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Mining Records Curator
Arizona Geological Survey
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Tucson, Arizona 85701
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James Doyle Sell Mining Collection

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ASARCO

Exploration Department
Southwestern United States Division

December 27, 1983

Mr. A. Syndbad
P. O. Box 746
Apache Junction, AZ 85220

Ruth Claims
Goldfield Mining District
Pinal County, AZ

Thank you for sending the information on your Ruth Claims. You were right that we would find no gold in our surface and dump samples but we did find an ounce or so of silver in several of the black manganiferous calcites. The information from your drill hole #2 with 2.4 oz. Ag/T between 65 and 95 feet depth was also quite interesting.

However, because of the present low metal prices and "hard times" in the mining industry we did not find enough favorable indications on your property which would warrant additional work by us at this time. However if you develop additional mineralized intercepts by drilling you should certainly bring the property to our attention again in future years.

We wish you luck in the development of your property and hope you have had a Merry Christmas and will have a good 1984. Thank you and Mr. Barrick again for your help.

Very truly yours,

Fleetwood R. Koutz

Fleetwood R. Koutz
Geologist

FRK/cg

cc: JDSell

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703
1150 North 7th Avenue (602) 792-3010

JDS

ASARCO

Southwestern Exploration Division

December 22, 1983

R. L. Brown
New York Office

Ruth Claims (Norwell-Goldfield
Exploration & Mining-A. Syndbad)
Goldfield Mining District
(Apache Junction)
Pinal County, AZ

I submit the report by F. R. Koutz on the inspection and sampling of the area by FRK and me. Also attached is a copy of the material you submitted to me for your reference.

I agree that no large tonnage or significant gold reserves are on the subject property.

Sincerely,

James D. Sell

JDS/cg

Attachments

cc: WLKurtz (w/o attach)
FRKoutz " "

FRANK CULLEN BROPHY
PHOENIX, ARIZONA

46 West Monroe
November 3rd, 1948

TO THE STOCKHOLDERS OF THE SANTA MARIA EXPLORATION COMPANY:

The following is the result of drill hole No. 1 on the ground of the Santa Maria Exploration Company:

1. The primary purpose of this hole was to do the assessment work for the period beginning July 1st, 1948, and ending July 1st, 1949. Therefore it will be unnecessary to do additional assessment work until about May, 1950, should we decide to defer further exploration to that date.

2. It had been hoped that the exploration in this hole would give some evidence concerning the potentialities of our property. Broadly speaking, the results of our drilling were negative. The hole was located on the side line between Santa Maria claims Nos. 37 and 38 - 634 feet from the southeast corner which adjoins the ground of the Anaconda Copper Company. The elevation at the point of drilling was 2909.7 feet. The hole was spudded on June 17th, 1948, and drilling stopped on July 30th, 1948. The first water was struck at 475 feet but did not rise in the hole. The second water was reached at approximately 700 feet and rose to 375 feet. The ordinary surface conglomerate which covers this whole area ended at 785 feet. The hole then entered a typical reddish material which our engineer has classified as an andesite flow. At about 900 feet the water began to get hot with a temperature of 135 degrees recorded. This hole was continued with a 13-1/2" bit to a depth of 1,560 feet in approximately the same formation. At this point a ten inch bit was used to continue the drilling to a depth of 2144 feet, all in approximately the same formation. During the last 100 feet the formation softened considerably so that to proceed to greater depth will require casing. Character samples were taken at ten foot intervals from 500 feet down. Character samples for the first five hundred feet were taken at intervals of 20 - 30 feet.

The material at 2040 feet was analysed and showed traces of gold and silver, while copper was negligible. At 2140 feet the sample showed 0.005 Gold, and silver of 2/10 oz; copper negligible. This indicates insufficient mineralization for practical purposes. It is the opinion of our consulting engineer, Morris Elsing, that we did not succeed in getting through the andesite flow in which no basic mineralization can be expected, and he is anxious that we continue the hole at some future time. When future assessment work is required, the matter will have to be carefully considered to see whether we shall proceed along the lines of this suggestion or drill at some other location. Mr. Elsing considers the fact that we did not strike into an ore body at this point of no great significance, and he has expressed the opinion that the value of the property is still a matter of conjecture. For his services, Mr. Elsing accepted stock in lieu of cash, and has sufficient confidence to desire to continue on that basis.

3. Work goes on at the Magma property where a four-compartment shaft is being sunk; and the development of the San Manuel ore body is definitely on its way. There is no work that I know of being done at the Anaconda property. There have been rumors that the Anaconda Copper Company has been discouraged with some of

the later drilling. These, however, are merely rumors and must be regarded as such.

4. I propose to keep our shareholders periodically advised of all progress in the district, and will forward immediately any views that may have a bearing on the value of our property.

Truly yours,

Frank C. Brophy

Frank C. Brophy:j

Santa Maria Exploration Company
Churn hole #1
Location: SE¼SW¼SE¼ sec. 25, T. 8 S., R. 16 E.

Following notes by Mr. Morris Elsing, Tucson: Analyses by Otis B. Coulson

Elev. of tower - 2,909.7
Hole spudded in June 7, 1948
Hole stopped July 30, 1948
First water struck at 475 ft.
Second water struck at approx. 700 ft. Rose to approx. 375'.
Ordinary conglomerate ended at 785 ft. Hole then entered red material.
Hole drilled with 13¾-in. bit to 1,560'.
Drilling continued to 2,144 ft. with 10-in. bit.

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
90	Gray, lt. pink, red-brown	Subangular, few angular	Granite, trachite, feldspar felsite, quartz	Granite, feldspar, quartz, biotite, felsite	Prob. alluvial material from volcanic & intrusive source rocks. Pebbles 65%, sand and granules 35%.
120	do.	Subangular	Mostly granite, little felsite, quartz, feldspar	do., but mostly granite	do., but mostly intrusive source rock.
150	do.	do.	Granite, feldsite, quartz, feldspar	Granite, feldspar, quartz, felsite, biotite	Prob. alluvial material from volcanic & intrusive source rocks.
180	Lt.brown	do.	do.	do.	do.
220	do.	do.	do.	do.	do.
250	do.	do.	do., but mostly granite	do., mostly granite	do., predominantly from intrusive source rocks.
280	lt. pink-ish brown	do.	do.	do.	do.
320	do.	do.	do.	do.	do.
350	do.	do.	do.	do.	do.
380	do.	do.	do.	do.	do.

Santa Maria Exploration Company
Churn hole #1 - Cont. by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
420	lt. pink-ish brown	Subangular	Granite, felsite, quartz, feldspar, also little tuff but mostly granite	Granite, feldspar, quartz, felsite, biotite but mostly granite	Prob. alluvial material from volcanic & intrusive source rocks. Mostly from intrusive source rocks.
460	do.	do.	do., no tuff	do.	do.
500	do.	do.	do.	do.	do.
530	do.	do.	do.	do.	do.
550	do.	do.	do.	do.	do.
575	do.	do.	do.	do.	do.
600	do.	do.	Granite, feldspar, quartz, felsite	Mostly granitic material, some felsite, quartz, feldspar	Prob. alluvial material, mostly from intrusive but some from volcanic source rocks.
625	do.	do.	do.	do.	do.
650	do.	do.	do.	do.	do.
675	do.	do.	do., also little tuff (?)	Granite, felsite, quartz, feldspar, biotite.	Prob. alluvial material from intrusive & volcanic source rocks.
700	do.	do.	do., mostly granitic	do., mostly granitic.	do., but mostly from intrusive source rock.
725	do.	do.	granite, feldspar, quartz, felsites	Granite, felsites, quartz, feldspar, biotite	Prob. alluvial material from intursive & volcanic source rocks.
750	lt.brown	do.	do.	do.	do.

Santa Maria Exploration Company
Churn hole #1 - Cont. by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
775	brown	Subangular	volcanics mostly, little quartz	volcanics mostly, little quartz and feldspar	Prob. mostly alluvial material from volcanic source rocks, possibly little intrusive.
800	do.	do.	do.	do.	do.
825	do.	do. few rounded	do., little feldspar	do.	do.
850	do.	do.	do.	do.	do.
875	do.	do.	do.	do.	do.
900	Red-brown	Subangular	Felsites mostly, little quartz	do.	Prob. alluvial material from volcanic source rocks
920	do.	do.	do.	do.	do.
940	do.	do.	do., also feldspar	do.	do.
960	do.	do.	do.	do., little epidote and magnetite	do.
980	do.	do.	do.	do.	do.
1000	do.	do.	Felsite mostly, little quartz and feldspar	Felsite mostly, little quartz, epidote, limonite, magnetite, feldspar	do.
1020	do.	do.	do.	do.	do.
1040	do.	do.	do., little granite	do.	do., possibly also a little from intrusive source rock.

Santa Maria Exploration Company
Churn hole #1 - Cont. by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
1060	Red-brown	Subangular	Felsite mostly and feldspar, little quartz	Felsite mostly, little quartz, epidote, limonite, magnetite, feldspar	Prob. alluvial material from volcanic source rocks.
1080	do.	do.	do.	do.	do.
1100	do.	do.	do., possibly little granite	do.	do., also possibly little from intrusive source rock.
1120	do.	do.	do.	do.	do.
1140	do.	do.	do.	do.	do.
1160	do.	do.	do., little calcite	do.	do.
1180	do.	do.	do.	do.	do.
1200	do.	do.	do.	do.	do.
1220	do.	do.	do.	do.	do.
1240	do.	do.	do.	do.	do.
1260	do.5	do.	Felsite	do.	Prob. alluvial material from volcanic source rock.
1280	do.	do.	do., little quartz	do.	do.
1300	do.	do.	do.	do.	do.
1320	do.	do.	do.	do.	do.
1340	do.	do.	do.	do.	do.

Santa Maria Exploration Company
Churn hole #1 - Cont. by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
1360	Red-brown	Subangular	Felsite, little quartz	Felsite mostly, little quartz, feldspar, epidote magnetite	Prob. alluvial material from volcanic source rock.
1380	do.	do.	do.	do.	do.
1400	do.	do.	do.	do.	do.
1420	do.	do.	do.	do.	do.
1430	do.	Subangular, few rounded	Felsite	Felsite mostly, also calcite, quartz, feldspar, granite	Prob. alluvial material, coarse sand 60%, granules 40%. Volcanic source rocks and intrusive source rocks.
1450	do.	Subangular	do., also a little quartz and feldspar	do., but no calcite	Prob. alluvial material from volcanic source rocks.
1470	do.	do.	do.	do., also a little chlorite & quite a lot of magnetite	do.
1490	do.	do.	do.	do., also a little biotite	do.
1510	do.	do.	do.	do.	do.
1530	do.	do.	do.	do.	do., mostly sand, few granules.
1550	do.	do.	do.	do.	Prob. alluvial material from volcanic source rocks, and a little from intrusive source.

Santa Maria Exploration Company
Churn hole #1 - Cont. by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
1570	Red-brown	Subangular	Felsite, also a little quartz and feldspar	Felsite mostly, also calcite, quartz, feldspar a little biotite & a little epidote staining. A little chlorite and quite a lot of magnetite.	Prob. alluvial material from volcanic source rocks, and a little from intrusive source rocks. Sand 65%, granules 35%
1590	do.	do.	do.	do., also little limonite staining	do.
1610	do.	do.	do.	do.	do.
1630	do.	do.	do.	do.	do.
1650	do.	do.	do.	do.	do.
1670	do.	do.	do.	do.	do.
1690	do.	do.	do.	do.	Prob. alluvial material from volcanic source rock.
1710	do.	do.	do.	do.	do.
1730	do.	do.	do.	do.	do.
1750	do.	do.	Felsite mostly, little quartz	Mostly felsite, some magnetite, little feldspar, epidote, biotite, limonite, chlorite, quartz, calcite.	Prob. alluvial material from volcanic source rocks.
1770	do.	do.	do.	do.	do.
1790	do.	do.	do.	do.	do.

Santa Maria Exploration Company
Churn hole #1 - Cont.

by Otis B. Coulson

Depth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
1810	Red-brown	Subangular	Felsite mostly, little quartz, also little feldspar	Mostly felsite, some magnetite, little feldspar, epidote, biotite, limonite, chlorite, quartz, calcite.	Prob. alluvial material from volcanic source rocks.
1830	do.	do.	do., but no feldspar	do.	do.
1850	do.	do.	Felsite and felsite porphyry	do., also some felsite porphyry	Prob. alluvial material from volcanic source rocks
1860	do.	do.	Felsite mostly, little quartz	do., but no felsite porphyry	Prob. alluvial material from volcanic source rocks.
1870	do.	do.	do.	do.	do.
1890	do.	do.	do.	do.	do.
1910	do.	do., few rounded	do.	do.	do.
1930	do.	do.	do., little feldspar	do.	do.
1950	do.	do.	do., a little quartzite(?)	do., a little quartzite(?)	do., possibly also from quartzite(?) source rocks.
1960	do.	do.	do.	do.	do., good rounding even on a few of quartz pebbles, shows the alluvial origin.

epth	Color	Angularity	Composition over 2 mm.	Composition under 2 mm.	Remarks
70	Red-brown	Subangular, some rounded	Felsite, some feldspar, little quartz	Mostly felsite, some magnetite, little feldspar, epidote, biotite, limonite, chlorite, quartz, calcite	Prob. alluvial material from volcanic source rocks, several different types volcanic rocks.
90	do.	do.	Quartz	do.	do., even few of quartz grains rounded. 95% sand, 5% granules.
10	do.	do.	Felsite, some quartz	do.	do.
30	do.	do.	do.	do.	do., but sand 80%, pebbles 20%
50	do.	do., few angular	do., also rhyolite, granite, feldspar	do.	do., granules 50%, sand 50%. Possibly little of material from intrusive source.
70	do.	Subangular, some rounded	Mostly felsite, little quartz, feldspar	Mostly felsite, some magnetite, little feldspar, epidote, chlorite, biotite, limonite	Prob. alluvial material from volcanic source rock.
90	do.	do.	do.	do.	do.
10	do.	do.	None present	do.	do.
30	do.	do.	Felsite	do.	do., sand 95%, granules 5%.
5(?)	do.	do.	do., feldspar, little granite	do., little calcite	Prob. alluvial material from volcanic source rock, and possibly also intrusive

Santa Maria #1

The lower 300 feet of these samples is considered to be alluvial material. This opinion is based on the following facts:

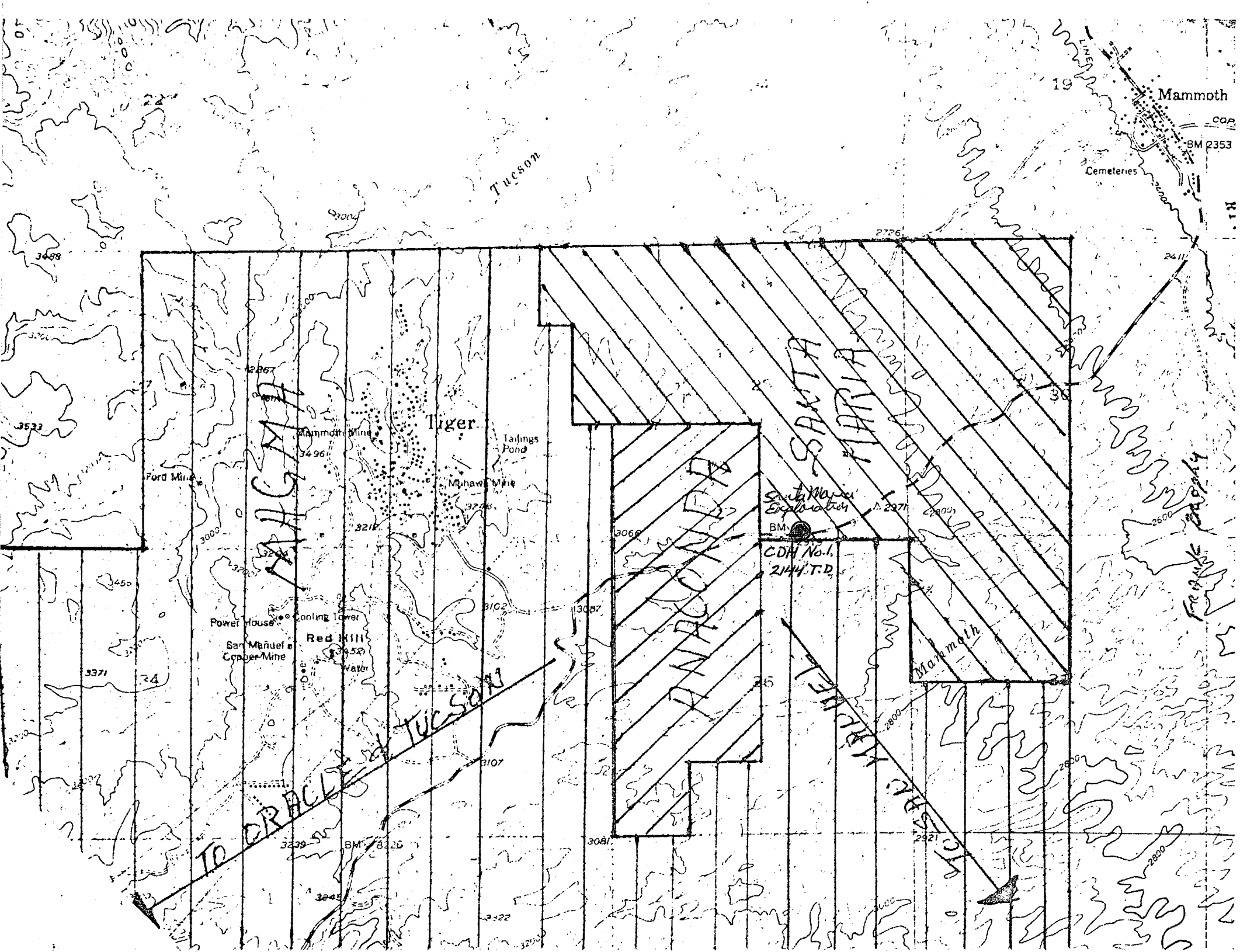
(1) The individual grains or pebbles are mostly subangular with quite a few rounded ones. Angular grains are lacking and all the material is well weathered.

