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James Doyle Sell Mining Collection

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ASARCO

Southwestern Exploration Division

October 7, 1976

FILE MEMORANDUM

Sol Property
AMAX Exploration
Graham County, Arizona

Charlie Miller of AMAX called on 6/8/76 concerning a possible joint venture of their Sol Prospect. On 6/11/76, W. L. Kurtz, F. T. Graybeal, and J. D. Sell inspected the Sol data, but not the core, in the AMAX office. This memo is from the inspection and conversations.

The Sol Prospect is 15 miles E and NE of Safford along the Morenci highway and is covered by 512 unpatented claims. The surface geology is post-mineral basalt and gravel cover with some valley lake beds. The post-mineral cover varies from 200 to 500 feet in thickness. The target area was found in 1971 with a gravity anomaly and follow-up IP work. Drilling since that date has been: AMAX 4 holes, Phelps Dodge 12 holes, and Quintana 2 holes. All but one penetrated the valley fill deposits and most holes were between 2 and 3 thousand feet in depth. The deepest hole was 3600 feet with a bottom hole temperature of 70°C. A bedrock high extends north-south under the Sol VABM and drops off quickly to the east. An Exxon hole to the east bottomed in gravels at a depth in excess of 3000 feet.

The drilling has defined a steeply dipping, thousand-foot-wide granodiorite dike trending N10°E. The dike cuts a sequence of metavolcanics and volcaniclastics which strike N20°W and dip SW. The bedrock suface dips to the SW.

Centered on the south end of the granodiorite is an elliptical potassic zone 3000 x 4500 feet elongated N10°E, containing 1-3% pyrite; surrounded by a phyllic zone 4000 x 7000 feet with 3-8% pyrite; followed by a propylitic zone of 1-5% pyrite. The alteration zone of interest is 6000 x 9000 feet, containing 1-8% pyrite. Copper within the zone assays between 0.05 and 0.06% copper. The best ten-foot run in the potassic zone returned 0.46% copper while the best ten-foot run in the phyllic zone returned 0.68% copper.

The alteration is dominantly sericite-carbonate-chlorite-epidote with or without quartz. Although coarse breccia and retrograde alteration is extensive at KCC Safford and PD Dos Pobres, they are only locally developed at the Sol Prospect. The anomalous mineralization is near the phyllic-potassic contact and within the metavolcanic-volcaniclastic sequence. Molybdenum is anomalous in the phyllic zone. Inferred mineral resource at Sol is 54 million tons at 0.14% copper with a 0.10% cutoff.

AMAX and PD drilled 41,967 feet of rotary and core footage. Of this PD in 12 holes drilled 26,460 feet at a total cost of $420,000.00.

Two age dates have been determined. Hole SOL-4 sampled weakly mesozonally altered granodiorite with less than 4% secondary biotite. The whole rock K-Ar date is 60.7±2.4 m.y. Hole Sol-6 sampled sericitized metavolcanics at a depth of 1,558 feet. The age of sericite K-Ar is 67.5 ± 2.9 m.y.

The Sol alteration zone is the second largest in the Safford district. The phyllic zone is similar to the KCC zone but not to the PD zone.

Other tonnage-grade figures for the district include:

KCC Safford	2 billion tons at 0.20% copper
PD Dos Pobres	400 million tons at 0.72% copper
ICC Sanchez	80 million tons at 0.36% copper
San Juan	50 million tons at 0.52% copper

James D. Sell

JDS:lb

cc: FTGraybeal
WLKurtz

Notes on AMAX "SOL" property ~~out~~ of Safford 6/11/76

Located in section 19, T7S, R28E + Sec. 24, T7S, R27E.
32°48'30"N ; 109°32°W

Holes drilled since 1971 when gravity anomaly, IP work etc. started.

AMAX 4
PD 12
Quintana 2
18 — one did not get out of valley fill.

Also ½ dozen or so holes on State Prospecting permits etc.
holes generally 2-3000 ft deep.
Valley lake beds ~~200~~-500 feet thick
Top of sulfide 700-1200 ft below ~~top of BR~~ surface.
25,000 ft total core with 10,000 ft of premineral

Age dates:
Hole Sol 4 in weak mesozonally altered (<4% secondary biotite) granodiorite. Whole rock KAr = 60.7 ± 2.4 m.y.
Hole Sol 6 in sericitized metavolcanics at depth of 1,558 feet, sericite K-Ar = 67.5 ± 2.9 m.y.

Outline:
Phyllic zone plan: 4000 x 7000, elongated N10°W, 3-8% py.
Potassic core zone plan: 3000 x 4500, " " ", 1-3% py.
± 1000 ft wide granodiorite "dike" centered on alteration but cut then and extends to far? N10E out into propylitic zone.
± 54 mill tons of 0.14% Cu w/ 0.10% cut off.

SOL 19-24

4 + 12 + 2

25,000 total core

10,000 [illegible]

Sulf 700-1200 below surface

general 2-3,000' holes

[illegible]

1. 2202.4 T.D. Top, stringers w/ clay-seri
middle, disseminated, strong seri, [illegible]
bottom wk chloritization w/ weak to wk diss [illegible]

2. T.D. top, diss w/ chlorite-epid
middle " w/ seri & some chl.

5. To SW of nose [illegible] TKVS ~~from~~ 1398 ~~[illegible]~~ 2667. TD in prop. and pog at 3582.

4. hit [illegible] at 970'.

18. S of #4 Quit to 2950 TD in volcaniclastic [illegible] etc.

Sol 4 weak [illegible] altered (<4% [illegible] hb) granodiorite whole rock KAr (0.7 ± 2.4

Sol 6 sericitized metavolcanics (1,558 ft), sericite 67.5 ± 2.9

ASARCO EXPLORATION RECORD

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

PCD#

Section I General Indexing

(1) Name(s) of Property or Area: SOL Owner: AMAX	(2) Country: USA	(3) State or Province: Az
	(4) Co. or Map Sheet: Graham	(5) File or Gore No.

(6) Latitude	(7) Longitude	(8) Mer.	Tws.	Rng.	Sec.	(9) Examined by	(10) Date
32°48'30" N	109°32' W	G+SR	7S	27E	24	WLK, FTG, JDS	6/11/74
			7S	28E	19	(11) Office 1	(12) Field Days

Section II Sources of Information

(13) References Author	Date	Title	Publications	Vol. No.
Files of AMAX Submittal, 1974.				

Section III Appraisal

(14) Recommendations
- ☐ Action Now
- ☒ Too Low Grade
- ☐ Too Small
- ☐ Ownership Problem
- ☐ Access Problem
- ☐

(15)
- ☐ Past Producer
- ☐ Producer
- ☐ Mineral Deposit
- ☒ Prospect
- ☐

- ☐
- ☐ Geologic Concept
- ☐ Geochem Anomaly
- ☒ Geophy. Anomaly
- ☐

(16) Production

Commodity	Tons	Grade

(17) Reserves ☐ Measured ☒ Estimated

Commodity	Tons	Grade
Copper	54 million	0.14%

(18) Num. Drill Holes 18
Approx. Total Footage 42,000 +

(19) Excavations

(20) Spectro. Analysis Attached

(21) Assays Attached

(22) Geochem Results Attached

Section IV Geologic Data

(23) Commodity or Contained Metals: copper

(24) Ore Minerals - Major: Minor: chalcopyrite

(25) Host Rocks - Major: Granodiorite, metavolcanics Minor:

(26) Age of Host Rocks: Gd, whole rock 60.7 ± 2.4 my - Metavolc. sericite 67.5 ± 2.9 m.y.

(27) Nature of Exposures: Completely covered by alluvial fill or Quaternary basalts

(28) Alteration: potassic core → phyllic → ~~propylitic~~ propylitic

(29) Total Extent: phyllic 4000 x 7000 ft, elongated N10E

(30) Structure: ±1000 foot wide granodiorite "dike" centered on alteration pattern, but continues into propylitic zone.

(31) Ore Occurrence (Size): phyllic zone contains 3-8% pyrite; "ore" on contact of gd-metavolc ~~volcaniclastic~~ with some 54 million tons of 0.14% inferred.

(32) Age of Mineralization: ± 60 my.

(33) Conclusions and Recommendations — Depth to Mineralization

Very large alteration zone with very low copper values associated with moderate to high pyrite values. Top of sulfides 700-1200 feet below surface with around 500 feet of leached capping. Capping thickness increases to NE.

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

March 17, 1975

FILE MEMORANDUM

Quintana Drilling
Safford District, Arizona

W. E. Saegart was in on the morning of March 14, 1975 to see Tony Kroha. He stopped in for coffee, while waiting, and mentioned that Quintana was on the seventh hole at Safford and this would probably be the last and they would pull out of the district.

