CONTACT INFORMATION
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Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

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James Doyle Sell Mining Collection

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ASARCO

Southwestern Exploration Division

January 6, 1976

FILE MEMORANDUM

Copper Mountain Area
Pangea Resources Corporation
Ajo District
Pima County, Arizona

During the November AGS meeting, both H. Kreis and I gleaned some data during conversations with T. Mitcham.

They have drilled one hole.

Wendell Knight rotaried the hole (his rig generally goes less than 2000 feet deep), and the hole was then cored.

The hole was completed to ±3100 feet, after going from volcanics into conglomerate.

Somewhere above the base of the conglomerate, they cored a ±150 foot slide block of Precambrian granite, which was weakly altered and mineralized, and then reentered conglomerate for a short distance before again coring Precambrian granite.

They penetrated the "basement" granite some 300 feet, and it was also weakly altered and mineralized, similar to the slide block.

T. Mitcham asked me (JDS) if I was aware of various thicknesses of blocks in conglomerate and I mentioned that numerous blocks, such as in the San Pedro western side, were considerably thicker. Tom expressed some concern that they may have stopped the hole in a second slide block. He and I did not go into the question of how to differentiate a block as to being a possible slide versus true bedrock.

James D. Sell

James D. Sell

Henry G. Kreis

Henry G. Kreis

JDS:lb

ASARCO

Southwestern Exploration Division

November 17, 1975

FILE MEMORANDUM

Overall Mineralization
Anamax Twin Buttes
Pima County, Arizona

During the recent AIPG field trip to the Twin Buttes complex, the following percentages were given for the amount of mineralization in the various rock types based on the present reserve figures:

Porphyry	10%
Cretaceous Arkoses	15%
Penn-Permian Sediments	75%

James D. Sell

JDS:lb

cc: JRKing

~~WLR~~
~~for info~~

J. H. C.

AUG 21 1973

Richard Lundin ph. 324-3060

age 24 — married.

Working on BS under Guilbert (Has BA from Beloit College) & ~~wants to~~ will continue with MS under Guilbert. Has picked out ± 30 sections on east side of Bahoquavari (see Xerox) & will do a complete mapping, geochem, ground mag, photo interpretation (Scale 1:500). Hopes to complete in Spring '75.

Needs part time work

help in transportation costs (actually 4-wheel drive vehicle)

geochem costs

Recently (until Sept 1, 1973) working for Ted Eyle Superior Oil.

Jim

6/24/75

Apparently has not completed his work at U of A.

Is now owner (part) of Wallaby Enterprise

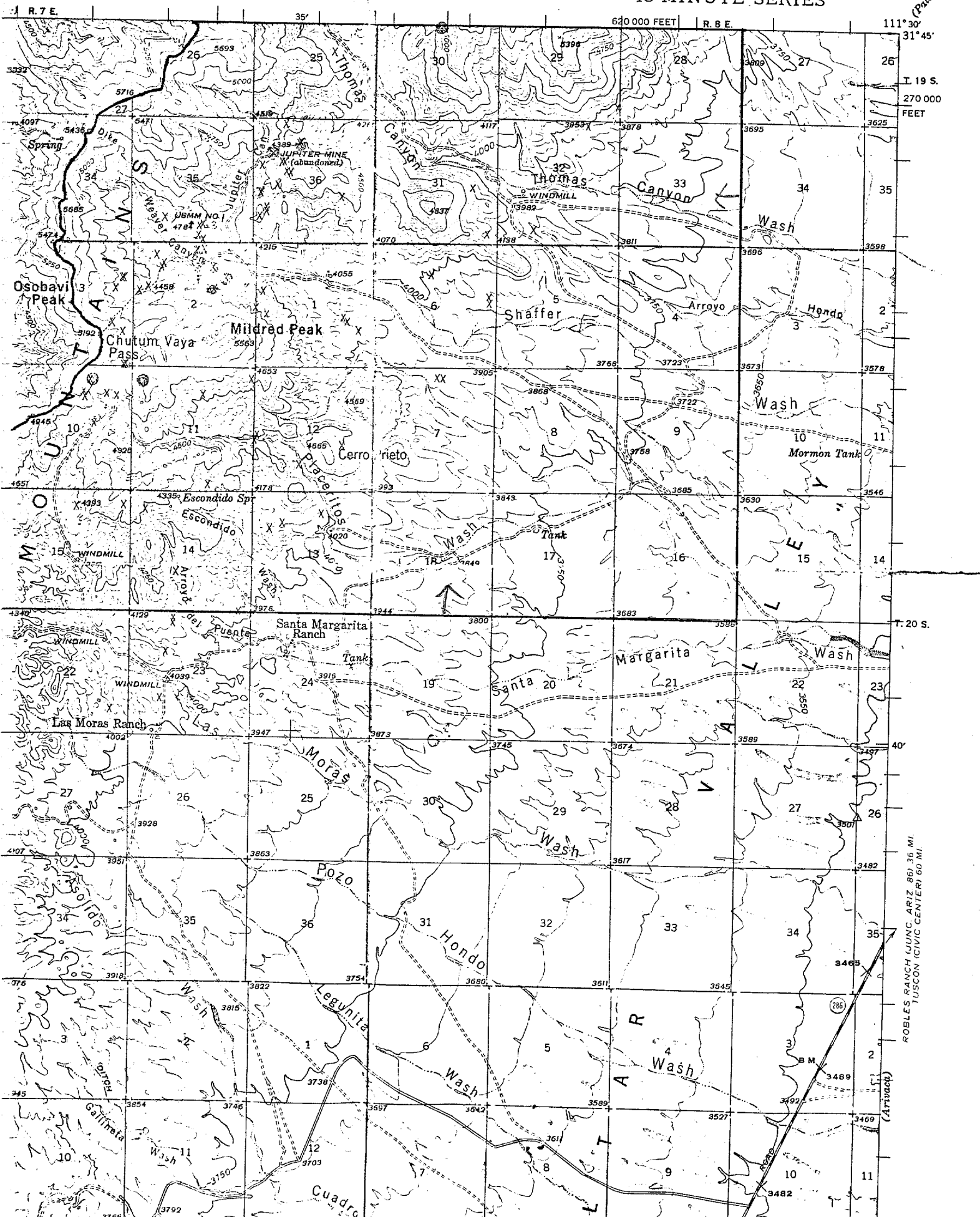
Will do anything, anytime, anywhere. !!

Vic Krol's son-in-law.

Is preparing "district" files for sale @ $100.00/per county, hope to have some 300 districts for sale. At present has a dozen or so. Apparently Vic is doing same for Nevada.

ESTATES
OF THE ARMY
ENGINEERS

ARIZONA
(PIMA COUNTY)
PRESUMIDO PEAK QUADRANGLE
15-MINUTE SERIES



6-24-74

FROM: W. L. KURTZ

TO: JRK

Upon return from Nevada let's see about review of Missouri-Pacific Twin Bridges.

A Oliver (CWT ground) has offered additional data gathered since Davis' review about a year ago.

Oliver Kilroy 624-2161

cc. Key file
✓JDS
FTG
JHC

Clovis F. PRISER
299-1026
4660 Cerro de Aguila
Tucson 85718

J. D. S

Ph: 299-1026

1435 SOUTH 10th AVENUE
P.O. BOX 1889

Jacobs Assay Office

Registered Assayers

PHONE 622-0813

85702 Tucson, Arizona, May 30th, 1971

Sample Submitted by Mr. C. F. Preser

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore * $	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
X	0 13	13 00	17 8/10	8 15/100				

* Gold Figured $ 100.00 per oz. Troy

Charges $ 5.50 Paid

Very respectfully, Ben P. Jacobs

Sections of State Land Available.

5' Level – .005 Au; 0.20 Ag; 0.06 Cu

8' " – .010 " ; 0.30 " ; 0.05 "

Wallaby Interprise
Richard Lundin

Dr Vic Krall (ex Thomas) is son-in-law.
Wanted to do thesis in E side of Boboquivari
Set up own company
Does district reports & compilation from Vic's files etc.

Wallaby

Se

Cons Cole ↔
Tuscoa
Segri
N. Prin
Ponzaga (Neadnuts)
etc
Whetstone
Dos Polines, Safford -

Intensive Silver Bell type, epidote

Native Silver & Native Copper
& their oxidized equivalent OKC

Note linear rotation ≅ late, hydrothermal

Intense silicification & epidote in areas of Ag°, Cu°
alters ± propylitic alt throughout Silver Bell equiv.

+ Scattered in Sec. 2 & 11 (W½ s) T14S, R8E.

JDS

MINING DEPT
JUL 24 1975
TUCSON

511 Vananda
Ajo, Arizona 85321

July 23, 1975

Crib

R. B. M.
JUL 24 1975

American Smelting and Refinery Co.
Mining Division 1150 North 7th Avenue
Tucson, Arizona 85705

Gentlemen:

I have found, in my opinion, what could be a large deposit of copper oxide ore. The ore bearing veins also contain silica, alumina, silver and gold.

