	2.35	240	8	Qtz.monzonite.Weak pyrite from 390 to bottom.

TABLE I - ROSKRUGE SOUTH DRILLING (CONTINUED)

Hole No.	Depth	Total Cost	Cost/Foot	Alluvium Depth	No. of Claims Validated	Remarks
8	161'	734.00	4.56	130	3	Fresh qtz. monzonite
9	210'	1,026.50	4.89	120	8	Fresh qtz. monzonite
9	2657'	13,115.90	4.94		61	

Holes 1, 2, and 4 were spotted on the I.P. anomaly, and sulfides and/or limonite were found in all three. Holes 3 and 6 were spotted on weak, questionable anomalies, and no sulfides or limonite were found. All bedrock cuttings and core were analyzed for geochemical copper and molybdenum. Hole RS-1 is highest, with the best primary grade prediction in the arkose from 475 to 510 feet, 0.11% copper. Holes RS-1 and RS-2 are higher in copper and molybdenum than the other holes, indicating a possible trend to higher values towards the south. Mineralization is related to the contact between the quartz monzonite and the arkose with best copper values in the arkose. Only about 1/6 of the I.P. anomalous zone has been tested so far; most of the anomaly occurs to the south on the Papago Reservation.

II. LAND

A. Federal Claims

Corner and end center monuments have been set and surveyed for the 145 Coco claims covering the block of ground shown on the attached map. Validation drilling has been done for 61 claims as shown on the map. Claims not validated will be re-papered to hold until we decide whether to drop or validate them.

B. Indian Land

Most of the I.P. anomaly and area of interest is on the Papago Reservation. No parcels have yet been put up for bid, and indications are that none will be if a 10% NSR royalty is necessary. We plan to make contact with the Indians and attempt to negotiate an exclusive permit-lease.

III. PLANS

A ground magnetic survey will be conducted to better define the magnetite-bearing contact zone, and to help unravel some of the complexities hidden by gravel cover.

All data will be studied and recommendations for further work will be made.

JM

J. D. Mancuso

BE. . CREEK MINING COM. .NY
2601 NORTH FIRST AVENUE
TUCSON, ARIZONA

TO R.E. Lehner DATE February 6, 1967

FRO... J.D. Mancuso

SUBJECT: Roskruge South Examination, Monthly Report, January, 1967, (06-01-0614)

I. DRILLING

Hole RS-1 was completed at 554 feet; attached is a graphic log. Petrographic studies and limonite separates are being made for closer control of rock type, alteration, and limonite.

II. I.P.

Line I, in the southern part of Section 9, T14S, R10E, was re-run at 500 foot dipoles to get a more precise pick on the limits of the I.P. anomaly. A small, questionable response shows up west of the anomaly drilled by hole RS-1.

Another reconnaissance line was run along the road northeast through Sections 7, 8, 5, 4, and 3, T14S, R10E. No valid Pfe anomalies were noted. Apparently the anomaly terminates near the center of Section 9.

III. PLANS

Seven short holes to validate 52 claims (in addition to those validated by hole RS-1) will be drilled. These holes will penetrate gravel cover, and a short core will be taken in bedrock. At the completion of this drilling, we may recommend deepening one or more holes to sulfides.

J. D. Mancuso

ROSKRUGE PEDIMENT EVALUATION
PIMA COUNTY, ARIZONA
(0612-580)

SUMMARY AND RECOMMENDATIONS

The Roskruge pediment is located in T12, 13, 14S, R9, 10E, Pima County, Arizona.

The following lithologic units are exposed in the area: Paleozoic limestones, Cretaceous sediments and volcanics, Laramide monzonite, Tertiary tuff and volcanics, including rhyolite plugs, Quaternary(?) basalt dikes and Quaternary gravels.

Copper oxides, shearing and bleaching were observed in four separate localities. In all cases, the mineralization and alteration is controlled predominantly by northeasterly fractures and small faults. Alteration consists of clay, epidote, silicification, and minor sericite development.

Based on the mineralization and alteration, four I.P. lines are proposed for the Roskruge pediment area (see Plate 5).

INTRODUCTION

The Roskruge pediment is located in T12, 13, 14S, R9, 10E, Pima County, Arizona. Access to the area is gained by ungraded roads and jeep trails.

GEOLOGY

Rocks adjacent to the Roskruge pediment range in age from Paleozoic to Recent with the oldest units being exposed in the northwest portion of the area. The Paleozoic rocks consist of Devonian Martin limestone, Mississippian Escabrosa limestone, and Pennsylvanian-Permian Naco limestone.

The most widespread unit, found predominantly in the southern portion of the area, is of Cretaceous age. The Cretaceous sequence consists of red beds, an arkosic sandstone, andesitic agglomerate, and andesitic volcanics.

A Laramide monzonite intrusive outcrops in the southeastern part of the area. The rock is holocrystalline, medium-grained, and shows minor chloritic alteration in most outcrops. Hornfels with minor epidote is developed where the stock cuts the Cretaceous volcanic sequence.

Tertiary volcanics are represented by a basal water-laid tuff unit, rhyolite plugs, dikes, flows and welded tuff, andesites, and latites.

Quaternary(?) basalt dikes, trending in a northwesterly direction, intrude the Cretaceous sequence and Laramide stock.

No attempt was made to define or map the Quaternary gravels, for in most cases, they are horizontal and represents very recent material.

MINERALIZATION AND ALTERATION

Four separate areas of mineralization and alteration were noted. They are located in the following sections: Section 8, T13S, R9E, Section 20, T13S, R9E, Sections 7, 18, T14S, R10E, Section 12, T14S, R9E, and Section 10, T14S, R10E.

The mineralization found in Section 8, T13S, R9E, was previously examined by John Balla*. Balla states that the mineralization consists of moderate to abundant amounts of chrysocolla and malachite confined to fractures and faults in Cretaceous andesite agglomerate. The trend of the fractures and faults containing copper oxides is dominantly east-west with minor mineralization occurring in a northwest direction.

The southwestern area (Section 20, T13S, R9E) contains weak copper oxides, malachite and chrysocolla. The copper oxides are after chalcopyrite which occurs as sparse disseminated grains adjacent to northeast fractures and small faults. The host rocks are Cretaceous sediments (coarse-grained arkosic sandstone) and a rhyolite flow. Some sericite and disseminated pyrite occur in this rhyolitic material as coatings and irregular patches.

The south-central area (Sections 7, 18, T14S, R10E and Section 12, T14S, R9E) shows pronounced shearing in a N60°-85°E direction. These zones are readily observed by their limonitic (mostly jarosite and goethite) color. They occur in various widths and are intermittent along the strike direction. No copper oxides were observed, but weak copper and molybdenum mineralization was detected by geochemical sampling. Some pyrite cavities were observed in the limonitic material which contains weak to moderate clay alteration.

The southeast zone (Section 10, T14S, R10E) of alteration is located on a small hill. Here the alteration is present as bleaching (strong clay alteration) and silicification in Cretaceous arkosic sandstones. The country rock contains epidote, which is presumed to have been introduced as disseminations and coatings along fractures. Here, as elsewhere, the zones are trending northeasterly. The widths vary, but are at least 10-15 feet wide and continuous for 100 feet or more. Geochemical sampling of these bleached zones shows anomalous values in copper, with two samples being greater than 400 parts per million.

* Balla, J. C., Penny Mine, Waterman Mining District, Pima County, Arizona, Bear Creek Mining Company Report, 1964.

GEOCHEMISTRY

A total of 146 geochemical samples were collected. These include 105 rock chip, 28 soil, seven water well and six stream sediment samples. Sample locations are shown on Plate 2.

Anomalous values were detected in the bleached zones, where the average was 48 parts per million copper and 4 parts per million molybdenum. The average for pre-ore rocks, excluding faults and mineralized zones is 28 parts per million copper and 2 parts per million molybdenum. Spectrographic results for one sample taken from the bleached and silicified zone located in Section 10, T14S, R10E were anomalous in copper, silver, and lead.

A soil sampling traverse did not define any anomalous values beneath the gravel covered area.

Water well sampling indicated weak to moderate values in and adjacent to the pediment.

LAND STATUS

A generalized land status map (Plate 5) shows the surface and mineral rights to the land in the Roskruge pediment and vicinity. The majority of the land is controlled by the State or Federal Government.

I.P. RECOMMENDATIONS

The proposed I.P. consists of four lines which are shown on Plate 5. The following factors were considered in proposing the lines: (1) N60°-85°E trending zones of alteration and mineralization, (2) the zones do contain, or have contained, variable amounts of copper, (3) silicification and propylitic alteration in the form of chlorite and epidote, (4) proximity of a Laramide monzonite intrusive, (5) the mineralized and altered zones trend into the gravel covered area, and (6) a shallow pediment (less than 500 feet) and greater than two and one-half miles in width exists adjacent to the mineralization and alteration.

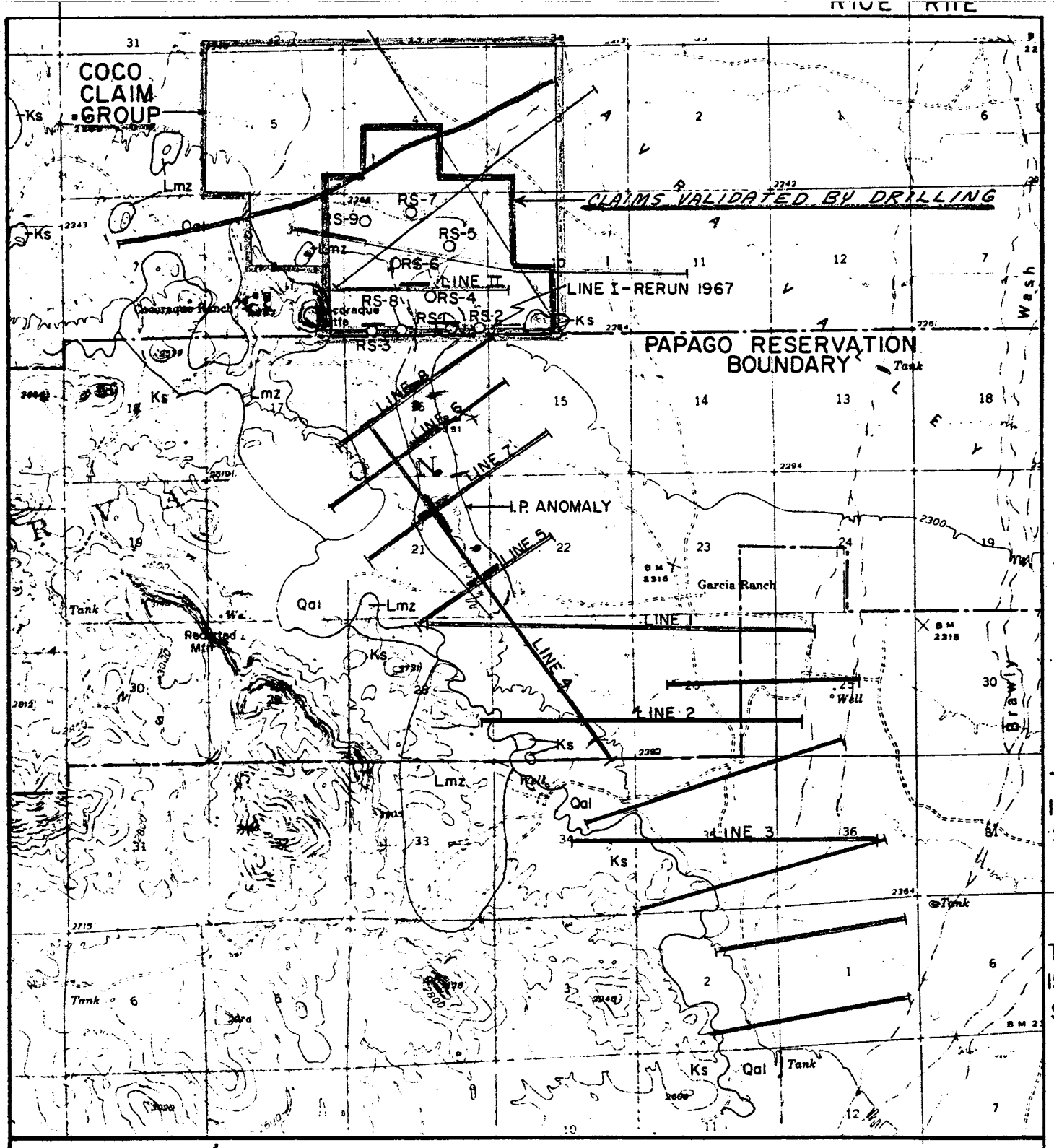
CONCLUSIONS

Geochemical sampling indicated anomalous amounts of copper and molybdenum in the zones of alteration and mineralization, especially where copper was suspected but not visible.

Previous gravity data has substantiated a pediment of greater than two and one-half miles in the Roskruge pediment area.

Based on the above described mineralization and alteration, plus the fact that a pediment (greater than two and one-half miles) does exist, four I.P. lines have been recommended.