Apparently one hole was very encouraging, but subsequent follow-up could not extend the values.

James D Sell
J. D. Sell

JDS:lb

cc: WLKurtz

ASARCO

Southwestern Exploration Division

September 30, 1977

FILE MEMO

Towne Mines
Safford Project
Graham County, Arizona

Rumor is that CONOCO has a Boyles Brothers rig on Towne Mines' Ben Hur property north of Safford.

J. D. Sell

JDS:lb

cc: SRDavis

ASARCO

Southwestern Exploration Division

January 5, 1982

TO: FILE

FROM: J.D. Sell

Lindsey Canyon Area
Clark Mining District
Graham County, Arizona

Mr. S.R. Davis of the ASARCO office submitted a report on the subject area, dated November 2, 1973. It was of interest to read a paper in G.S.A. about the same area. This was:

> "The Eagle Pass detachment, southeastern Arizona: Product of mid-Miocene listric[?] normal faulting in the southern Basin and Range," by George H. Davis and James J. Hardy, Jr. Geol. Soc. of Amer. Bulletin, Part I, volume 92, p. 749-762, 14 figures, 1 table, October 1981.

Hardy had mapped it as his Master's thesis at the University of Arizona under George Davis' supervision, and was mainly interested in the structural significance of the area.

JDS/mlm

c: W.D. Payne

ASARCO

Southwestern Exploration Division

May 7, 1982

Memorandum

To: File

From: N. P. Whaley

Skyview Project
Graham County, Arizona
Larson/(GRL) Construction Company
Invoice controversies

Hopefully these phoenix-like controversies have been laid to rest by Graham M. Clark, Jr.'s letter to GRL Construction Company dated February 25, 1982 (copy attached). If they have not, the comprehensive histories are contained in my letters to Larson Construction Company and GRL Construction Company, both dated April 10, 1980. Copies of these letters can be found in my drilling projects files which are stored in room 3 in the basement. They will be found under SKYVIEW - OPERATIONS.

Copies of my letters of April 10, 1980 with all supporting enclosures had been directed to T. C. Benavidez, F. T. Graybeal, H. G. Kreis, and C. D. Newton of our company.

N. P. Whaley

N. P. Whaley

NPW/cg

Attachment

cc: GMClark, Jr.
HGKreis, w/attach.
CDNewton, W/attach.
JDSell, w/attach.

ASARCO

Legal Department
Graham M. Clark, Jr.
Assistant General Counsel

February 25, 1982

GRL Construction Company
203 5th Street
Safford, AZ 85546

Attention: Kent Larson

Gentlemen:

By your letter of January 15, 1982, you inquired about an unresolved open notice you show on your books concerning work done by GRL for Asarco at a drill site in the Gila Mountains north of Safford, Arizona. In response, I call your attention to a letter from Mr. N.P. Whaley of April 10, 1980, a copy of which is enclosed, indicating that Asarco disputed portions of your invoice to us of $13,190.41. The letter indicated the areas of dispute in the invoice and offered as payment in full $10,771.88. Subsequently, the check was cashed.

It is Asarco's position that all accounts with GRL Construction Company are settled, and there is no outstanding balance due.

Very truly yours,

Graham M. Clark

Graham M. Clark, Jr.

GMC:jm
Encl.
cc: NPWhaley

Graham Co

FROM: W. L. KURTZ

P.D- Safford
Aug 8, 1983

TO: RL Brown

JJ Sell reports that PD will consider disposing of PD Safford (Dos Pobres) — as you recall original reported reserves were ± 225 M @ .92 Cu as buy cpy

Considerable dev. has been done — shafts, rooms, trial block cave that did not work (too small a try?)

Any interest for us to acquire and make study with help of Mining Department

cc: JJ Sell/SA Anzalone

Gave info to [illegible] 3/14/85 [illegible]

Phone call from:

DWEY WILKINS, DUNCAN, AZ.

359-2043

WANTS a GEOLOGIST TO LOOK AT HIS SiO_2 (Quartz) PROJECT (WITH 3.02/AG (Silver) and .03 OZS/AU. (Gold)
LOCATED NEAR Ash Peak about 14 miles from Duncan.

Possibly the Denver crew, if in Lordsburg can take care of this

P. Barlow

[signature]

FOR SiO_2 Flux (EL PASO Smelter)

Tony Dalla Vista spoke with Mr. Wilkins & said to call Denver Office they might have someone in the area.

mk

303-234-9462

T. I. Probert
Director-Engineering

Safford Deposit
SLC Visit
11/6/86 w/ J Angelone

100 mill prestrip
then 3/1 w/o ratio
Reserve 66 mill ton @ 0.8% Cu, mainly oxide
C Phillips, verbal 11/6/86

Oct 17, 1986 T I Probert from C H Phillips

66.3 million tons at 0.79% Cu with 0.58% readily soluble; 336 million tons waste.

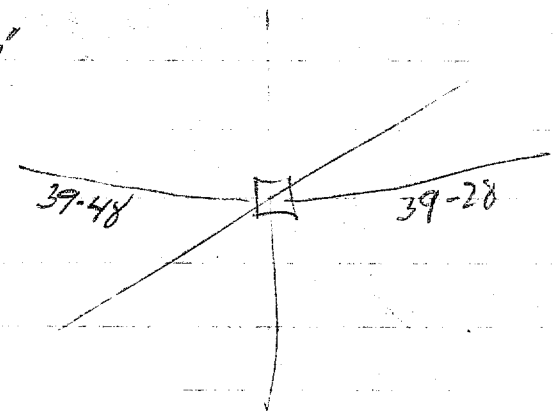
116.7 million tons prestripping with 120 deep of 1.0% plus of ore available.

Stripping ratio 5.07 overall; 3.31 after prestrip.

Section 12,750 thru 15,000. 45° pit walls.

Sec 13,750 NE ± centered dep looking NE.

top of ore 4500'
base ± 3000'



main drilled zone
Sec 5, T6S, R27E
N of Safford Airport

DH 39-28 from collar

210' – 0.67 total – 0.51 adj.
100' – 0.27 – 0.17
110' – 0.52 – 0.42
590 – 0.71 – 0.51
76' – 0.13 – 0.03

990' – 0.63 – 0.47

DH 39-48

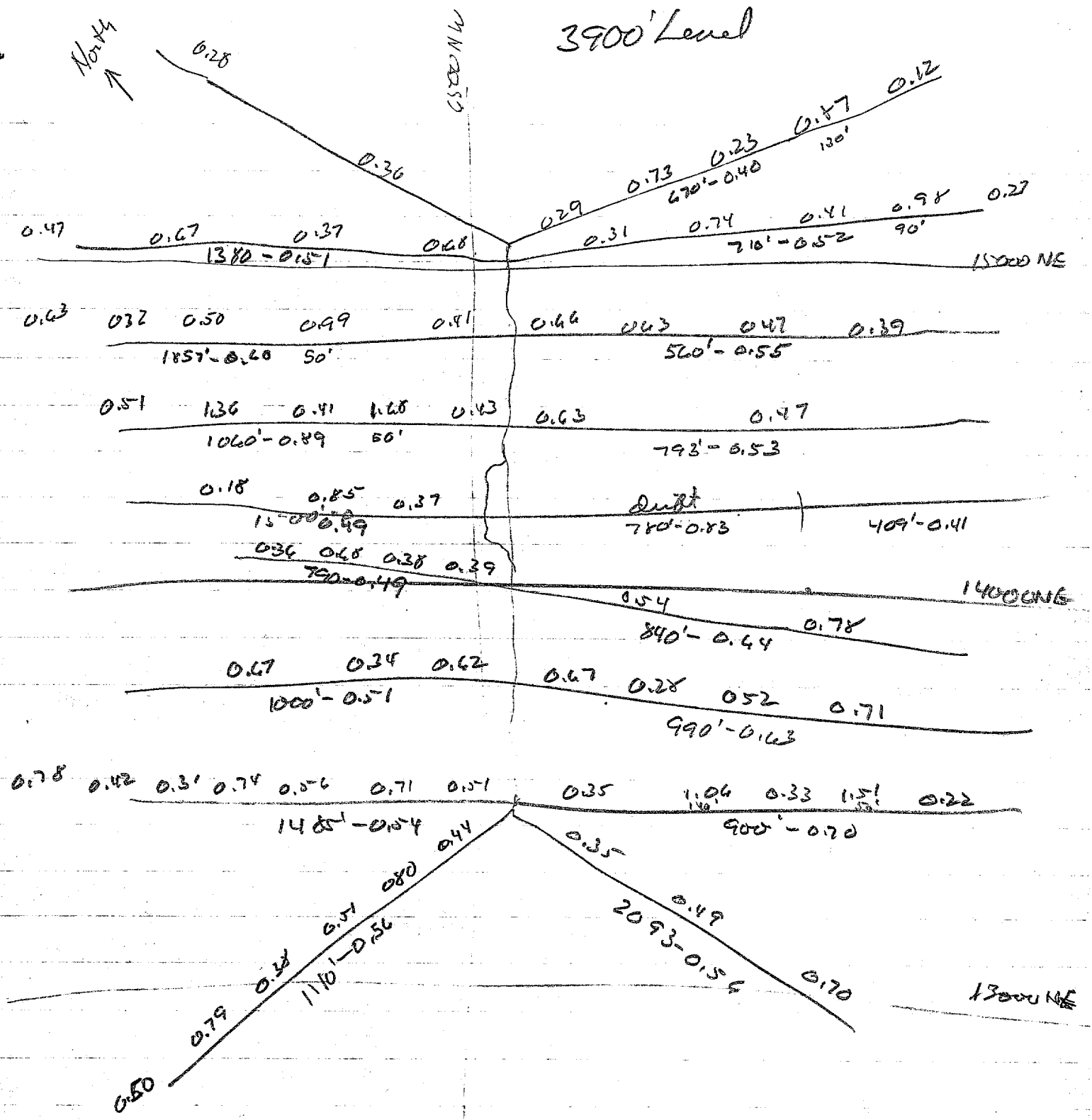
260' – 0.60 – 049
430' – 0.34 – 0.25
310 – 0.67 – 0.54