(2) The material is extensively broken down, both into fine-grained sand sizes and into the constituent minerals.

Most of the material consists of a reddish-brown volcanic rock although a few samples contain a little granite or small amounts of different type volcanics. All of the samples are quite uniform, in general, as to texture, color, weathering, and composition.

There seem to be no volcanic flows, as such, or volcanic flows intercalated with alluvial material.

Signed - Coulson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2144 T.D.
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TO ORACLE & TUCSON
SANTA CRUZ
PINAL
COUNTY
LINE

ASARCO

Southwestern Exploration Division

February 23, 1977

TO: F. T. Graybeal

FROM: J. D. Sell

Report - Potential Porphyry Copper Deposit
Owl Head Mining District
Pinal County, Arizona

Mr. John Johnson of Sedona (282-5569) and Mr. Bill Savage of Tempe (966-9709) arrived at this office on Tuesday, February 22, 1977.

They have a group of claims in the Owl Head District. They apparently had talked with Steve Davis just before he went south and were told to contact Doug Smith. They submit the attached report by T. L. Hanks for our consideration. They believe the IP data is from Asarco but do not actually have the hard data.

Hanks drilled one hole for them, OW-1 on Map AO-2, located on the east side of their "anomaly" (E center of Sec. 34, T8S, R12E) to a depth of 700 feet and should have been in the "anomalous area" as shown on the cross section. However, no ore values were cut and Johnson-Savage knew little more about it.

When Al Giesecke was working the district I secured the following verbal information from Hugh Steele. Hugh would not release any bedrock data, except for the footage, but stated that it was not of sufficient interest. I have placed the holes on a Xerox copy attached.

TABLE 1, Magma churn drill holes, 1948, Verbal Hugh Steele
All holes in T8S, R12E

CDH #1 855'E and 50'S of N quarter corner of Sec. 20
260 feet of gravels

CDH #2 "Mine Well" in Sec. 22
water and andesite fragments at 225'
425' to basement

CDH #3 NW1/4 of Sec. 28
440' to basement

CDH #4 "Magma Well" in Sec. 20
400'(?) to basement

CDH #5 NE1/4 of Sec. 26
295' to basement

CDH #6 SE corner of Sec. 29
lost tools, whole string, in gravels at 365'

It would appear from the Magma churn drill holes that a shallow bedrock extends in the area drilled. If OW-1 penetrated bedrock as indicated, then the entire area has a shallow depth.

I'm sure the Magma drilling did not find any leached capping or porphyries as this was about the time Hugh was working on San Manuel and would have been very interested in such material.

James D. Sell

James D. Sell

JDS:lb
Att.

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				Acid		2.00			2.00		
									38.46		
				Labor -							
				Check Charging System		3.50			3.50		
				VALVES							
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3 - CHANGE OVER
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3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY American Smelting & Refining Company

DATE September 26, 1973

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	
WG - 1	.001	0.01						
WG - 2	.001	0.01						
WG - 3	.380	0.20						

A.D.C.
SEP 28 1973

Invoice # 9851

CHARGES $ 10.50

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETER S. LURES Date Signed 10/26/73 Arizona U. S. A.

ASSAYER - CHEMIST

INVOICE

No. 9851

3226 East 46th Street — Phone 624-0049

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY American Smelting & Refining Company — DATE September 26, 1973

SAMPLE MARKED	ANALYSIS	CHARGES
WG - 1 —— WG - 8	Au, Ag	$ 10.50

A. D. C.
SEP 28 1973

COPY

3441 East Milber JDS Orazaba Mine Robert Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE Aug. 10, 1977

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT SiO_2	PERCENT Al_2O_3	PERCENT IRON	Percent CaO
VBD-1	.003	0.37	0.03	1.06	67.8	12.0	4.73	0.4
VBD-2	.005	0.65	0.03	0.75	69.0	9.4	5.07	0.2
VBD-3	.001	0.15	0.02	0.30	50.8	8.7	7.18	7.5
VBD-4	.001	0.26	0.02	4.42	41.1	13.4	12.58	0.5
VBD-5	.175	297.54	0.03	13.30	56.3	0.7	1.51	0.2
BULK-6	.002	1.44	0.01	0.25	91.8	1.8	1.51	0.7

REGISTERED ASSAYER CERTIFICATE NO. [illegible] PETE S. FLORES 8/10/77 Date Signed Arizona U.S.A.

CHARGES $ 174.00

INVOICE NO. 15236

Dear Mr. Crist:

If you'll set a date and hour when I can meet you I can meet your or your representatives at that hour at the Junction of the Highway with the Peralta Road.

I drive a gray Pick Up with a Camper Shell Ariz License # Y.N. 9840.

Without my assistence it will be difficult to find the upper workings and other points of interest I did not mention.

Respectfully yours,

A. Sindbad.

P.O. Box: 746

Apache - Jct.

Ariz 85220.

AMERICAN SMELTING AND REFINING COMPANY
EXPLORATION DEPARTMENT
SOUTHWESTERN UNITED STATES DIVISION
P. O. BOX 5747, TUCSON, ARIZONA 85703

R. B. CRIST
PROPERTY MANAGER

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

July 17, 1975

Mr. A. Syndbab
P.O. Box 746
Apache Junction, Arizona 85220

Dear Mr. Syndbab:

This will acknowledge the receipt of your letter to Asarco that was mailed in care of the Valley National Bank Building, Tucson, Arizona.

I have enclosed two copies of a topographic map outlining in Section 30, Township 1 N., Range 10 E. the location of your mining claims.

Please return the second map indicating the location of your claims and we will have a look.

Thank you.

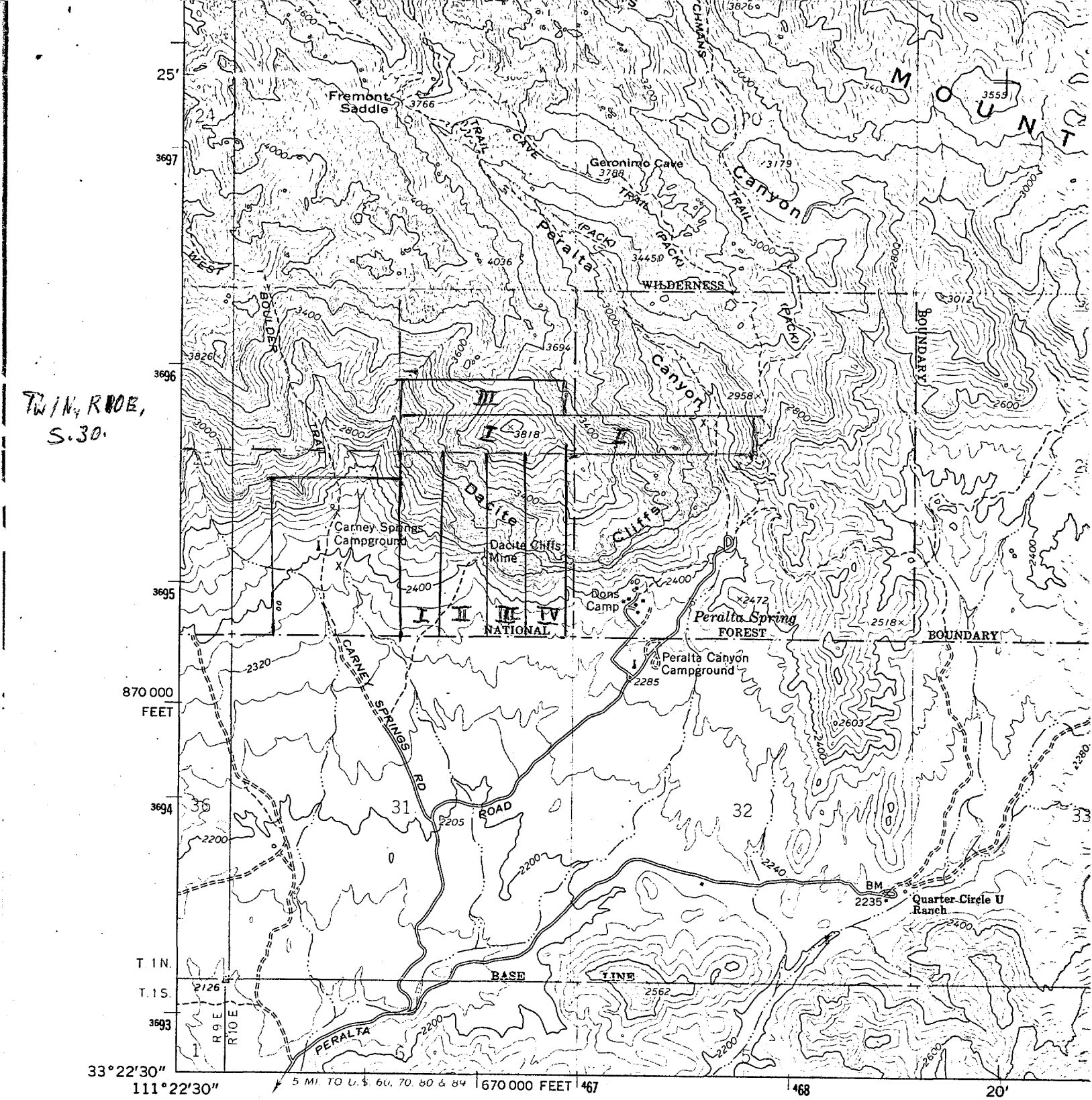
Sincerely,

R.B. Crist

RBC:vh
Enclosures Maps (2)
Stamped self-addressed envelope

cc JDS

Turn Over please.



TWP, RNGE, S.30.

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1962. Field checked 1966

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Where omitted, land lines have not been established

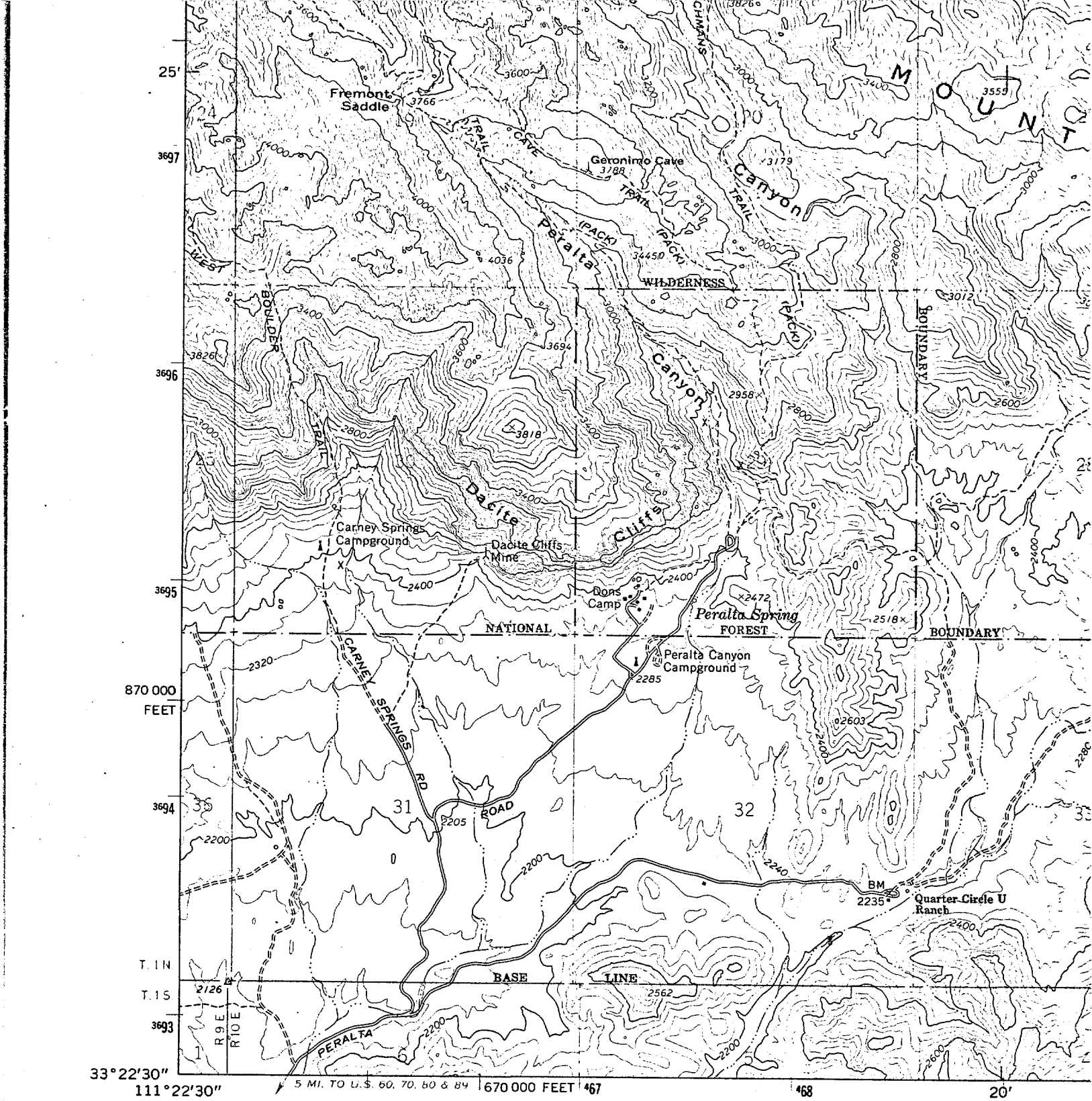
GN MN

0°10' 3 MILS 13½° 240 MILS

UTM GRID AND 1966 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

(SUPERSTITION MTS. SW) 3750 IV SW

FOR SAL



(SUPERSTITION MTS. SW)
3750 IV SW

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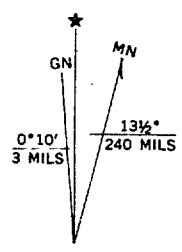
Topography by photogrammetric methods from aerial photographs taken 1962. Field checked 1966

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Where omitted, land lines have not been established



UTM GRID AND 1966 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

3441 East Milber

Phone 889-5787

INVOICE NO.
15463

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE Nov. 14, 1977

Mr. J. D. Sell

SAMPLE MARKED	ANALYSIS	CHARGES
B. (AT-96-19	Geo-Chem Cu, Pb, Zn, Mo	$ 7.00
	Preparation	0.75
A. (QDC-15		
QDC-16	Geo-Chem Cu, Pb, Zn, Mo	14.00
	Preparation	1.50
	TOTAL	$ 23.25