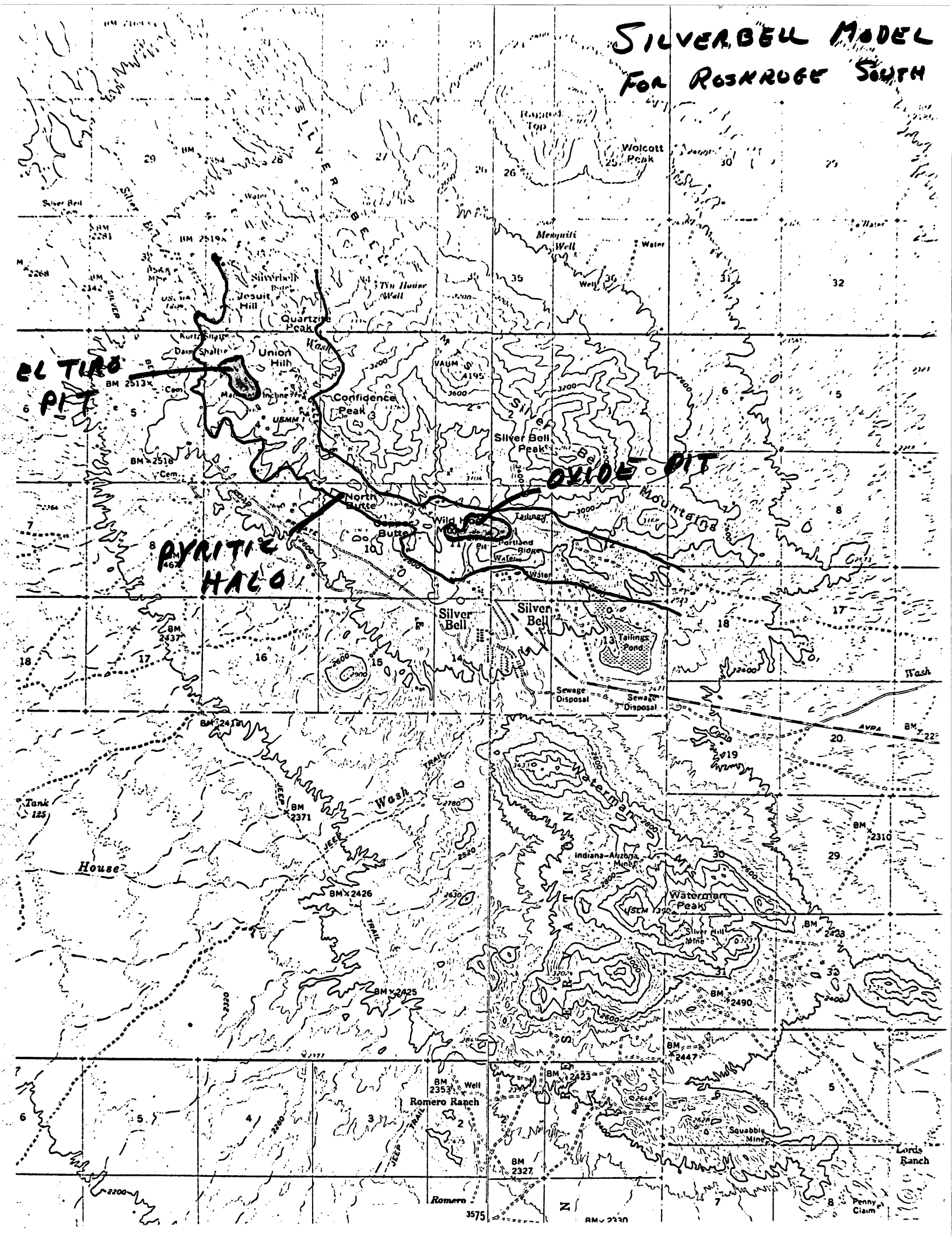
D. W. Blake
June 23, 1965

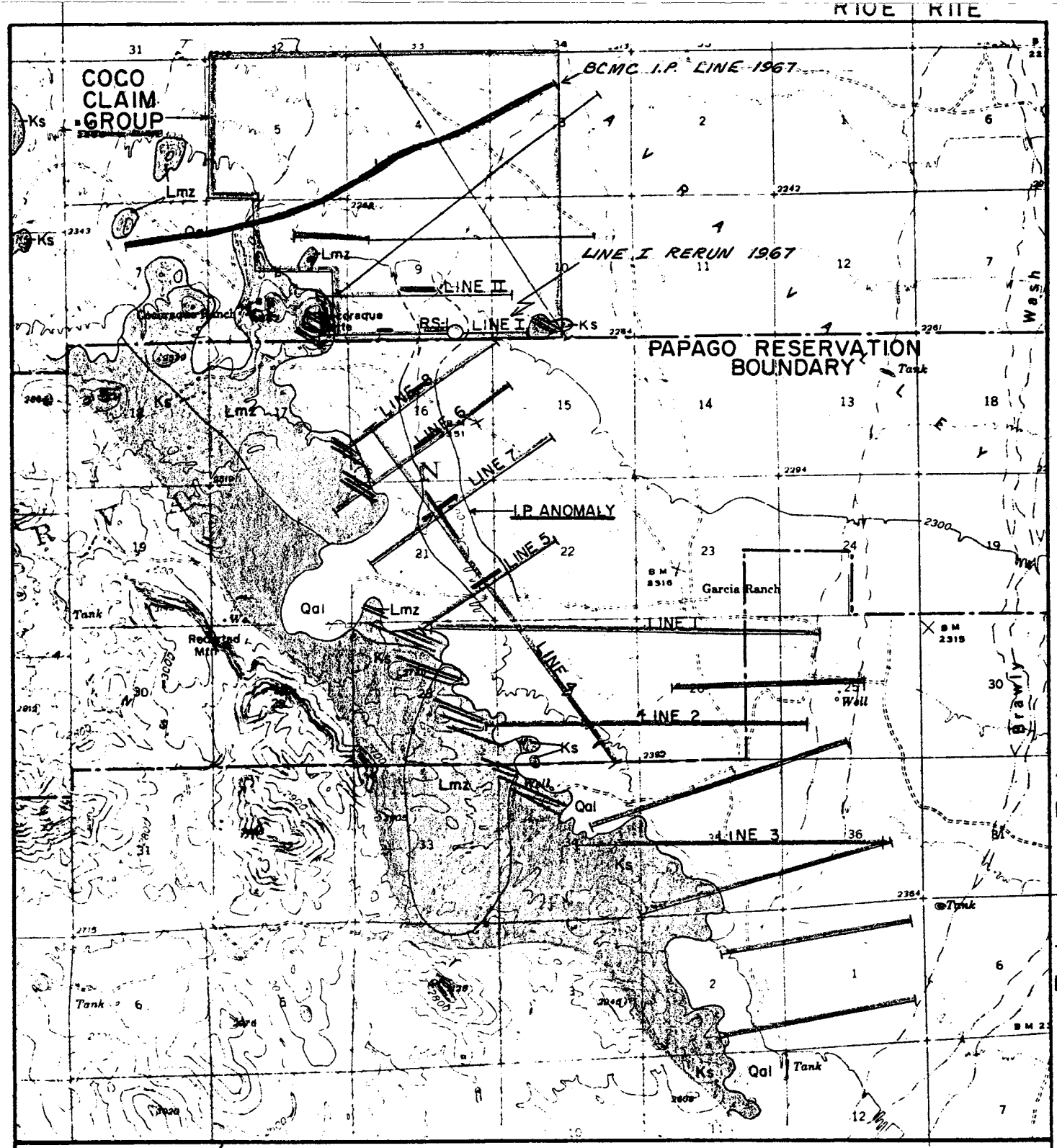


ROSKRUGE SOUTH EXAMINATION

Qal	GRAVEL COVER
Lmz	LARAMIDE MONZONITE
Ks	CRETACEOUS ARENACEOUS SEDIMENTS
	ALTERED AND MINERALIZED
●	RS-1 COMPLETED JAN. 1967
○	RS-2 – RS-9 COMPLETED FEB. 1967

- BCMC I.P. LINES – 1967
- BCMC I.P. LINES – 1965
- BCMC I.P. LINES – 1966
- GEOSCIENCE I.P. LINES
- NEWMONT I.P. LINES
- I.P. ANOMALY


SILVERBELL MODEL
FOR ROSKRUGE SOUTH
EL TIRO PIT
PYRITIC HALO
OXIDE PIT
Silverbell
Jesuit Hill
Quartzite Peak
Union Hill
Confidence Peak
Silver Bell Peak
North Butte
Copper Butte
Wild Hog Mine
Portland Ridge
Silver Bell
Tailings Pond
Sewage Disposal
Wolcott Peak
Mesquiti Well
Tin House Wall
Silver Bell Mountains
Waterman Peak
Indiana-Arizona Mine
Silver Hill Mine
Romero Ranch
Squabble Mine
Lords Ranch
Penny Claim
Tank 125
House
Wash
Romero
Well
Water



ROSKRUGE SOUTH EXAMINATION

- Qal — GRAVEL COVER
- Lmz — LARAMIDE MONZONITE
- Ks — CRETACEOUS ARENACEOUS SEDIMENTS
- ALTERED AND MINERALIZED
- ○ DRILL HOLE COMPLETED
- BCMC I.P. LINES – 1965
- BCMC I.P. LINES – 1966
- GEOSCIENCE I.P. LINES
- NEWMONT I.P. LINES
- I.P. ANOMALY

Bear Creek Mining Company

Arizona District

NORTH FIRST AVENUE
ON, ARIZONA 85719

TELEPHONE: 602-624-5547
TWX: 510-837-0252

May 31, 1967

Mr. Paul A. Bailly
Bear Creek Mining Company
1826 Kennecott Building
10 East South Temple
Salt Lake City, Utah

Re: Arizona - Roskruge South Examination; Progress Report

Dear Paul:

I enclose a Progress Report by J. Mancuso on the Roskruge South Examination. As you recall, this area of interest was generated through the Pediment Reconnaissance program whereby a favorable geologic environment led to the recommendations for an I.P. survey which was positive. The I.P. anomaly extends both inside and outside of the Papago Indian Reservation. We staked claims and drilled nine holes outside of the Reservation to the north and found that sulfide minerals occur at and near the contact between an intrusive rock and Cretaceous sediments. The copper content was greatest in hole RS-1 with several values as much as 500 ppm. Only about 20 percent of the I.P. anomaly has been tested by drilling; the remaining portion of the anomaly with the best pfe values is to the south on the Reservation.

The day after the bids were opened on the San Xavier Reservation, the mining consultant for the Tribe, Vern Smith, called this office and mentioned that the BIA had expected a total of $25,000 in bonus bids but were incredulous over the $3/4-million actually bid. In view of this success on the San Xavier Reservation, they now plan the same procedure for the main Papago Reservation. Bear Creek, as well as other companies, were solicited to submit land parcels of interest (8,000 to 10,000 acre sizes) for withdrawal and to be placed for bid. We have no intentions of submitting any area or areas, including Roskruge South, and playing their little game. We have learned that they anticipate leaving the areas 'open' for a 90-day period of advertisement and closing them just prior to the bid-opening date. This would give everyone the chance to go out and evaluate all areas submitted for withdrawal prior to the bid-opening.

Very truly yours,

Bob

Robert E. Lehner

REL:kre

Encls: 2 copies of report

cc: R. Holmer w/2 copies of report
A. Weiss w/1 copy of report

BEAR CREEK MINING COMPANY

ARIZONA DISTRICT

PROGRESS REPORT
ROSKRUGE SOUTH EXAMINATION
PIMA COUNTY, ARIZONA

(06-01-0614)

by

James D. Mancuso

May 26, 1967

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TABLE OF CONTENTS

		PAGE
SUMMARY AND CONCLUSIONS		1
RECOMMENDATIONS		2
I.	INTRODUCTION	2
II.	GEOLOGY	2
III.	OUTCROP ALTERATION AND LIMONITE	4
IV.	GEOCHEMISTRY	4
V.	I.P. SURVEYS	4
VI.	DRILLING	5
VII.	LAND	7

LIST OF ILLUSTRATIONS

PLATE 1 INDEX MAP

PLATE 2 GEOLOGIC MAP

PLATE 3 GROUND MAGNETIC PROFILES

PLATE 4 LINE 1 - GROUND MAGNETIC AND I.P. PROFILES AND GEOLOGIC CROSS SECTION

PLATE 5 LINE RK-I - GROUND MAGNETIC AND I.P. PROFILES AND GEOLOGIC CROSS SECTION

PLATE 6 GEOCHEMICAL COPPER

PLATE 7 GEOCHEMICAL MOLYBDENUM

PLATE 8 INDUCED POTENTIAL SURVEYS

PLATE 9 LAND MAP

DRILL LOGS:

RS-1 RS-6

RS-2 RS-7

RS-3 RS-8

RS-4 RS-9

RS-5

SUMMARY AND CONCLUSIONS

The Roskruge South Examination is an outgrowth of the exploration of the Papago Indian Reservation by the Pediment Reconnaissance crew in 1966.

An I.P. anomaly about three miles long and 1,000 to 2,000 feet wide occurs in a gravel covered area along a contact between a Laramide quartz monzonite porphyry stock and Cretaceous arkose. Age dates of the quartz monzonite show that it is about 68 million years old, the same as intrusives associated with porphyry copper deposits in the southwest.

"Halo" type mineralization and alteration occur in bedrock on the mountain front and in a small inlier adjacent to the covered area. Propylitic and some clay-sericite alteration, magnetite, weak goethite and geochemically anomalous copper and molybdenum in rock were noted.

Nine drill holes (2,657 feet) for claims validation and "peep" holes, show that sulfides occur at and near the contact between the quartz monzonite stock and the Cretaceous sediments beneath 100 to 400 feet of leached capping. Gravel cover varies from 100 to 240 feet in the area drilled. Copper content is greater in sediments than in quartz monzonite and is highest in the south end of the area drilled, at the Indian Reservation boundary. Only about 20 percent of the I.P. anomalous zone has been tested by drilling - the largest part, with best anomalous Pfe values, occurs on the Papago Reservation.

A total of 145 claims have been staked north of the Reservation and 61 have been validated by drilling.

Parcels of the Reservation are being solicited by the Bureau of Indian Affairs to advertise for bid on a bonus basis. Royalty terms will be 10 percent NSR for porphyry copper type orebodies.

The unexplored target area is, I feel, excellent for the following reasons:

1. It is located on major structural and mineralization lineament trends, about midway between the Silverbell and Pima-Mission Districts.

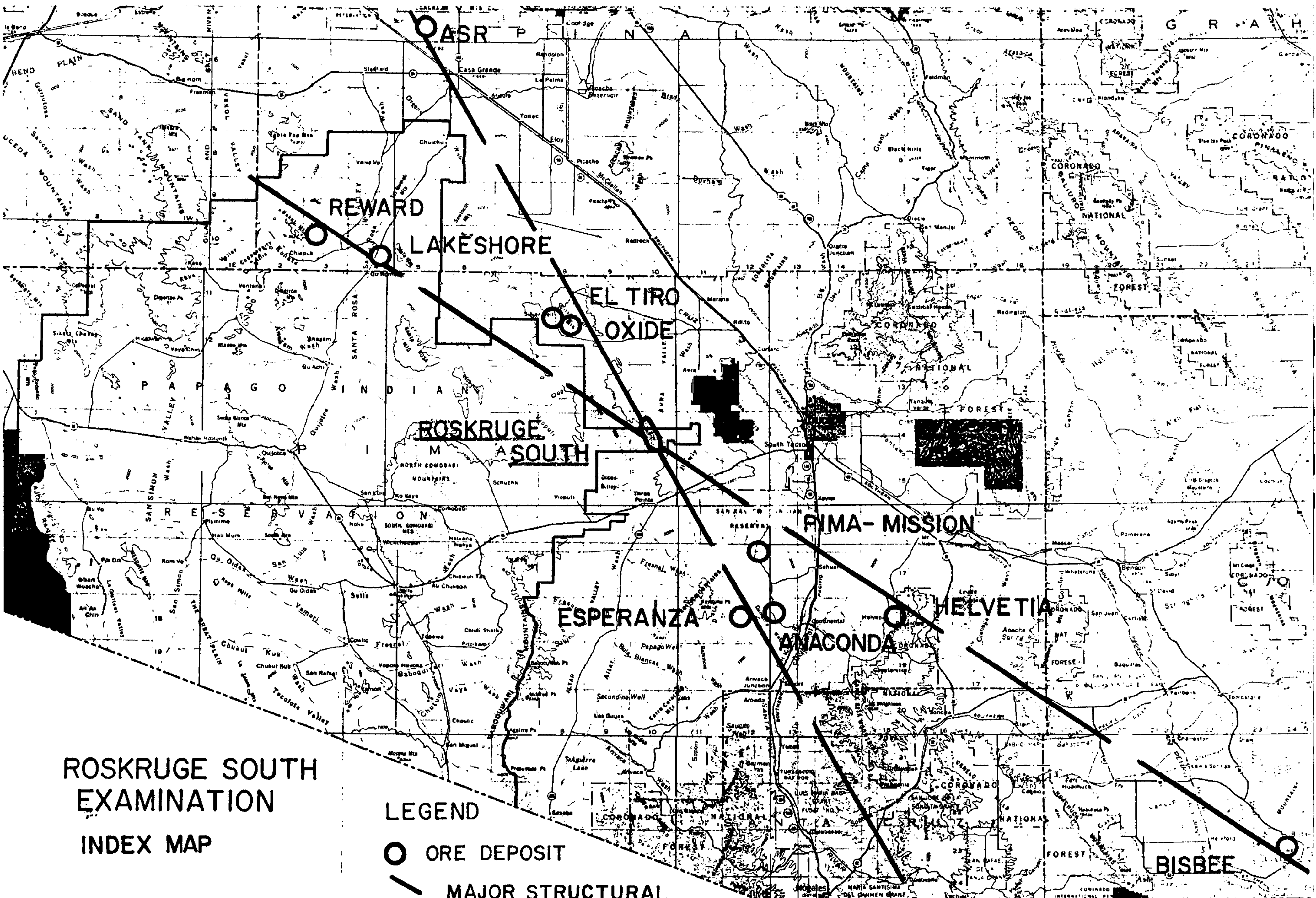
2. The Laramide stock is porphyritic and is the same age as most other porphyry copper stocks in the southwest.

3. The mineralized zone occurs at the stock contact, a very favorable locus in most porphyry copper deposits.

4. Sulfides and anomalous copper were found in the area drilled, and to the south the untested portion of the target is large enough to hide a large copper deposit and pyritic halo.

5. There is a good chance for an enriched blanket to be preserved beneath gravel cover; 100 to 400 feet of leached capping were noted in the drilling.

6. Gravel cover is thin and sulfide response on the I.P. profiles is relatively shallow, indicating that any deposit found would be amenable to open pit mining.



ROSKRUGE SOUTH
EXAMINATION

INDEX MAP

PLATE 1

RECOMMENDATIONS

Roskruge South, as noted above, is an excellent covered exploration target. However, most of it occurs on the Papago Reservation where a Permit-Lease will be required for mining. Parcels of the Reservation are requested from interested parties to be advertised for bid on a 10 percent NSR royalty basis. Pros and cons of our requesting Roskruge South from the BIA at this time are discussed in Chapter VII of this report.

I recommend that we do not request the Roskruge South area be advertised at this time. If someone else does request it, we will know we have competition, and can gauge our bid accordingly, and may even have time to request additional "smoke screen" areas. If no one else requests the area, we can, after the bidding for other parts of the Reservation, try to negotiate a Permit-Lease for Roskruge South by pointing out lack of interest by other parties since no one else thought enough to request it. Also, because we control the adjacent land, we might have a negotiating point.

I feel that Roskruge South is definitely a worthwhile target, but delaying tactics at this time may allow us to get the land for a cheaper bonus bid and may, though unlikely, give us a chance to negotiate downward the required royalty rates. However, events between now and the time of advertisement for parcels may cause a re-assessment of my recommendation. If we find out that all areas of the Reservation must be put up for bid, and if only a short time is allowed between advertisement and bidding (instead of the 90 days now being considered), we may find it advantageous to submit Roskruge South now and make our bid at this time.

I. INTRODUCTION

Roskruge South is located 20 miles west of Tucson in and adjacent to an east-west arm of the Papago Reservation as shown on the Index Map, Plate 1. Parts of Sections 3,4, 5,8,9,10,16,17,21,22,27,28, T14S, R10E are included.

In the Winter and Spring of 1966, reconnaissance mapping by the Pediment crew during the evaluation of the Papago Reservation outlined a possible alteration-mineralization halo around a buried copper deposit projected on a Laramide quartz monzonite - Cretaceous arkose contact. This contact zone north of the Reservation had already been evaluated in 1965 with negative results (Roskruge Pediment, by Dave Blake, June 23, 1965).

An I.P. survey on and to the south of the Reservation was conducted in the Spring of 1966, and follow-up I.P. and drilling were conducted north of the Reservation in early 1967.

II. GEOLOGY

Roskruge South is located on strong trends, possibly indicating deep-seated structural connections, between Bisbee, Helvetia, Esperanza, Anaconda, Twin Buttes, and Mission Pima to the southeast, and Oxide and El Tiro (Silverbell District), Lakeshore, Reward, and the ASARCO Casa Grande deposit to the northwest (Plate 1). A further projection northwest across Arizona includes Bagdad and Ithaca Peak. This setting is extremely favorable for the occurrence of an economic porphyry copper deposit, and coupled with direct evidence of mineralization (discussed below) justifies additional exploration.