1000' – 0.51 – 0.40

1182' – 0.28 – blk.

Roger K. Andrews
Mgr., Prospect Portfolio
Kennecott, SLC

Charlie H. Phillips
Consultant for KCC, SLC



1" = 50' Scale map.
AMC 6/10/41

Sheet 1 of 2

I G Pickering Sept 8, 1972

John E Welch

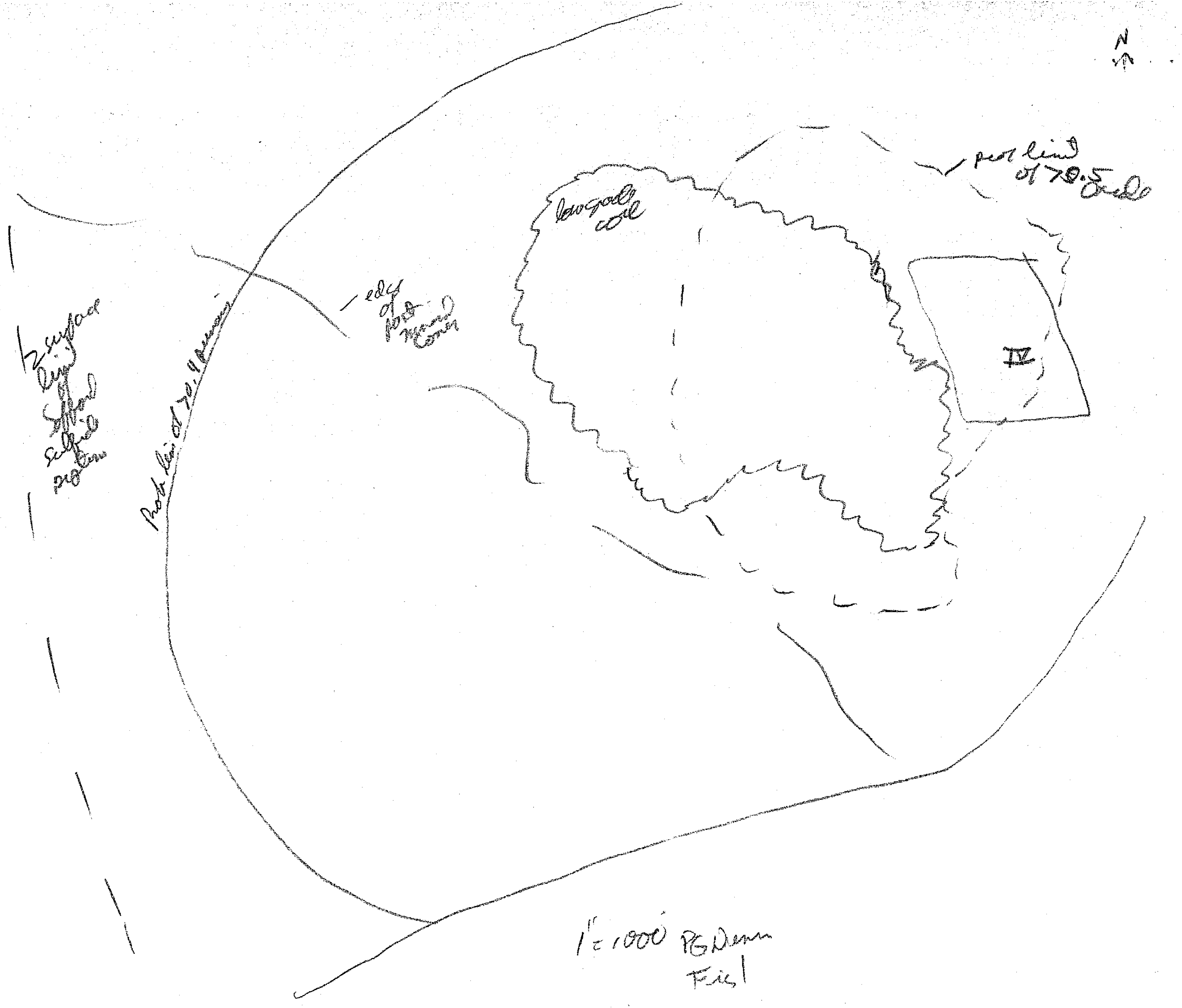
Probable Primary & Chalcocite Reserves

Kennecott - Safford Deposit

Graham Co, AZ

The probable primary reserves are calculated as 1,000 million tons of 0.57% Cu. These reserves are in three areas of the deposit and include the an upper and lower zone in Area I. The probable chalcocite reserves are calculated as 92 million tons of 0.61% ore in Area II. The total probable reserves are 1,100 million tons of 0.57% Cu. The data are based on intercepts in 15 drill holes. The drill holes are shown in the plan map & the zone of mineralization on sections.

Cover letter ↑ of report to JEW from PG Dennis Sept 1, 1972


N
IV
1" = 1000'
PG Dunn
Fig 1

ASARCO

Southwestern Exploration Division

JDS

December 4, 1986

FILE NOTE

Kennecott Copper Corporation's
Safford Copper Deposit
Graham County, AZ

During the AGS meeting on December 2, 1986, I chatted with two PD geologists and was informed that PD now has the KCC Safford copper deposit.

The deposit was apparently "given" to PD to sooth the rough feelings generated by a large slide into the Chino Pit after the price was agreed upon.

James D. Sell

JDS:mek

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

JDS

ASARCO

Mining Department

November 24, 1986

ASARCO Incorporated

NOV 25 1986

SW Exploration

Mr. R. J. Kupsch, V. P.
Mining Department
NEW YORK OFFICE

Kennecott Copper Corporation's
Safford Copper Deposit
Graham County, Arizona

On November 6, 1986, a visit was made to Kennecott Copper Corporation's Research Center in Salt Lake City to review geological data and ore reserve figures from their Safford, Arizona, copper deposit. This review was undertaken to determine if the Safford copper deposit contains sufficient economic potential to justify acquisition by Asarco. The writer was accompanied by Mr. J. D. Sell of Asarco's Southwestern Exploration Department.

Summary

After reviewing geological and assay cross-sections and plans along with engineering, ore reserve, and environmental data, it does not appear that the Safford copper deposit has sufficient economic potential under current or near future economic conditions to warrant acquisition by Asarco.

The deposit is a large, low-grade, zoned porphyry copper system with an erratic enrichment zone and copper oxide capping. The entire deposit is covered by an extensive and thick basalt cap. It has a mineral inventory of ±2 billion tons assaying 0.41% Cu at a 0.20% Cu cutoff. KCC has concluded, and we agree, that a profitable mining operation cannot be established using currently available mining technology. The three principal deterrents to a successful venture at Safford are (1) the low-grade, erratic, and discontinuous nature of the ore-grade material; (2) the presence of three types of ore (oxide, mixed oxide and sulfide, and sulfide) requiring separate treatment plants with resulting high capital costs; and (3) the excessive depth at which the deposit is buried.

Discussion

cc
KSS has recognized the difficulties presented in attempting to mine the larger sulfide and oxide portion of the Safford deposit and has recently evaluated the possibility of developing a smaller open pit on the shallowest part of the oxide cap covering the deposit.