OK for Payment
James D Sell

A. Devils Canyon Project EA-0139 ——— $15.50

B. Toe General, 94 Hills Reeman ——— 7.75

$23.25

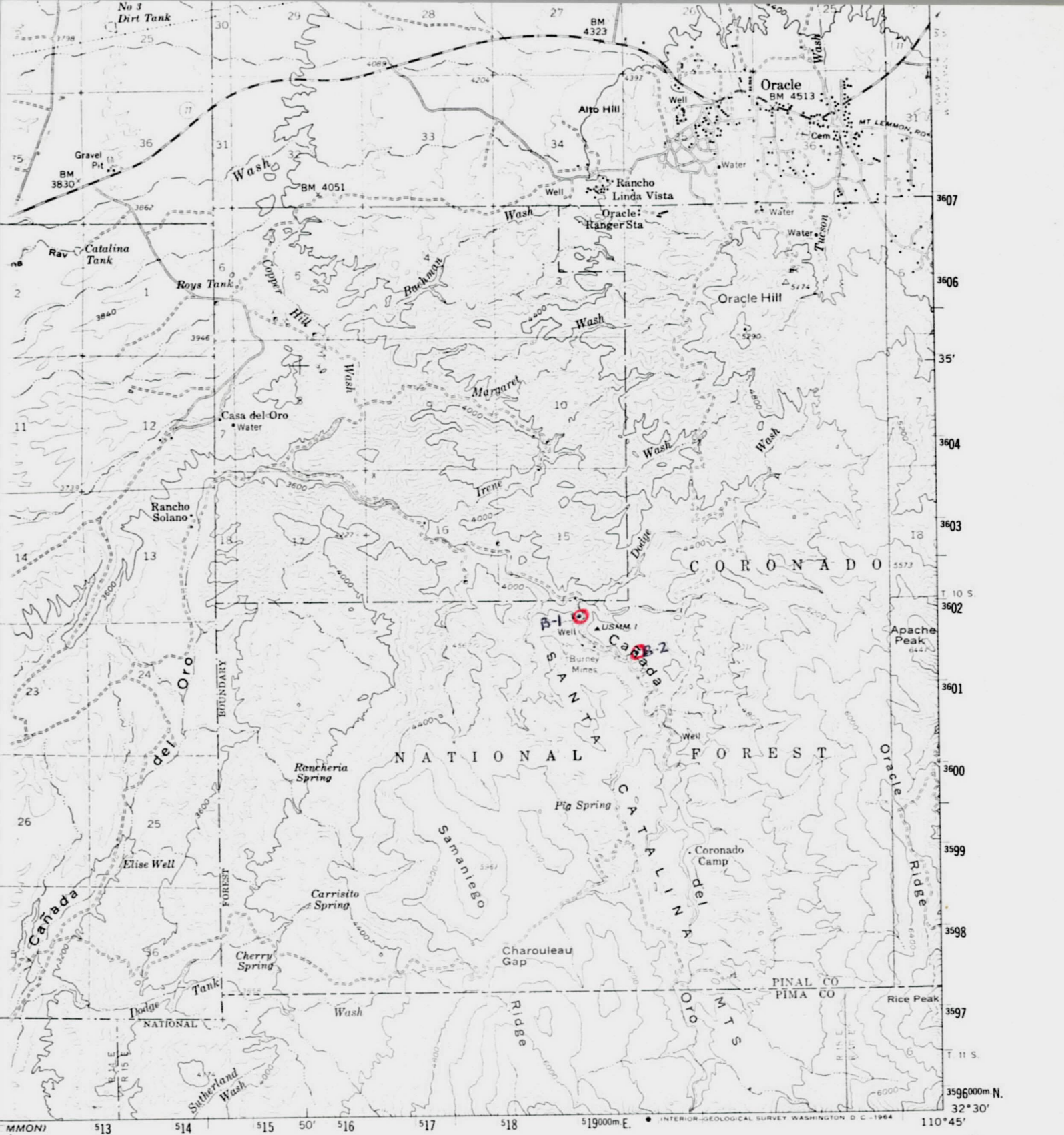
THANK YOU MUCH!!

CHARGES $ 7.75

INVOICE NO. 15463

REGISTERED ASSAYER
CERTIFICATE NO. 2892
PETE S. FLORES
Date Signed 11/14/77
Arizona U. S. A.

ASSAYER - CHEMIST



500

2 3 4 MILES

12000 15000 18000 21000 FEET

3 4 5 KILOMETERS

VAL 80 FEET
SEA LEVEL

ROAD CLASSIFICATION

Heavy-duty — Light-duty

Medium-duty — Unimproved dirt

U. S. Route — State Route

ARIZONA

QUADRANGLE LOCATION

AL MAP ACCURACY STANDARDS
ER 25, COLORADO OR WASHINGTON 25, D. C.
AND SYMBOLS IS AVAILABLE ON REQUEST

ORACLE, ARIZ.
N3230—W11045/15

1959

AMS 3849 III—SERIES V798

Burney Mines. (Oracle 15' sheet).

B-1 Drill Hole. Aug 30, 1971 - Oct 24, 1971 - Vert.

0-27 Overburden
27-140 Mescal
140-173 My Porp.
173-205 Mescal
205-330 Drip Springs (Shale-Lm Sect).
330-456 " " (Qtzite Sect.)
456-498 Db
498-632 dsq
632-686 Db
686-898 dsq (qtzite & Lms Sect).
898-1054 db, fract. & bx
1054-1170 dsq (qtzite & Lms Sect.).
1170-1217 Pioneer shale
1217-1252 - db bx, fract, epid, magnetite
1252-1256 Pioneer
1256-1258½ Basic Dyke
1258½-1284½ Pioneer
1284½-1307 Basic Dyke
1307-1392 Pioneer
1392-1585 My Porp., propylitic alt. some argillic
1585-1632 Pioneer
1632-1772 Diabase fract, py, gal, sphal qz on widely scattered shears
1772-1844 Pioneer
1844-1964 - Basic Gabbroic rock. fract. epid-mag.
1964-2095 Pioneer
2095-2431 Basic Gabbroic rock, fract, epid, chl., magn. minor diss py & hem fract

B-1 (Continued)

2431-2554 Feldspar Porph (Andesitic ?) Epid fract & feld repl.

2554-2578 dlb. epid chlor minor py.

2578-2606 Pioneer

2606-2965 Feldspar Porph ("Metadiorite"?) Propylitic

2965-3124 Pioneer

3124-3134 Pinal Schist.

B-2 Drill Hole. Dec. 16, 1971 - March 30, 1972 Vert.

0-7 Overburden

7-31 Cotalina Fm.

31-103 Igneous dike (alt db?)

103-120 Troy qtzite

120-126 Igneous strong alt, py.

126-131 Birthday Vein.

131-185 Troy qtzite

185-205 Feldspar porph. strong alt. limonite & py. (190)

205-225 Qtzite limonite

225-227 Feldspar porph (?) alt.

227-327 Troy qtzite, bx, shale

327-339½ Mescal Lms limest & shale. alt w/ porph wisps.

339½-340 Fault zone

340-372½ Dripping Sp. w/ shale qtzite, alt por (365-371).

372½-430 db.

430-431 Fault

431-433½ dsg. some porph?

433½-450 porphyry. chlorite-clay.

450-471 Mescal intimately intruded by porphyry.

471-484 Qtzite bx

B-2 (Continued).

474-489 Shale & limy sed. & alt pors.

489-490½ Alt porph.

490½-494 Limy fragments. Fault zone.

494-500 Mescal & porph.

500-502 Porphyry.

502-513 Lms & limy shale w/ pors alt.

513 Gouge.

513-515 Alt argill porph.

515-516½ Alt.

516½-517 Alt.

517-561 Alt., mottled, silicified

561-609 Pioneer. Qtzite arkose.

609-639 Alt.

639-667 Pioneer

667-889 Alt. gabbroic, chlorid

889-919 Pioneer

919-927 Intrusive alt.

927-1010 Pioneer

1010-1016 Andesite

1016-1041 Pioneer

1041-1043 Alt.

1043-1077 Pioneer

1077-1079 Alt.

1079-1123 Pioneer

1123-1138 Alt

1138-1144 Pioneer

1144-1156 Porphy, propylitic

1156-1170 Pioneer

B-2 Continued

1170 - 1302 Db.

1302 - 1331 Pioneer

1331 - 1451 Db, gabbroic chl. epid.

1451 - 1463 Pioneer

1463 - 1481 Porph. hbl. alt. chl. clay.

1481 - 1506 Pioneer

1506 - 1874 Feldspar porph. & minor diorite epid. syl., chl.

1874 - 1909 Pioneer.

Memo: To F. T. Graybeal

April 1, 1977

F.T.G.

BRENDA MINE, ARIZ
John Johnson + Ted Hanks
(Telephone 966-9709)

A call was taken March 30, originally for Jim Sell, concerning the Brenda Mine offered to ASARCO. Mr. Hanks informed me that they had two other properties about 22 miles south of Florence known as Big Mine and Rocky Butte, samples taken at these prospects ran 4.8% and 3.2% Cu respectively. No I.P. work has been done at either prospect.

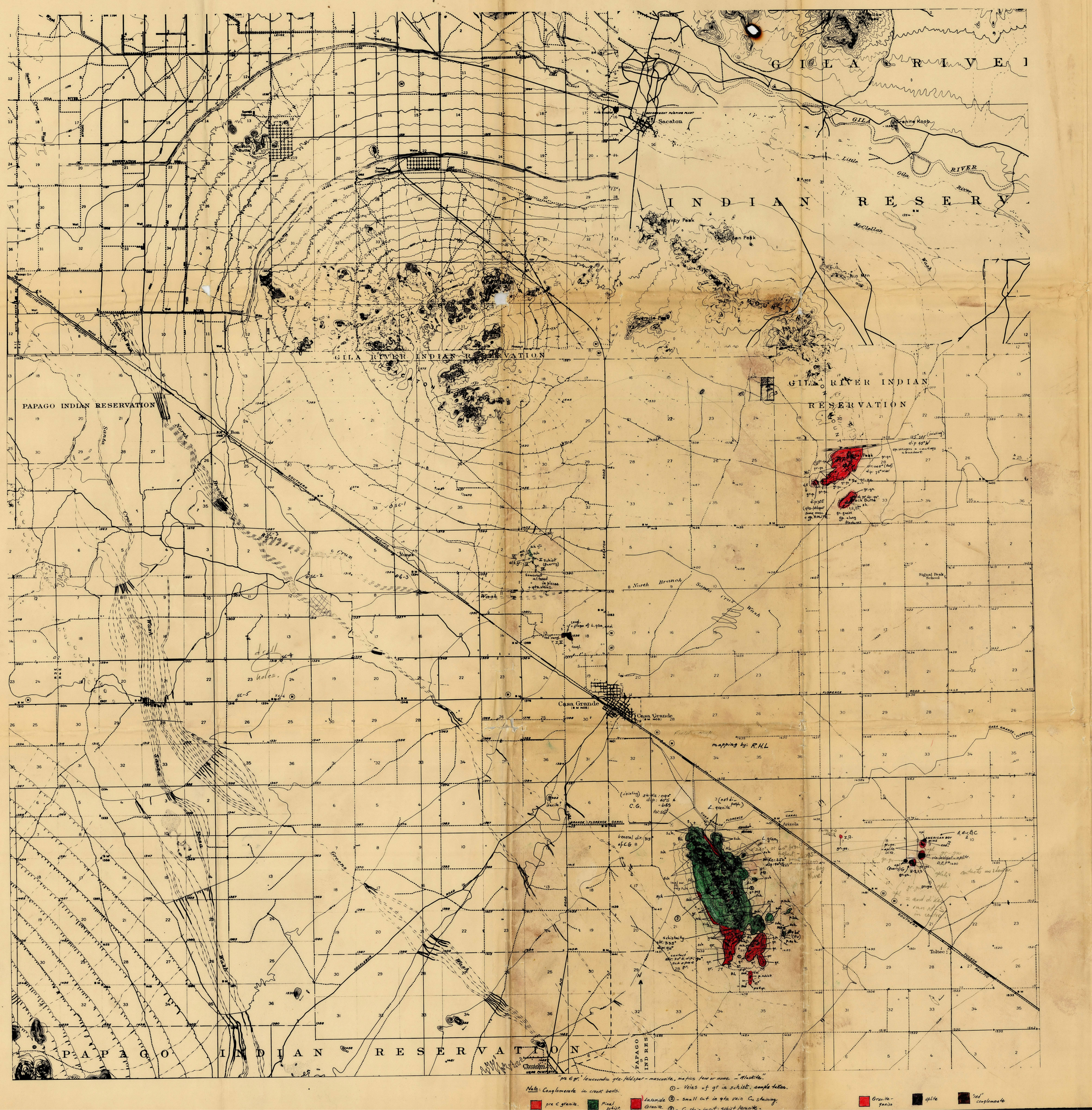
If ASARCO is interested they can accompany geologist to visit their properties

L. W. Pickard

JDSell

Sounds like in Pioneer area - Owl Heads
For your interest + action if you think necessary

FTG.
4/1/77


GILA RIVER
Sacaton
INDIAN RESERV
GILA RIVER INDIAN RESERVATION
PAPAGO INDIAN RESERVATION
Casa Grande
North Branch Santa Cruz Wash
Signal Peak School
Toltec
Chuichu
PAPAGO INDIAN RESERVATION
PAPAGO IND RES
mapping by: R.H.L.
"pre Є gr." leucocratic qtz-feldspar-muscovite. mafics few or none - "Alaskite."
Note: Conglomerate in creek beds.
① - Veins of gr in schist. sample taken.
② - small cut in qtz vein Cu staining.
pre Є granite.
Pinal schist.
Laramide Granite.
Granite-gneiss
aplite
"red" conglomerate

(Frank Topic) 11/1/78

reports EXXON on 3rd hole in ~~Monmouth~~ - Hazel area. ... New hole down by river.

JDSell → E.T.G

GRI REALTOR®

JOHN H. VERKENNES ▫ REAL ESTATE
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(AC 507) 931-5530 or 931-2507

COPPER PROPERTY

ATTENTION:

Metal Mining Division
Exploration
Geology
Real Estate

FOR SALE

PINAL COPPER CORP.

CASA GRANDE, ARIZONA, U.S.A.

1,240 acres in Pinal Co. Arizona, which the company owns, by right of discovery under United States Law. 64 contiguous unpatented mining claims situated on the Papago Indian Reservation in Pinal County, Arizona, approximately 52 miles south and west of Casa Grande and about 30 miles north and east of Ajo.

All claims are evidenced by appropriate documents of title, recorded in the office of the county recorder of Pinal County, Arizona.

Charles H. Dunning, an outstanding mining engineer, completed a report on this property in 1956 and in the conclusion of his report stated, **"You have a large but not definitely measurable tonnage of commercial ore, and very large areas of probable ore. If development and operation is carried on according to good engineering practice the project should be very successful."**

The Lakeshore Mine (Noranda-Hecla) is approximately fifteen (15) miles east; Newmont Mining Corp. has property five (5) miles north; the Phelps-Dodge Ajo Mine is about thirty (30) miles southwest of Pinal. The Pinal property appears to be on a sort of triangle with the above mentioned mines, and geologists believe it to be on the same strike as the others.

It has been known that eight of the sixty four claims contained gold and molybdenum has been found in some areas.

The Board of Directors and Officers of Pinal Copper Corp. feel the asking price for this property is very reasonable considering the current market and monetary conditions.

All interested parties — please contact: John Verkennes for arrangements for inspection and exploration. This property will be sold for terms, cash, or exchange of stock approved by the Pinal Corp. Board of Directors.

JDS

T. 7 S. R. 10 E.

MRS. GRAHAM / Ken Phillips } 7N-3E

Sec	
1	Fed. Mem.
2	P.P. 7813.0 + 0.1L 1/10/80 595.46 Bashaw Freeport 1-4-78
3	Fed. Mem
4	" "
7	Bash-Fz - 0.1
"	40 Ac. State SENE Open
9	Fed Mem
10	" "
11	" "
12	" "
13	" "
14	" "
15	" "
16	600 Ac. Open
19	Fed "
20	" "
21	" "
24	" "
25	OPEN
26	"

Call week of 5-11 & go to mem to review data

Carl Smith
Iron Mtn, Superior
3 geochem. F.P. Surveyor
Dry Test Labs, Phoenix.

6741 E Butte, Mesa 85205
ph 985-6485.

Sec.
R11-12 E T1N o

Beeh Hwy turn N.
go to Billing St. (just before Friestatter, turn Left on crest.
go ½ block turn right onto Butte. Second house around corner.
Big boat in carport Copper Rock in front yard.
South side of street.

Lazy Mule Group
Hewitt Canyon
T1N R11-12 E
±4' NS by ±3' EW

Also see DW Peterson's Superstition Geochem samples in area.