Cretaceous, Tertiary and Quaternary rocks outcrop in the Examination area, as noted on Plate 2:

Qg - Quaternary alluvial cover east of the main Roskruge Mountains. A gravity survey in the north part of the area indicates a gradual thickening of gravels, with no major Basin-Range faulting noted in the Examination area.

Qb - Basalt dikes - a few young basalts occur in the western part of the area, dated at about 10 million years.

Trt - Rhyolite tuffs, including ash flows and ash falls, dated about 13 million years old occur at Recortado Mountain, Sections 19 and 30.

Tb - Small inliers of basaltic flow material occur in the northern part of the area and a zone of basalt to basaltic andesite dated about 23 million years occurs to the south.

Tv - A small inlier of acid to intermediate volcanics occurs in the north.

Tql - A small quartz latite plug cuts Laramide quartz monzonite in Section 6.

Lm - Laramide quartz monzonite porphyry - the Cocoraque Butte pluton - occurs as a northwest trending stock intruding Cretaceous arenaceous sediments in the central part of the area. Thin sections indicate this rock to be a quartz diorite to quartz monzonite porphyry with up to 50 percent .07 to .2mm ground-mass made up of quartz-orthoclase-oligoclase-andesine and phenocrysts (to 4mm) of oligoclase-andesine and biotite. Age dates taken from this pluton show that it was emplaced about 68 million years ago, which makes it equal (within limits of analytical error) to the intrusive porphyries at Cananea, Silverbell, Bagdad, and Mineral Park, and within ± 5 million years of the mineralizing intrusives at Twin Buttes, Esperanza, Lone Star (Safford), Ajo, Globe-Miami, Ray, and Chino.

Lv - Acid to intermediate tuffs, pyroclastics, agglomerates and flows were deposited contemporaneously or just before the emplacement of the Cocoraque Butte pluton (69 to 71 million years).

Ks - Arenaceous sediments, including conglomerates, arkoses and siltstones of the Cretaceous Cocoraque formation. One age date of an interbedded andesite flow (or sill?) showed 108 million years, middle Cretaceous.

No rocks older than Cretaceous were noted on the surface or in the drilling.

Major structures include a normal fault which trends northwest and separates Laramide from Cretaceous rocks in the western and southwestern parts of the area, and the anti-cline in the Cocoraque formation, noted by reversals in dip on either side of the Cocoraque Butte quartz monzonite stock, indicating some forceful intrusion of the stock, such as is noted at other Southwestern porphyry copper deposits.

Some minor shearing and cross fracturing was also noted.

In order to project the contact between the quartz monzonite stock and the Cretaceous sediments beneath alluvial cover, a ground magnetic survey was conducted on lines

shown on Plate 2. Profiles (Plate 3) show that the stock has higher magnetic susceptibility than the sediments, and coupled with I.P. resistivities, drill hole information, and known location in outcrop (also see the profiles and cross sections of Plates 4 and 5), this contact was projected as shown on Plate 2. This zone is immediately west of the I.P. anomaly, showing that (as we suspected) the sulfides occur at and near the contact.

III. OUTCROP ALTERATION AND LIMONITE

Mineralized zones, including alteration, limonite, and magnetite were noted in outcrop adjacent to post-mineral cover (Plate 2). Silicification and propylitic alteration and magnetite were noted at and near the stock-sediment contact in the south-central part of the area (Sections 27, 28, 34) and propylitic alteration and silicification were noted in the northern part of the area (Sections 10 and 16). Only a few isolated limonite zones (goethite) were noted, in Sections 20, 28, and 34.

This is not the quantity or strength alteration and limonite expected over an orebody (especially when copper and molybdenum are considered, as discussed in the following section), but could well represent a halo zone around a buried deposit.

IV. GEOCHEMISTRY

Plates 6 and 7 show the results of geochemical sampling for copper and molybdenum. Included are outcrop rock samples and drill cuttings from the first 50 feet of pre-mineral rock. Anomalous and background designations are based on a study of hundreds of samples collected throughout the Papago Reservation.

These maps show that copper and molybdenum contents are not extremely high, but anomalous values do occur and enough are grouped to indicate a possible halo adjacent to a covered deposit.

V. I.P. SURVEYS (PLATE 8)

Four I.P. surveys were conducted in the Roskruge South area by or for Bear Creek:

1. In the summer of 1964, five lines (Michel on Plate 8) were run north of the Indian Reservation as a follow-up to the evaluation of the Roskruge Pediment under the Pediment Reconnaissance Program. No definite anomalous responses were noted, though some questionable higher Pfe's were recorded at the south end of the area surveyed.

2. In the Spring of 1966, eight lines were surveyed (Eisenbeis on Plate 8) as a follow-up of the Roskruge South Pediment evaluation by the Pediment Reconnaissance crew during the exploration of the Papago Reservation. A weak anomaly was noted between 4 and 6 west on line 1, and additional lines surveyed to the north outlined the I.P. anomaly shown on Plate 8. A study of I.P. and geologic data in 1966 indicated to us that the I.P. anomaly occurs at and near the contact between the Laramide stock and Cretaceous sediments. Additional work since then, as noted in this report, confirmed this prognosis.

3. In late 1966, a contract I.P. crew (Geoscience) ran two lines north of the Reservation fence to determine whether the I.P. anomaly crosses onto non-Indian land where we might drill and determine its source. These lines

(RK-I and RK-II) did indicate anomalous zones.

4. In early 1967, Bear Creek (Topping on Plate 8) ran more I.P. north of the Reservation. Geoscience line RK-I was run with 500 foot dipoles (instead of 1000 foot) to get a better pick of the anomaly for spotting a drill hole, and line RK-III was run to the north to make certain the anomaly was cut off in that direction.

The I.P. anomalous zone outlined by these surveys is shown on Plate 8. It is three miles long, 1,000 to 2,000 feet wide, varies in quality from "weak" to "strong", occurs at or near the contact between Laramide quartz monzonite and Cretaceous sediments, and has been found by drilling on the north end to be caused by sulfides.

VI. DRILLING

Nine holes totaling 2,657 feet were drilled to test the I.P. anomaly and the stock-sediments contact beneath gravel cover and to validate 61 Federal claims staked by Bear Creek Mining Company north of the Papago Reservation. Drilling was by rotary and air hammer with only spot cores taken.

Table I summarizes the drilling results, and hole locations are shown on Plates 2, 8, and 9.

TABLE I - ROSKRUGE SOUTH DRILLING

Hole No.	Depth	Total Cost	Cost/ Foot	Alluvium Depth	No.of Claims Validated	Remarks
1	544'	4,615.50	8.31	1.35'	9	Mineralized arkose & qtz. monzonite.Sulfide @ 510'.
2	320'	2,335.15	7.30	180'	6	Quartz monzonite.Pyrite from 285 to 320'.
3	32'	294.25	9.20	10'	3	Fresh qtz.monzonite.
4	270'	765.00	2.83	160'	7	Mineralized arkose-oxide bottom.
5	400'	1,429.50	3.57	200'	10	Quartzite. Traces of limonite.
6	230'	789.00	3.43	170	7	Fresh qtz. monzonite.
7	480'	1,127.00	2.35	240	8	Qtz.monzonite. Weak pyrite from 390' to bottom.
8	161'	734.00	4.56	130	3	Fresh qtz.monzonite.
9	210'	1,026.50	4.89	120	8	Fresh qtz. monzonite.
	2,657'	13,115.90	4.94		61	

Graphic drill logs are enclosed with this report, and a brief discussion of each hole follows:

RS-1 This hole was drilled to test the I.P. anomaly north of the Reservation. The quartz monzonite at the top of the hole (to 200 feet) is probably an apophysis from the main stock to the west and the quartz monzonite at the bottom of the hole is interpreted as being part of the main stock (see Plate 5). The arkose has three sills and/or dikes of andesite - andesite porphyry. Limonite evaluation shows some sulfides occurred in all rocks, with the highest content in the arkose near the quartz monzonite at the bottom of the hole.

Sulfur assays indicate .5 to 1.5 percent (by volume) pyrite in the quartz monzonite in the lower part of the hole where it is about one-half leached. Pyrite occurs as fine disseminations in the rock, and limonite was noted on fractures.

Copper is anomalous in all rocks beneath alluvium, with best assays in the arkose immediately above the quartz monzonite; from 456 ppm copper with 60 percent jarosite and 40 percent goethite - this gives a predicted primary grade of 0.114 percent copper in that interval. The oxide and sulfide zone below this in quartz monzonite has only 60 ppm copper.

The arkose immediately above the stock is apparently best host for copper mineralization and enrichment probably occurs in sediments east of the contact where the arkose is more permeable than the quartz monzonite, allowing movement of ground water.

RS-2 Drilled to validate claims and to "peep" through the alluvium into part of the I.P. anomaly on line RK-1 (see Plate 5). Only quartz monzonite was intersected, but from other evidence (I.P. and magnetics), it probably is an apophysis and not the main part of the stock. Limonite was intersected to 255 feet, and pyrite below. Pyrite content is two to three percent (volume), somewhat higher than hole RS-1. The bottom of the leached zone in hole RS-2 occurs 300 feet higher than it does in hole RS-1. However, sulfides occur in this tight intrusive rock and might be a perched zone, with the oxide zone probably deeper in adjacent arkose. Copper is low in the leached zone (less than 40 ppm) but averages 80 ppm in the sulfide zone.

RS-3 Drilled to validate claims and to "peep" through gravels to test a questionable Pfe response on line RS-I.

Less than 10 feet of gravel cover occurs over fresh quartz monzonite.

RS-4 Drilled to validate claims and "peep" through gravels to test anomalous Pfe response on line RK-II. Brecciated, altered arkose with secondary biotite and magnetite were intersected from beneath the alluvium at 160 feet to the bottom of the hole (270 feet). Jarosite and goethite (2J:1G) occur - sulfides were not intersected. Copper is only slightly anomalous, though with the amount of jarosite noted most of it would be leached.

RS-5 Drilled to validate claims and "peep" through gravels. Relatively fresh, unmineralized quartzite and arkose were intersected.

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escalating upwards).
eservation for royalty
and we were told by
o this same royalty:

This makes a mineable porphyry copper deposit subject to a ten percent NSR royalty. In September, 1966, we felt this would be an excessive royalty, so all work was terminated on the Papago Reservation.

However, in late 1966 and early 1967, studies on the effect of the expected royalty rates were requested from KCC-SECC, and results indicated that a ten percent NSR would not lower the profitability of a porphyry copper deposit so much that it would be eliminated from consideration. Plots were made of a number of variables, including royalty rates (0 to ten percent NSR), tonnage, grade, copper price, and stripping ratio; results indicate that all the variables are important: A price rise of 36 to 38¢/pound has about as much influence on Hoskold rate of return as a royalty rate of 0 vs ten percent NSR; a ten percent NSR royalty is equal to about 0.06 percent increase in copper grade from no royalty, etc.

We recommended, therefore, that ten percent NSR royalty is acceptable, if necessary, and we should continue to explore and/or bid for good ground where this royalty is required. Permission to proceed was received from the Head Office, and a bonus bid on the San Xavier Reservation, where this royalty was required, was submitted on May 3, 1967. We lost out on the San Xavier Reservation (we bid $111,111.11 for Tract I, and winning bids were $501,938.00 for this Tract and $256,000.00 for Tract II on which we did not bid). The BIA was understandably elated by these bids, especially since established Arizona mining companies were involved (Bear Creek, Pima Mining, and Phelps Dodge), so the Main Papago Reservation will be advertised for bid on the same royalty basis.

We have been informally asked to request parcels of the Reservation we want advertised for bid, and expect shortly to receive a formal notice to do so. Parcels requested by interested companies are to be submitted to the BIA, they shall make the final selection of areas and advertise them for bidding to be held 90 days after receipt of the advertisement. During this 90 day period, the advertised parcels will be open to exploration.

A few areas have been applied for so far but no action was taken by the BIA prior to the San Xavier sale; now, however, I believe we can expect a number of areas will be requested for bid.

We can proceed in one of two directions, either: 1) Request Roskruge South be put up for bid at this time, or 2) Not submit any area for bid. Pros and cons of each are discussed below:

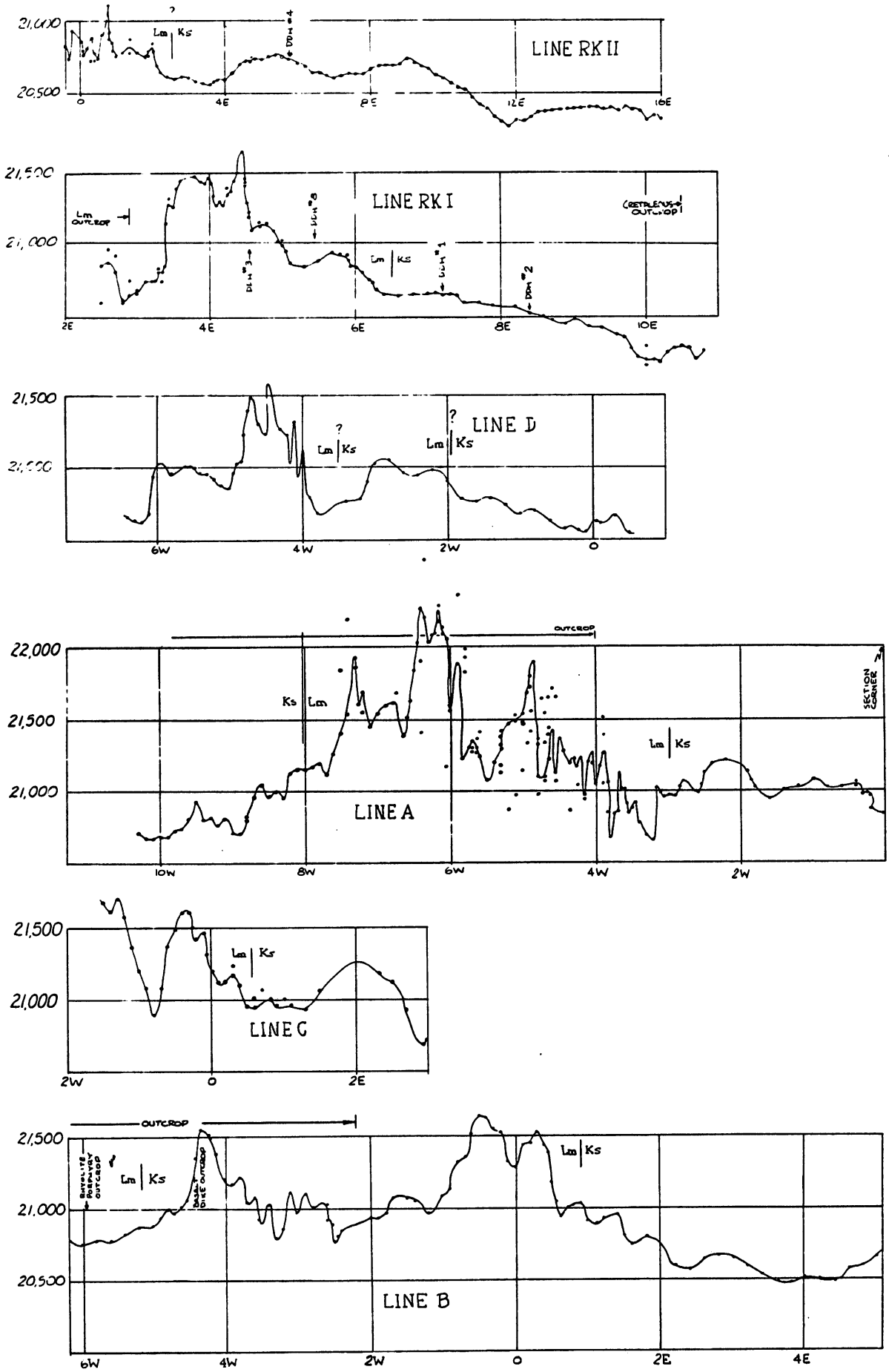
1. If we do submit the Roskruge South area for bid, we will let others know it is an area of interest with positive exploration results, and because of the long time between advertisement and bidding (90 days) others may explore and come up with the same target area we have. However, if we submit a <u>number</u> of parcels, of which only Roskruge South is of interest to us ("smoke screen") other companies will not have time to thoroughly check them all out. We may obtain the target area for a relatively low bid, and will have time this year to drill.

2. If we do not request any areas for bid, one of two things can happen: Someone else will or no one will request the Roskruge South area. If someone else does request it, then we'll have to bid against them, knowing we have competition for that specific area (or could they also be requesting "smoke screen" areas?), and

we will not have the opportunity to request many other areas to throw off our competitors. If no one requests the area, it will not be offered during this bid sale.

I feel there is little chance to negotiate a lease on any area of the Papago Reservation until after bidding takes place. There is a slight chance that since we control adjacent ground at Roskruge South by mining claims, we might be able to negotiate for the Indian land if no one else requests it to be put up for bid.