A recent study by C. H. Phillips, consultant and former KCC employee, has outlined a 66 million ton oxide reserve assaying 0.79% total copper with 0.58% readily-soluble copper. Reaching this oxide reserve requires a pre-stripping of 116 million tons of waste. 336 million additional tons of waste must be removed during mining of oxide material for a total waste-ore ratio of 5.07 to 1. Phillips uses a 45° pit slope which may be too steep and does not include main haul ramps. It is difficult to see how this plan could become a profitable venture.

KCC attempted to in-situ leach a deep (+3,000 feet) section of the primary copper-sulfide material lying adjacent to the main Safford deposit. The KCC personnel we spoke with said they had spent in excess of $10 million on the venture and it was clearly unsuccessful.

If in-situ leaching of poorly-fractured copper-oxide ores were an established, economically-viable procedure, the oxide cap at Safford might offer a suitable target.

Preliminary tests were also conducted on in-situ leaching of the oxide zone and capturing the leach solution in the underground workings, "but the fractures were inadequate for in-place leaching of copper without additional breaking of the rock." There is also some question about the environmental problems that might result from an in-situ leach operation in the area. Migration of leach solution into the alluvial aquifer feeding the Gila River above Safford appears to be a possibility. This could be obviated by a series of interceptor wells, but these would be costly. In-situ leaching of the Safford deposit does not appear to be a cost-effective option at this time.

Location

The Safford deposit is located in the Lone Star Mining District, 9 miles northeast of the town of Safford, Graham County, Arizona. It lies in the Gila Mountain range at an elevation ranging from 4,500 to 5,500 feet. The climate is typical of the upper Sonoran Desert, receiving from 8.5 to 12 inches of rainfall a year.

Property Description

KCC presently holds and/or owns the following properties, all of which are in the Lone Star Mining District, Graham County, Arizona:

1.	Patented mining claims	1,436.77 acres
2.	Mineral and surface rights for other patented lands acquired by exchange with the federal government	9,044.83 acres

(Property Description, cont.)

3.	State mining leases of 20 acres each	320.00 acres
4.	Unpatented lode mining claims, one of which was purchased from an individual	367 claims
5.	Lands for which application has been made and decision is still pending for exchange with the federal government	502.38 acres

Annual direct maintenance costs are estimated at $38,000 for assessment work on Federal unpatented claims and for work commitments on State leases, plus $17,000 for taxes on patented land for a total annual direct cost of $55,000.

Geology

Porphyry copper mineralizaiton at Safford occurs in Cretaceous andesitic volcanics that are known from drilling to be greater than 4,000 feet in thickness. The andesites are intruded by acid-to-intermediate stocks and plugs of Laramide age, and by a well-developed Laramide dike swarm that intrudes a northeast-trending shear zone in the andesites. The dikes are predominantly latitic in composition.

Premineral rocks at Safford crop out within a northwest-southeast elongated "window" that is about 10 miles long and 2 miles wide. To the northeast, Tertiary basaltic volcanics that form the Gila Mountains cover the premineral rocks, and to the southwest, premineral rocks are covered by the extensive gravels that fill the Safford valley.

After deposition, the mineralization was exposed to oxidation, leaching, and enrichment. Because the primary sulfide mineralization consisted mainly of chalcopyrite with only lesser amount of pyrite (±1%), "the chalcocite blanket formed was probably spotty and erratic." Only remnants of this enriched secondary zone now exist due to later periods of uplift, associated with movement along strong faults cutting the deposit. This structural disturbance resulted in very deep oxidation and leaching. The leached zone itself varies from 0 to 950 feet and averages 440 feet thick.

Primary minerals consist principally of pyrite and chalcopyrite with lesser amounts of bornite, molybdenite and rare tetrahedrite, galena and sphalerite. Secondary sulfides include chalcocite and covellite. Chrysocolla is the most abundant oxide in the deposit. Malachite, brocanthite, cuprite, tenorite, native copper, and chalcotrichite occur in lesser amounts.

Reserves

Bear Creek's computer-generated reserve using all available data, without regard to specific mining plans or stripping ratio as follows:

Cutoff Grade (% Total Copper)	Tonnage	% Total Copper
0.20	2,099,040,000	0.413
0.35	1,209,760,000	0.518
0.40	953,120,000	0.559
0.45	747,520,000	0.598
0.50	567,840,000	0.638
0.55	416,960,000	0.682
0.60	300,320,000	0.727
0.70	144,480,000	0.822
0.80	66,880,000	0.920

Drilling - Shaft Sinking - Drifting

Summary

Shaft Sinking	800 feet
Drifting	3,000 feet
Exploration & Development Drilling	267,383 feet
Drilling for Leach Test	20,000 feet

Exact costs were not available, but a number of the people involved with the work indicated the total costs exceeded $35,000,000. This included all of the research work done on the in-situ tests.

Conclusion

Wide-spaced surface drilling (±700-foot spacing) and subsequent underground check drilling and drifting has outlined a large, low-grade, porphyry-type copper deposit at Safford. The deposit has been subjected to post-mineral faulting, deep leaching and oxidation resulting in an erratic, non-uniform distritution of mineralization. The deposit is too deeply buried to mine economically by open-pit methods. The grade, ore type, and structural conditions are too irregular and unpredictable to support a block cave operation. In-situ leach tests to date have indicated that this is not an economically-viable production method for this property. The Safford deposit does not demonstrate a profit potential for the near future and

is not recommended for acquisition by Asarco unless it can be acquired for mere holding costs and held for possible exploitation in the distant future.

S. A. Anzalone

SAA:brw

cc: T. C. Osborne
T. E. Scartaccini
J. D. Sell

JDS

ASARCO

Southwestern Exploration Division

December 2, 1991

FILE NOTE

H.J. Downey's Thoughts
SW¼, Sec. 5, T8S, R19E
Graham County, Arizona

East of the Copper Creek breccia pipe and deep mineral zone is a quarter mile square of "Tglp" pyroclastic cones within the "Tgla" lower andesite of the Galiuro Volcanics as mapped by the USGS in Professional Paper 461, Attachment A.

Mr. Downey believes these to be vent breccias and possibly older than the basal Galiuro Volcanics themselves. Possibly related to the Copper Creek Granodiorite of Tertiary age.

Within this zone are a number of quartz-sericite vein/gouge/breccia zones with chalcocite and chrysocolla mineralization, which Downey believes may be vented from a major porphyry system below, and thus the zone is a pre-mineral unit surrounded by the post-mineral Galiuro Volcanics. Downey is presently having an age-date run on the sericite from one of the better veins/gouge.

He also submitted some specimens to Sid Williams for his comment. A copy of the reply is attached (Attachment B).

Downey will keep SWED informed as to the age-date received.