However, my opinion is not qualified in any professional way. I am not a geologist nor a mining engineer. My only qualifications are what I have observed and through assey work on the property as to what is indicated.

My means of collecting samples are of a manual nature. I simply dig test holes in the areas approximately six feet deep and twelve feet wide at the top. So far, I have completed four test holes and the assey work has been done. I believe the samples collected and asseyed to be of a good representation of this area. The assey reports are as follows through P1 to P4.

P.1	Total Copper	= 47.34%
	Oxide Copper	= 39.23%
	Silver (AG)	= 1.66 oz/ton
	Gold (AU)	= .020 oz/ton
P.2	Total Copper	= .61%
	Oxide Copper	= .45%
	Silica	= 88.1%
	Alumina	= 3.3%
	Lime	= 1.3%
	Silver	= Nil
	Gold	= Nil
P.3	Total Copper	= 1.72%
	Oxide Copper	= 1.43%
	Silica	= 70.7%
	Alumina	= 9.1%
	Lime	= 4.8%
	Silver	= Nil
	Gold	= Nil
P.4	Copper Oxide	= .06%
	Silica	= 85.3%
	Alumina	= 4.6%
	Lime	= 1.8%
	Iron	= 2.2%
	Silver	= 0.05% oz/ton
	Gold	= 0.001 oz/ton

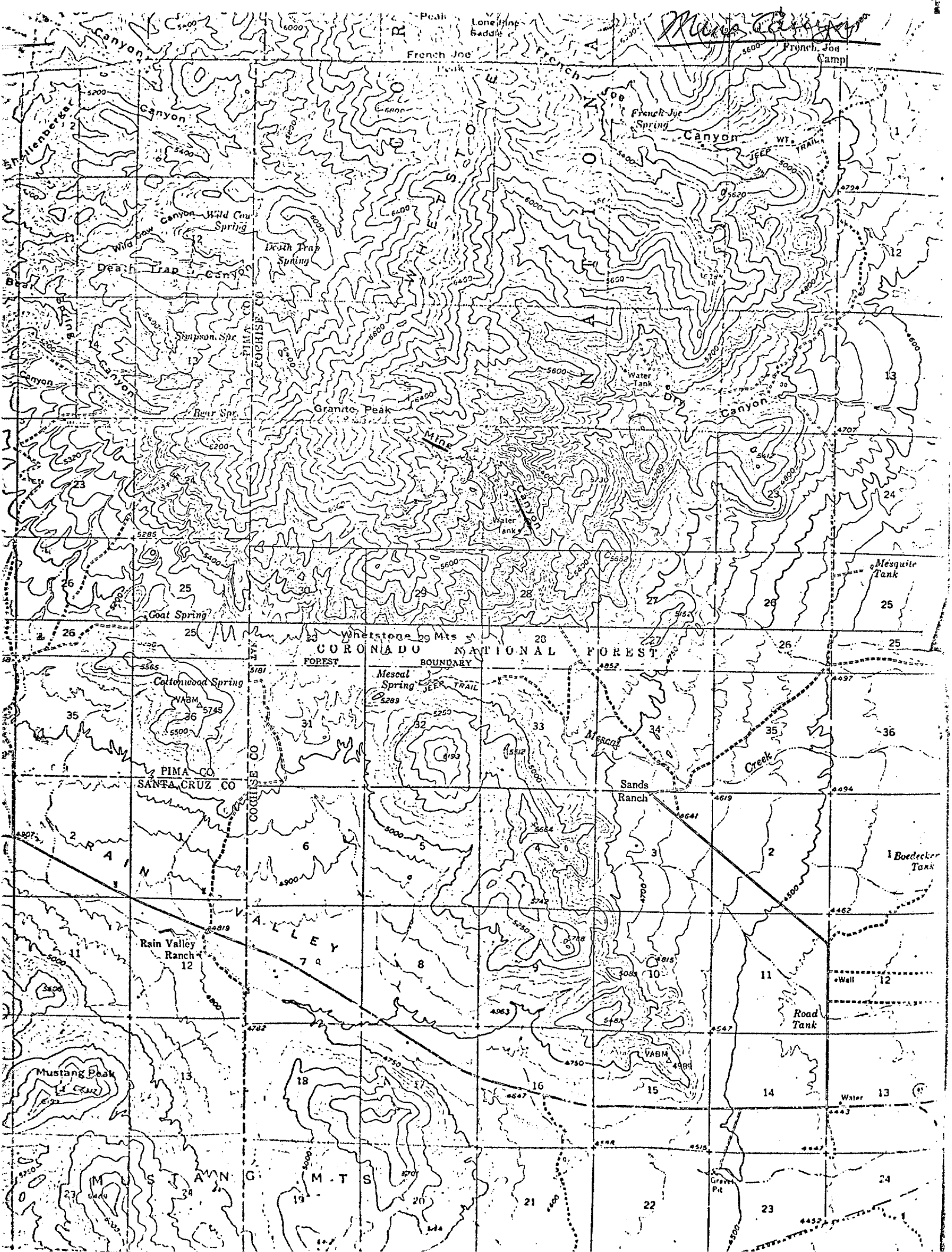
The property is easily accessible by gravel and dirt roads. However, the location itself is approximately two miles from these roads.

Another good feature is that Phelps Dodge Corp., New Cornelia Branch has recently installed a large plant at its smelter in Ajo, Arizona. It appears to be able to produce adequate amounts of sulphuric acid. The acid plant is not a great distance from the property described above.

I hope this short letter is of preliminary value and hope to be hearing from you soon.

Sincerely,

Peter D. Henry
511 Vananda
Ajo, Arizona 85321
Peter D. Henry
Telephone: 602-387-7127


Lone Pine Saddle
French Joe Peak
French Joe Camp
French Joe Spring
Canyon
Wild Cow Spring
Death Trap Spring
Death Trap Canyon
Bear Spring
Simpson Spr.
Bear Spr.
Granite Peak
Mine
Water Tank
Mesquite Tank
Goat Spring
Whetstone Mts
CORONADO NATIONAL FOREST
FOREST BOUNDARY
Cottonwood Spring
Mescal Spring
JEEP TRAIL
Mescal Creek
Sands Ranch
PIMA CO
SANTA CRUZ CO
COCHISE CO
RAIN VALLEY
Rain Valley Ranch
Boedecker Tank
Road Tank
Mustang Peak
MUSTANG MTS
Gravel Pit

Veinlet Mineralization in the Granite Peak Stock

The eastern sector of the Granite Peak Stock is dominated by a NE-elongated quartz monzonite porphyry stock within the main mass of granodiorite. Except for skarns, mineralization and alteration intensity centers on a small NE-trending quartz latite porphyry dike centrally located within the quartz monzonite porphyry stock (Figure 2). Fracturing is largely unidirectional, NE-trending, and vertical. Sulfides are mostly restricted to narrow quartz-calcite veinlets bordered by narrow zones of K-feldspar and very minor sericite. Local strong development of argillic alteration is seen in outcrop, but only to a subdued degree in drill core. Sulfides consist of pyrite, chalcopyrite, bornite, and molybdenite in a tentatively defined early stage and galena, sphalerite, and tetrahedrite in a later stage of more prominent veins to 20 cm thick. The non-pervasive character of mineralization and alteration along unidirectional fractures suggests that only a weak hydrothermal system developed to deposit the early stage assemblage. The later stage minerals are associated with calcite gangue in the same fractures as the early stage, creating a telescoped assemblage. The later, peripheral type mineralization may be related to a deep-lying hydrothermal center for which there is no other evidence.

There are 12 drill holes in the area. Six of these are angle holes plunging across the NE trend of fractures. Two are vertical holes, 753 feet and 520 feet deep. The remaining four holes are shallow tests to 180 feet. I have compiled data from the angle holes and the 753 feet deep vertical hole to arrive at order of magnitude figures for the outcropping reserve: 29 million metric tons of 0.28% Cu and 90 ppm Mo. The 520 feet deep hole is located at the site I recommended, adjacent to the quartz latite porphyry dike (Figure 2). It contains 515 feet of 0.25% Cu and 131 ppm Mo. A suggestion of zoning is indicated by highest copper grade of 0.33% Cu in the interval 60-170 feet and highest molybdenum grade of 387 ppm in the interval 450-520 feet. Cross-section D of Figure 5 shows dh-5 contains comparable copper and molybdenum grades across the mineralized zone as well as the postulated zoning of decreasing Cu-increasing Mo with depth. Supergene enrichment is virtually nonexistent due to low pyrite content and presence of neutralizing carbonates in the veinlets.

In some respects the copper and molybdenum veinlet mineralization and associated alteration resembles that of root zones to porphyry copper deposits.