ASARCO

Southwestern Exploration Division

JDS

March 13, 1984

Memorandum to Staff

R. B. Cummings informs me that sometime in the first weeks of April, he will lead a close-down field trip to Sacaton. Larry Johnson, writing the close-down geology section, has found several items of exploration interest.

Dave Sawyer, graduate student (Santa Barbara) doing Ph.D. work at Silver Bell, is wrapping up his field work this spring and has also offered to take a group on a field trip (for those that missed the first).

If you are interested in either trip, call Carol and put your name on the list. If you are around when they come off then you will be notified.

James D. Sell

JDS/cg

cc: WLKurtz
JHCourtright
DSawyer
RBCummings

JDS

ASARCO

Southwestern Exploration Division

June 11, 1985

FILE NOTE

San Manuel Tour
1985 Spring Meeting
AIME AZ Section

The field trip of May 5, 1985, consisted of a tour underground to view the test block for their new "...low cost alternative to the existing full gravity block caving mining system..." See the attached handout sheet.

Also attached is a copy of the 1984 Spring Mining Geology Session. Articles include: History and Development of the San Manuel Mine, 10 p.; A Summary of the Development of the San Manuel Mine Subsidence Area, 2 p.; A General Description of the San Manuel Oxide Deposit, 8 p.; Continuous Miner Drift Excavation and Geomechanical Rock Classification at San Manuel, 18 p.; Tiger--A Brief Look at Current Utilization and Potential, 11 p.; and, Bibliography, 4 p.

J. D. Sell attended the surface tour into the cave area where in place leach tests have been conducted as well as oxide copper mined and test leached in several different ways. As stated in the Magma 1984 paper, the oxide ore is "... rubblized and lies draped down and across the various north limb undercuts..." But, the zone is now outside the main caving area and Magma has suggested that roads can be safely maintained in the rubblized cave material and drill holes have been successfully reverse air rotary drilled in this material and cased with plastic and received test solutions for in excess of six months.

San Manuel has outlined 280 million tons of oxide at an overall grade of 0.67→0.72% copper, mainly as chrysocolla. The open pit will mine 60 million tons of "easily soluble copper," i.e., 0.50% copper; while the underground in situ leach will tackle 170 million tons of 0.45% easily soluble copper values. The 800 feet of underground column takes around 45 days from input to base travel time. See also, Arizona Pay Dirt March 1985, for pictures and an article on the project. Note that perhaps +100 million tons could be open-pitted if the need is foremost.

The afternoon talks are listed on the attached packet. No specific handouts on the talks were available but F.R. Koutz's notes are attached. My (J.D.S.) surprise was the way San Manuel is attacking a wide range of problems, including a new low-cost mining method, and effectively dropping their manpower requirements to between 1/2 and 2/3 of the former need.

F. R. Koutz attended the morning underground tour to the 2315' level LHD test block being readied for first production in the next 4-6 weeks. As described on the attached handout/maps with my notes, the Trench-Load-Haul Dump method of mining removes the need for a grizzly level, and the extensive transfer raise system. There is still the need for a main haulage level below, but eventually San Manuel hopes to combine all production levels (haulage, grizzly, undercut) for each lift by using LHD and conveyor systems to move muck to the shaft pockets.

On the attached maps the trench drifts will be ring drilled in expanded wedge pattern and shot with broken ore being extracted by LHD from parallel draw drifts with herringbone draw subs into the caving trench drifts. Development is by Dosco Roadheader--a coal mining machine with a rotating head with picks on a boom. In softer well fractured ground the head is not only used to break rock from the face but to mill the muck to smaller sizes. Rotating gathering arms move the muck onto a conveyor chain for transfer to a LHD trammer. The roadheader causes only minimal damage compared to blasting. High pressure water jets added to the rotating head increase "digability"--harder rock can be cut--and decrease wear. In unaltered or heavily silicified ground a modified minimal blasting pattern is used to prefracture the rock for the roadheader. The roadheader will also soon have a roof-bolting attachment and is used with a modified jumbo chassis to move concrete forms.

Note that the trench and draw drifts were set up parallel to the predominant ±N60E direction of Laramide dacite porphyry dikes and fractures into Precambrian quartz monzonite. This minimizes excess spalling. The dacite porphyry is more sericite-clay altered than the quartz monzonite, although there is often a silicified (quartz-sericite) alteration selvage around the dp dikes. Variation in drift spacing in the test block is designed in response to the varying rock strength.

San Manuel has instituted an efficiency/cost saving program with each production team with quotas and competition between various teams. For example, a major effort is being made to conserve compressed air (14¢/1000 cfm) by issuing quotas, encouraging miners to turn off valves, etc., and by posting consumption records and quotas of various teams in the dry and the entrances to various working places. The shifter gives each crew a record/quota slip on consumables each day. An effort is being made to bring back the well-rounded miner who will do most jobs in the mine, rather than various "crafts" (i.e. Union) men. All of this has reportedly helped morale tremendously and reduced manpower and material costs significantly in these hard times.

The remainder of the morning was taken up with a tour of the combined hoisthouse for the #3 four skip-shafts. The skips can be run automatically from a central control room. The main mine control room monitors and often remotely runs electrical, air and water in the mine pumps, fans, temperatures, pressures, power usage, surveillance cameras, etc. While the dispatch

control room handles underground haulage similar to an air traffic control center. The magnetic control boards will soon be replaced by computer/CRT terminals for each haulage level. Particularly interesting were the zoom surveillance cameras with videotape capability which have eliminated the need for a number of watchmen. Magma also routinely monitors emissions from Hayden with these cameras. All San Manuel control room readouts and summaries are readily available to Newmont - Tucson, and New York over computer hook-ups.

Overall it is quite clear that San Manuel has significantly reduced costs and the present research and test program should reduce costs further.

J. D. Sell

F. R. Koutz

JDS:FRK:mek

cc: SWMD

1985 SPRING MEETING
A.I.M.E. ARIZONA SECTION
UNDERGROUND & GEOLOGY SECTIONS

F.A. Kustr
4 June 85

UNDERGROUND TOUR ROUTE

Save $ by compressed air management: cost 14¢/1000 CFM
- Compressors shut down during shift change

General

Magma Copper Company, San Manuel Division, has begun a research and testing program at the San Manuel underground mine. A satisfactory, lower cost alternative to the existing full gravity block caving mining system is being sought. The test block to be viewed underground is the first stage of this effort. The test block will be described in detail in the afternoon technical session. 4-6 weeks to production test

Viewpoint #1 (see attached map)

#4 Draw Drift: The drift has been excavated and is now being poured. The drift cross section is 12 ft. high by 14 ft. wide. The concreted drift is 9.5 ft. high by 11 ft. wide. The drift was driven with a rubber-tired, 2-boom, diesel powered jumbo and a rubber-tired, 3.5-cu.yd. diesel LHD. Finished concrete is 18 inches thick in the back and ribs and 12 inches in the floor.

"Salvage" From MIAMI EAST
also 10 to 15 yd³ LHD For clean-up

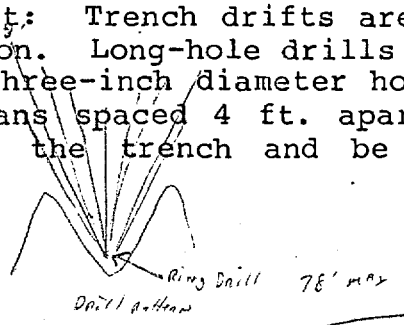
Viewpoint #2

#5 Draw Drift, #3S Draw Point: Draw points are 45° off the center of draw drifts. The draw point opening at the lintel is 7 ft. high by 10 ft. wide. A 3.5-cu.yd. LHD will be used to scoop muck from the draw point and haul it to centrally located ore passes. Draw points are spaced 35 ft. apart.

Viewpoint #3

6' steel Some 4' steel

#5 Trench Drift: Trench drifts are driven 10 ft. x 10 ft. in cross section. Long-hole drills are used to drill blast-hole rings. Three-inch diameter holes are drilled up to 78 ft. long in fans spaced 4 ft. apart. When blasted, caved ore will fill the trench and be drawn through the draw points.



Viewpoint #4

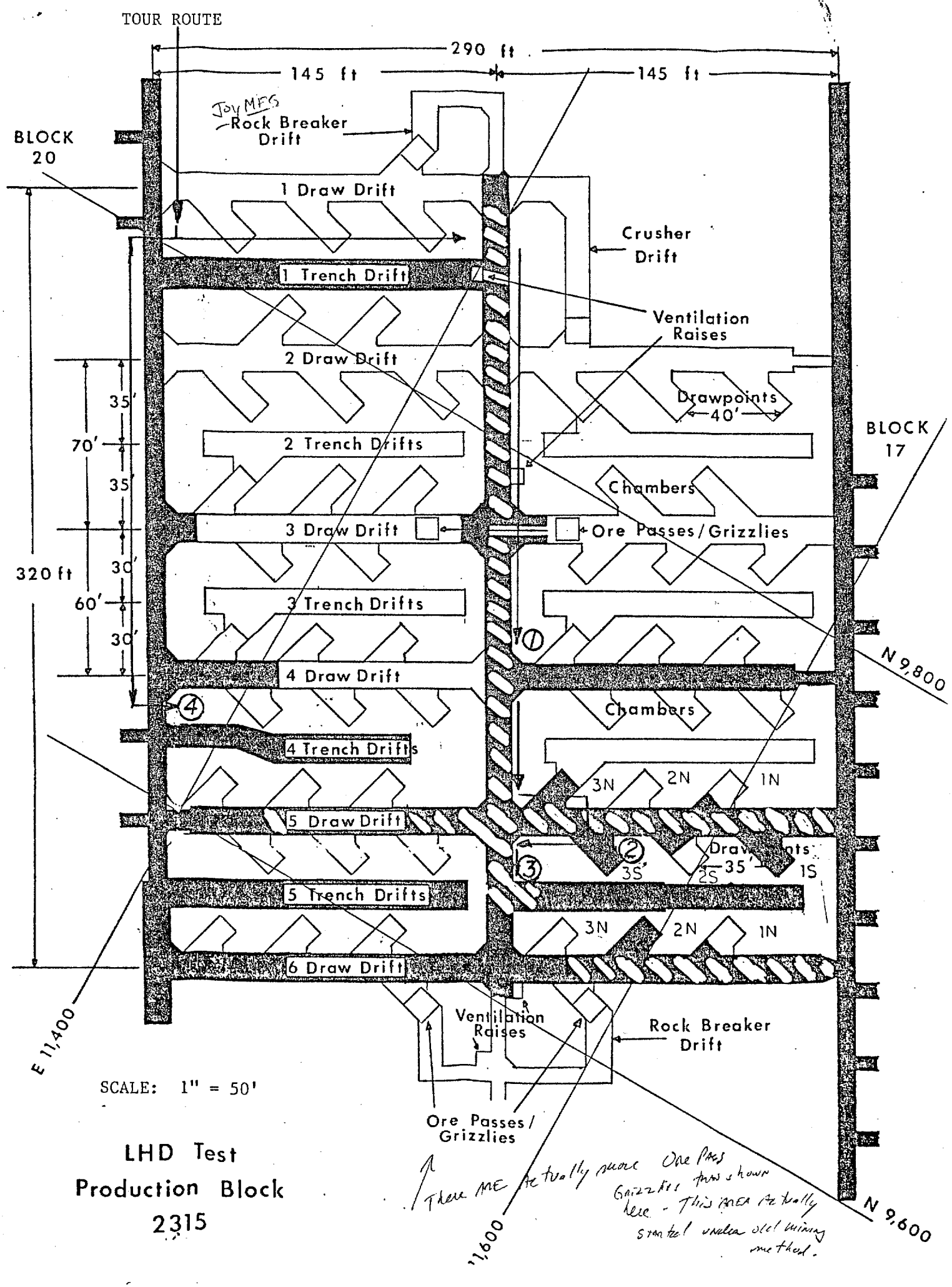
#4 Draw Drift Roadheader: Roadheaders are being used throughout the test block and the mine for drift excavation. Roadheaders will be discussed in detail during the afternoon technical session.

DOSCO

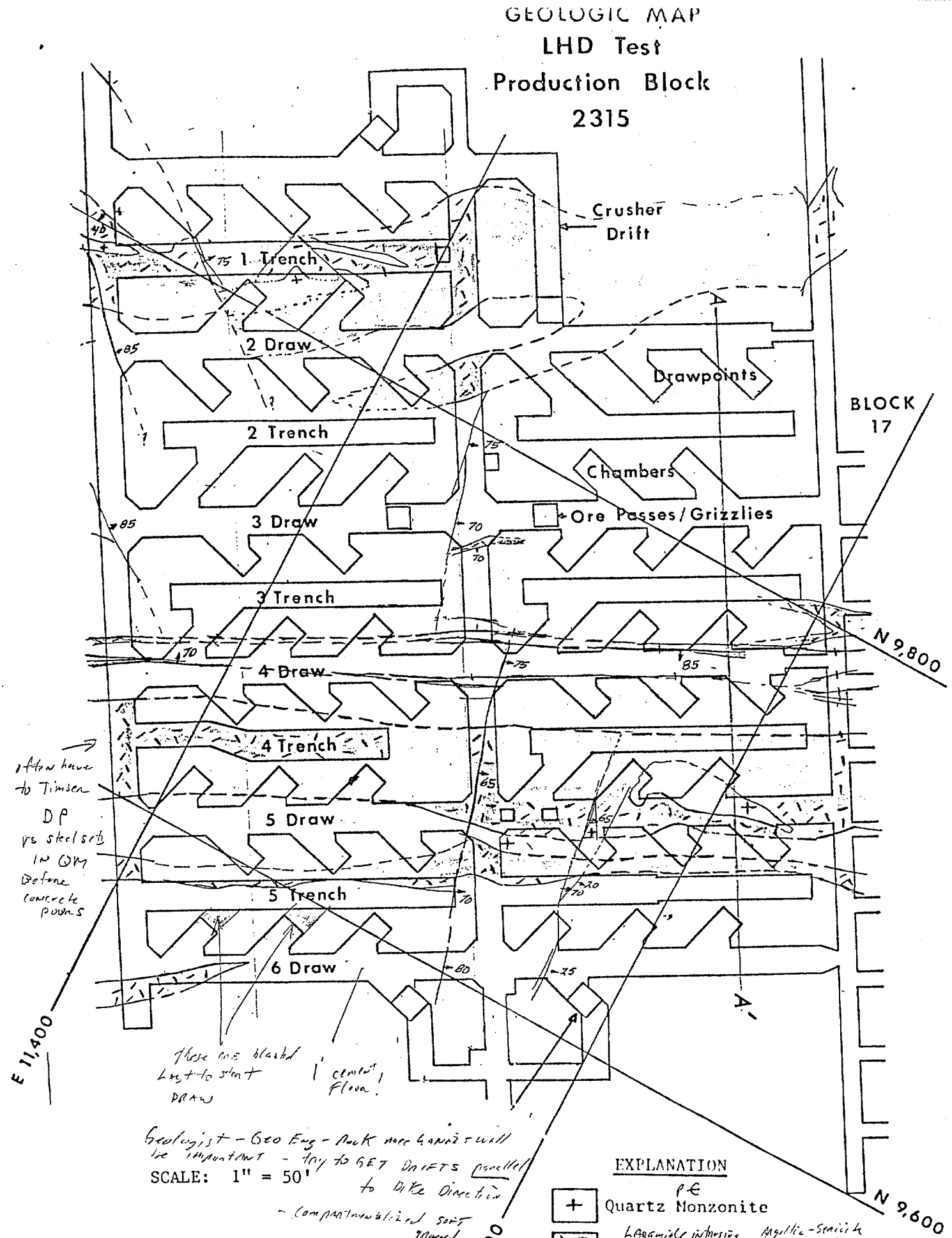
CREWS give names to Roadheaders - builds morale

Need LOTS of PM - But pays off.
SAT+SUN day TOTALLY devoted to overhaul. + ½ hour @ START+STOP of SHIFT.