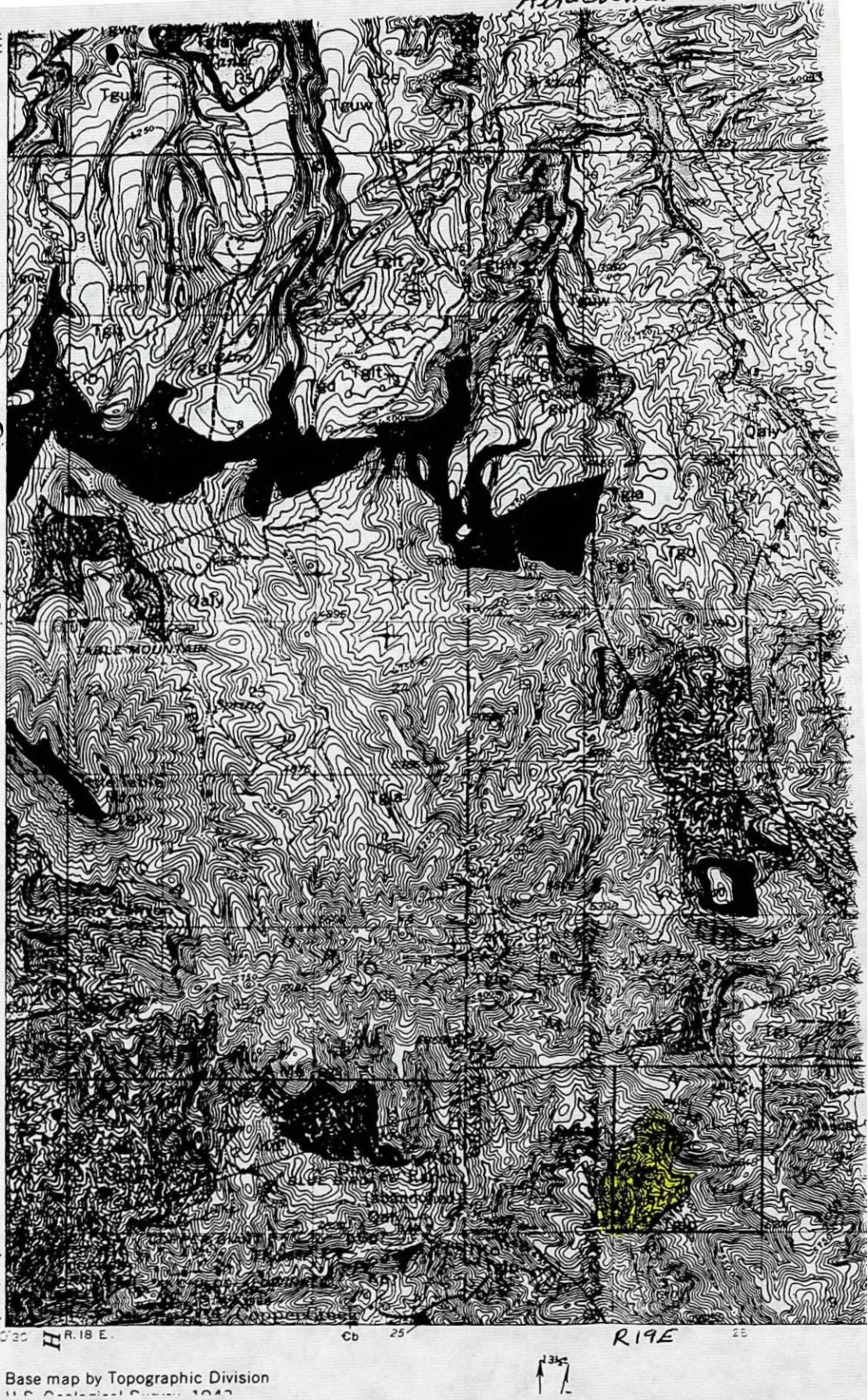
James D. Sell

JDS:mek
Att.

cc: W.L. Kurtz

USGS
Prof. Paper
#461

Geology of the Klondyke Quadrangle, Graham & Pima Counties, AZ.



Attachment B FILE

SW¼ Sec. 5
T8S, R 19E
Graham Co, AZ

GLOBO DE PLOMO ENTERPRISES

P.O. BOX 872
DOUGLAS, AZ 85607
USA

24 November 1991

H. J. Downey, Inc.
Exploration & Development
1803 E. 10th St.
Tucson, AZ 85719

Dear Mr. Downey:

Recently Arnulfo Manzo provided me with excellent thin sections and polished sections of the two samples you left with him. I have examined all four of these prepared samples. Rather than describing them individually, I thought it best to discuss the findings in this letter.

The thin sections show mainly copper and iron oxides resulting from severe oxidation and recrystallization of copper and iron minerals from what was formerly sulfide material. Oxidation in fact has been so thorough that I was unable to find a trace of original sulfides. I suspect that either chalcopyrite or bornite - associated with minor amounts of tetrahedrite - was the original starting material. The oxide suite includes supergene hematite, abundant chrysocolla, minor amounts of plancheite, and traces of conicalcite and stibiconite.

One of the thin sections shows virtually only oxide material but the other thin section from sample ECC-1 does show that the sulfides were originally associated with what is clearly hydrothermal quartz and sericite. Much of the chrysocolla in these samples has clearly replaced earlier sericite.

As for the relationship of this mineralization to rocks and alteration, I am afraid I can say little owing to the nature of the samples themselves. They are simply too richly mineralized and thoroughly oxidized to provide much information on the original rock types and nature of their alteration. But at least the findings show that the mineralization is hydrothermal, not exotic or solely supergene, and that alteration in the rocks was quartz-sericite dominant initially. I see nothing in the samples that would either confirm or deny the possibility that this mineralization is related to a porphyry system.

I am returning the polished slabs and thin sections to you by parcel post.

Best regards,

Sidney A. Williams
SAW:bj

encls.

JDS

ASARCO

Exploration Department
Southwestern United States Division
James D. Sell
Manager

January 6, 1993

Mr. J.R. Nelson
2525 W. 32nd Avenue
Denver, Colorado 80211

Sycamore Canyon Prospect
Sec. 13, T11S, R25E
Sec. 18, T11S, R26E
Graham County, Arizona

Dear Mr. Nelson:

Your proposal on the Sycamore Canyon gold prospect of Summit Minerals has been reviewed and Asarco SWED declines to investigate the property.

Thank you for bringing it to our attention.

Sincerely,

James D. Sell

JDS:mek

cc: W.L. Kurtz

ASARCO Incorporated P.O. Box 5747 Tucson, Az 85703-0747
1150 North 7th Avenue FAX (602) 792-3934 Phone (602) 792-3010

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Safford District Office
711 14th Avenue
Safford, AZ 85546

(602) 428-4040

In reply refer to:
2200 (044)
AZA 28789:AZA 28793

Dear Interested Party:

Phelps Dodge Mining Company (P.D.) has proposed two separate land exchanges with the Bureau of Land Management (BLM): The Morenci Land Exchange and the Safford Land Exchange. The BLM is in the process of preparing an Environmental Impact Statement (EIS) for each land exchange in conformance with the National Environmental Policy Act (NEPA) of 1969 and Council on Environmental Quality Regulations parts 1500-1508.

As a potentially interested and/or affected party, we would like to notify you of a series of public open house/scoping meetings that have been scheduled to provide you with an opportunity to express your ideas, comments, and concerns about the proposed exchanges.

The following information is enclosed in this letter:

- An information summary sheet about the proposed land exchanges;
- Maps of the proposed exchange lands;
- A comment/notification sheet addressed to BLM (requires postage); and
- A schedule of public scoping meetings for the proposed exchanges and their locations.

We invite you to attend any or all of the scheduled meetings. If you are unable to attend, but would like to comment on the proposal, please complete the enclosed comment form and mail it back to us by January 17, 1995. Thank you for your participation. For further information, please contact BLM, Safford District Office, Attn: Mike McQueen, 711 14th Street, Safford, Arizona 85546; telephone number (602) 428-4040.

Sincerely,

Margaret L. Jensen

Margaret L. Jensen
Gila Area Manager

Se puede obtener información acerca de la propuesta en español. Llame a Scott Evans del Departamento de Administración de Tierras, (602) 428-4040.

FACT SHEET FOR THE MORENCI AND SAFFORD LAND EXCHANGES

What are these projects about?

Two separate land exchanges have been proposed involving approximately 18,000 acres of federal lands near Morenci and Safford, Arizona. Land exchanges involve trading federally-owned lands ("the selected lands") for privately-owned lands ("the offered lands") of equal monetary value. Each exchange is further described below.

Who is involved?

The Safford District of the Bureau of Land Management (BLM) is the federal agency responsible for managing the public lands proposed for the exchanges. Phelps Dodge Corporation (PD), based in Phoenix, Arizona, is the project proponent. Under the National Environmental Policy Act (NEPA) and CEQ regulations Parts 1500-1508, the BLM is responsible for completing an environmental impact statement (EIS) to analyze potential impacts that may result from each proposed exchange. SWCA, Inc., Environmental Consultants, has been retained as a third-party contractor to assist the BLM in preparing the EISs for these exchanges.