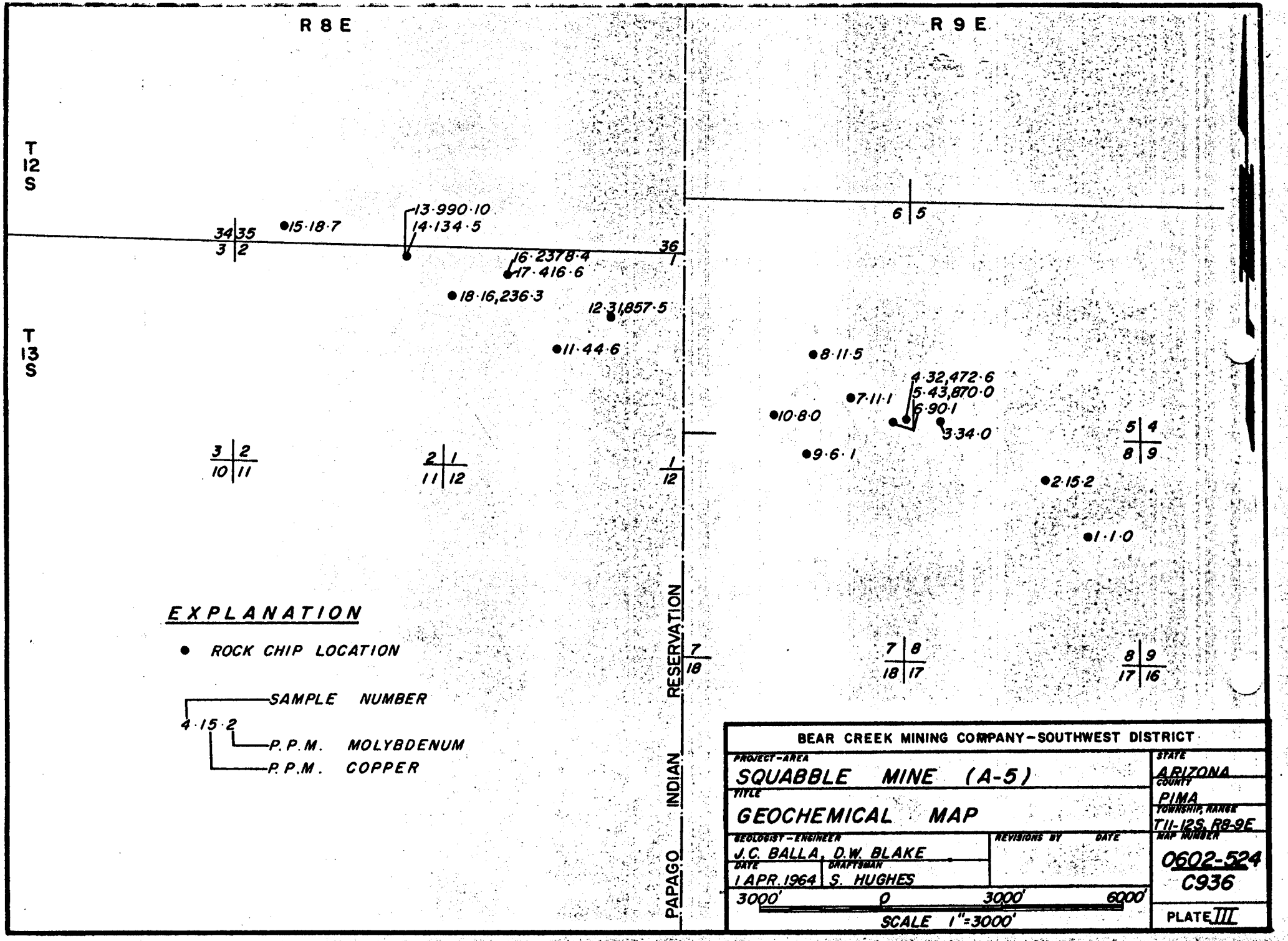
Incidentally, H.R. Eisenbeis, who conducted the original I.P. survey at Roskruge South, now works for Phelps Dodge, who also are very active on the Reservation. Though I don't suspect Dick will point out to Phelps Dodge that Bear Creek Mining Company has an I.P. anomaly, he may hint that this is an area where Phelps Dodge should conduct their own survey.

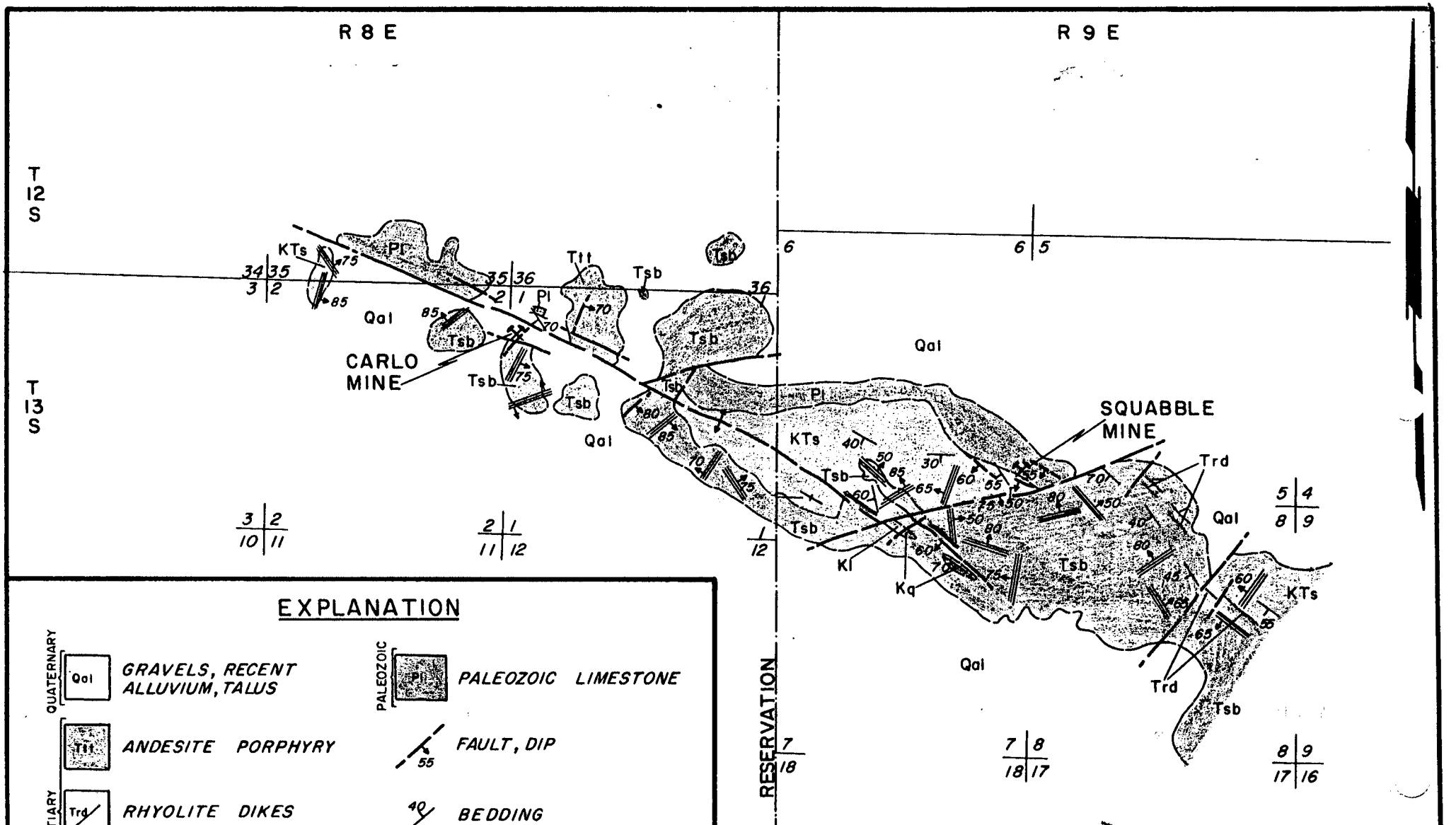


ROSKRUGE SOUTH EXAMINATION
GROUND MAGNETIC PROFILES

HORIZONTAL SCALE 1" = 2000'
VERTICAL SCALE 1" = 1000 GAMMAS

PLATE 3


R 8 E
R 9 E
T 12 S
T 13 S
34 35
3 2
15·18·7
13·990·10
14·134·5
36
1
16·2378·4
17·416·6
18·16,236·3
12·31,857·5
11·44·6
3 2
10 11
2 1
11 12
1
12
7
18
6 5
8·11·5
4·32,472·6
5·43,870·0
6·90·1
7·11·1
10·8·0
3·34·0
9·6·1
5 4
8 9
2·15·2
1·1·0
7 8
18 17
8 9
17 16
PAPAGO INDIAN RESERVATION
EXPLANATION
ROCK CHIP LOCATION
SAMPLE NUMBER
4·15·2
P.P.M. MOLYBDENUM
P.P.M. COPPER
BEAR CREEK MINING COMPANY—SOUTHWEST DISTRICT
PROJECT-AREA
SQUABBLE MINE (A-5)
TITLE
GEOCHEMICAL MAP
GEOLOGIST-ENGINEER
J.C. BALLA, D.W. BLAKE
DATE
1 APR. 1964
DRAFTSMAN
S. HUGHES
REVISIONS BY
DATE
STATE
ARIZONA
COUNTY
PIMA
TOWNSHIP, RANGE
T11-12S, R8-9E
MAP NUMBER
0602-524
C936
3000' 0 3000' 6000'
SCALE 1"=3000'
PLATE III



EXPLANATION

QUATERNARY

- Qal — GRAVELS, RECENT ALLUVIUM, TALUS

TERTIARY

- Tll — ANDESITE PORPHYRY
- Trd — RHYOLITE DIKES
- Tsb — SILVER BELL FORMATION AGGLOMERATE

CRETACEOUS

- Kq / Kl — Kq - QUARTZITE, Kl - LIMESTONE
- KTs — REDBED SANDSTONE

PALEOZOIC

- Pl — PALEOZOIC LIMESTONE

FAULT, DIP (55)

BEDDING (40)

BEDDING, VERTICAL DIP

FRACTURE, SHOWING DIP (75)

FRACTURE, 90°

BEAR CREEK MINING COMPANY – SOUTHWEST DISTRICT	
PROJECT-AREA: SQUABBLE MINE (A-5)	STATE: ARIZONA
TITLE: GEOLOGIC MAP	COUNTY: PIMA
GEOLOGIST-ENGINEER: J.C. BALLA, D.W. BLAKE	TOWNSHIP, RANGE: T11-12S, R8-9E
REVISIONS BY / DATE	MAP NUMBER: 0602-524 / B934
DATE: 1 APR. 1964 — DRAFTSMAN: S. HUGHES	
3000' 0 3000' 6000' SCALE 1" = 3000'	PLATE II

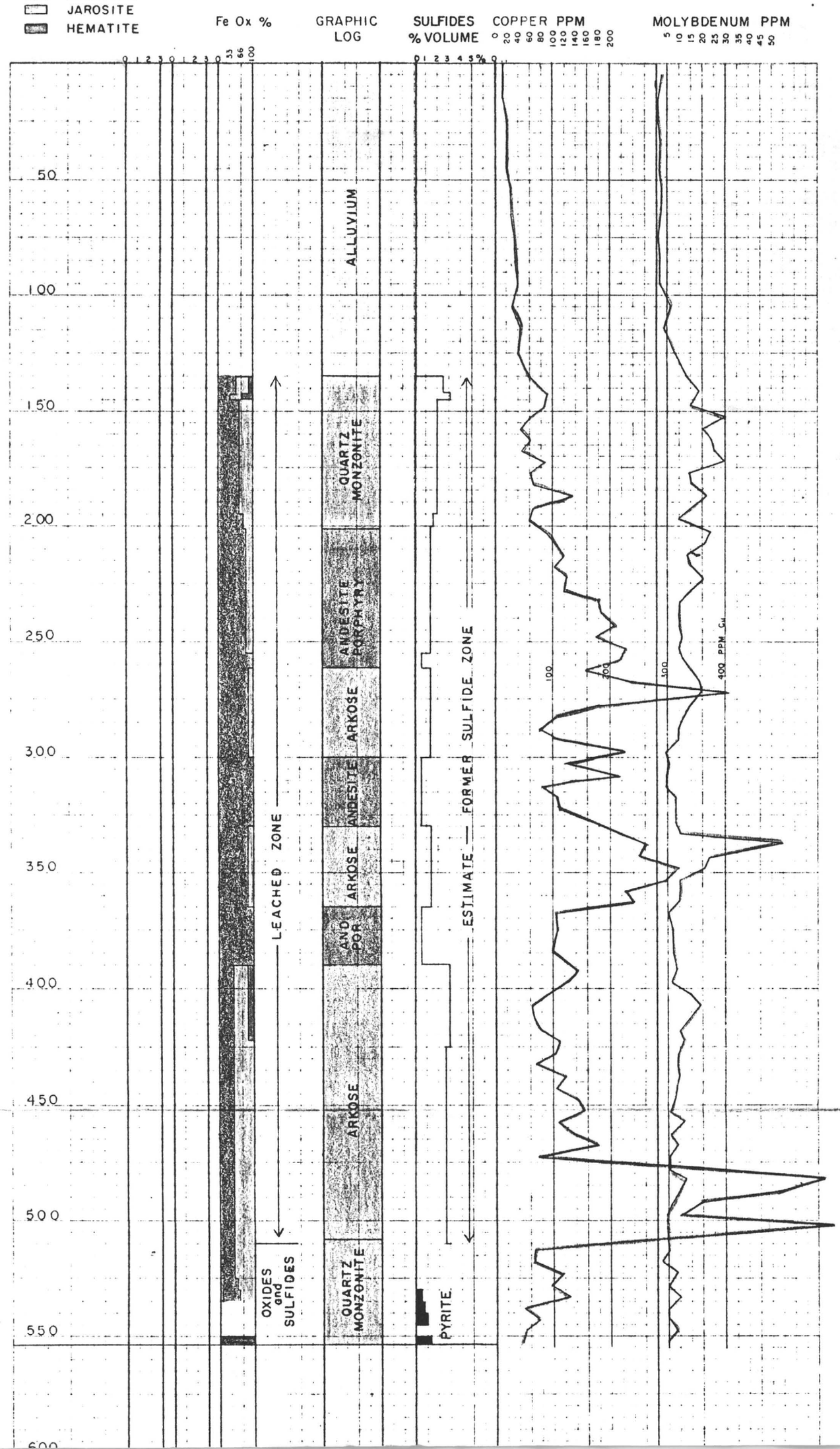
The Roshruge area will be submitted as a Contingent Exam ~~with a budget request of $70,000 to drill 4, 1000 foot drill holes~~ to test an IP anomaly over pediment gravels. Previous drilling demonstrates the anomaly reflects sulfide mineralization. ~~The~~ Because the bulk of the area occurs on The Papago Indian Reservation the Exam status of the area is contingent on successful negotiations with the Indians for a prospecting permit in this area.

DIAMOND DRILL LOG

HOLE NO. RS-1 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION -90 TOTAL DEPTH 554 DATE STARTED 12-21-1966 COMPLETED 1-9-67

STATE ARIZONA COUNTY PIMA MINING DIST. ROSKRUGE COLLAR ELEV. ≈2335

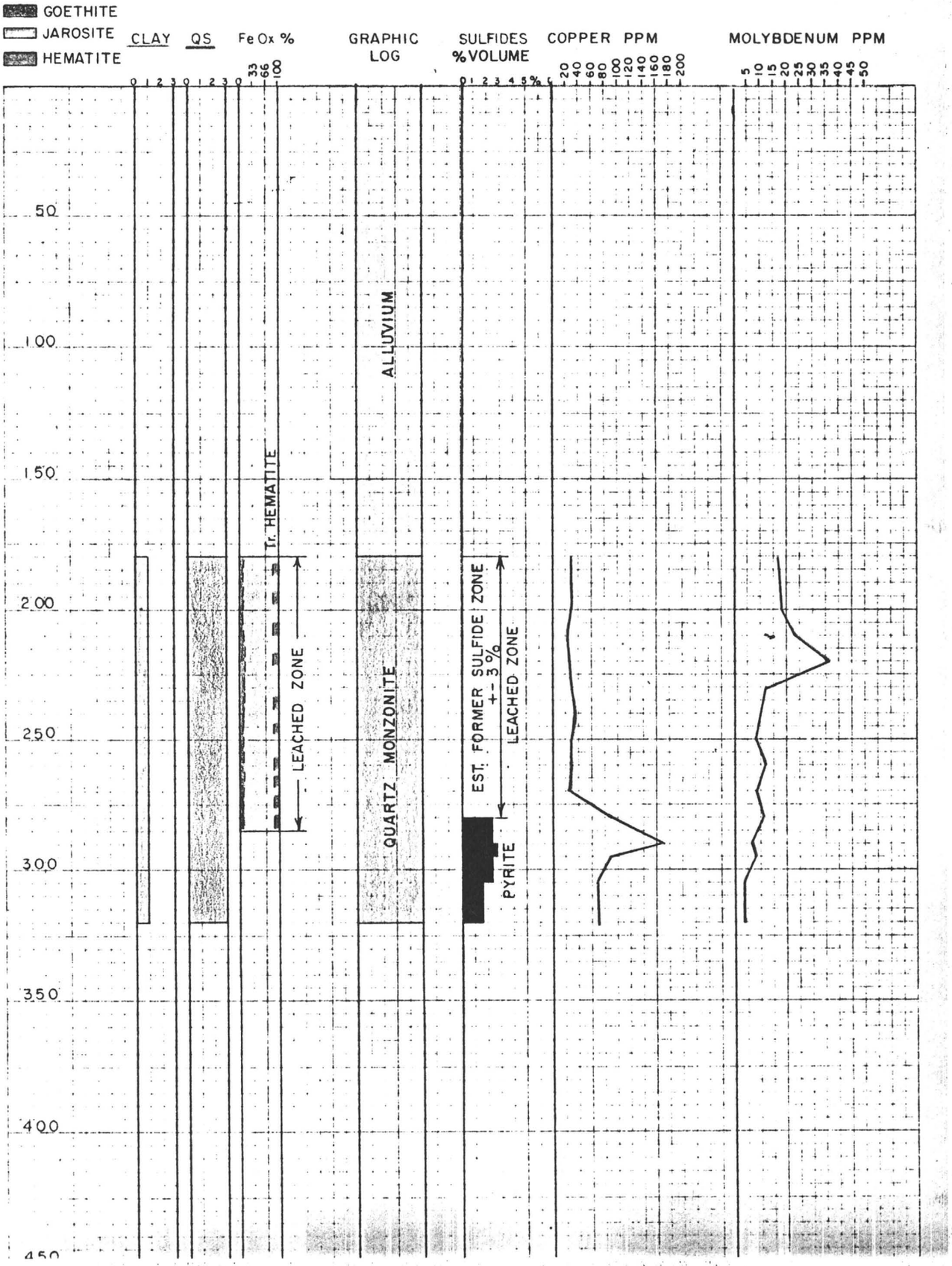


DIAMOND DRILL LOG

HOLE NO. RS-2 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 320 DATE STARTED 2/8/67 COMPLETED 2/9/67