Vernon D. DeRuyter
24 February 1979

DUVAL CORPORATION

INTER-OFFICE MEMORANDUM

FROM J. E. Shearer DATE April 14, 1970

TO File ATTENTION

SUBJECT: Review of New Jersey Zinc's GSB Drill Hole Data

The Kalaf Brothers brought New Jersey Zinc's drill hole data to the Tucson Exploration office on April 8th. The data was reviewed and carefully re-calculated. The following conclusions were drawn:

Holes #1 and #4, located in the vicinity of the Black Oak adit, intercepted 400' and 332' of .33% Cu at depths of 100' and 220', respectively. Hole #2, which is located 900' SW along the structure from Hole #1, intercepted 46' of .31% Cu at a depth of 210'. Also Hole #3, which is located 800' NE along the structure from Hole #4, intercepted 122' of .28% Cu at a depth of 407'. This indicates that the tenor of the rock is highest in the immediate vicinity of the Black Oak adit and decreases in both directions along the structure.

The New Jersey Zinc drill holes, with the exception of Hole #4, were inclined 30° in a direction perpendicular to the strike of the shear zone. Hole #4 was inclined 60° in a direction perpendicular to the strike of the shear zone. ~~The steeper dip of Hole #4 cutting the deeply dipping shear zone would account for the higher tenor of .33% Cu in this hole.~~

In light of this data, a better understanding of the mineralization occurrence has been gained. We were under the impression that the tenor of the rock was higher and that the localization of the mineralization was dispersed differently than indicated by this data.

It is my opinion, since reviewing this data, that the New Jersey Zinc Company did a thorough job of testing this shear zone with two holes in the area of highest mineralization intensity and holes to the NE and SW along the strike of the structure showing that the mineralization decreases in both direction along the structure.

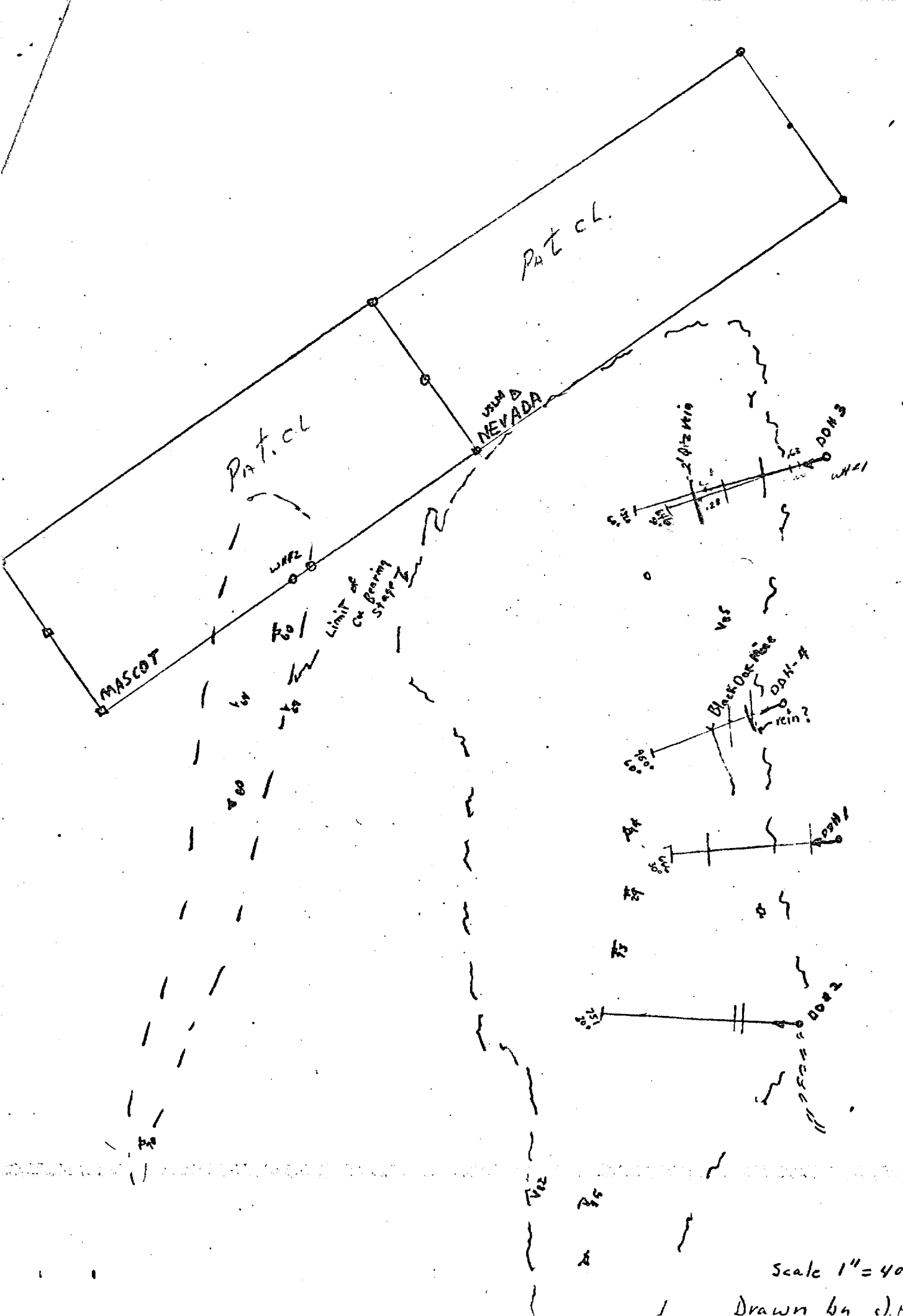
J. E. Shearer

JES:ssh

NJZ DRILL HOLE ASSAYS

	Interval	Thickness	Ave. Cu	Ave. Mo
Hole #1	10 - 100	= 900'	.09	.001
	100 - 500	= 400'	.33	.007
	500 - 666	= 166'	.08	.002
Hole #2	8 - 210	= 202'	.13	
	210 - 256	= 46'	.31	
	256 - 751	= 495'	.12	
Hole #3	10 - 407	= 397'	.07	
	407 - 529	= 122'	.28	
	529 - 646	= 117'	.06	
Hole #4	10 - 220	= 210'	.08	.011
	220 - 552	= 332'	.33	.024
	552 - 950.5	= 398.5'	.17	

Calculated by J. E. Shearer


Patent
Patent
NEVADA
MASCOT
WH#2
Limit of Cut Bearing Steep Z
Quartz Vein
DDH#3
WH#1
Black Oak Mine
DDH-4
rein?
DDH#1
DDH#2
Scale 1" = 400'
Drawn by J.F.

ASARCO

Southwestern Exploration Division

April 28, 1981

TO: W. L. Kurtz

FROM: J. D. Sell

Maris Property
Santa Cruz-Pima Counties
Arizona

Yes, this is the Fresnal Wash prospect (Pima County) submitted by Ken Brooks and investigated by B.J.Devere in October 1978.

Bert collected 8 samples and ran them for Au, Ag, Cu, Mo, and W, plus three spectrographic samples (results not in file). No reported anomalous values in any of the samples, except for one 38 ppm Mo (sample #5).

Bert thought the zone was not a typical porphyry Cu-type alt., but rather a quartz-mica greisen in a probable volcanic vent zone.

However, perhaps the property should again be looked at in light of the high Zn values of Brooks and he also had some 3 ppm Ag; as a possible high level expression of a moly zone. Vent area breccias are often major clues. The low tungsten values are not compatible with a possible Zn hood zone in moly target.

Bert did not look at the eastern exposure on the Pima-Santa Cruz line.

James D. Sell

James D. Sell

JDS:lb

ASARCO

Exploration Department
Southwestern United States Division

November 28, 1983

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

Ruth Claims
Goldfield Mining District
Pinal County, AZ

Dear Mr. Syndbad:

Thank you for your letter of 18 November. Please express our thanks to Mr. Barrick who showed us around your claims. Our examination of your property was at the direct request of our New York office. We took eight samples from your property from which we will send you the results when they are returned from the assay lab. In the meantime we would appreciate a map of your claims with the locations of your hammer-drill holes shown and copies of the assays of the cuttings from down the hole plus any reports or assays you have on the drill holes or the property which would help us evaluate it.

I will be out of town from November 28 to about December 14, but can be reached by phone after that. Thank you for your cooperation.

Very truly yours,

Fleetwood R. Koutz

Fleetwood R. Koutz/cg
Geologist

FRK/cg

cc: JDSell

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

JDS for info

ASARCO

Exploration Department
Southwestern United States Division

June 12, 1984

Pima County, AZ
Pima District.

Mr. Wes Becker, Sr.
Managing Partner
Hel Roc Mining Company
P. O. Box 26706
Tucson, AZ 85726

Dear Mr. Becker:

As agreed in our telephone conversation yesterday I am enclosing the two brochures which you left with Mr. Sell on March 13, 1984.