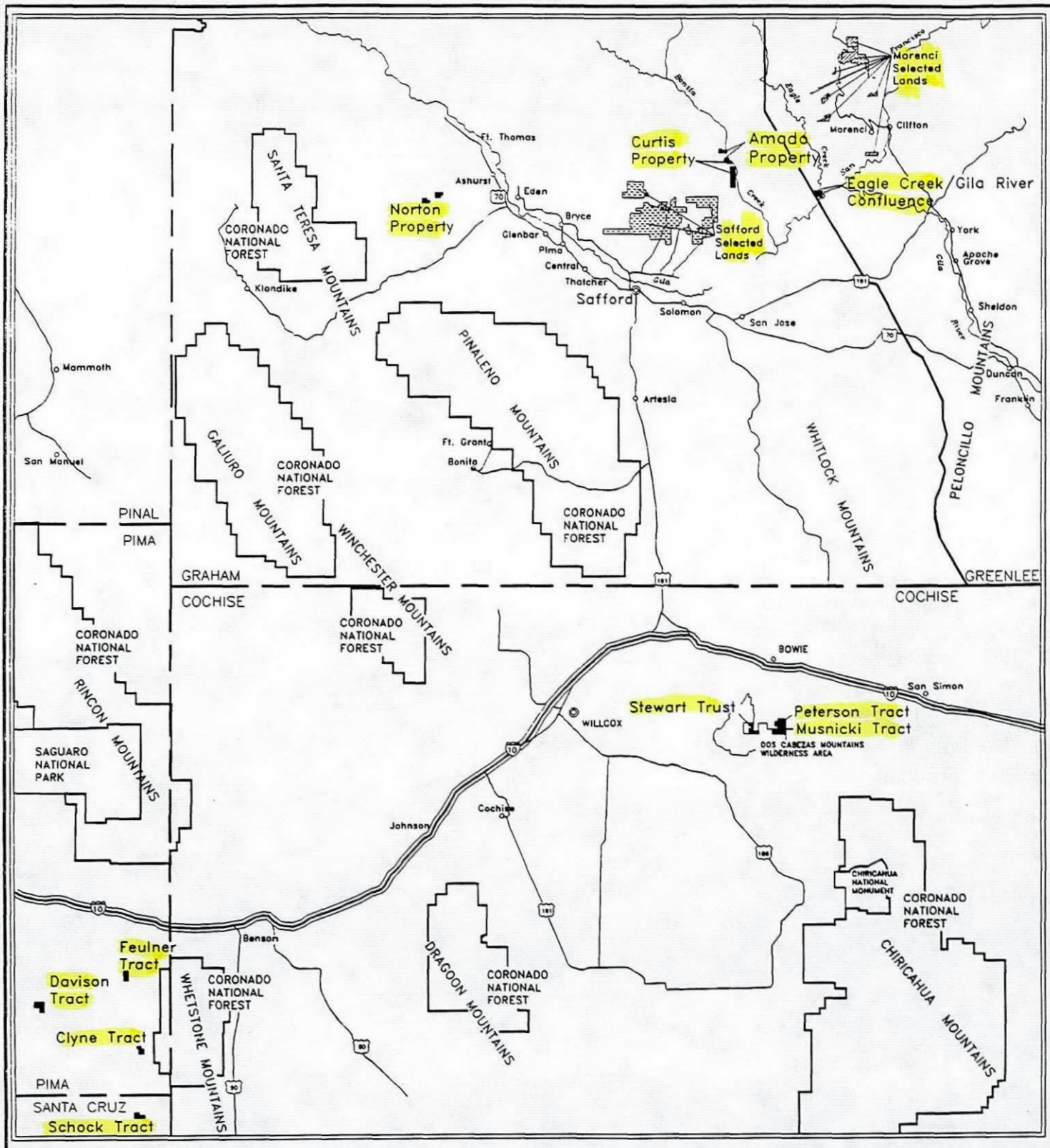
Morenci Land Exchange. PD has selected approximately 4,000 acres of lands adjacent to its existing Morenci Mine in order to consolidate land holdings and to support continued mining operations. In exchange, PD is offering the Eagle Creek parcel, the Clyne parcel, the Stewart Trust parcel and the Petersen parcel (see over). The parcels total approximately 1,200 acres.

Safford Land Exchange. PD has selected approximately 14,000 acres of BLM lands adjacent to its Dos Pobres, San Juan, and Lone Star properties in the lower Gila valley about 6 miles north of Safford, Arizona in order to secure lands for future exploration and to consolidate its land holdings. In exchange, PD is offering the Curtis-Amado property, the Norton parcel, Schock parcel, Feulner parcel, Davison parcel, and the Musnicki parcel. These properties total approximately 2,963 acres.

All of the offered lands for both proposed exchanges have been identified as desirable for public ownership because they provide one or more of the following:

- contain valuable habitat, including riparian;
- are private inholdings within large parcels of public land already managed by BLM; or
- provide essential access to other tracks of BLM-administered land.

On the back of this information sheet is a map depicting the general locations of the selected and offered lands involved in the Morenci and Safford Land Exchanges.



Scale MILES
0 5 10 15 20

LEGEND
- OFFERED LANDS
- SAFFORD SELECTED LANDS
- MORENCI SELECTED LANDS

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

OFFERED AND SELECTED LANDS FOR SAFFORD AND MORENCI LAND EXCHANGE

SWCA Environmental Consultants, Inc.

PROJECT # 07-94851		DRAWN BY MAD	DATE Sept 18, 1994
FILE NAME	D:\acad11\07\pd SEL_LAND.DWG	CHECKED BY TL	REVISION DATE Nov 17, 1994

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

March 24, 1970

FILE MEMORANDUM

FROM: Wm. L. Kurtz

JOSEPH MULLER PROPERTY
ARAVAIPA DISTRICT
GRAHAM COUNTY, ARIZONA

On March 20, 1970, Mr. Reginald Skiles, Consulting Geologist presented the new data developed by the Ralph M. Parsons Company on the Aravaipa Property of Joseph Muller. Mr. Skiles had previously presented data on the property to Mr. Courtright. (See letter from Courtright to Collins dated June 13, 1968.) Mr. Courtright concluded at that time no exploration potential existed for ASARCO.

The new work consisted of I.P. surveys and drilling. In the southern area the I.P. anomalies were tested by drilling. A drill hole about 1 1/2 miles west of the Grand Reef Mine penetrated 1,000 feet of fine sand, silt, and gravel. A drill hole about 3/4 miles west of the Grand Reef Mine penetrated 200-300 feet of alluvium and bottomed at 1,000 feet in Horse Mountain volcanics without any significant mineralization having been encountered. According to Mr. Skiles, the quantity of magnetite encountered was sufficient to account for the aeromagnetic anomaly in this area. A third short drill hole near the Grand Reef Mine failed to intersect any significant mineralization. It would appear that something "other than sulfides" was causing the I.P. effect.

In the northern area (see Courtright's letter of June 13, 1968) several zones of weak I.P. response were outlined. I do not believe these outline any valid drill targets.

I am informing Mr. Kirk, Attorney for Joseph Muller, that we are not interested in participating in any exploration at Aravaipa.

Wm. L. Kurtz

WmLK:lab
cc: JJCollins
JHCourtright
WESaegart
JDSell

J. H. C.

MAR 25 1970

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

W. E. SAEGART
SUPERVISOR

W. L. KURTZ
ASSISTANT SUPERVISOR

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

March 13, 1970

Mr. Reginald Skiles
4018 Cheshire Drive
Cypress, California

Dear Mr. Skiles:

I will be available to meet with you and Mr. Kirk on Friday, March 20, about 2:00 p.m. at our Tucson Office to discuss the Aravaipa Area.

In a letter dated February 5, 1970, from Mr. William Lawson to Mr. Tittman, it was stated that Mr. Kirk also could provide us with some information on the Church and Banner Properties near Morenci. We would like very much to be able to review this recent drill data.

Very truly yours,

Wm L. Kurtz

Wm. L. Kurtz

WmLK:lab

cc: Richard Kirk, Esq., Grant & Kirk, 521 Fifth Ave., N.Y.C.
Mr. William Lawson, Fuller Building, 595 Madison Ave., N.Y.C.
J.J.Collins
J.H.Courtright
W.E.Saegart

Aa-7A.0.0

J. H. C.

NOV 4 1969

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

October 31, 1969

W.E.S.
NOV 17 1969
MR. WES
READ AND RETURN
PREPARE ANSWERS ..... HANDLE .....
FILE ..... INITIALS .....

FILE MEMORANDUM

Blue Crystal Claims
G. Anderson Submittal
Graham County, Arizona
Safford - 17 miles ENE of

The 253 Blue Crystal claims are situated north and northeast of the juncture of Bonita Creek and the Gila River. Post-ore volcanics and Holocene sediments are the exposed rocks in the area, the former containing small, randomly scattered veinlets of exotic copper minerals. Some of these volcanics are also lightly altered locally. These phenomenon were ascribed to "late leakage" by Dr. Lacy*.

Five diamond drill holes have been drilled within the claim group, the approximate locations of which are marked on the appended map. Three of the holes were drilled by P-D and two by AMAX. The core from the latter was scanned and found to be bottomed in post-ore volcanics. No alteration or metallic mineralization was noted. Depths of the holes, designated as Blue Crystal Nos. 4 and 5, were 1690 and 2314 feet respectively. Data from P-D's work was not available.

The withdrawal of the two aforementioned concerns, plus the poor showings of the examined core, indicates further exploration efforts to be prohibitively speculative unless the hole depths were limited by funds equivalent to assessment work requirements. No down-the-hole geophysical instruments exist which might be employed to further test the area.