STATE ARIZONA COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335



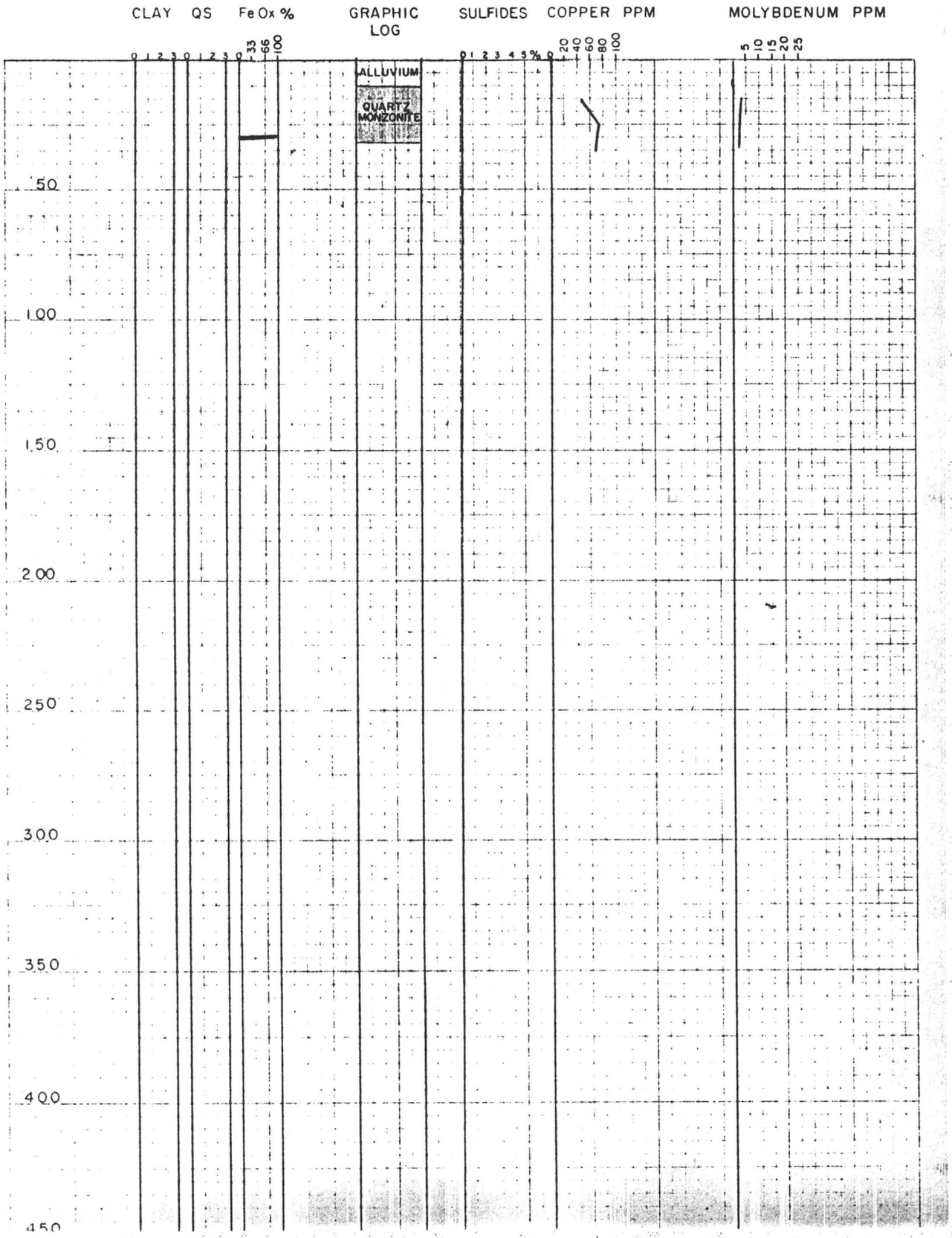
DIAMOND DRILL LOG

HOLE NO. RS-3 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 31.7 DATE STARTED 2/14/67 COMPLETED 2/14/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈ 2335

GOETHITE

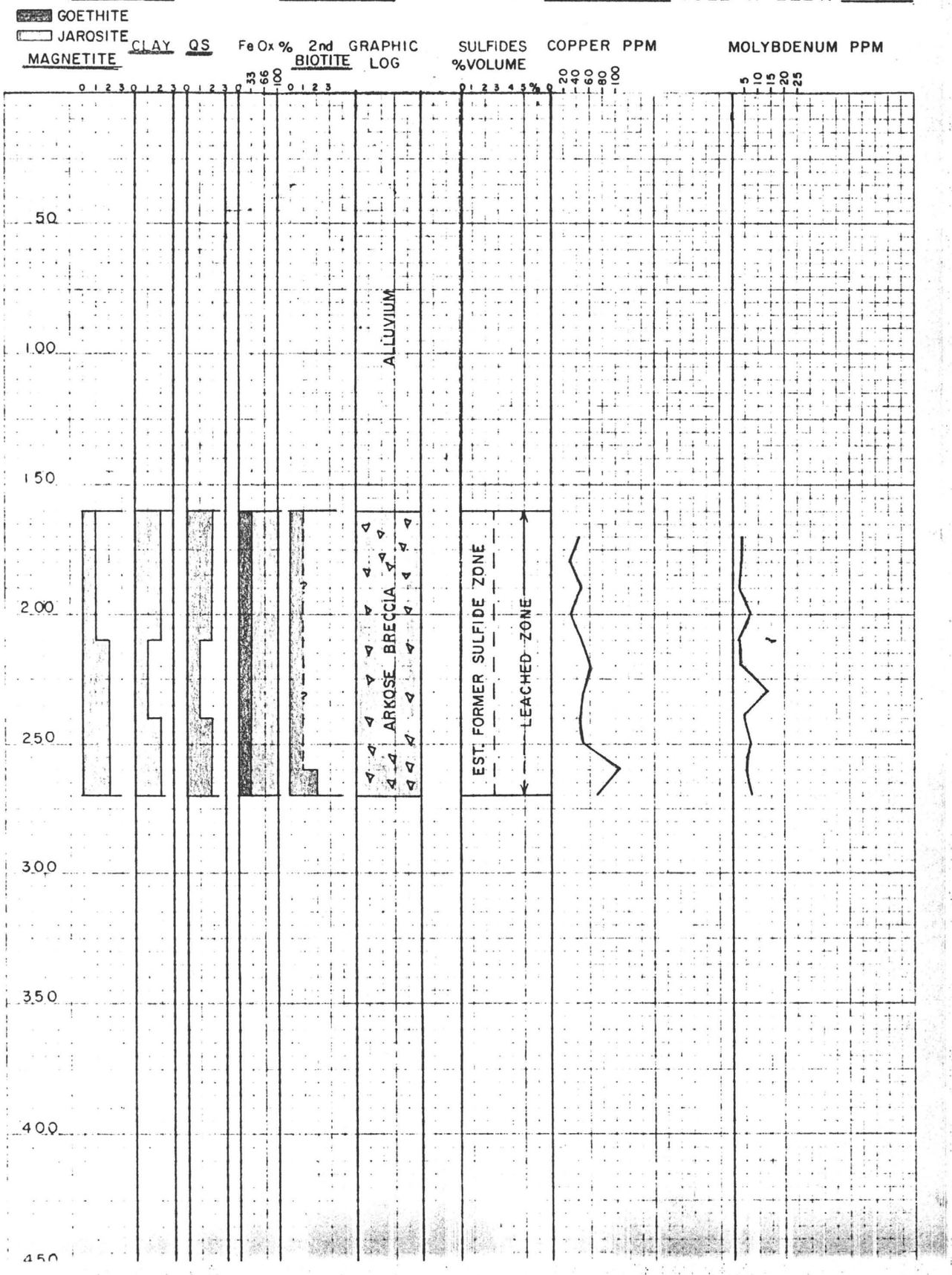


DIAMOND DRILL LOG

HOLE NO. RS-4 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 270 DATE STARTED 2/14/67 COMPLETED 2/16/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

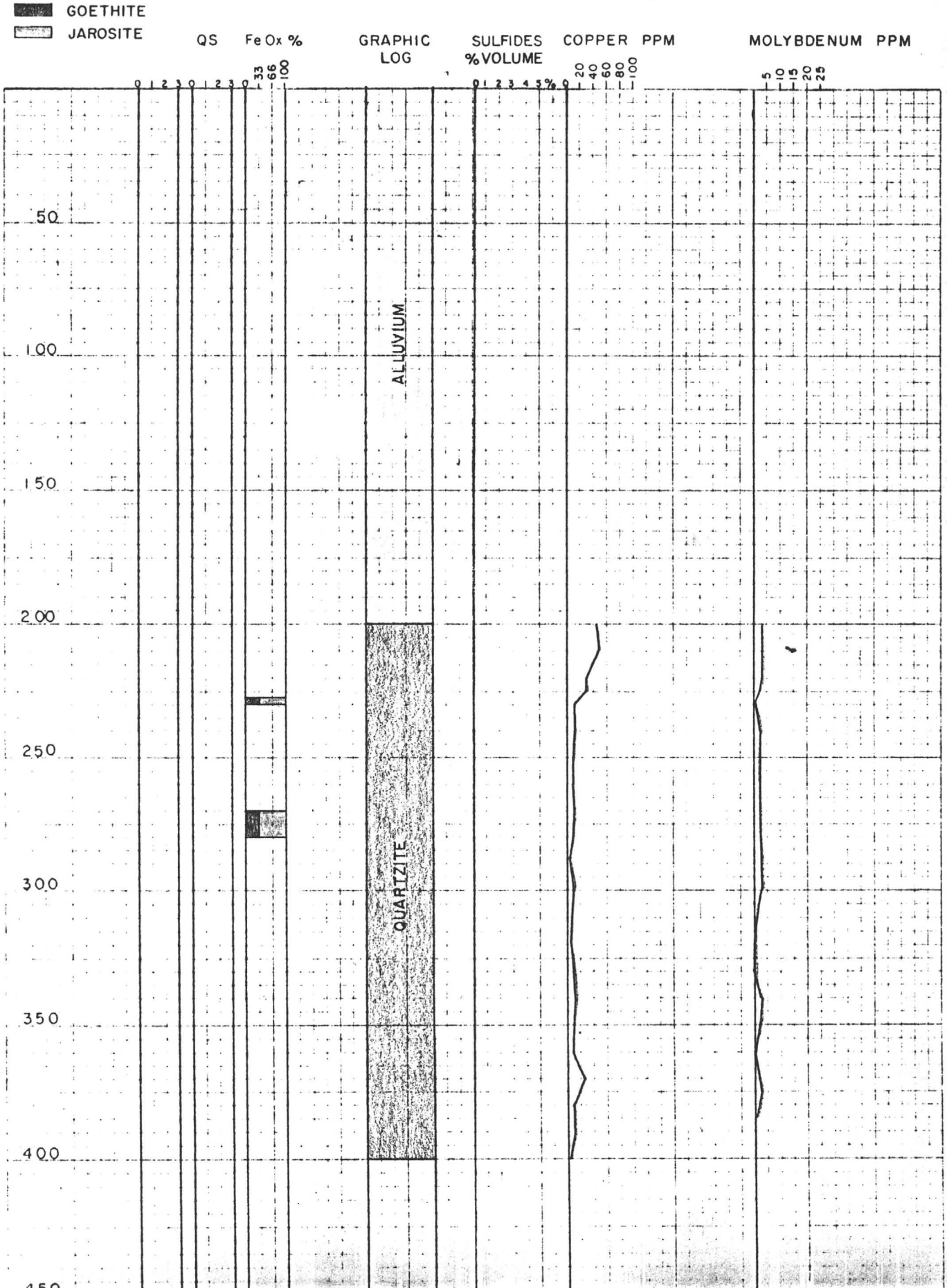


DIAMOND DRILL LOG

HOLE NO. RS-5 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 400 DATE STARTED 2/16/67 COMPLETED 2/17/67

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

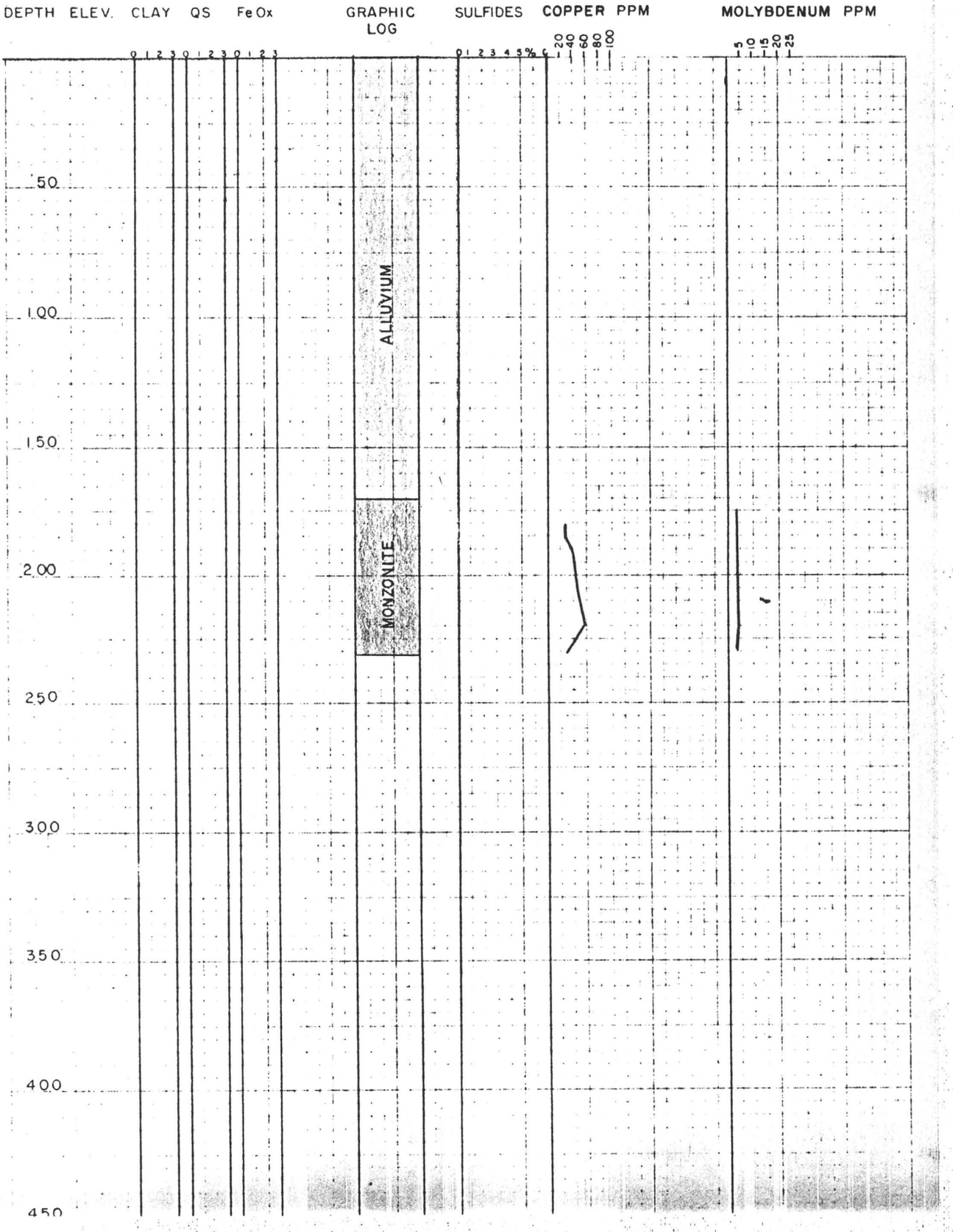


DIAMOND DRILL LOG

HOLE NO. RS-6 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 230 DATE STARTED 2/18/67 COMPLETED 2/20/67