Sincerely,

Carol Gregory

Mrs. Carol Gregory
Secretary to
James D. Sell, Manager

Enclosures

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

JDS

ASARCO

Southwestern Exploration Division

November 14, 1984

File Memorandum

AMOCO's Pima Mine
Pima County, AZ

While at the Denver AIME/SME Meeting, I chanced to talk with M. C. "Bud" LaBarr, mining equipment trader-evaluator-salesman of Tucson, AZ.

Bud reported that he has talked with AMOCO's top people (controlling parent of Cyprus Pima Mining Company) who said they had offered Phelps Dodge a ten million dollar ($10,000,000) package in exchange for getting out from under their Cyprus-PD Smelter contract. The package was 1 large shovel, 8 trucks, 1 mill, ½ of the second mill, and miscellaneous surface inventory.

Bud would not speculate on whether PD was interested in the deal or the Pima property in general.

He did say that he had heard that Asarco was interested in the Pima property (and thus why he chanced to talk with me I suspect). I replied that I knew nothing of the above but that Pima-Asarco did have a common sideline stripping agreement of some type.

James D. Sell
J. D. Sell

JDS/cg

cc: FTGraybeal
WLKurtz
TEScartaccini

RECEIVED
MAY 5 1986
EXPLORATION DEPARTMENT

ALOTTA RESOURCES LTD.

4001 Indian School Road, N.E.
Suite 200
Albuquerque, New Mexico 87110

Authorized shares: 10,000,000
Issued shares: 2,538,000
Parent Company: Tundra Gold Mines Limited, owns 750,000 shares

MINERAL ZONE PROJECT, IDAHO COUNTY, IDAHO, U.S.A.

Seven thousand feet (7,000') of core drilling indicated 758,000 tons of .08 gold in a block 300' long, 150' wide to a vertical depth of 500'.

An area 1,000' east-west by 300' north-south will be drilled off at 100' centres this summer. This could outline an open pit orebody.

Oxides persist to 350' vertical from surface. This could be open pitted and leached for gold recoveries.

SASABE GOLD PROJECT, PIMA COUNTY, ARIZONA, U.S.A.

Your company, subject to regulatory approval, will acquire a new property 50 miles south of Tucson, Arizona.

This 50 claim property contains a mineralized trend which has been traced for 3 miles with widths of ¼ - ½ mile.

Open pit, leachable gold targets here could contain 100,000 to 1,000,000 ounces of gold. See enclosed report by project manager and geologist Robert Akright.

Currently, sampling and mapping (by two geologists on site) is underway.

QUEBEC PROJECTS, VAL D'OR, QUEBEC, CANADA

Currently, your company is reviewing possible projects in the province of Quebec.

The project manager will be Peter Ferderber of Val D'Or. Peter and I go back many years together. It will be great working again with an old friend and one of Canada's most successful mine finders.

The project co-ordinator (in both Canada and the United States) for all the Tundra associated companies will be another friend and co-hort, F. Dale Corman, P.Eng.

These two men will play an important part in building your companies future.

Tundra and associated companies have a new office in Val D'Or, Quebec. These offices, open since January 1986, are at:

615 Avenue Centrale
Val D'Or, Quebec J9P 1P9
Canada

The resident geologists here are Cathy Applegath-Pike and John Pike.

Yours truly,

Bert Applegath.

Albert W. Applegath
President
ALOTTA RESOURCES LIMITED

AWA/cep

ROBERT L. AKRIGHT
GEOLOGICAL CONSULTANT
MINERALS EXPLORATION AND DEVELOPMENT

To: A.W. Applegath **Date:** March 25, 1986

From: R.L. Akright **Subject:** Sasabe Gold Project
Pima County, Arizona

Ore Target Concept and Potential

Preliminary geochemical outcrop sampling has detected anomalous gold values (up to .27 oz. Au/T) in a series of large zones of argillic alteration, silicification and limonite staining. These NE-SW trending mineralized zones appear to be related to one or more of five Tertiary intrusive events cutting Jurassic sediments ranging from argillite to conglomerate. The mineralized zones have been incompletely studied and appear to offer excellent targets for large tonnage open pit mineable gold deposits.

Individual mineralized zones range in size up to 100 feet in width and up to 2000 feet or more in length. The area of mineralized zones appears to extend a mile or more in length.

The limited extent of geological mapping, geochemical sampling and related studies on the area make geological estimating of the reserve potential tenuous at the best. Important are the following facts:

(a) The mineralized targets are large.
(b) There is gold in the mineralized system.
(c) This is to a great extent an untested area.
(d) The alteration patterns are consistent with gold targets in other areas.
(e) The land position is large.
(f) Mineralization is at the surface and gold reserves developed would most likely be mineable by open pit methods.

With these facts in mind, it is not too difficult to visualize ore targets with a potential of one to ten million tons of ore at an average grade of .03 to .10 oz. Au/T. Assuming favorable metallurgy, such ore could be processed using heap leach technology on a full calendar year basis, and not subject to winter shut-down problems typical of most heap-leach operations in more northern states.

7221 SOUTH YARROW ST. LITTLETON, COLORADO 80123 (303)-979-1466

Bert's in your back door

Alotta Resources Ltd. Suite 200, 4001 Indian School Road, N.E., Albuquerque, New Mexico, U.S.A. 87110
A Subsidiary of Tundra Gold Mines Ltd.

August 29 1986

ANNUAL REPORT

Authorized shares: 10,000,000
Issued shares: 2,538,000
Parent Company: Tundra Gold Mines Limited, owns 950,000 shares

SASABE GOLD PROJECT, PIMA COUNTY, ARIZONA, U.S.A.

This fifty claim property contains a mineralized gold trend which has been traced for three miles with widths of a quarter to half a mile. Open pit, leachable gold targets here could contain 100,000 - 1,000,000 ounces. This property needs geologic mapping, geochem surface sampling and drilling.

As part of the public financing, 10,000' of reverse circulation drilling is planned this year. This is subject to regulatory approval.

NEW SENATOR ROUYN PROPERTY, ROUYN, QUEBEC, CANADA

Your company has an option to earn 75% of this property by completing 60,000' of core drilling.

This property produced 1,800,000 tons of .14 gold between 1940-1955.

A shaft was sunk to 3,000' with seventeen working levels. Ore was mined from strong quartz systems 600' long by 30-90' wide.

An independent consultant, after the mine closing, estimated 166,639 tons of .14 gold was left in this mine of which 100,000 tons was recoverable. Gold recoveries here varied in production from 94-96%.

The 375' level in this mine averaged .29 gold over a length of 543' and a width of 17.5'