Have concrete DRIFT forms - moved by old jumbo chassis
Now on rubber tired w/ hydraulics ← SOON to try with attachment on top of road header. Will modify Roadheader with roof bolting GEAR considering Adding temp hydraulic pumps to roadheader while Bolting



LHD Test Production Block 2315


GEOLOGIC MAP
LHD Test
Production Block
2315
Crusher Drift
1 Trench
2 Draw
Drawpoints
BLOCK 17
2 Trench
Chambers
3 Draw
Ore Passes / Grizzlies
3 Trench
4 Draw
4 Trench
5 Draw
5 Trench
6 Draw
N 9,800
N 9,600
E 11,400
E 11,600
A
A'
45
75
85
70
65
60
Often have to Timber DP vs steel set IN QM Before concrete pours
these are blasted Last to start DRAW
1' cement flow!
Geologist - Geo Eng - Rock mechanics will be important - try to GET DRIFTS parallel to Dike Direction
- Compartmentalized soft ground
SCALE: 1" = 50'
EXPLANATION
pE
Quartz Monzonite
Laramide intrusive Argillic-Sericitic
Dacite Porphyry SOFT / Hard silicified (Q-S) selvage
N50-60E dikes
Fault, showing dip
Roof handles are great in DP But mobs with silicified selv. + Fresh QM IF Add high pressure WATER-spray almost
IF have to BLAST only want to Fracture Not break up Rock
½-⅔ # of holes & high veloc. explosive
← slot pattern

CROSS SECTION THROUGH A-A'
LHD TEST BLOCK

Quality "circles" w/ safety meetings
Supervisors pass out Quota slips & previous results
on consumables (Air, water, powder supplies) @ start of each
shift. Competition between crews but Safety taken
strongly into consideration. Average age of miners
has dropped.

May 85
production Av. 47,450 TPD Goal 51,600 for 4 June

EXPLANATION

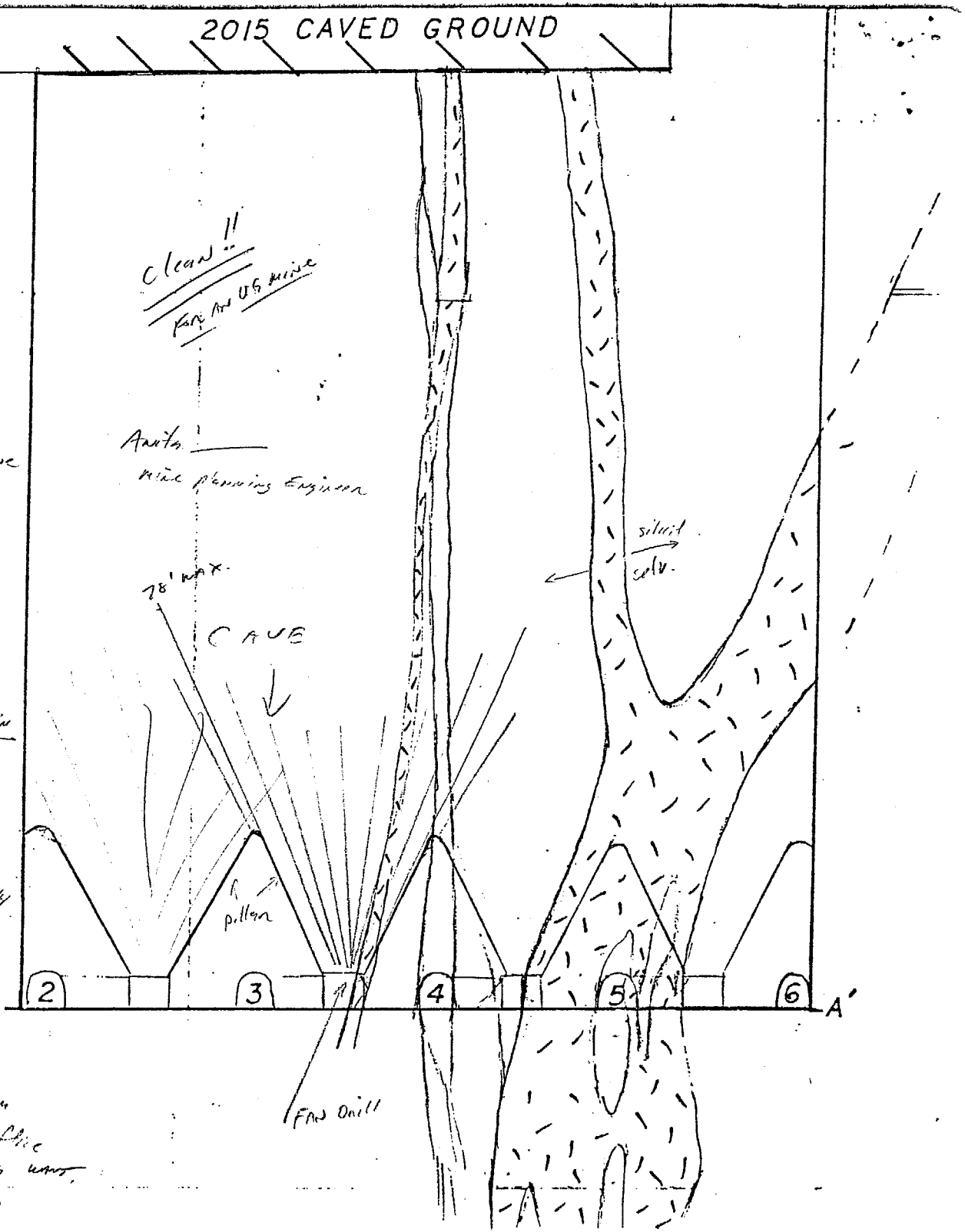
- Quartz Monzonite
- Dacite Porphyry (soft well fractured)
- Fault, showing dip (80)

IF pumps turned off SHAFTS would Flood @ 1 FT/min

SCALE: 1" = 50'

Hoists: 3/A, B, C, D
CAN be run from Rm Automatically
From control room. Surveillance CAMERAS
Video tape capability + Zoom lenses. Regularly
Monitor Hoisting stock

Control room operator runs & monitors electric/hydraulic
PUMPS, FANS, Surveillance CAMERAS, Temperatures, Air pressures
Power usage. This eliminates many supervisors, night
WATCHMEN. Dispatching on 2315 LEVEL
2 main haulage levels is still
done with magnetic boards but will soon install CRT
display - like Air Traffic control. ACC control room
data summaries sent to Tucson - NY etc. & head office
will be able to interrogate SAM. Manual anytime they want.
Data stored - computer terminals at monitor stations



June 5, 1985

SPRING MEETING
A.I.M.E.--ARIZONA CONFERENCE
UNDERGROUND & GEOLOGY SECTIONS

Schedule of Events

8:00 - 9:00	Registration -- Mine Training Center
9:00 - 9:30	Slide Presentation describing Mining Method
9:30 - 11:30	Underground or Surface Tour
11:30 - 1:30	Lunch at the San Manuel Golf Club
1:30 - 4:00	Technical Session -- San Manuel High School Auditorium

"Improving Mining Methods at San Manuel" -- A brief summary of cost reduction programs underway. Presented by Francisco Durazo, Mining Engineer, ~~Assistant~~ General Mine Foreman, Operations.

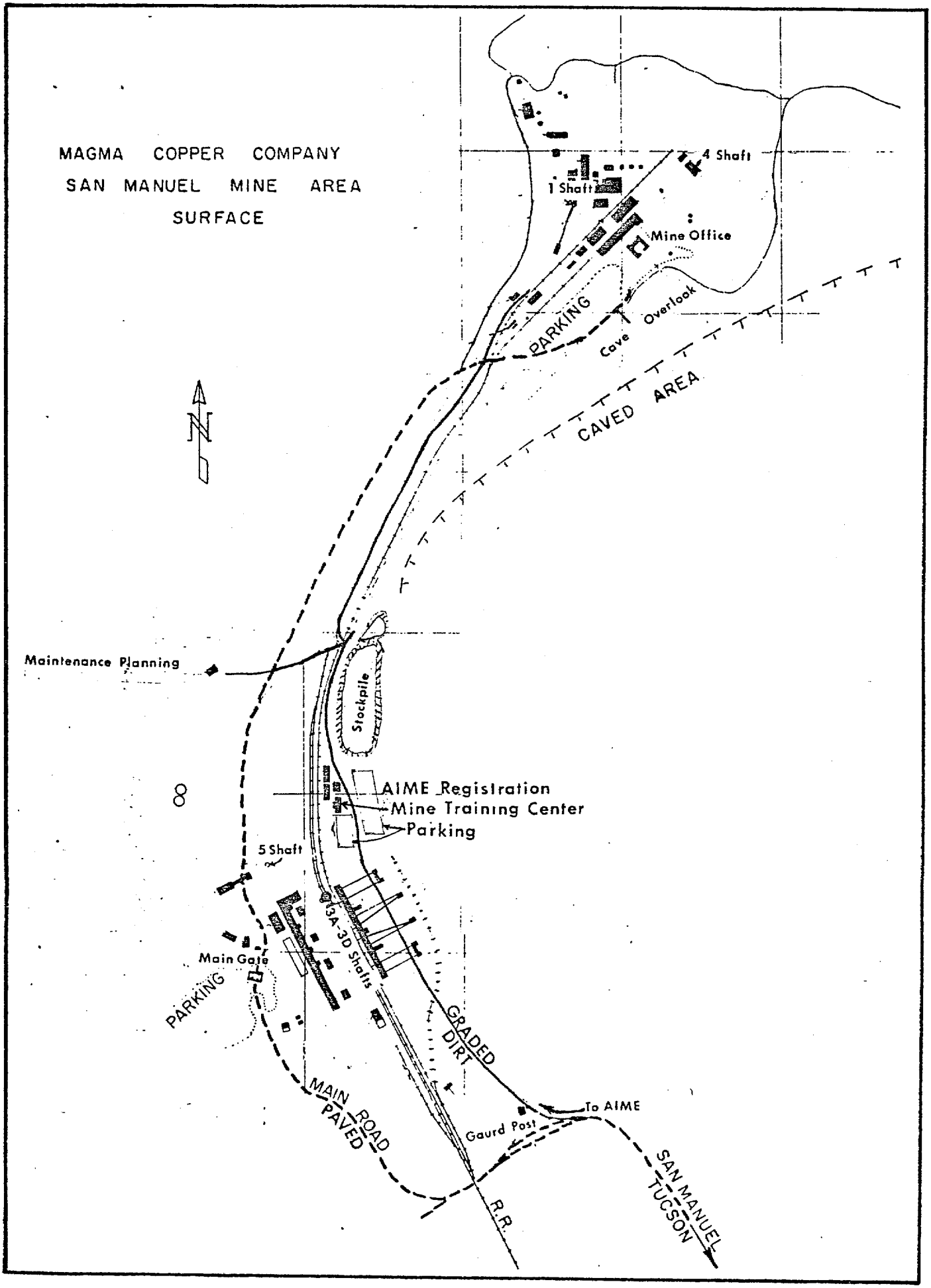
"Applying a Roadheader to the Established Conventional Mining System at San Manuel" -- A general description of roadheader drift development. Presented by Walter Douglas III, Engineer, Special Projects.

"Mechanized LHD Production Test Block at San Manuel" -- A general description of a new mining caving method and production concept currently being tested. Presented by Ed Sutich, Mining Engineer, Special Projects.

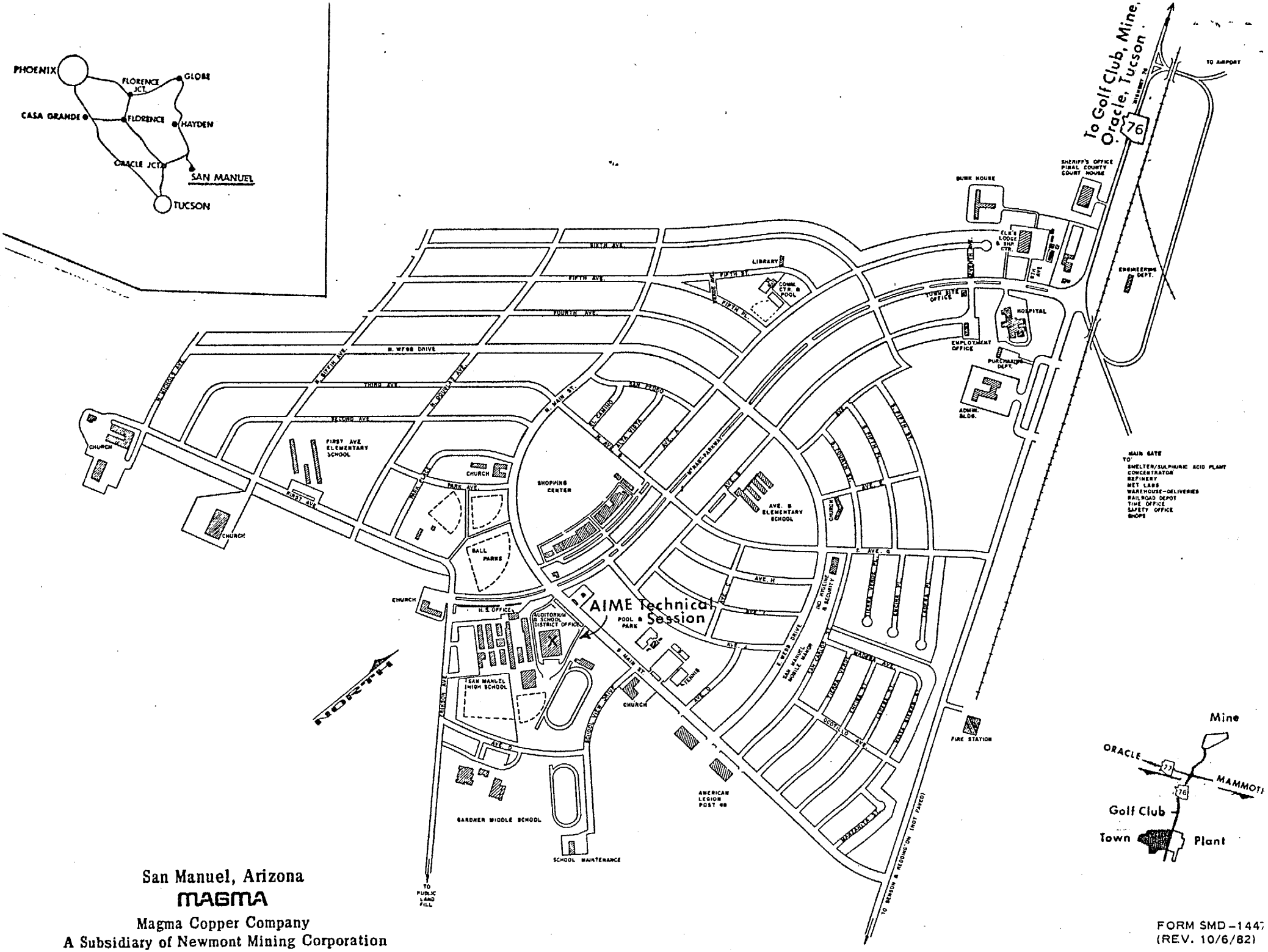
Since Magma Copper Company sponsored the 1984 Mine Geology Spring meeting of the Arizona Conference of A.I.M.E., there will be no geology technical sessions this year. However, extra copies of last year's geology sessions will be available to attendees.

For those planning to take the underground or surface tour, safety equipment will be provided. However, it possible, please bring your own safety equipment such as hard hats, safety boots or shoes, and safety glasses. Those taking the underground tour should, in addition, bring a safety and a safety lanyard, if you have them.

Tim Acton -- Chairman -- Underground Section.
Bob Hockett -- Chairman -- Geology Section.
Lou Sandbak -- Program Chairman.



FORM SMD-2320



San Manuel, Arizona

MAGMA

Magma Copper Company

A Subsidiary of Newmont Mining Corporation

FORM SMD-1447
(REV. 10/6/82)

ASARCO

Southwestern Exploration Division

JDS

January 8, 1986

To: J. R. Stringham

From: J. D. Sell

Asarco Patented Ground
Along Aravaipa Creek
T7S, R16E
Pinal County, AZ

Mr. Joe Shearer, geologic consultant:

2430 B North Huachuca Drive
Tucson, Arizona 85745

Phone: 623-5662 (business)
Phone: 791-3961 (private)

recently worked for a group which has the claims in the southern quarter of Sections 11 and 12, T7S, R16E, as shown on the attached map portion. The ten holes were drilled for gypsum and they believe they have a saleable product.

Asarco apparently has a patent on the land in Aravaipa Creek and up on to the banks on the south, being held for the water rights.

Shearer's people would be interested in a lease-option on the portion of the gypsum bed between the drill holes and Aravaipa Creek. They might also wish to venture with Asarco, or some other arrangement.

Please confirm and outline on the map the area of Asarco ownership and return to me.