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

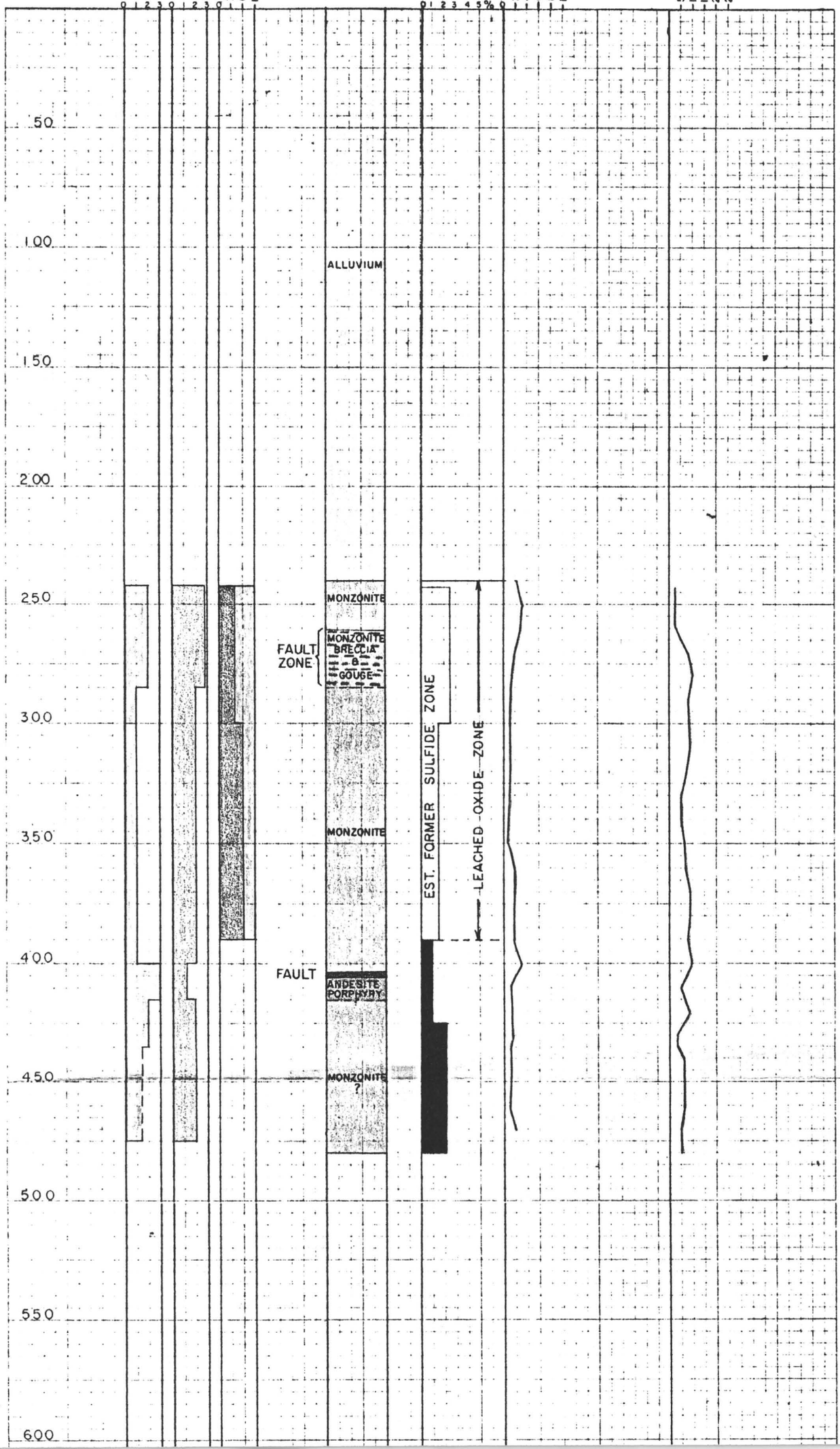


DIAMOND DRILL LOG

HOLE NO. RS-7 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 480 DATE STARTED 2/20/67 COMPLETED 2/22/67

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

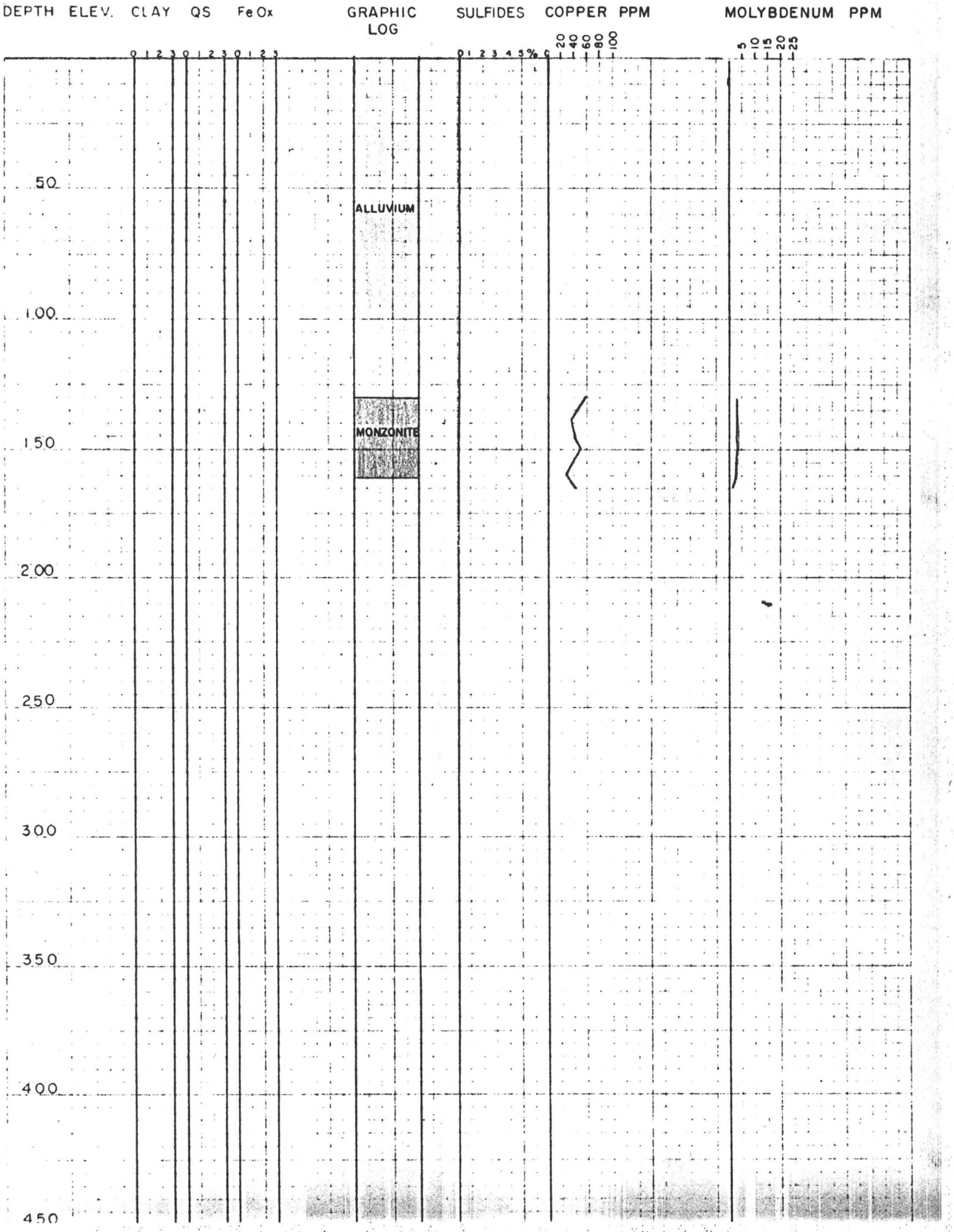


DIAMOND DRILL LOG

HOLE NO. RS-8 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 161 DATE STARTED 2/22/67 COMPLETED 2/24/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

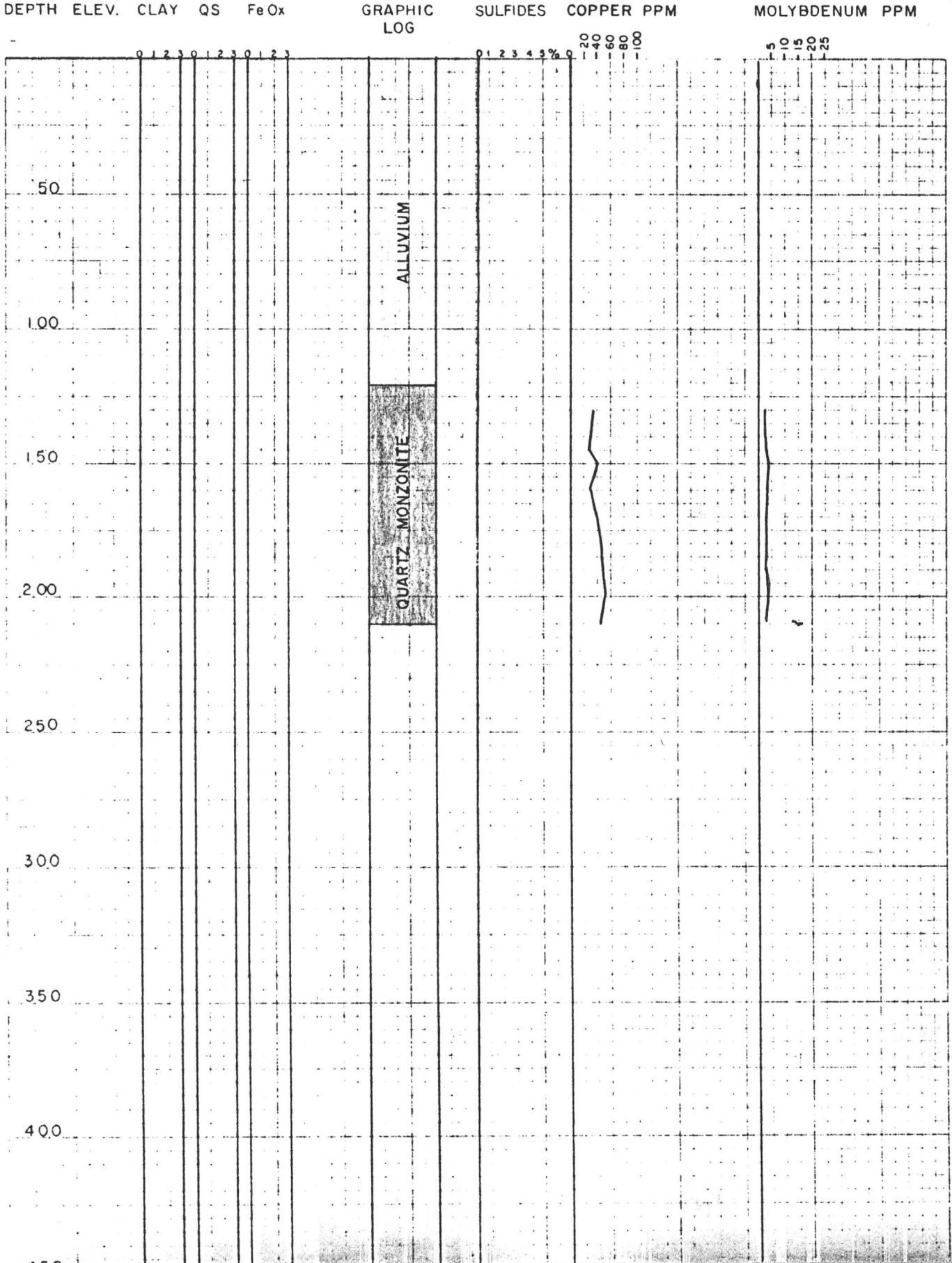


DIAMOND DRILL LOG

HOLE NO. RS-9 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 210 DATE STARTED 2/23/67 COMPLETED 2/24/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

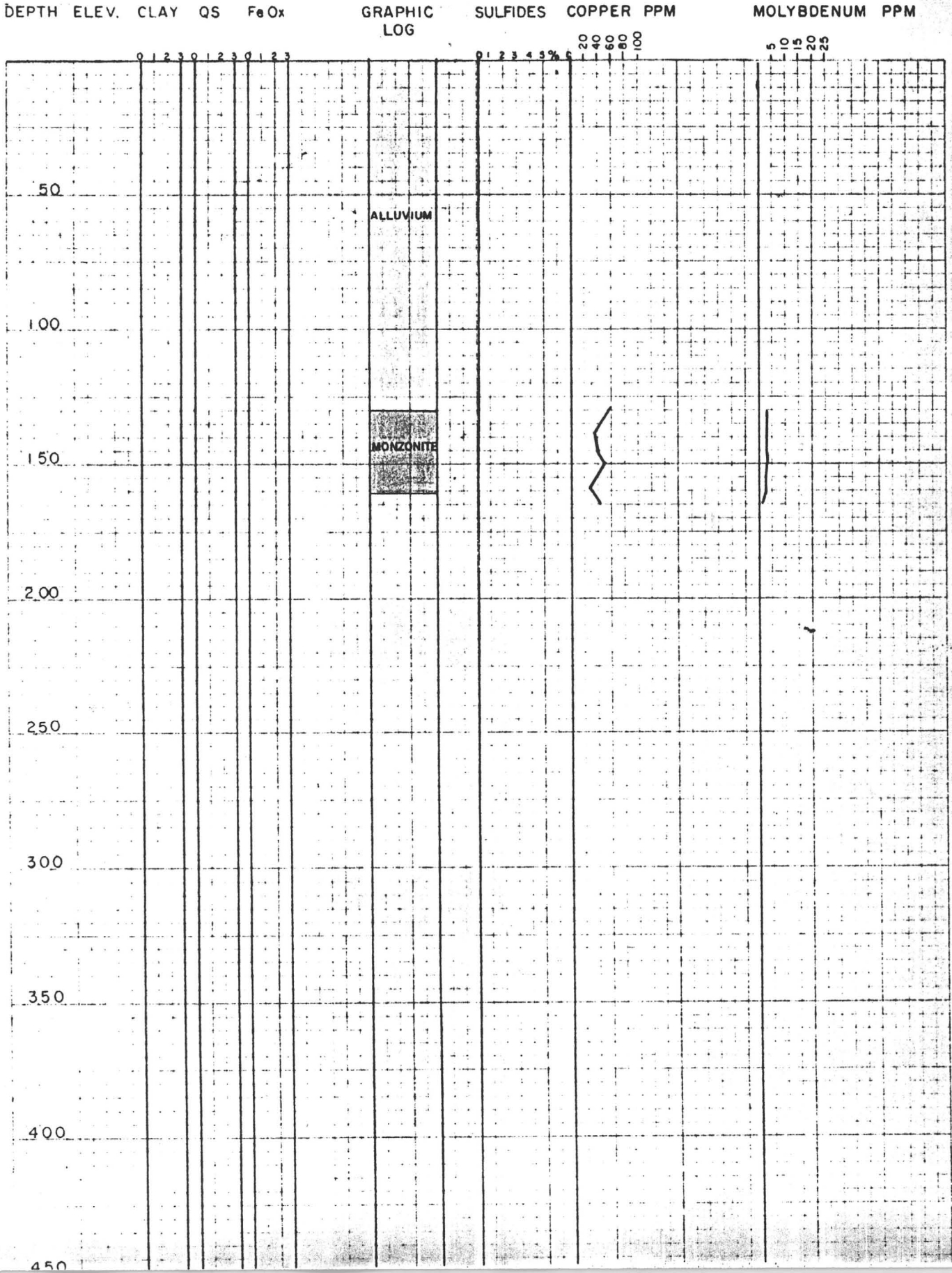


DIAMOND DRILL LOG

HOLE NO. RS-8 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 161 DATE STARTED 2/22/67 COMPLETED 2/24/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