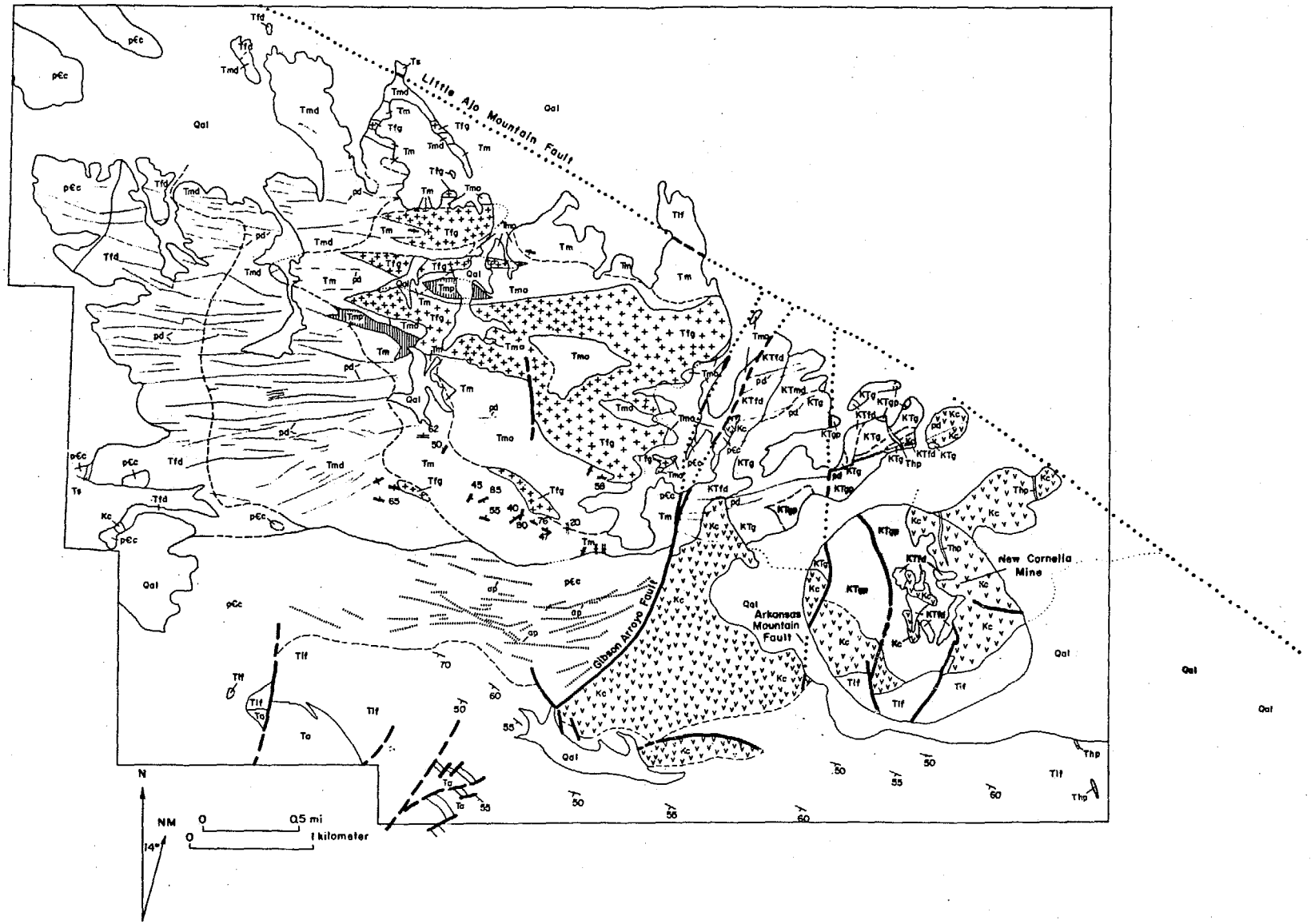
CUSMAP
Ajo-Lukeville
1°x2°

February 26-27
1988
Mallory Field Trip

EXPLANATION

Qal	Ailuvium and mine waste, undifferentiated, Quaternary	
Thp	Hospital porphyry	Tertiary
Ts	Sneed Andesite	Tertiary
Thp	Ajo Volcanics	Tertiary
Tlf	Locomotive Fanglomerate	Tertiary
pd	Feldspar porphyry and hornblende andesite dikes	Tertiary
ap	Andesite porphyry dikes	Tertiary
Tmp, Tfg, Tmo, Tm, Tmd	Pluton of Cardigan Peak: Monzogranite porphyry, Tmp; fine-grained granite, Tfg; monzogranite, Tm, and monzogranite with oikocrystic quartz and K-feldspar, Tmo; and quartz monzodiorite, Tmd	Tertiary
Tfd	Fine-grained diorite and quartz diorite, age uncertain	
KTgp, KTg, KTmd, KTfd	Cornelia pluton: Granodiorite porphyry, KTgp; granodiorite, KTg; quartz monzodioite, KTmd; and fine grained diorite and quartz diorite, KTfd	Late Cretaceous and early Tertiary
Kc	Concentrator Volcanics, Cretaceous (?)	
p€c	Cardigan gneiss and Chico Shuni Quartz Monzonite, Proterozoic	

60	Strike and dip of beds
40	Strike and dip of monzogranite porphyry dikes
— — —	Geologic contact, dashed where uncertain
— —	Fault, dashed where uncertain


Little Alo Mountain Fault
Gibson Arroyo Fault
Arkansas Mountain Fault
New Cornelia Mine
Qal
pЄc
Tfd
Tmd
Tm
Tfg
Tmo
Tmp
Tlf
Ts
Tp
Kc
KTfd
KTmd
KTg
KTgp
Thp
pd
N
NM
14°
0
0.5 mi
0
1 kilometer

MOKness.

Contact this prospector & arrange to visit the area. I had asked for location, but as you need — He didn't provide such. Jim 2/5/88

Timothy Conroy
Box 539 Arizona City
85223
ph. 466-5II3

ASARCO Incorporated

FEB 5 1988

SW Exploration

To: Mr. Sell
re: possible exploration

Dear sir:

This is a brief prospecting summary of the surface on the area discussed by phone Feb I, firstly, I realize that it would seem unlikely that any mineralized area in southern Arizona would not have been thoroughly prospected by mining/exploration companies or in part be noticed and cited by U.S. geog. survey teams that mapped the area, yet I feel this property was overlooked.

The rocks of the area are monzonite/diorite porphyries with quartz in excess (quartz monzonite/diorite), these rocks were in turn intruded by diabase dikes of irregular form. Limestone is scarce, some conglomerate beds were formed and cemented mostly by carbonates so little replacement is noticed on veins in this area.

What attracted me to this area was a iron stained leached outcrop which appeared to be a fissure vein, faulting was evident as seen by slickensided quartz and the gliding plane down the fissures strike, there are no apparent walls on the surface. Specularite and epidote are seen as contact minerals, in places specularite floods the rock, copper stained barite with fluorite are also found in places, hematite and other iron oxides are abundant on and near this outcropping, although no carbonate veins are seen on the surface it appears that siderate veinlets were converted to iron as witnessed in other veins near this outcrop, in some places a greenish yellow clay appears, this material showed .25 cu. and .00I au. on assay. The length of this vein is 2000 ft. and 75 ft. in width. This outcrop may have been superficially explored before, some shallow holes are noticed along the outcrop, perhaps the low au. value discouraged further work, in checking with the state land office and pinal co. records no claims were ever recorded in this area.

I filed permits to explore this outcrop, but decided that after a year of exploring that the outcropping was to lean of au. and to small to persue as a copper prospect. Last year I started searching away from the vein, in following a diabase dike I was surprised at the amount of the oxidized veinlets that ran from the dike laterally into the porphyry, in tracing these veinlets they showed to be siderate veins converted to iron, this dike was abruptly sheared between two small hills with diabase going in all directions, I followed a vein of rhodocrosite and found apple green copper stained quartz diorite going up one small hill, this rock showed disseminated blebs of copper material, but in places relic chalcopyrite had not yet fully oxidized, I found more greenish iron stained clay at the base of the hill, the porphyry here was almost as altered as the vein I described earlier.

The big difference was the amount, this stained porphyry was bedded with no hills or rolling plain, I spent 3 months exploring this mineralized land, the porphyry was colored with subtle shades of brown,yellow and red, I found large kaolin blankets, anhydrite veins and in places more apple green porphyry, calcite and quartz veins also run through this rock, aplite veins with a sugary texture are common. I realized that I was'nt looking at 2 or more deposits, but one large mineralized deposit with a somewhat enriched peripheral zone, because of alluvium I cannot give an accurate measure of the size, but a mile square would not to far off.

As you can see I've painted a pretty picture, but the reality is that I don't know whats under this rock. It would be impractable if not futile for me to explore this area on my own, my knowledge is limited to basic prospecting, and my finances are limited to basic beer drinking. I believe this area warrants exploration on a different level than I'm able to give. If you or your company would like to examine this area please contact me.

Thank you,
yours truly,
Tim Conroy

JDS - yours

Denton
REAL ESTATE CO.
commercial division

ASARCO Incorporated

MAY 9 1988

SW Exploration

May 5, 1988

Asarco Incorporated
Exploration DEpt.
PO Box 5747
Tucson, AZ 85703

Dear Sirs:

The Denton Real Estate Company is pleased to offer for sale or lease a group of mining claims about 65 miles Southwest of Tucson, Arizona, on the east flank of the Baboquivari Mountains.

The property is held by 6 state leases in the Northwest quarter of Section 36, Township 20S, Range 7E.

The mine has been worked at three independent levels. The upper, the earliest was known as the Iowana, the next, The Jupiter, the lowest, The New Jupiter. New drillings and assays show that there are significant values of readily accessible gold and silver, mostly in the form of sulfides.

The owner will entertain an exploration six month option period for $10,000, plus an additional lump sum payment of $10,000 upon exercise of the option, followed by payments of advance minium royalties of $3,000/quarter, plus 5% of the net profit above the $1,000/mo. min. An outright sale or installment sale, with lease payments applicable to the purchase price are a possiblity.

Qualified operators are invited to review the drilling and assay reports.

For further information please call me at (602) 577-0700.

Yours Truly,

Charles S. Porter

Charles S. Porter, GRI

CSP/pg

LA PALOMA CORPORATE CENTER
3567 E. Sunrise Dr., Suite 215
Tucson, Arizona 85718
(602) 577-0700

THE NEW JUPITER MINE

Located in the Northwest quarter of Section 36, T19S, R7E, G&sr B&M, Pima County , Arizona, in the Baboquivari Mining District (Mildred Peak, Arizona, 7.5 ' Series USGS map).