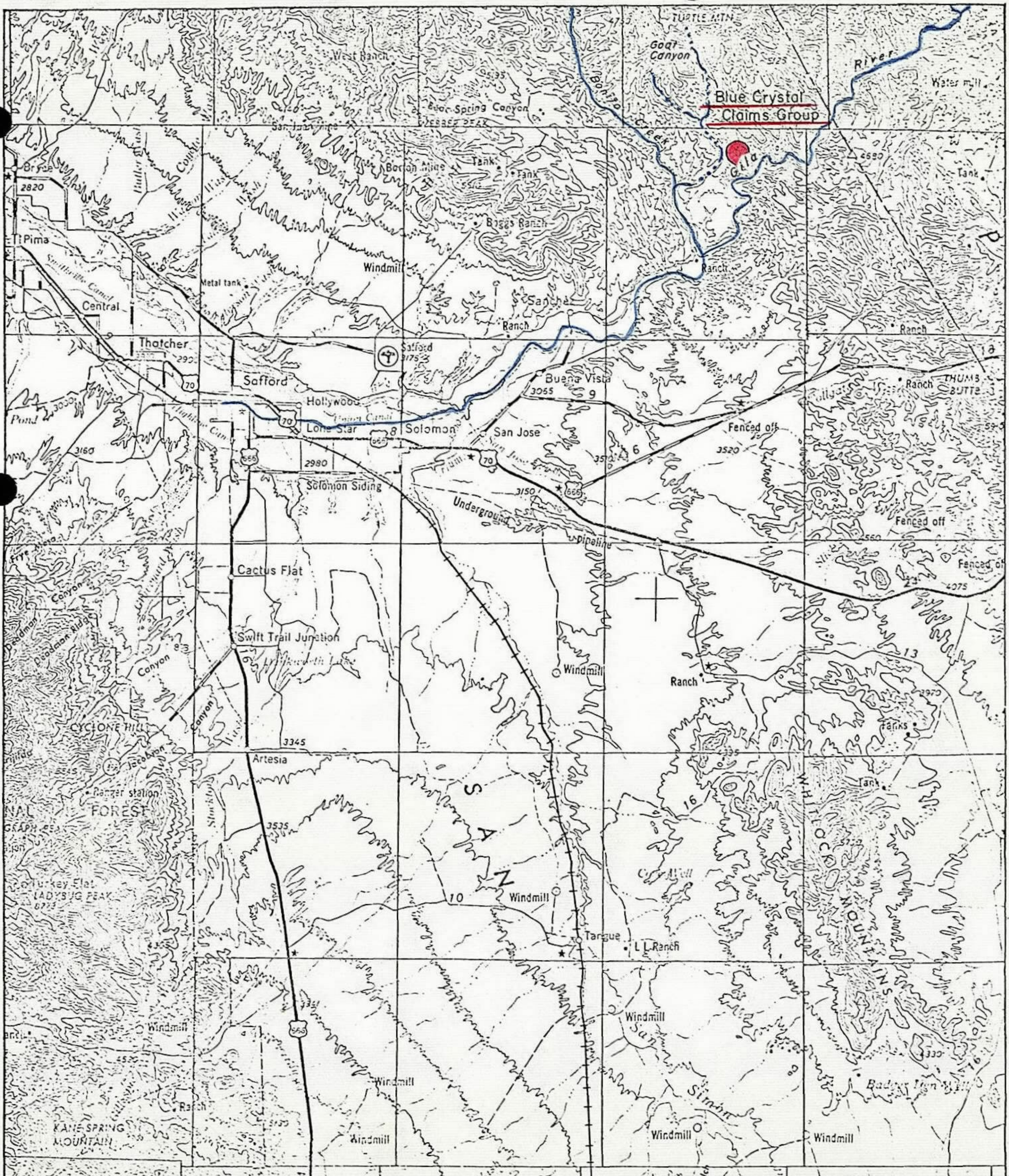
No further work is recommended.

R. D. Karvinen

RDK/kvs

cc: JHCourtright

* Personal communication with Dr. W. C. Lacy, University of Arizona (10/27/69)



INDEX MAP

Blue Crystal Claims

Guy Anderson Submittal

GRAHAM CO. ARIZONA

1:250,000

R.D.K. Oct. 1969

2218

Approx limit Blue Crystal Claim Group.

O Approx location P-D holes

X Approx loc Amax holes

Blue Crystal Claim Group.
Guy Anderson Submittal
Graham Co., Ariz.

~~HA.3.3~~
AA.7A.00

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 23, 1967

J. H. C.

JAN 24 1967

TO: J. H. COURTRIGHT

FROM: WILLIAM G. HOSKINS

SAMPLING IN VICINITY OF
SIXTEEN TO ONE MINE
IN THE GALIURO MOUNTAINS
GRAHAM COUNTY, ARIZONA

Introduction

During the helicopter reconnaissance of the Galiuro Mountains in December 1966, Mr. Joe Wojcik took a sample of altered volcanics in the vicinity of the Sixteen to One Mine which ran 4.25 ozs. Ag/ton.

Messrs. Barry Watson, Joe Wojcik and I, on January 6, 1967, sampled a large area of altered volcanics in and near the vicinity of the first sample.

Conclusion

The altered volcanics do not carry sufficient mineralization to warrant further work.

Only 7 of the 26 samples assayed silver (0.04 to 0.31 ozs/ton), and most of these were on or near small veins worked in the past. Gold and copper are nil.

Sampling

The most altered zones were selected and 26 samples were taken. Each sample was chipped from outcrops 200 to 300 feet in length and weighing 4 to 6 pounds.

The samples were assayed for Ag., Au., and Cu. as follows:

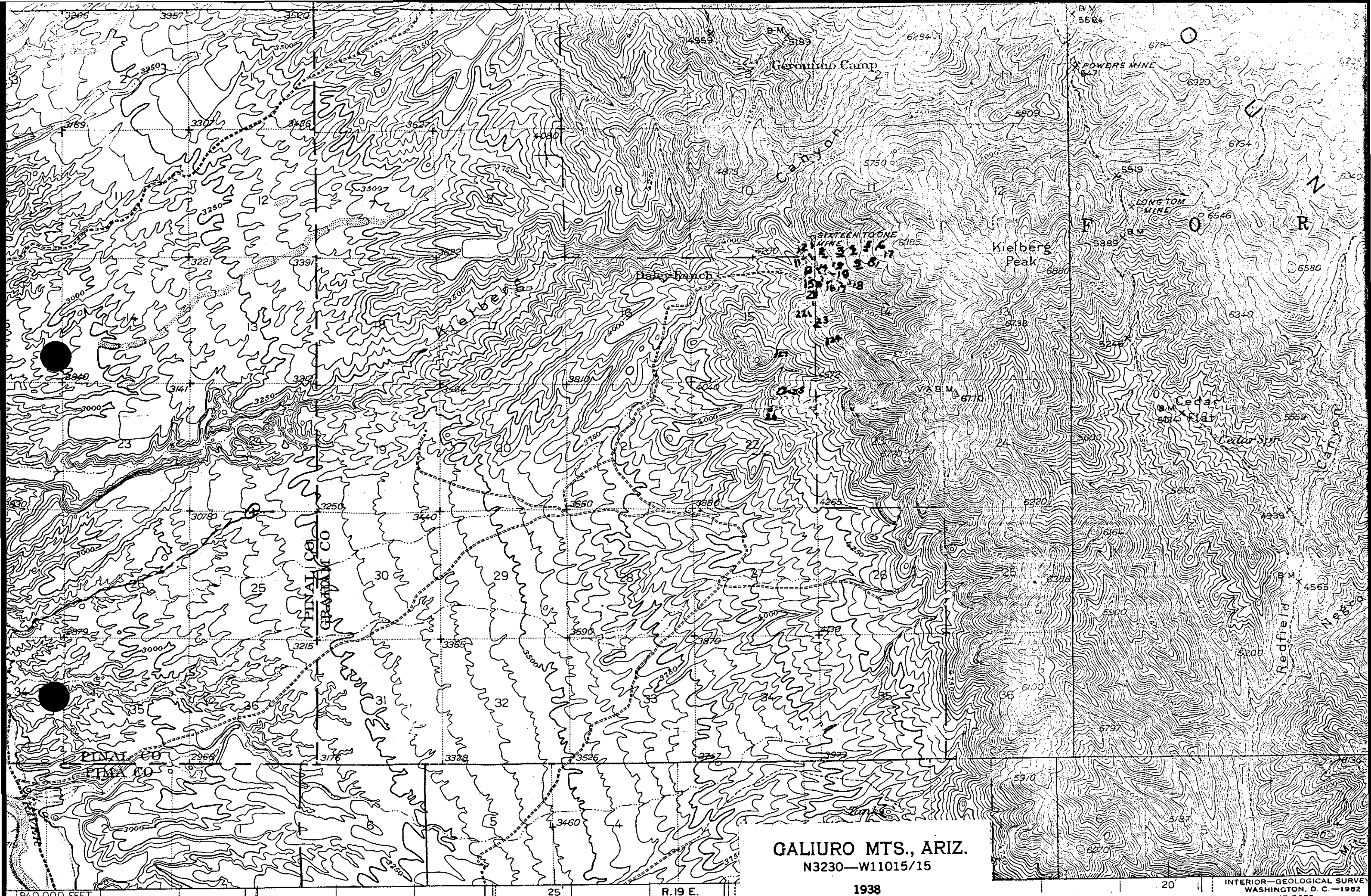
SAMPLE NO.	AU. OZS.	AG. OZS.	CU. %
16-1	None	None	0.01
16-2	None	None	0.01
16-3	Tr.	0.06	0.01
16-4	Tr.	0.04	0.01
16-5	None	None	0.01