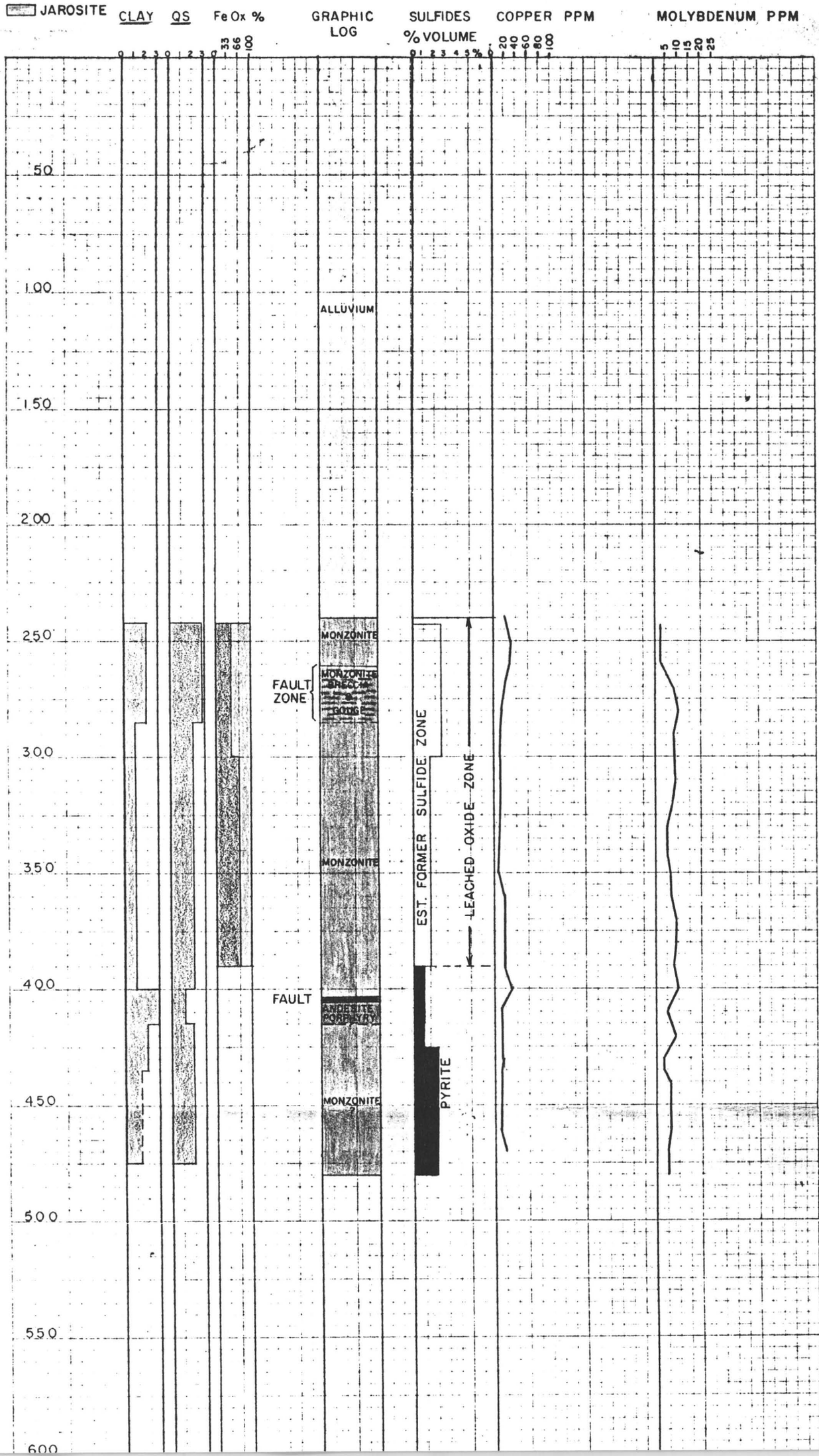


DIAMOND DRILL LOG

HOLE NO. RS-7 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 480 DATE STARTED 2/20/67 COMPLETED 2/22/67

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

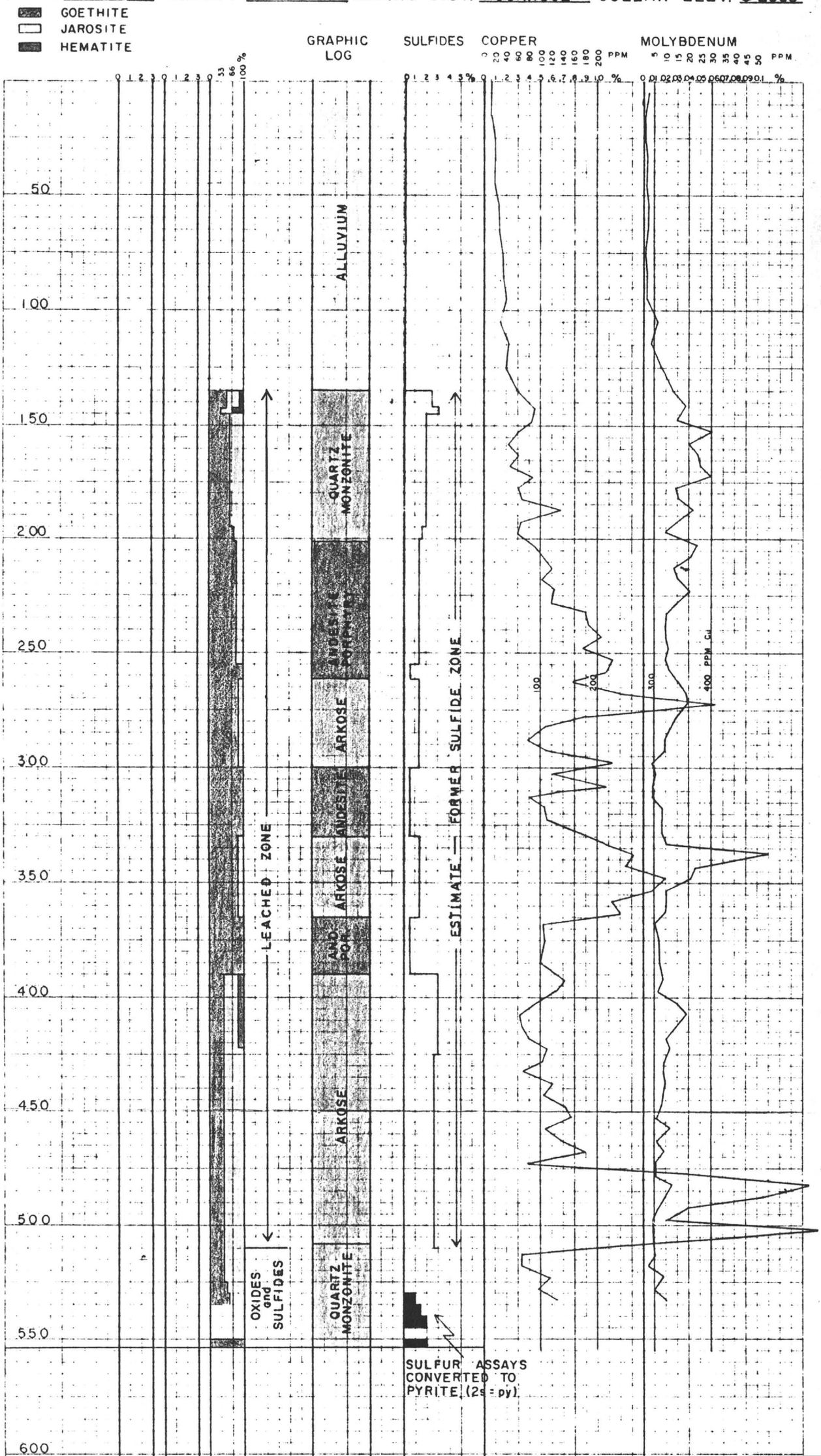


DIAMOND DRILL LOG

HOLE NO. RS-1 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION -90 TOTAL DEPTH _____ DATE STARTED 12-21-1966 COMPLETED 1/9/67

STATE ARIZONA COUNTY PIMA MINING DIST. ROSKRUGE COLLAR ELEV. ≈2335

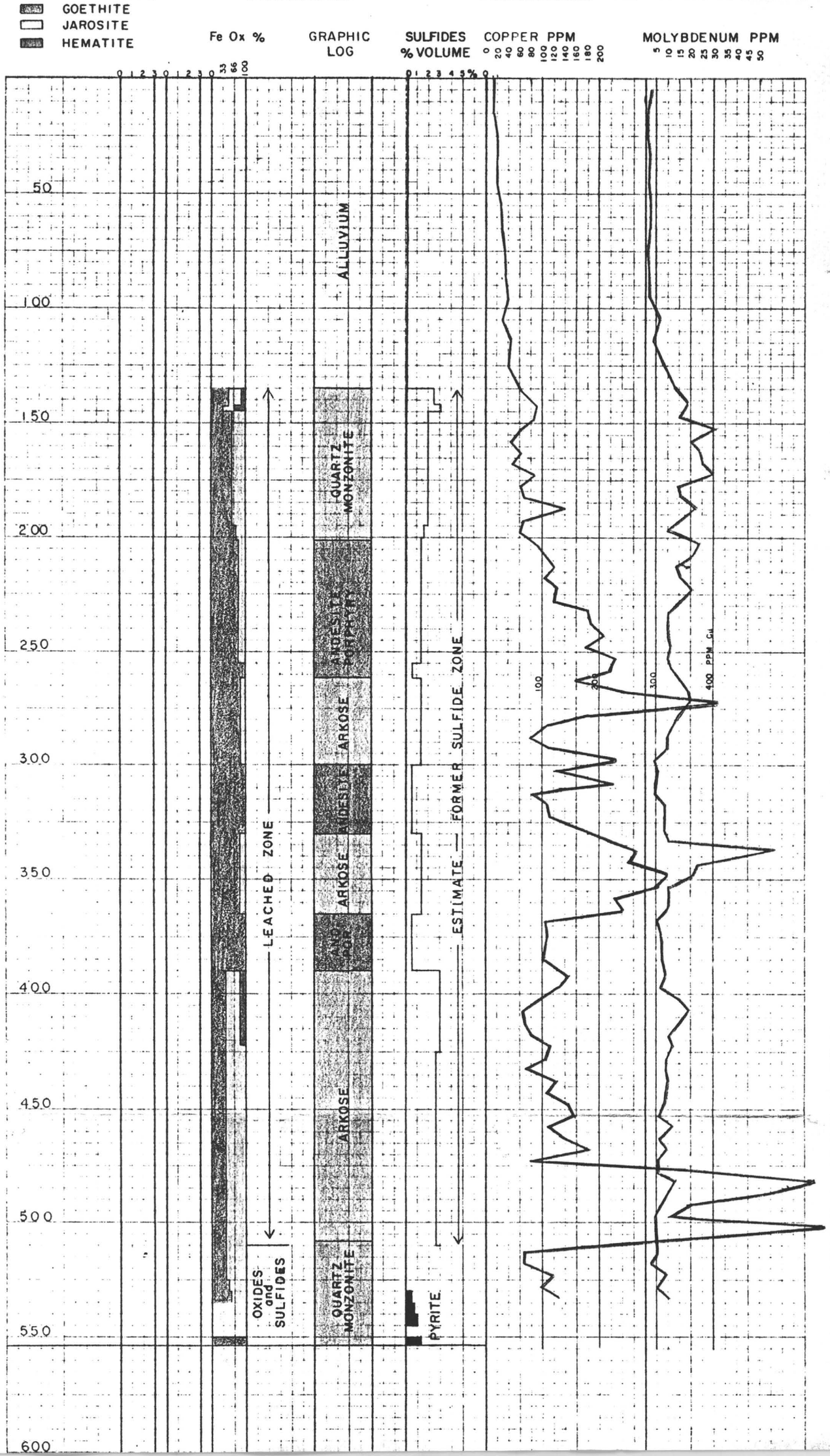


DIAMOND DRILL LOG

HOLE NO. RS-1 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION -90 TOTAL DEPTH _____ DATE STARTED 12-21-1966 COMPLETED _____

STATE ARIZONA COUNTY PIMA MINING DIST. ROSKRUGE COLLAR ELEV. ≈2335

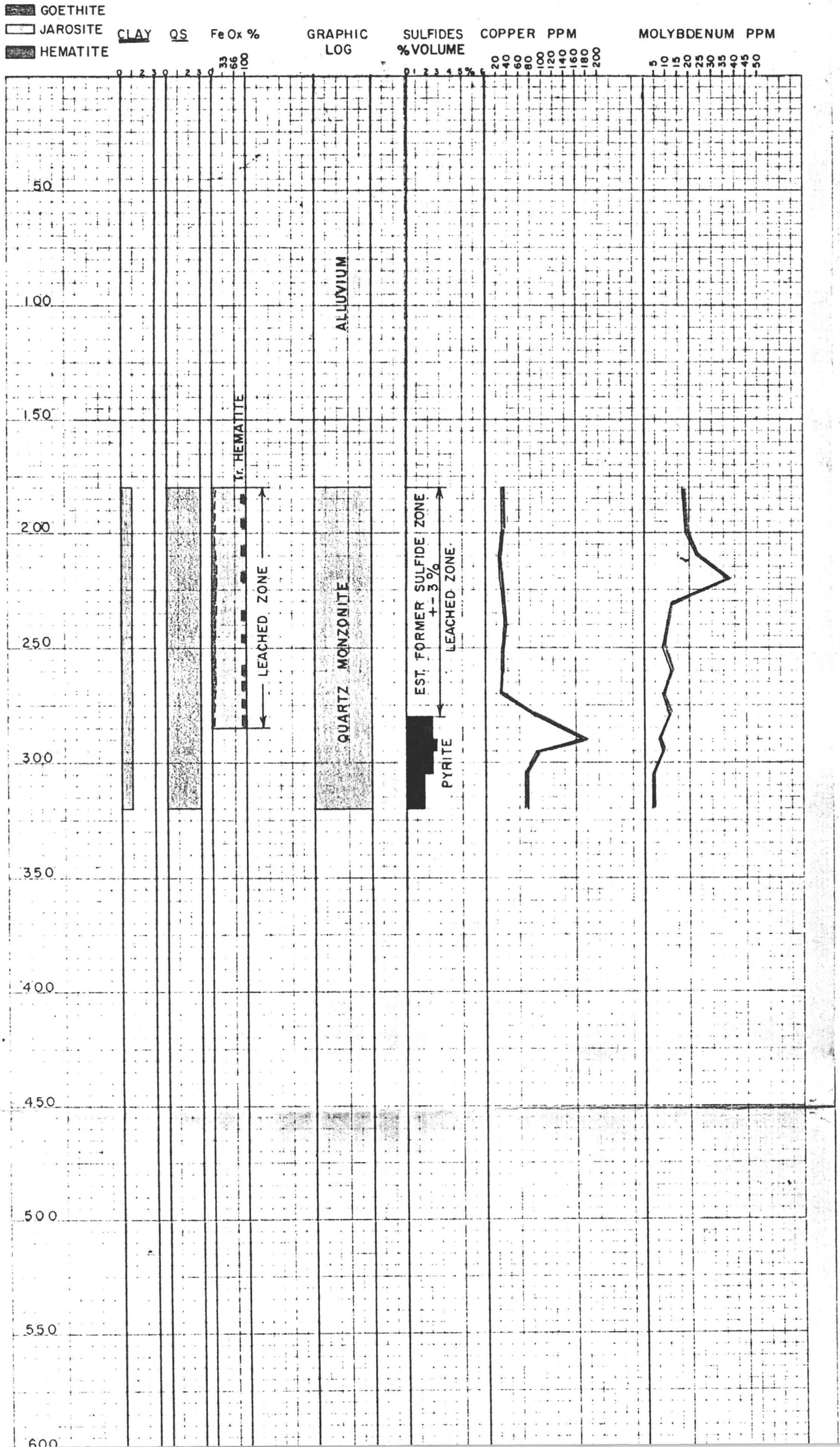


DIAMOND DRILL LOG

HOLE NO. RS-2 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 320 DATE STARTED 2/8/67 COMPLETED 2/9/67

STATE ARIZONA COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335



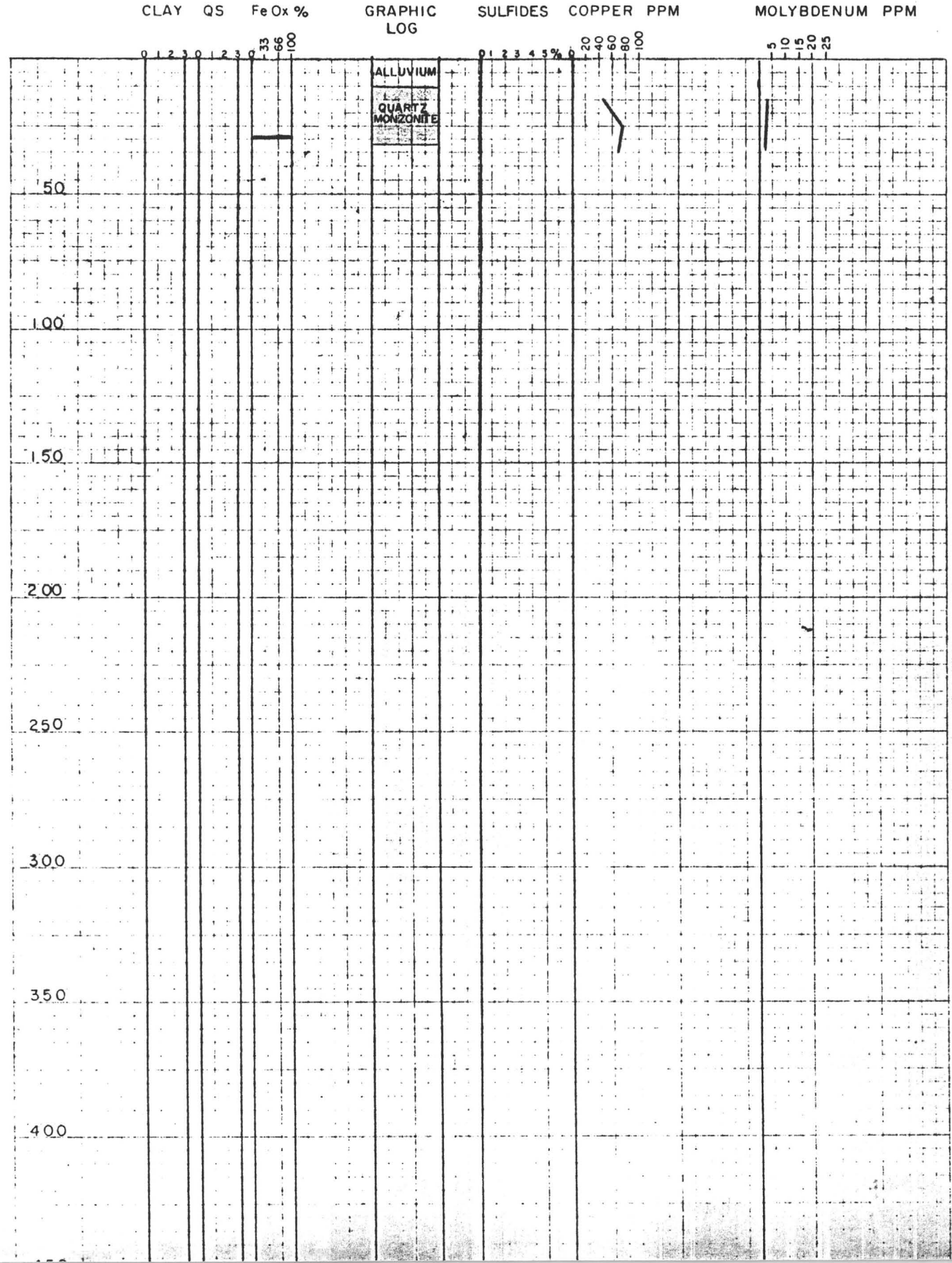
DIAMOND DRILL LOG

HOLE NO. RS-3 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 31.7 DATE STARTED 2/14/67 COMPLETED 2/14/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