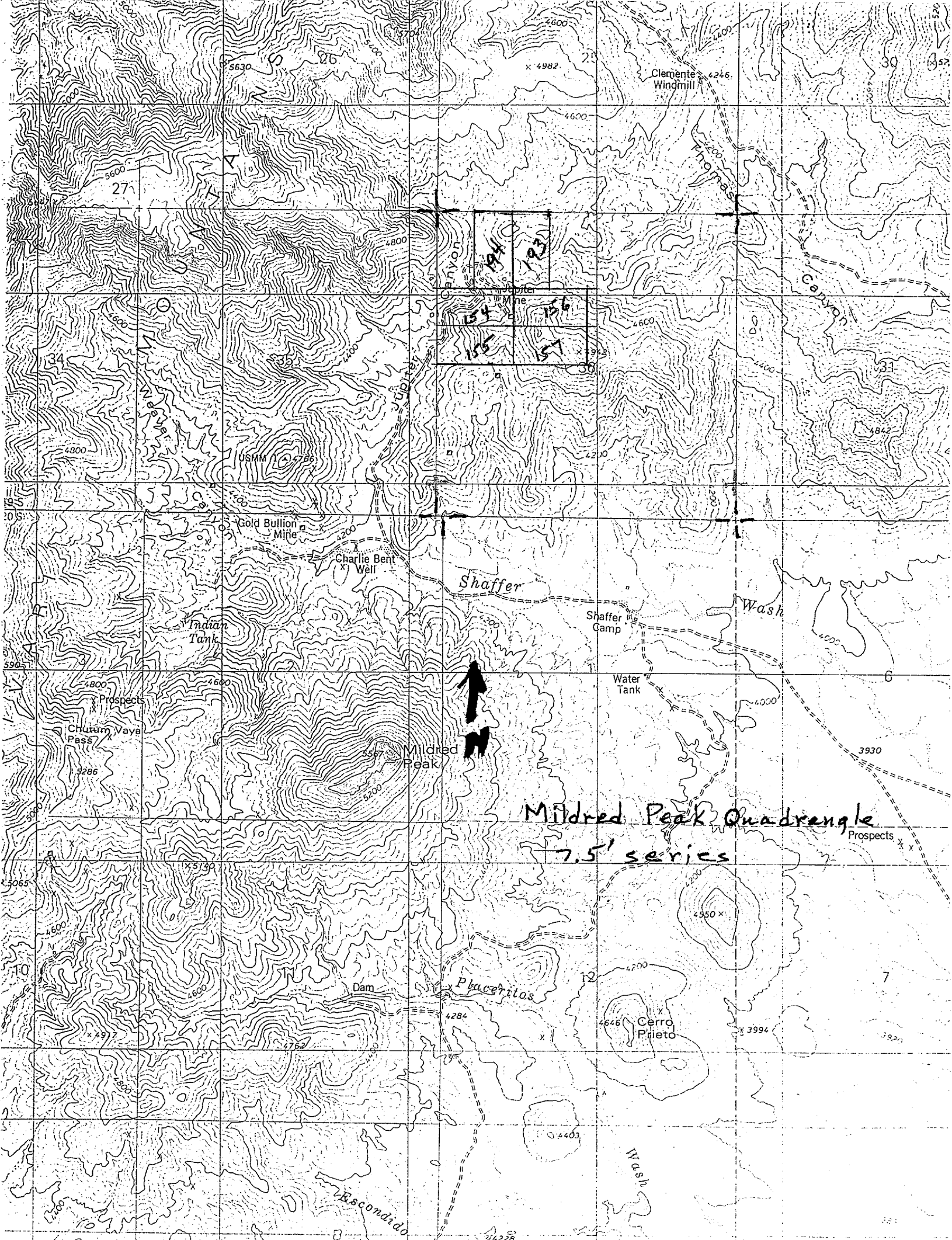
The claims are of the type B, that is, laid out according to a twenty acre legal description and having no extralateral rights.

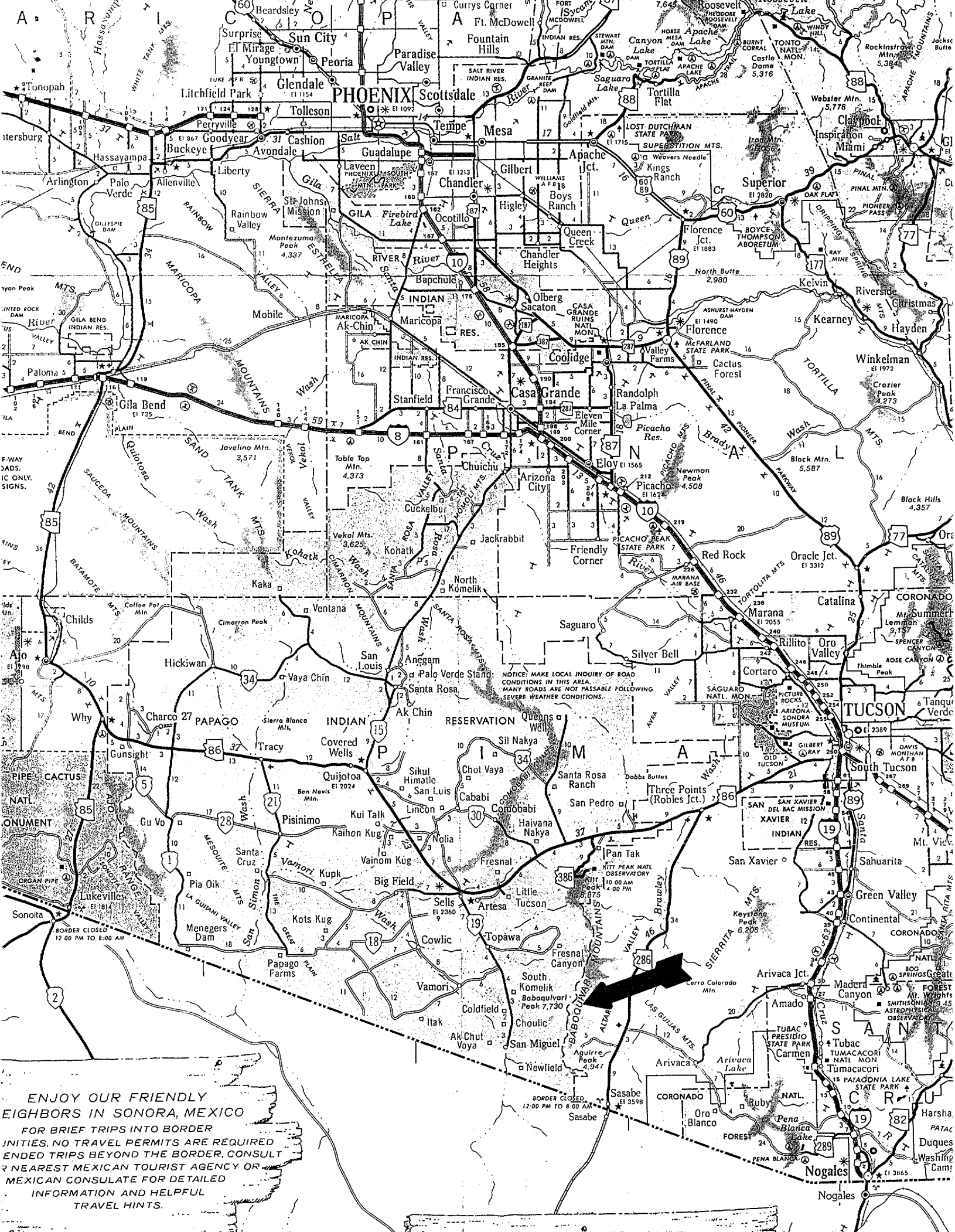
Arizona State Lease	Legal Description	Record
11-04193	W2NE4NW4	3-31-71
11-04194	E2NW4NW4	3-31-71
11-04154	S2SW4NW4	11-30-70
11-04155	N2SW4NW4	11-30-70
11-04156	N2SE4NW4	11-30-70
11-04157	S2SE4NW4	11-30-70

"Material in sight and available for mining would be in the 30,000 to 40,000 ton range and assays 0.5 to 1.5 oz/ton gold and 5 to 15 oz/ton silver".

from Owner's professional report.

Terms: $10,000 up frontfor exploration and option, then $10,000 to exercise the option, plus $1000/mo, paid quarterly, plus 5% of net profit over the basic minimum royalty.


Clemente Windmill
Thomas Canyon
Jupiter Mine
Jupiter Canyon
USMM
Gold Bullion Mine
Charlie Bent Well
Shaffer Wash
Shaffer Camp
Indian Tank
Water Tank
Prospects
Churuum Vaya Pass
Mildred Peak
Prospects
Placerites
Dam
Cerro Prieto
Escondido Wash
Mildred Peak Quadrangle
7.5' series
193
194
154
155
156
157


PHOENIX
TUCSON
Nogales
Sonoita
Lukeville
Sasabe
Arivaca Jct.
Tubac
Tumacacori
Nogales
BORDER CLOSED 12:00 PM TO 8:00 AM
BORDER CLOSED 12:00 PM TO 8:00 AM
NOTICE: MAKE LOCAL INQUIRY OF ROAD CONDITIONS IN THIS AREA. MANY ROADS ARE NOT PASSABLE FOLLOWING SEVERE WEATHER CONDITIONS.
ENJOY OUR FRIENDLY
EIGHBORS IN SONORA, MEXICO
FOR BRIEF TRIPS INTO BORDER
UNITIES. NO TRAVEL PERMITS ARE REQUIRED
ENDED TRIPS BEYOND THE BORDER, CONSULT
R NEAREST MEXICAN TOURIST AGENCY OR
MEXICAN CONSULATE FOR DETAILED
INFORMATION AND HELPFUL
TRAVEL HINTS.