SAMPLE NO.	AU. OZS.	AG. OZS.	CU. %
16-6	None	None	0.01
16-7	Tr.	0.08	0.01
16-8	None	None	0.01
16-9	None	None	0.01
16-10	None	None	0.01
16-11	0.03	0.31	0.01
16-12	Tr.	0.20	0.01
16-13	None	None	0.01
16-14	Tr.	0.26	0.01
16-15	None	None	0.01
16-16	None	None	0.01
16-17	None	None	0.01
16-18	None	None	0.01
16-19	None	None	0.01
16-21	None	None	0.01
16-22	None	0.10	0.01
16-23	None	None	0.01
16-24	None	None	0.01
16-25	None	None	0.01
16-26	None	None	0.01
16-27	None	None	0.01

William G. Hoskins

WILLIAM G. HOSKINS

WGH/mg
cc: BNWatson
JRWojcik



by Lee Morrison and J. Mark Holmes
1938

TRUE NORTH
MAGNETIC NORTH
14°
APPROXIMATE MEAN DECLINATION, 1938

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE

AG-70.0.6 Route to: WGF, BHW, WES

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

J. H. C.
JAN 17 1967

January 4, 1966

W.E.S.
FEB 14 1967

TO: J. H. COURTRIGHT

FROM: WILLIAM G. HOSKINS

MAGNETIC LOW ANOMALY
IN MARKHAM WASH
GILA MOUNTAINS
GRAHAM COUNTY, ARIZONA

Introduction

The magnetic low anomaly plotted by the U.S.G.S. in Markham Wash in the Gila Mountains, Graham County, Arizona, was mapped the 20th through 21st and the 28th through 29th of December, 1966, to determine if the magnetic low could be validated.

A window of pre-mineral andesite (Silver Bell type) exists which is intruded by a monzonite. The area surrounding this window was closely observed for other pre-mineral andesite outcroppings and float.

Geochemical samples were taken for copper and molybdenite from the intrusive and pre-mineral andesite.

Conclusion

The magnetic low is probably due to the intrusive being lower in magnetite than the surrounding andesites and basalts.

The monzonite appears fresh, but the andesite is weakly altered and mineralized in a small fracture zone. No outcrops or float of the monzonite or andesite could be found west of the window.

Bear Creek Exploration Company completed an I.P. survey of the area sometime in November, 1966. The ground was not staked by them, indicating a target was not found.

The pre-mineral andesite and monzonite is in color contrast with the post-mineral volcanics. The helicopter reconnaissance project could possibly locate other windows of pre-mineral andesites and intrusives.

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

Geology

The volcanics were mapped as post-mineral and pre-mineral on the basis of Silver Bell type andesite being pre-mineral.

A pre-mineral andesite and monzonite intrusive is exposed along Markham Wash west of the Narrows (see Geol. map). The andesite is a dark gray to greenish fine grain rock grading up section into a green epidote blotched breccia flow. The andesite is intruded by the monzonite and later basalt dikes cut both the monzonite and andesite. Several of the basalt dikes follow a N25°E shear zone in the andesite.

The monzonite appears fresh, but the andesite is weakly altered and mineralized in one fracture zone a few feet wide.

A north-south fault in Markham Wash has down dropped the east side an undetermined amount. The post-mineral volcanics covering the west edge of the window is flat lying and this area was covered closely for additional outcrops and float without success.

Geochemical Assays

One sample was taken of the monzonite and two of the andesite with the results following:

Sample No.	Rock Type	Cu. PPM	Mo. PPM
WH-1	Monzonite	118	5
WH-2	Andesite	141	5
WH-3	Andesite Fracture Zone	246	20

Magnetic Anomaly

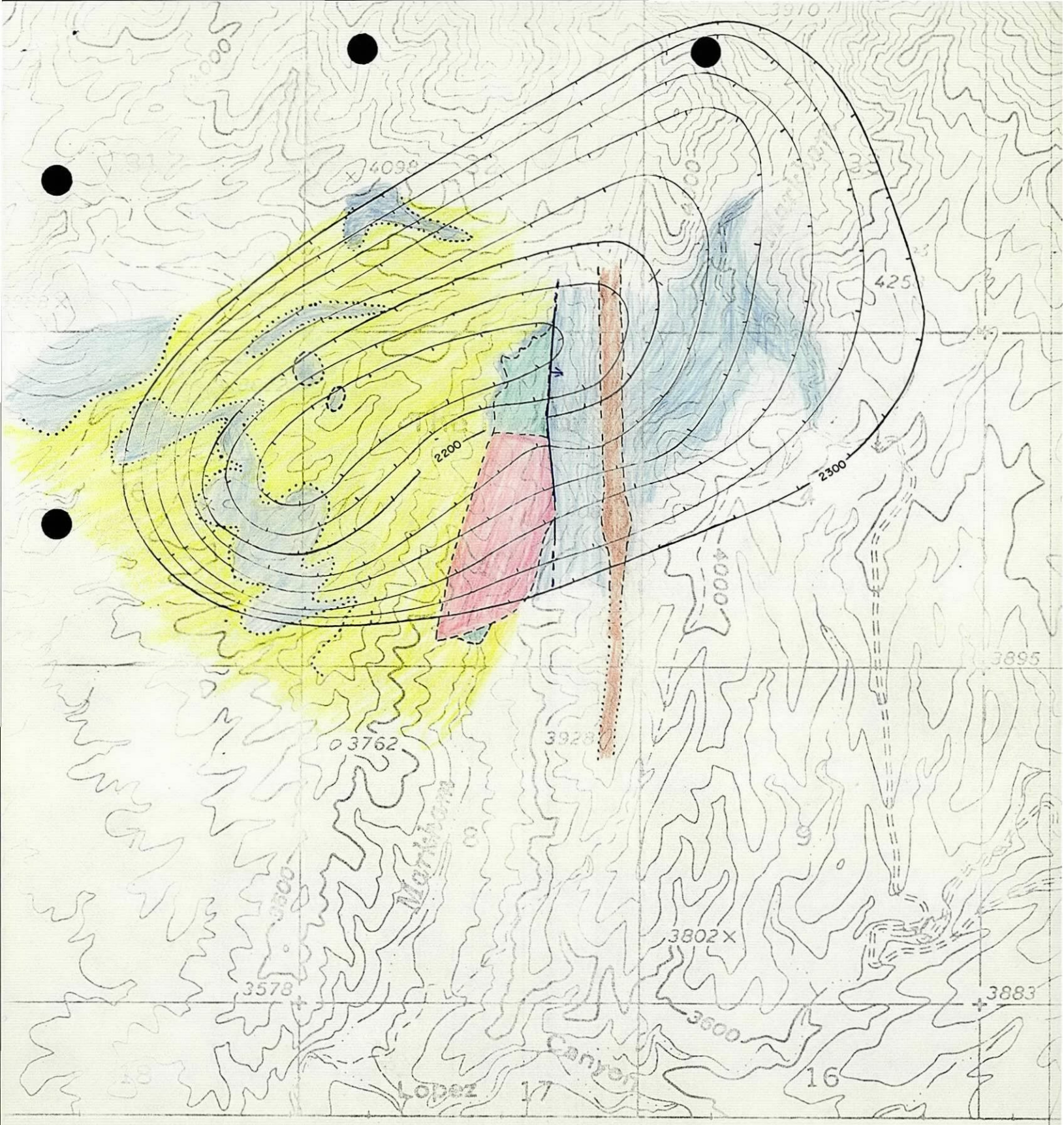
The magnetic low is probably due to the intrusive containing less magnetite than the surrounding andesites and basalts. According to Wayne Farley this is typical of many of the Laramide porphyry type intrusives in Arizona.

Land Status

The ground is not staked at the present time. Only one claim marker was found and this appeared to have been made several years ago.

William G. Hoskins
WILLIAM G. HOSKINS

WGH/mcg
Attachment



Alluvium

Post-Mineral Andesitic Dikes

Post-Mineral Andesite

Monzonite

Pre-Mineral Andesite

Contour Interval 20 gammas
Flown 1000' Above Surface

MARKHAM WASH

Gila Mtn., Graham County, Arizona

Approx. Scale 1" = 1500'
Contour Interval 80'

W.G.H., Jan. '65