James D. Sell

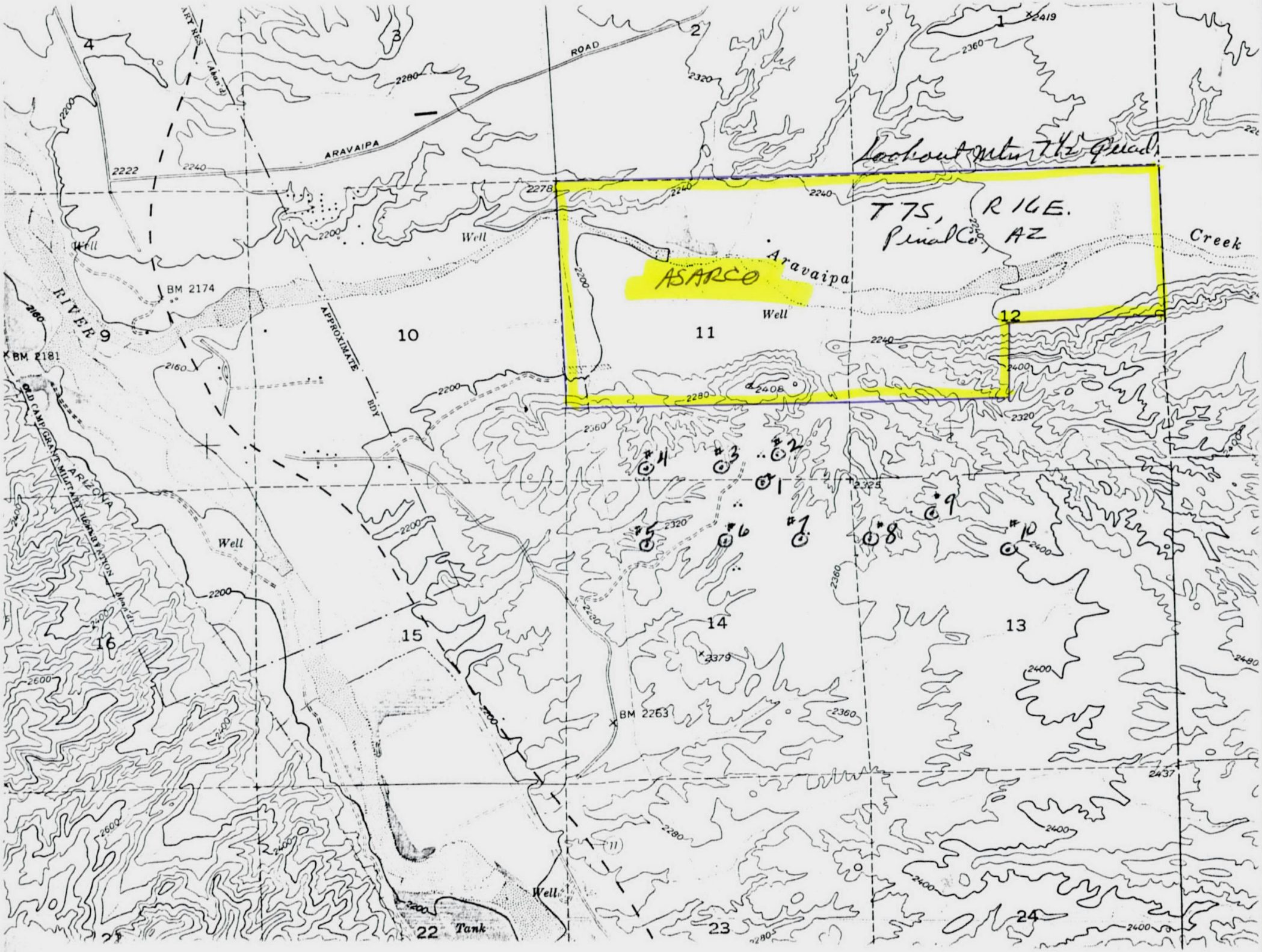
James D. Sell

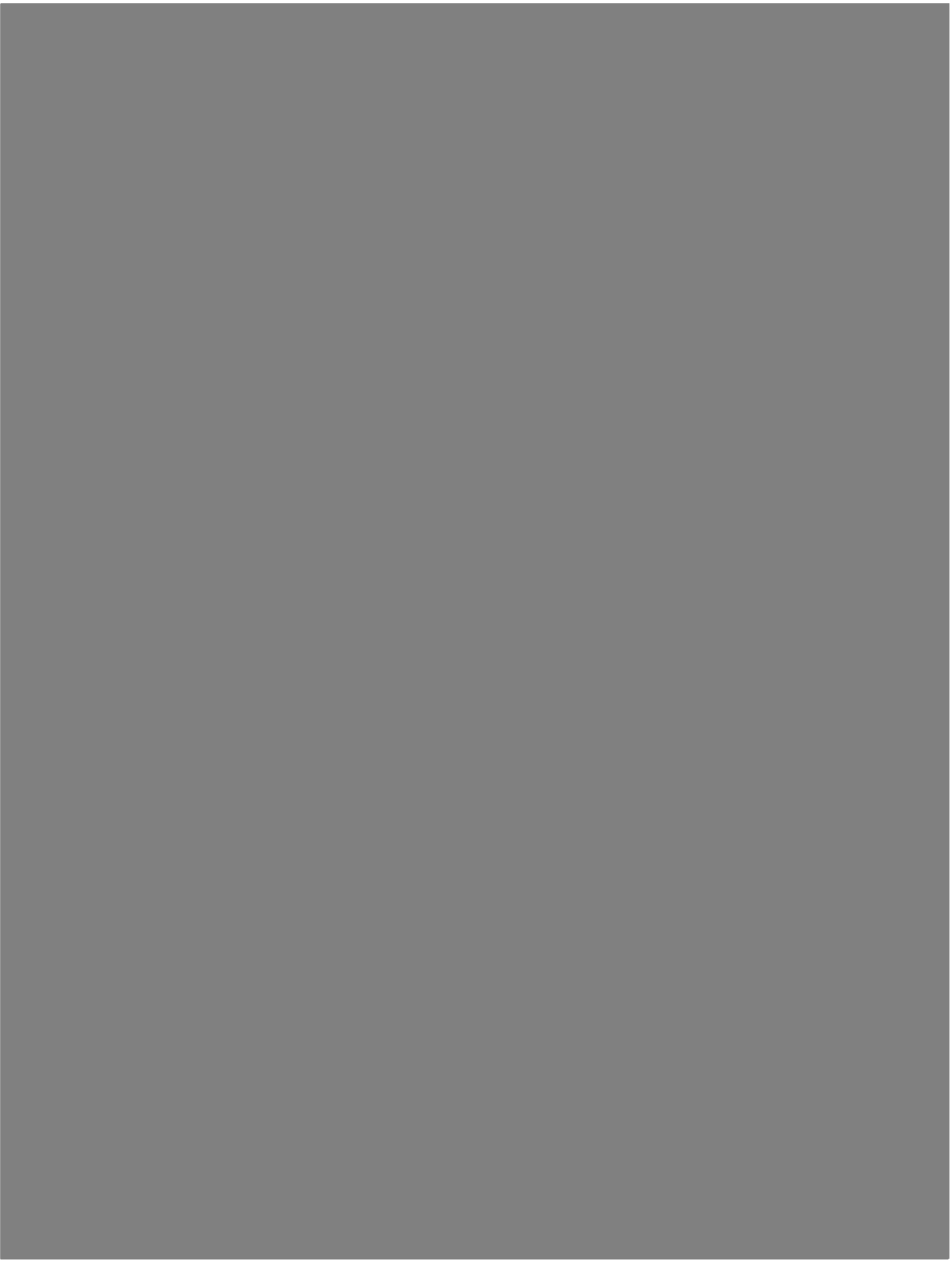
JDS:mek
Att.

cc: W. L. Kurtz

1/9/86 Verbally told Mr. Shearer to put together his proposal(s) and go directly to the Hayden Smelter people.

JDS


ROAD
ARAVAIPA
Well
BM 2174
RIVER
BM 2181
APPROXIMATE
BDY
ARIZONA
Well
Well
Tank
BM 2263
Aravaipa
Creek
ASARCO
T 7S, R 16E.
Pinal Co., AZ
Lookout Mtn. Th. Quad.
10
11
12
13
14
15
16
22
23
24



JDS

ASARCO EXPLORATION RECORD

☐ FIELD EXAMINATION ☐ LITERATURE SEARCH ☐ ASARCO FILE ☒ Property Submittal

Section I General Indexing

① Name(s) of Property or Area	② Country	③ State or Province
Goldmine Mountain, SE side (Andrade Property)	USA	Arizona
	④ USGS Quad. Chandler Heights	⑤ File or Core No. Pinal County

⑥ Latitude	⑦ Longitude	⑧ AMS Sheet	Township	Range	Section	⑨ Examined by	⑩ Date
33°10'40"	111°37'50"	Mesa	3S	7E	SW/4 10; NE/4 16	H.G. Kreis	11-21-86
						⑪ Office SWED	⑫ Field Days 1

Section II Sources of Information

Date Typed 12/9/86

⑬ References

Author	Date	Title	Publications	Vol. No.

Property submitted by Richard Andrade, P.O. Box 992, Casa Grande, Arizona 85222 (ph. 836-5998).

Roi Tan -1 to -4 unpatented mining claims.

Section III Appraisal

⑭ Recommendations
- ☐ Action Now
- ☐ Too Low Grade
- ☒ Too Small
- ☐ Ownership Problem
- ☐ Access Problem
- ☒ No Interest

⑮
- ☐ Post Producer
- ☐ Producer
- ☐ Mineral Deposit
- ☒ Prospect
- ☐
- ☐ Geologic Concept
- ☐ Geochem Anomaly
- ☐ Geophy Anomaly
- ☐

⑯ Production

Commodity	Tons	Grade
	None	

⑰ Reserves ☐ Measured ☐ Estimated

Commodity	Tons	Grade
	None	

⑱ Num. Drill Holes None
Approx Total Footage

⑲ Excavations 4 Vert. Shafts. 10'-60' deep

⑳ ☐ Spectro. Analysis Attached ㉑ ☒ Assays Attached ㉒ ☒ Geochem Results Attached

Section IV Geologic Data

㉓ Commodity or Contained Metals Au

㉔ Ore Minerals-Major Au° Minor

㉕ Host Rocks-Major Biot.-muscov. sch-gn; bio.qtz.dior Minor Amphibolite

㉖ Age of Host Rocks Precambrian

㉗ Nature of Exposures Good exposures at the shafts, fair exposures in the general area of the shafts, extensive cover to the east.

㉘ Alteration Nil to locally moderate sericitization

㉙ Total Extent <3' thick, confined to fault zone

㉚ Structure Strongly developed fault-shear structures, typically 3' to 5' thick, striking N70°E and dipping 80°S; widely spaced.

㉛ Ore Occurrence Fault zones host thin (up to 2' aggregate thickness), discontinuous quartz-Au veins. Approx. 1% former pyrite cubes in qtz. No mineral continuity.

㉜ Age of Mineralization Laramide (?)

㉝ Conclusions & Recommendations

The gold-quartz veins are too thin and discontinuous to be of interest. Conceivably, the quartz veins could be the extreme fringes of a porphyry copper system, but this hypothesis was not investigated.

(For additional space use extra sheets)

ASARCO

Exploration Department
Southwestern United States Division

December 9, 1986

Mr. Richard Andrade
P.O. Box 992
Casa Grande, AZ 85222

Dear Mr. Andrade:

A couple of weeks ago I examined the geology of your Roi Tan No. 1 to 4 claims. I found all the old shafts that you described to me over the phone, so I knew exactly where you took your samples.

Unfortunately, the gold-quartz veins exposed in the workings are not of sufficient width and continuity to be mined by a company as large as Asarco. Consequently, I took a few samples of the wall rocks to see if by chance the gold values extended out from the quartz veins. As you can see from the enclosed assay sheet, the wall rock samples carry no gold.

The gold veins on the Roi Tan claims are not large enough to be acquired by Asarco, but I appreciate the opportunity to have examined them.

Sincerely,

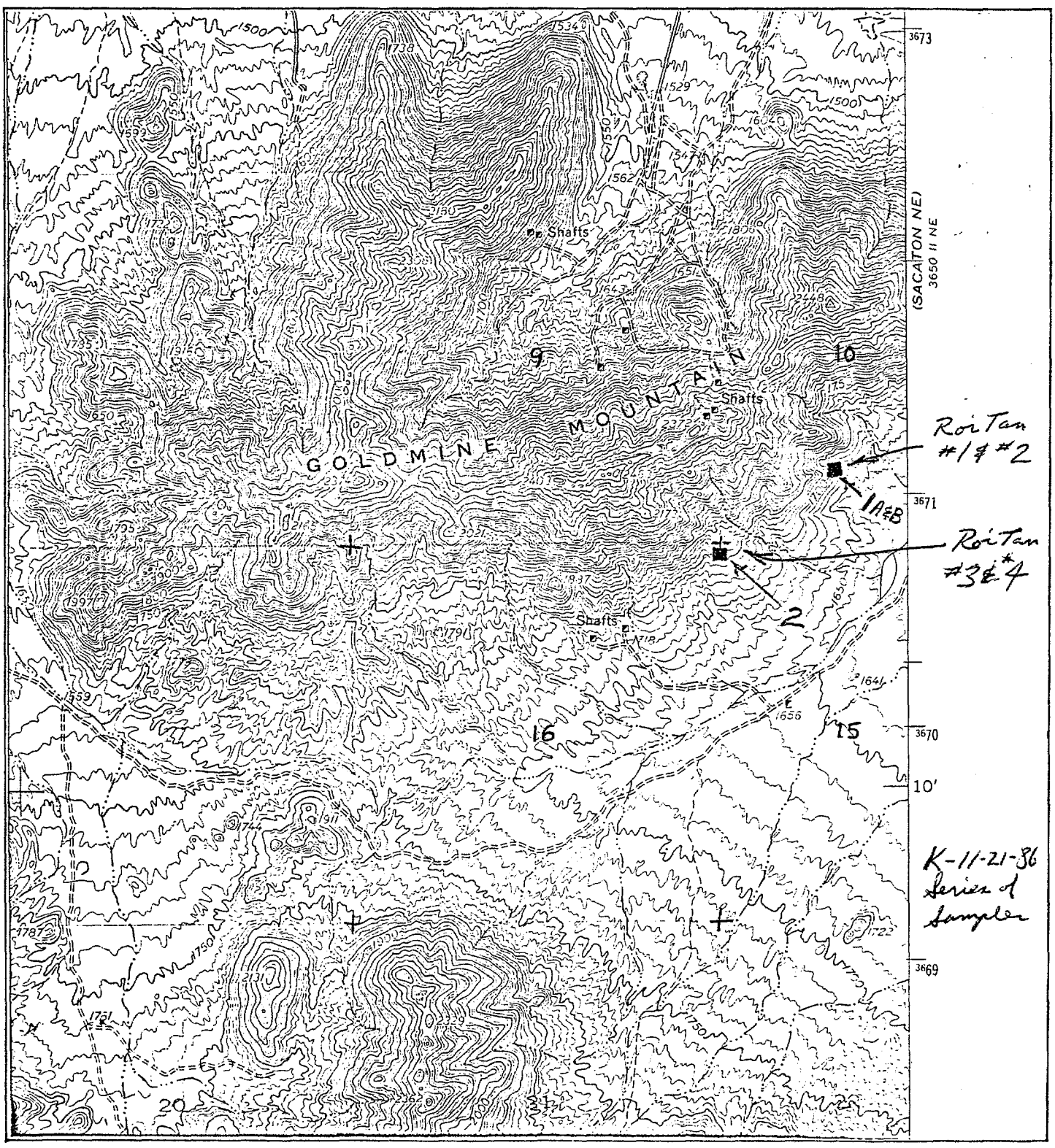
Hank Kreis

Henry G. Kreis
Senior Geologist

HGK:mek
encl.

cc: J.D. Sell

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703-0747
1150 North 7th Avenue (602) 792-3010



ASARCO Incorporated

1986 GOLD PROGRAM

AMS Sheet: MESA AZ
USGS Quad.: CHANDLER HEIGHTS (7½')

Twsp.: 3S **Rng.:** 7E **Sec.:** 10, 16

Prospect Name: GOLDMINE MTS, SE SIDE
Owner: R. ANDRADE

Examined by: H.G. KREIS
Follow-up Recommended: Yes☐ No☒
SCALE: 1" = 2000'

State: ARIZ
County: PINAL
District:

map no. _____ **date** 11/26/86

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. TAJ 469
December 5, 1986
K-11-21-86
PAGE 1 OF 1

Andrade

ASARCO INCORPORATED
Attn: Mr. H.G. Kreis
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 3 Rock Chip Samples

ITEM	SAMPLE NUMBER	Au (ppm)
1	K-11-21-86-1A	<.02
2	K-11-21-86-1B	.07
3	K-11-21-86-2	<.02

1 ppm = 0.03 oz/ton

cc: ASARCO INCORPORATED
Attn: Mr. James D. Sell
Southwestern Exploration
P.O. Box 5747
Tucson, Az 85703

ASARCO Incorporated
DEC 9 1986
SW Exploration

REGISTERED ASSAYER
CERTIFICATE NO.
9425
WILLIAM L.
LEHMBECK
SIGNED
ARIZONA

12/9/86

ANDRADE PROPERTY
GOLDMINE MTN., PINAL CO., ARIZ.
SEC 10 & 16 T3S, R7E

K-11-21-86-1A Dump sample (70' deep shaft)
Alt. bio dio., pale green color from weak to mod-stg musc.-ser alt; tr-1% qtz veining, 1/8% F.T.S. (py on fract.).