GOETHITE

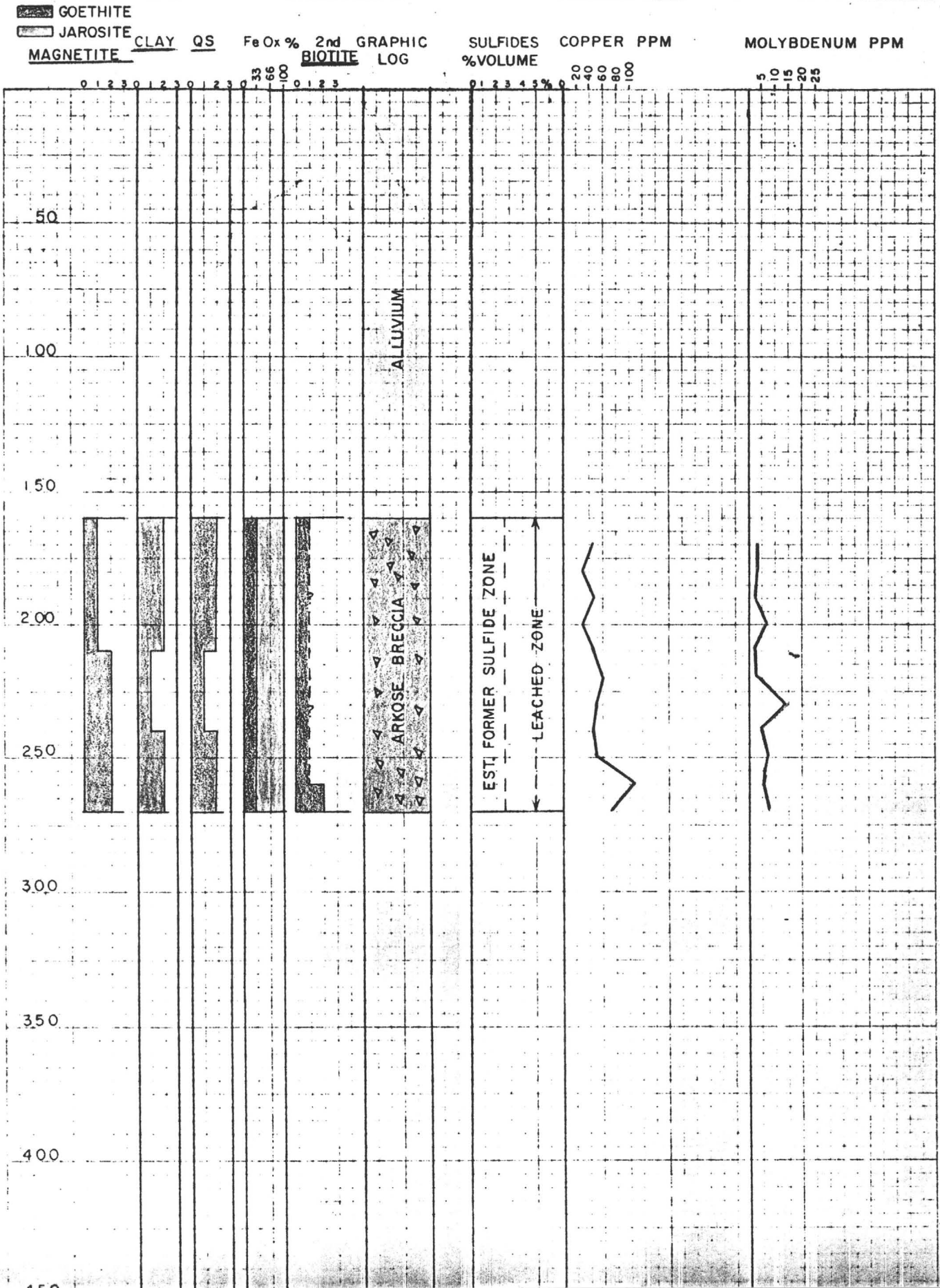


DIAMOND DRILL LOG

HOLE NO. RS-4 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 270 DATE STARTED 2/14/67 COMPLETED 2/16/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

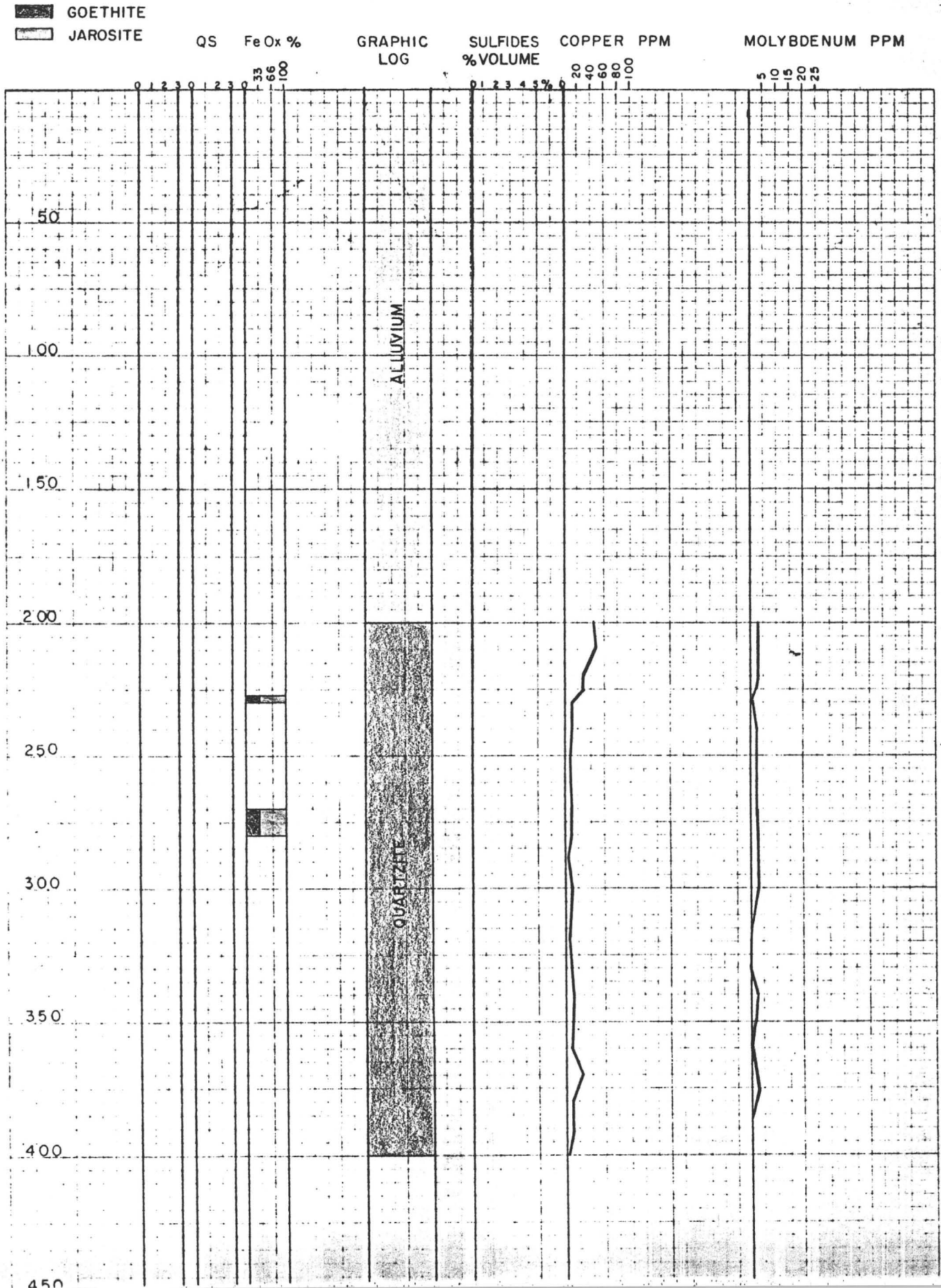


DIAMOND DRILL LOG

HOLE NO. RS-5 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 400 DATE STARTED 2/16/67 COMPLETED _____

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335

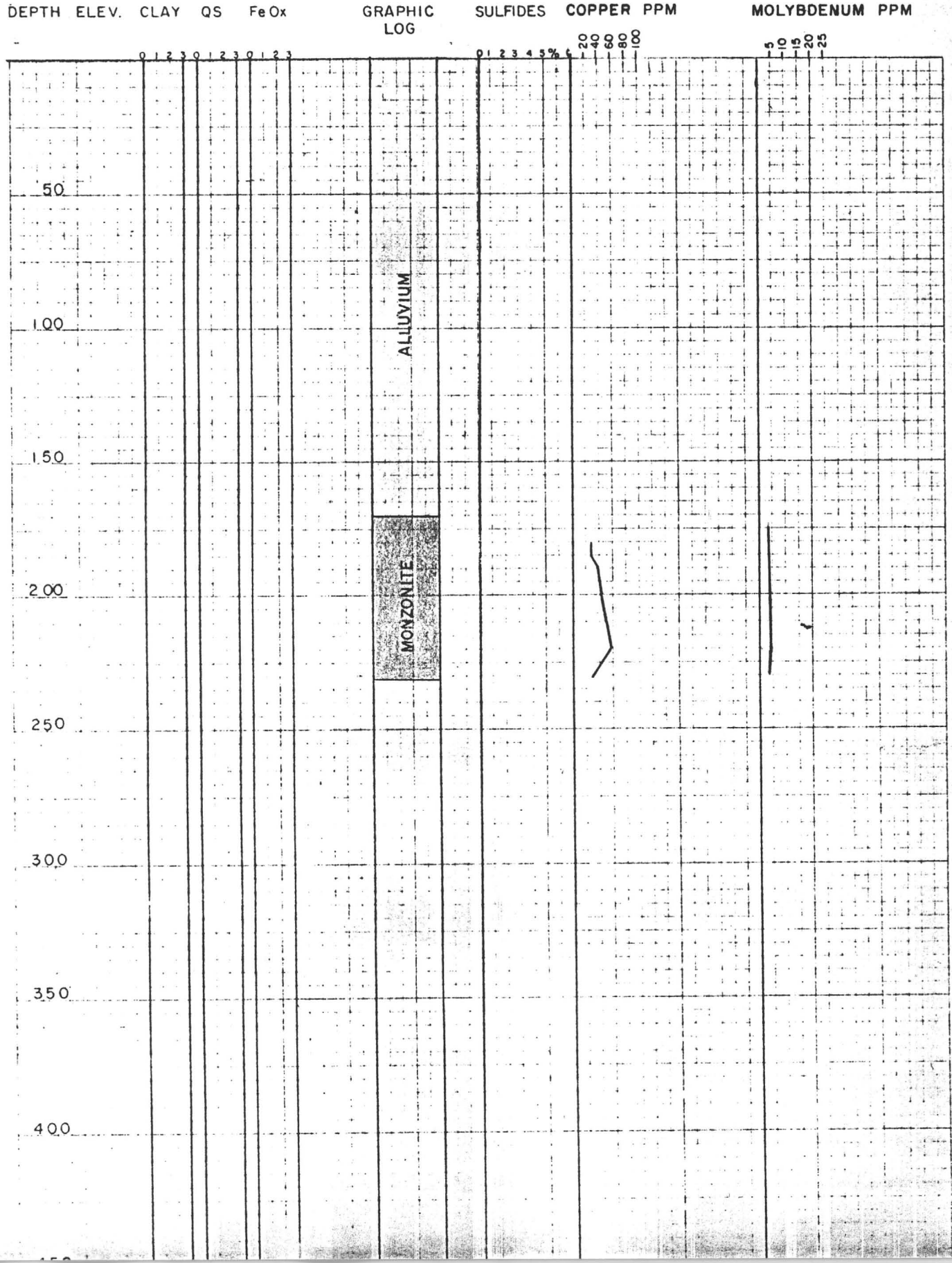


DIAMOND DRILL LOG

HOLE NO. RS-6 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

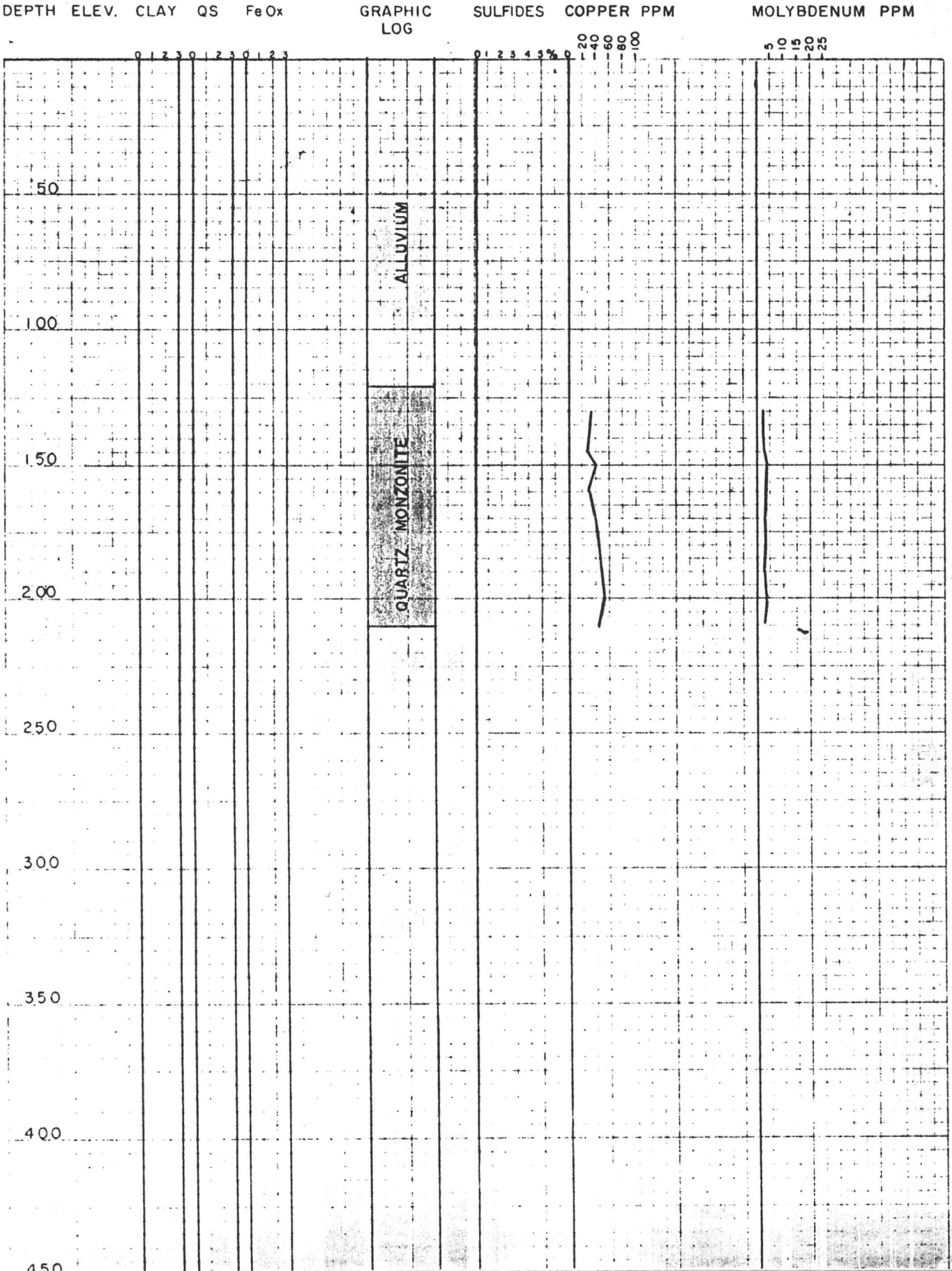
INCLINATION 90° TOTAL DEPTH 230 DATE STARTED 2/18/67 COMPLETED 2/20/67

STATE ARIZ. COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335



DIAMOND DRILL LOG

HOLE NO. RS-9 PROJECT ROSKRUGE SOUTH COORDINATES _____, _____

INCLINATION 90° TOTAL DEPTH 210 DATE STARTED 2/23/67 COMPLETED 2/24/67

STATE ARIZ COUNTY PIMA MINING DIST. _____ COLLAR ELEV. ≈2335