JDS

ASARCO

Southwestern Exploration Division

April 5, 1991

S.A. Anzalone

Copper Oxide Property
Korn Kob
Redington District
Pima County, Arizona

I note that S.F. Budge (Mining) Ltd., c/o Carole O'Brien, Scottsdale, Arizona, phone 602/945-4630, is seeking a JV or buyout of their Korn Kob tactite property north of Tucson (Skillings, March 30, 1991, p.8).

Carole says the south pit has been drilled out and has 20-25 million tons of +0.4% oxide copper at less than 1.5/1 waste/ore stripping ratio.

This is triple the tonnage in the last note in the SWED files. She also said that the north area has considerable oxide copper, but not enough drilling to put tonnage figures on at this time.

Carole has a room full of maps, logs, assays, reports, column leach tests, etc., which she offers for your investigation as to possible interest.

James D. Sell

JDS:mek

James D. Sell

cc: W.L. Kurtz

and 2,000 ft below the surface in host rock consisting of Laramide porphyry intruded into Precambrian Oracle Granite. Diabase and other mafic dikes intrude the host rock. The deposit is similar to the Sacaton porphyry copper deposit located 6 mi northeast; both deposits are buried beneath alluvial cover and contain a host rock that consists equally of Precambrian granite and Laramide intrusive rock, unlike most porphyry copper deposits (Cummings, 1982). Sacaton and Casa Grande may have been parts of a single hydrothermal system that was later separated by faulting. The Casa Grande deposit lies along the extension of a structural lineament called the Jemez zone that trends northeast from Sacaton to Globe, Ariz.

Companies developing the deposit have proposed leaching the buried ore in place. The U.S. Geological Survey (USGS) and the U.S. Bureau of Mines are studying the geology and hydrology of the area to evaluate the environmental impact of the leaching technique and to prepare an ore deposit model. In support of the study, the USGS has recently flown two aeromagnetic surveys over the Casa Grande deposit: one flown 600 ft above terrain at ½-mi spacing and the other flown 300 ft above terrain at ¼-mi spacing. These data were modeled to determine the configuration of the basement and overlying basin. The Bouguer gravity anomaly data of the area were used to constrain the magnetic modeling.

The aeromagnetic map flown 300 ft above terrain shows a magnetic low about 2 mi in diameter surrounding the deposit and a 20-nanoTesla (nT) high centered over the deposit. A 15-nT high, also inside the relative magnetic low, occurs 1 mi northeast of the deposit. These anomalies are partially obscured by a steep, 120-nT/mi, east-northeast-trending gradient on the flanks of a 300-nT high, 2½-mi north of the deposit. The source of this northeast-trending, high-amplitude positive anomaly is hidden below alluvium. Our first task was to adequately remove this regional magnetic gradient to enhance the local anomalies. Several methods were compared, including (1) removing a two-dimensional surface calculated from the gridded aeromagnetic data by using orthogonal polynomials (USGS program SURFIT); (2) removing higher level aeromagnetic fields (such as the 600-ft field or upward continued fields) from the 300-ft magnetic field; and (3) removing a 120-nT/mi southeast-dipping gradient. Mathematical enhancement of the residual and the total fields was performed; enhancement consisted of calculating the horizontal gradient to create a boundary map that has density contrasts outlined. These functions bring out features existing in the aeromagnetic data that are not readily apparent.

The Bouguer gravity anomaly map was similarly analyzed to remove a regional gradient. The residual gravity anomaly map shows a 2-milligal high centered over the deposit.

Interpretation of aeromagnetic data began by incorporating other information, such as geologic mapping from drill holes and gravity mapping. Magnetic profiles were selected from flight lines crossing the deposit and were modeled by using the USGS program SAKI (Webring, 1985).

REFERENCES

Cummings, R.B., 1982, Geology of the Sacaton porphyry copper deposit, *in* Titley, S.R., ed., Advances in geology of the porphyry copper deposits: Tucson, University of Arizona Press, p. 507–521.

Webring, Michael, 1985, SAKI: A Fortran program for generalized linear inversion of gravity and magnetic profiles: U.S. Geological Survey Open-File Report 85–122, 108 p.

Regional Geochemical Studies of the AJO and Lukeville 1° × 2° Quadrangles, Arizona

Harlan Barton and Paul K. Theobald

Regional geochemical studies were conducted during 1979 and 1980 in mountain areas of the U.S. portions of the Ajo and Lukeville 1° × 2° quadrangles, Arizona, except in the Papago Indian Reservation. Stream sediments were sampled at 971 localities within the 6,500-mi^2 study area. Sufficient heavy-mineral-concentrate sample for analysis was obtained from 952 of these localities. Sample sites were located on first- or second-order stream channels from drainage basins of less than 0.5 mi^2; and generally these sites were located where dry stream channels emerged from the narrow linear mountain ranges. The sampling density in the mountain ranges was one sample locality per 1.2 mi^2. Stream sediments were analyzed for 31 elements by optical emission spectroscopy in field laboratories.

Maps are presented showing locations of anomalous concentrations of (1) ore and ore-related elements—Sb, Bi, Cu, Pb, Mo, Ag, W, and Zn; (2) elements common to gangue minerals—Ba, Mn, and Sr; and (3) Sr depletion associated with hydrothermal alteration. Sixteen areas having anomalous element concentrations are identified, and their geological and geochemical characteristics are described.

The Mohawk Mountains anomaly is a cluster of sample localities having anomalous concentrations of lead, molybdenum, bismuth, and tungsten in heavy-mineral concentrates. One locality has anomalous molybdenum in a stream sediment.

An elongate cluster of sample localities in the Agua Dulce Mountains has anomalous concentrations of bismuth and tungsten. Some also have low-level lead and molybdenum in heavy-mineral concentrates. The western part of the anomaly, underlain by Precambrian rocks, is bismuth rich, whereas the eastern part is molybdenum rich. In addition to

these elements, the area is rich in thorium, niobium, and other rare-earth elements, all characteristic of a granitophile assemblage.

Sample localities from the low hills to the north of La Abra Plain have anomalous concentrations of molybdenum, tungsten, and, less frequently, lead. The anomaly is best reflected by molybdenum in stream sediment where extensive overlap from the Sonoyta Mountains anomaly is subdued.

The tight cluster of sample localities in the Booth Hills has anomalous concentrations of Bi, W, Pb, Mo, Th, Nb, and, in some localities, Sn. The anomaly is in an area of gneiss and granite of uncertain age and may reflect a late magmatic concentration of metals.

The copper anomaly in the vicinity of Growler Pass is reflected in normalized data for both sample media. The area also has anomalous concentrations of Pb, Mo, Bi, W, Cu, Sb, and Sn, but Sr is found in abnormally low amounts. The assemblage of elements suggests erosion into the middle or upper levels of a hydrothermal system.

Heavy-mineral concentrates throughout the Sauceda Mountains are anomalously rich in manganese. Two localities have anomalous antimony, and localities at the northwest end of the mountains are anomalous for barium and strontium. The area has the largest tin anomaly in the quadrangle.

The Sonoyta Mountains anomaly is strongly reflected in the distribution of antimony and silver, includes one of the few sites that has anomalous zinc, and has abnormally low strontium, which suggests widespread depletion during hydrothermal alteration.

The intense copper anomaly at Ajo is a direct reflection of the deposit at the New Cornelia mine. It is a zoned anomaly, and molybdenum is confined to the center of a larger lead anomaly that overlaps with copper. Anomalous concentrations of bismuth and tungsten occur locally. The anomaly is of interest primarily for comparative purposes. It provides a measure of the composition size and intensity of anomalous values in the vicinity of the known deposit at the New Cornelia mine.

A number of localities in the western part of the Maricopa Mountains have anomalous concentrations of W, Bi, Pb, Mn, and Y. The anomaly is closely associated with the outcrop area of Precambrian granite and most likely reflects a hydrothermal event superimposed upon the granite.

Sample localities anomalous for copper are in the vicinity of Mohawk Pass. Secondary copper minerals in these samples are derived from vein-type deposits in the Mohawk mining district; these deposits also contain anomalous concentrations of tungsten, molybdenum, bismuth, and lead.

The Painted Rock Mountains anomaly is a cluster of sample localities having anomalous lead and molybdenum in stream sediment and lead in heavy-mineral concentrate.

Left to right: Richard Henley (Australia), Charles Cunningham (USGS), Alan Wallace (USGS), and Andre Panteleyev (Canada) prepare to go underground to visit a newly discovered, rich vein of silver at Cerro Rico, Potosi, Bolivia.

The area is also rich in manganese, barium, and strontium, and, at one locality, copper. Veins containing barite and a variety of lead and molybdenum minerals have been mined in the Painted Rock district.