-1B Dump sample (30' deep shaft, 150' EST of -1A).
Muscov. schist, rare FeO_x on qtz vn.

-2 Dump sample. Mill to weak muscov.-ser. altered bio. qtz dio. (Qtz vein not included in sample; qtz vein w/ 1% F.T.S (pyrite) is 1' thk., N70°E strk. & vertical; vn in ≥4' thick fault zone

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

HG/K - alternating veins. contact Andrade and go look at the area and confirm the potential.

JDS 10/24/86

REPORT OF ANALYSIS

JOB NO. TAJ 465
October 20, 1986
#1A, #2A
PAGE 1 OF 1

ASARCO INCORPORATED
Attn: MR. JAMES D SELL
Southwestern Exploration
P.O. Box 5747
Tucson, Arizona 85703

Analysis of 2 Rock Chip Samples

ITEM	SAMPLE NO.	Au (ppm)	Ag. (ppm)
1	#1A	2.9	1.0
2	#2A	10.0	8.4

by Andrade
Grab Samples from area covered by 4 claims:
1A. Bleached, quartz + sericite in granite, with orange Fe-Ox throughout.
2A. quartz veins with broken and scattered seams of red-black Fe-Ox

North West of Casa Grande
Pinal Co., AZ.

William L. Lehmbeck
Manager
10/24/86

ASARCO Incorporated
OCT 22 1986
SW Exploration

Richard Andrade
PO Box 992
Casa Grande, AZ 85222
ph. 836-5998.

TAJ - 465

ORDER FOR ANALYTICAL SERVICES

Samples Sent to:

SKYLINE LABS, INC.
HAWLEY & HAWLEY, ASSAYERS AND CHEMISTS DIVISION
P.O. BOX 50106 • 1700 WEST GRANT ROAD
TUCSON, ARIZONA 85703
(602) 622-4836

W. Casa Grande
Andrade Property

Address Report To:

JAMES D. SELL
SWED, ASARCO
PO Box 5747
Tucson, AZ
85703

(Report and invoice in duplicate will be sent to above address unless otherwise instructed)

SHIPMENT NO.: _____
DATE SHIPPED: 10/10/86
SHIPPED VIA: hand
NO. OF CARTONS: _____
NO. OF SAMPLES: 2
(Information above helps us trace lost shipments)

Send Invoice To: _____

Send Copy of Report To: _____

PAYMENT FOR SERVICES REQUESTED MUST ACCOMPANY ORDER UNLESS CREDIT ARRANGED

LIST SAMPLE NOS.	DESCRIBE MATERIAL	LIST ELEMENTS TO BE DETERMINED (Give anticipated range of values, if possible) Describe any special sample preparation procedures desired.	INDICATE METHOD OF ANALYSIS*	✓ IF 31 – ELEMENT EMISSION SPEC SCAN DESIRED
#1A	rock	Au - Ag		
#2A	rock	" "		

INSTRUCTIONS *(Use Continuation Sheet If Necessary)*

*METHOD OF ANALYSIS: G-Geochem, Q-Quantitative or Routine Assay
W-Wet Assay, F-Fire Assay

†SAMPLE STORAGE: Pulps stored 90 days pending instructions, bulk rejects stored 30 days pending instructions.

Enclose yellow original with samples, send white copy by mail, retain pink copy. White copy will be returned to shipper as an acknowledgement that shipment has been received.

INDICATE DESIRED DISPOSITION OF SAMPLES AFTER ANALYSIS	Bulk Rejects	Pulp
Return at customer's expense via:		
Store temporarily pending instructions†	call me Thanks	
Discard immediately		

ACKNOWLEDGEMENT

JDS

ASARCO

Exploration Department
Southwestern United States Division
James D. Sell
Manager

June 22, 1987

Mr. John C. Munson
E.A. Wilcox Co.
174 Utah Avenue
So. San Francisco, CA 94080-6770

Silver Bell-Martinez Mines
Mineral Creek Mining District
Pinal County, Arizona

Dear Mr. Munson:

Please excuse my delay in answering your letter.

Asarco SWED would be interested in receiving any new data on the district that you might have for our reevaluation. Our file data stops in the mid-fifties when the interest in lead for the smelters disappeared.

An underground mine is not our preference at this time, but, perhaps, would be of interest for the precious metal content.

I'll look forward to your data package.

Sincerely,

James D. Sell

JDS:mek

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703
1150 North 7th Avenue (602) 792-3010

DAILY TERRITORIAL
February 10, 1988

Magma, Cyprus to explore locally for gold

ASARCO

Southwestern Exploration Division

Copy FTG sent 1/5/88 mek

December 11, 1987

FILE NOTE

Tiger Gold
Cyprus-Magma
Pinal County, AZ

At the AZ Conference of AIME, Dec. 7, 1987, I talked with Bob Hockett, special projects geologist for Magma. He stated that his boss told him to get into money making projects without spending any money.

At the Tiger portion of San Manuel, Magma had been mining the silicious capping for smelter flux as it had some gold in it. He had estimated that the veins and splits and gouge zones in the capping might contain 500,000 ounces of gold.

With the new San Manuel smelter going in, this type of silicious flux needs to be upgraded to a higher silica content and thus they were willing to take on a partner to mine the higher grade portions.

Cyprus Minerals has signed on to spend $2 million in exploration. They are going underground from the Mohawk shaft to define the possible tonnage-grade.

Bob said they have some zones up to 50' wide which carry 0.8 ounces per ton gold. They also have gouge zones which run 4-7 opt gold over six inches to two feet.

JDS:mek

James D. Sell

James D. Sell

cc: W.L. Kurtz

ASARCO

Southwestern Exploration Division

JDS

April 7, 1988

R.L. Brown
New York Office

Ray Mine Tour
SX/EW Plant

On March 16, 1988, John Balla and I visited the SX/EW operation at our Ray Mines Division for the purpose of familiarizing ourselves with this type of operation in regard to a similar plant of operation at our Heddleston deposit in Montana. Dennis Kerstiens who is the SX/EW Leaching Superintendent and Neil Nebeker who is the Silicate Plan Metallurgist conducted the tour. The tour included the crushing facilities, dump loading area, silica leach dumps and SX/EW plant. The tour was very informative and interesting. Both men did their best to answer any questions and should be commended for an excellent tour, the summary of which follows.

The leaching operation at the Ray Mine incorporates two circuits or "trains." The first circuit is from the silicate leach dump which is ore mined from the pit usually in excess of 1% copper, but is silicate so it can't be milled effectively. The second circuit or "train" runs off the sulfide waste dumps and assays in the order of .3 to .5% copper. These dumps are too low grade to send to the concentrator. These are being leached on a full time basis without regard to rock type, i.e., low-grade silicate and sulfide material. The concentration of the PLS (pregnant leach solution) in the silicate dump is in the order of 4-5 grams per liter of dissolved copper; conversely, the concentration of the PLS from the sulfide dump is in the order of 1 gram per liter of dissolved copper.

The silicate ore is mined from the pit, run through the primary crusher where it is reduced to -2½". It is then run through the secondary and tertiary crusher which is reduced to -3/4". At this point it is moved by conveyor up to the storage bins where the trucks will unload it and put it on to the leach dump. On the conveyor the ore is pre-wetted with a sulfuric acid solution in the order of 60 lbs. of acid per ton of ore. This solubilizes the copper in the ore up to 30 to 50% on the belt. It also agglomerates the fines. The ore is then added on to the leach dumps in 15' lifts which is then sprinkled with sulfuric acid. Leach cycle is 50 days long. The acid is applied in the order of .007 gallons/foot/minute or 20 gallons/liter H_2SO_4 along with 5 gallons/liter of ferrous and ferric sulfate to help in the leach process. Copper recovery is 65%.

On the sulfide side the low grade sulfide dumps are weathered, and due to the high iron content in the ore and the bacteria that is in the sulfide dumps, the ore is acid generating; the copper is leached on a continuous basis. One of the ways that the grade of the sulfide concentration is increased is by "cascading" which is taking the pregnant leach solution off the sulfide

dump and recirculating it back into the dump to increase the concentration. This, in effect, allows the ore to be leached more thoroughly, and thus increases the concentration of the pregnant leach.

The SX plant is designed to handle the two separate trains: the silicate train and the sulfide train. The silicate train being a higher grade in the order of 4 to 5 grams/liter of dissolved copper is handled in two extractions. The first extraction gets 60% of the dissolved copper, the second extraction gets 30% of the remaining dissolved copper, for a total of 90% of which 10% remains in solution and is pumped back to the silicate dump as a raffinate which is reapplied to the pads. Ninety percent extraction is completed, in other words all the copper is tied up into the organic compound. It is then stripped off within the SX plant to make an electrolyte which is shipped over to the tankhouse. Again, it takes two stripping operations on the silicate side and one on the sulfide side. The electrolyte is then pumped over to the tankhouse where starter sheets are added and the copper is plated onto the starter sheets. This electrowinning process generally takes 21 to 30 days, of which 250-280 pounds of cathode copper is produced/sheet.

It is probable in the case of Heddleston that the sulfide side of the SX operation is what we would generally be interested in, as we would probably not be producing a 4-5 gram/liter copper solution. The total tons of copper produced by the SX/EW plant is in the order of 100 tons per day, 75 tons being produced by the silicate side and 25 tons being produced by the sulfide side. In our scenario at Heddleston we are proposing a 15-20 tpd operation for the SX/EW plant, so we are looking at a much scaled down version as opposed to what the Ray Mine is operating on.

Some of the points of interest that Kerstiens and Nebeker brought up are that temperature is very critical in the SX plant. At 50°F and below there is a separation of the organic compound in the water and this affects the SX chemistry and reaction kinetics. In the case of Heddleston where temperatures will definitely be below 50°F, it will be necessary to warm the solutions or warm the building. Also, the height or thickness of the lifts on the pads is important because if the lift is too thick you will not get proper leaching throughout the pad, and, therefore, will not get good recovery. Location of the pads is critical too, in that organics affect the SX chemistry, so trees and bushes, etc. that get involved in the leach pad will affect the chemistry of the solutions which will affect the recovery in the SX plant.

The silicate pad at Ray is built on top of an old lake bed and sulfide dump, and the bottom 15-20' is composed of coarse quartzite boulders because they don't decompose and they are very stable. This layer of boulders acts like a French drain. The leachate fluids drain through the pile and come out through these little areas in the French drain and then are channeled into a big storage area which is then pumped down to the

SX plant. It is not hard to envision an operation like this at Heddleston on a smaller scale being highly efficient. The only thing that might cause some problems at Heddleston is the temperature. To get the maximum done on our leaching, we may have to leach in the warm months and then slow it up in the cold months. It probably also would be necessary to enclose our SX plant from the weather to make up for the cold months.

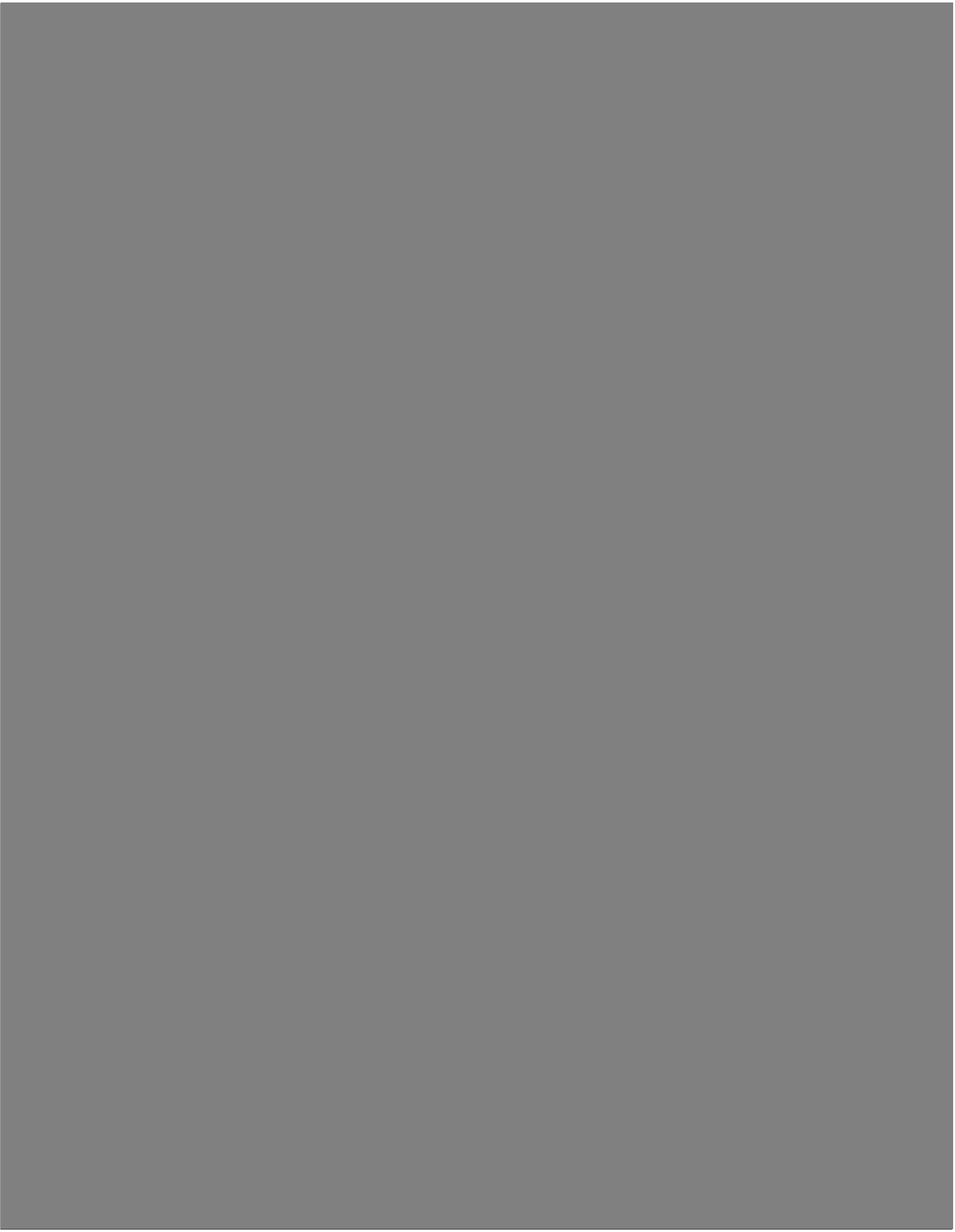
Ray Mines Division is well equipped to handle anything we could give them as far as testing on the Heddleston ores. As a matter of fact, they are quite anxious to try the Heddleston ores, since they will be mining chalcocite soon, and they would like to be able to leach the ore instead of sending it to the concentrator. They are equipped with 4", 6", and 10" leach columns. They have little mini SX plants for test work. They can do bottle-rolls and they have the know-how to conduct these tests in the proper fashion. If we can, in fact, prove out a reserve of 20 million tons of .7% copper or better at Heddleston and achieve a 65% recovery off the leach dumps, there seems to be little question that this could be a profitable operation, particularly in light of the SX/EW where cathode is produced right on the site.

Some of the other ideas mentioned as far as production of the product was copper powder and copper crystals which would not have the need of an electrowinning plant and might also cut costs. I guess this avenue needs to be explored further; assuming there is a market for it.

Mark A. Miller

MAM:mek

cc: W.L. Kurtz/J.D. Sell
J.C. Balla



Marine

LS&I Pellet Shipments Double to 7 Million Tons in 1987/88

Coal receipts also increase while limestone handled for first time

During mid-January, Lake Superior & Ishpeming Railroad Co. concluded the 1987/88 shipping season at its Presque Isle dock in Marquette, Mich., by handling the final cargo of iron ore pellets. The last shipment amounted to 26,980 gross tons of pellets loaded into the mv. *Charles E. Wilson* of the American Steamship Co. fleet that departed at 3:10 a.m. on Jan. 12 bound for McLouth Steel Products Co.'s plant in Trenton, Mich. In January, the tonnage aggregated 311,589 tons of pellets in 14 vessels.

For the calendar year of 1987, the final cargo was 19,498 gross tons of iron ore pellets placed aboard the *Frontenac* of the Canada Steamship Lines fleet departing from the LS&I's Presque Isle dock at 6:25 p.m. on Dec. 30 for The Algoma Steel Corp. Ltd.'s Steelworks division in Sault Ste. Marie.

During the 1987/88 season, shipments of iron ore pellets by LS&I totaled 7,062,259 gross tons in 308 cargoes loaded out at the Presque Isle dock, nearly double the 3,573,564 tons in the 1986/87 period. For the calendar year, the tonnage amounted to 6,773,431 tons in 295 cargoes.

In addition to iron ore pellet shipments, coal and limestone were received in 1987 at the Presque Isle dock with 1,569,417 tons of the former discharged from 58 vessels and 462,246 tons of the latter unloaded in 19 cargoes. During 1986, coal receipts were 945,819 tons, while limestone is a new commodity handled for the first time in 1987.

Rising Iron Ore/Coal Demand Lifts Duluth-Superior Port Tally

Cargoes handled in 1987 measure nearly 7.3 million tons over 1986 total

The port of Duluth-Superior handled 34,597,868 metric tons of waterborne commerce during the 1987 season, an increase of nearly 7.3 million tons over 1986 and 6.5 million tons ahead of the five-year average.

The Seaway Port Authority of Duluth credited increases in shipments of iron ore and coal for the rise in tonnage for the year. Domestic imports and exports last year totaled 30,249,688 tons, 8.3 million more than in 1986.

An increased demand for iron ore and taconite by the domestic steel industry pushed shipments from the Duluth Missabe & Iron Range docks and the Burlington Northern Taconite facility in Superior to 19,124,525 metric tons, compared with 14,448,970 tons in 1986.

Coal and coke shipments to and from the port totaled 10,371,665 metric tons last year, an increase of nearly 3 million tons over the previous year.

Grain shipments were slightly behind the 1986 season: 3,190,892 metric tons in 1987, compared with 3,291,732 the previous year.

General cargo decreased significantly in 1987: 66,946 metric tons compared with 175,108 tons in 1986. Port marketing director Sam L. Browman attributed the drop primarily to a decrease in P.L. 480 (Food for Peace) agricultural shipments by the federal government.

A total of 1143 vessels called at the port last year, 208 more than during the 1986 season. Seventeen nations were represented by the "salties", with Panama leading with 28 arrivals, followed by Greece with 24.

The last vessel of the season, the bulk carrier *American Mariner*, cleared the Superior entry Jan. 7. The last foreign vessel to leave Duluth-Superior was the Greek-registered *Maria G.L.*, which departed Dec. 12.

CSX Handles Last Vessel Cargo Dec. 24 at Torco Pellet Dock

Receipts total 3,269,520 G. T.

On Dec. 24, CSX Transportation completed the 1987 season of receiving and transshipping iron ore pellets at its Torco pellet terminal at the port of Toledo by handling the final cargo. At 6:25 p.m., the str. *Reserve* of Oglebay Norton Co.'s Columbia Transportation division fleet arrived at the Torco dock and commenced discharging the last shipment amounting to 23,619 gross tons of Hibbing Taconite Co. pellets loaded in Superior, Wis.

During the 1987 season, 3,269,520 gross tons of pellets were received in 137 vessel cargoes at the Torco dock consisting of 1,773,052 tons of Eveleth pellets and 1,496,468 tons of Hibbing pellets. A total of 3,460,900 gross tons of pellets was transshipped in rail cars for transportation to interior steel mills, with 115,458 tons of pellets remaining in stockpile at year-end.

In the previous 1986 season, receipts of pellets totaled 2,829,373 gross tons with 2,770,970 tons transferred to rail cars and 288,054 tons left in stockpile on Dec. 31, 1986.

JDS

ASARCO

Exploration Department
Southwestern United States Division
James D. Sell
Manager

February 1, 1989

Mr. Clay Worst
5289 E. Apache Trail, Hwy 88
Apache Junction, AZ 85219

Dear Sir:

Your very historical information packet on the Goldfields Mine area has been received.

At the present time I would not be interested in reviewing your large data package in that it is unlikely that we would want to conduct exploration within this area at this time.

Thank you for sending the summary information, and should you have a similar package in a more workable area, Asarco would be pleased to review the data.

Sincerely,

James D. Sell

JDS:mek

cc: W.L. Kurtz

ASARCO Incorporated P. O. Box 5747 Tucson, Az 85703-0747
1150 North 7th Avenue (602) 792-3010

ASARCO

Southwestern Exploration Division

JDS

February 16, 1989

FILE NOTE

Chillito Area
Pinal County, AZ

On 2/15/89 I had lunch with Eberhard (Hardy) Schmidt, consulting geologist, out of Spokane, WA.

Hardy is consulting for Cyprus Gold and evaluating the Christmas area for them. Cyprus acquired Christmas when they bought Inspiration.

His early interpretation is that some potential exists both in the Devonian limestone of the London and Arizona workings as well as the underlying quartzites. The quartzites were mined for silica flux at Chillito.

James D. Sell

JDS:mek

cc: W.L. Kurtz
S.A. Anzalone

ASARCO

Southwestern Exploration Division

JDS

February 10, 1989

FILE NOTE

Tiger Gold
Cyprus-Magma
Pinal County, AZ

After a breakfast meeting of the Arizona Geological Survey I chatted with Bob Hockett, special projects geologist for Magma, now retired.

Bob stated that Cyprus Gold may pull out of the Tiger project as their deal was:

1. Magma to contribute the land
2. Cyprus to fund all expenditures through production
3. Profits to be split 50/50.

Bob believes Cyprus has defined some 10 million tons of 0.06 opt gold along the 2500 feet of vein system.

Unfortunately, the Magma SWEW plant is close to the projected pit area and limits any pit to some 250 foot of depth in vicinity to the plant and leach pads. The remaining reserve in this area would need to be by underground methods.

Also Bob believes a slot-cave system might be the way to mine the whole zone from bottom to top.

Based on his thoughts, he believes the gold and other elements in the "gold system" were remobilized from the lower grade porphyry cap with the late rhyolite dike system (steep dips, 25-29 my of age - long after the laramide porphyry system was emplaced) providing the heat pump for the circulation and transport of metals into the prepared structural vein zones and wallrock.

James D. Sell

JDS:mek

cc: W.L. Kurtz

JDS

ASARCO

Southwestern Exploration Division

March 12, 1990

File Note

White Cliffs Diatomite Deposit
Sections 18-19, T9S, R18E
Mammoth Area
Pinal County, Arizona

John D. Shenk brought in a black-line print of his nine square mile Master's thesis mapping problem. The map and accompanying cross-sections are placed in the drafting file drawers until a copy of his thesis can be secured.

The thesis is in press, has been defended, and he will secure the degree this spring. Dr. John Guilbert was the principal advisor.

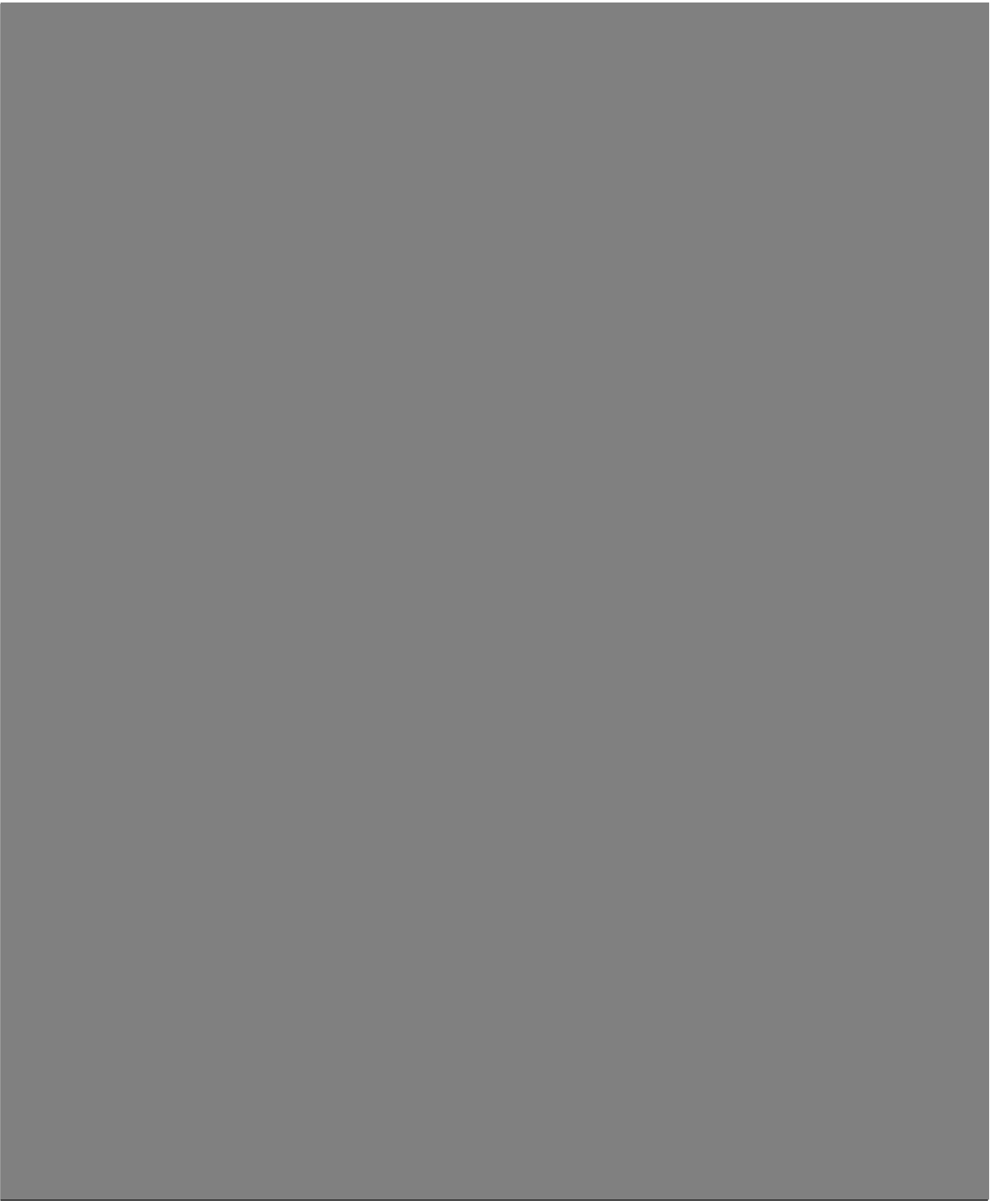
Based on detailed stratigraphic sections Shenk believes he has located a new area which may have up to 6 million tons of 70% diatomite, under shallow silt cover. The area is owned by the University of Arizona and has been leased the past few years to a group that is scratching around on the outcropping units to the west. As they have not paid the UofA other than the minimum, the lease may be available.

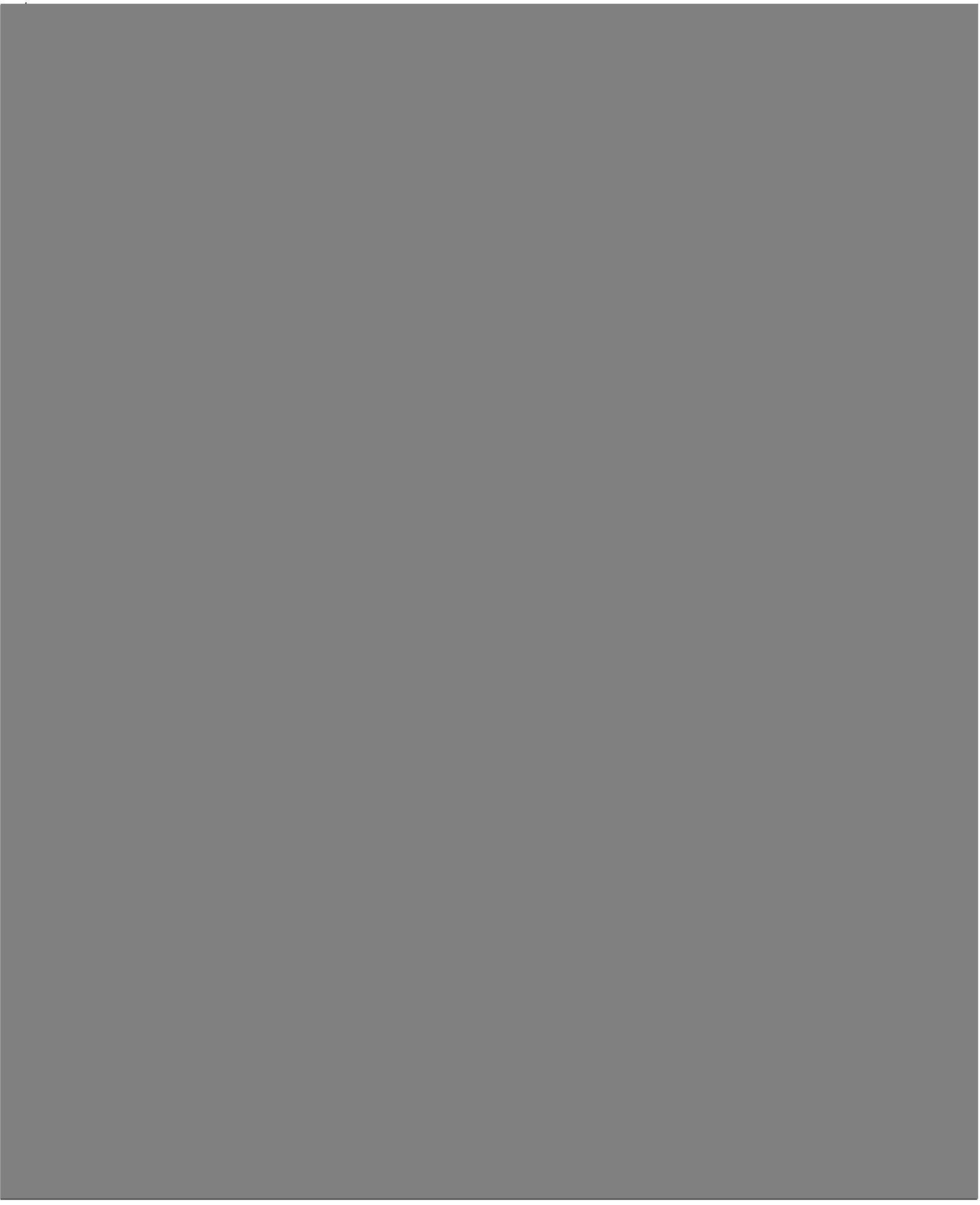
James D. Sell

JDS:mek

James D. Sell

cc: W.L. Kurtz
M.A. McClave
F.T. Graybeal





ASARCO

Exploration Department
Southwestern United States Division

May 10, 1991

Mr. Clay Worst
5289 E. Apache Trail
Apache Junction, Arizona 85219

Dear Mr. Worst:

Rex Thompson recently sent me a short summary of the property and geology compiled by you in the Goldfield District. In checking our files, we have evaluated the area several times, lastly, back in 1983. We also have a submittal from you in 1989 in our files.

In looking at the location map, I can see that urban sprawl is proceeding in your area, and the possibilities of permitting an open pit of the size we would be considering (assuming the ore is present) would be extremely remote.

If you do decide to proceed with production our smelter in Hayden, Arizona, might buy the ore as silica flux and pay you for the contained gold.

From an exploration point of view, however, I think we will again decline you offer to evaluate the property. Incidentally, your chronologic accounting of the property situation was very interesting.

Thank you for considering Asarco.

Respectfully,

MAM:mek

Mark A. Miller
Geologist

cc: Rex Thompson
J.D. Sell

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