The copper anomaly in the Ajo Range is represented by normalized anomalous sites. The prominent northwest trend of this anomaly is well displayed in the distribution of anomalously high concentrations of lead, molybdenum, silver, and tin and anomalously low concentrations of strontium, a common feature of hydrothermally altered zones. The general nature of the anomaly suggests remobilization of metals from older rocks beneath exposed volcanic rocks along a major northwest-trending structural zone.

The copper anomaly in the Batamote Mountains is second only to the Ajo anomaly in intensity and has a larger areal extent. The Batamote anomaly is isolated from the Ajo anomaly by an unsampled alluvial plain. Hence, it might appear to reflect a northern extremity of the Ajo anomaly. Although isolated anomalous concentrations for volatile elements and base metals have been observed in the general area, the anomaly is best characterized by copper. The Batamote Mountains are a broad, dissected shield volcano of late Tertiary age resting on latites of similar age. Both of these lithologies are younger than the mineralization at Ajo; hence, the Batamote anomaly cannot be directly related to the deposit at Ajo.

Scattered localities in the Cabeza Prieta and adjacent Tule Mountains are rich either in zinc or silver. Several other localities are weakly anomalous for either molybdenum or the assemblage of tungsten, molybdenum, and lead. Barium and strontium enrichment are probably related to a granite intrusion rather than to the hydrothermal mineral occurrences suggested by the other elements.

A single anomalous copper value in stream sediments and several normalized anomalous copper values in both the stream sediments and heavy-mineral concentrates were found in the Copper Mountains. Two of these heavy-mineral concentrates were also weakly anomalous for lead.

In samples from the low hills along State Highway 84 in the northeast corner of the Ajo quadrangle, heavy-mineral concentrates are manganese rich, and stream sediments are strontium poor. The area is anomalous for Pb, Bi, Th, La, Y, and, locally, W. The thorium, lanthanum, and yttrium association suggests a relation to the Precambrian granites exposed in the area, whereas the other elements suggest late magmatic or hydrothermal concentration of selected elements.

Genetic Model for the Carbonate-Hosted Pb-Zn-Cu-Ag-Au Manto-Chimney Deposits of the Gilman, Colorado District, Based on Fluid Inclusion, Stable Isotope, Geologic, and Fission-Track Time-Temperature Studies

D.W. Beaty, C.G. Cunningham, C.W. Naeser, and G.P. Landis

Multidisciplinary studies have resulted in the development of a comprehensive genetic model for the carbonate-hosted Pb-Zn-Cu-Ag-Au manto-chimney deposits of the Gilman, Colo. district. These deposits, located in the Colorado mineral belt, are some of the best examples of this type of deposit in the world. The model has direct application for both resource assessment and exploration.

The composite evidence shows that both the mantos and chimneys of the main sulfide ore deposits formed during the mid-Tertiary from a high-temperature, igneous-related, hydrothermal source. There may have been a poorly preserved silver-lead-zinc precursor event. The mineralizing event that formed the main orebodies has been dated by fission tracks at 34.5±2.6 Ma on late-stage hydrothermal apatite from the chimneys. A large, district-wide, paleothermal anomaly of the same age surrounds and is centered on the orebodies. Sulfur isotope data show a homogeneous sulfur source for the main orebodies. Bulk $\delta^{34}S=+1.6$ and indicates an igneous provenance. Lead isotopic ratios in the ore are indistinguishable from those of Tertiary igneous rocks throughout western Colorado. The components of the manto and chimney orebodies were transported by a hydrothermal fluid having $\delta^{18}O=+4$ to $+8$ and $\delta D=-55$ to -75 per mil; this hydrothermal fluid is inferred to be magmatic water. The fluid had a mean salinity of about 5 weight percent equivalent NaCl and a range of 1.5 to 9.4. Fluid inclusion and sulfur isotope fractionation data indicate that sulfide deposition in the chimney deposits took place at temperatures of about 390 to 410 °C. Lower temperatures were determined for the No. 1

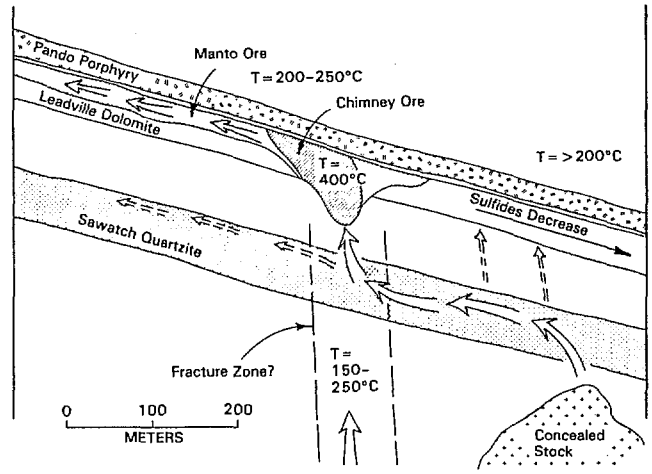


Figure 1. Paleohydrology of the carbonate-hosted Pb-Zn-Cu-Ag-Au manto-chimney deposits at Gilman, Colo. [Beaty and others abstract]

Manto (300–375 °C), for veins in the Sawatch Quartzite (230–370 °C), for late-stage apatite in vugs within the chimneys (309 °C), and for veins cutting Precambrian rock beneath the chimneys (174–306 °C, and a mean of 240 °C). Fluid movement during the ore-forming event is delimited by the distribution of fluid-inclusion temperatures, partial fission-track resetting, ore mineral assemblages, alteration mineral assemblages, and oxygen isotope exchange patterns in the orebodies and surrounding country rocks. Fluids moved updip within the Sawatch Quartzite from a source located to the northeast of the present deposits, then upsection through the chimneys to the Leadville Dolomite (an important aquifer), and then updip through the mantos where they ponded against the Pando Porphyry (fig. 1). Several small, paragenetically early, partially preserved silver-lead-zinc deposits at Gilman and Red Cliff are of uncertain origin.

Fluid Inclusion and Mineralogic Studies of a Palladium-Platinum Anomaly Zone in the Reeser's Summit Diabase, Pennsylvania: Evidence for Hydrothermal Transport

Harvey E. Belkin

The York Haven diabase sheet, of Early Jurassic age, crops out near the northern margin of the Gettysburg basin across the Susquehanna River south of Harrisburg, Pa. Gottfried and Froelich (1988), in a comprehensive study of mafic rocks in the Eastern United States Mesozoic basins, have defined a palladium and platinum anomaly associated with a ferrogabbro zone at Reeser's Summit, Pa. (Gottfried and others, this volume). The Reeser's Summit exposure consists of a 500-m section that has chilled margins characteristic of a high-titanium (1.1 weight percent) quartz-

cc JCB PGV

Frank Gibbons 602/983-2356
Apache Jct. Lucky Lady Mining

3 patented claims in Pima Co. pat. 1949
14S 4E Sec. 25
8 miles N of Sells.
Comobabi 8'g/t 25g Ag

JDS

ASARCO

CERTIFIED MAIL - RETURN RECEIPT

Exploration Department
Southwestern United States Division
James D. Sell
Manager

March 8, 1993

Brad D. Bassore
Basin Petroleum Company
P.O. Box 4028
Albuquerque, NM 87196

Prospect Submittal
Batamote Porphyry Copper Prospect
Pima County, Arizona

Dear Mr. Bassore:

Your packet of material has been received and is being returned to you.

Asarco SWED had looked at the data presented during the Lukeville CUSMAP presentation and concluded that the results did not meet our requirements at the time.

As your four years time and three miles peripheral limit is excessive, I will not request permission from my lawyer for the option to sign your agreement to see further information.

However, I do thank you for the opportunity.

Sincerely,

James D. Sell

JDS:mek
Atts.

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

BASIN PETROLEUM COMPANY

February 23, 1993

Mr. J.D. Sell
ASARCO Incorporated
1150 North 7th Avenue P.O. Box 5747
Tuscon AZ 85703

CERTIFIED RETURN RECEIPT REQUESTED #P477491414

Re: Prospect Submittal
Porphyry Copper Prospect
Pima County, Arizona

Enclosed for your review is a copy of USGS Bulletin 1907 which describes a major geochemical anomaly (CU,AG,BI), near Ajo, Arizona. Based upon this study, I located and now own (as an individual) 182 Federal Mining Claims and a Arizona State Prospecting Permit covering 639.38 acres (Section 2).

I have performed further geochemical studies in the area utilizing mesquite ash and have found anomalous concentrations of CU, AG, AU & SN. If your company would like to obtain access to my geochemical study and / or entertain futher discussions regarding this prospect , please have the appropriate corporate officer execute and seal the enclosed confidentiality / non-competition agreement and return to me in care of the letterhead.

I will be out of the office until March 21st . If you have any questions please feel free to give me a call after this date. Thank you for your attention to this matter.

Sincerely,

Brad D Bassore

Brad D. Bassore
BDB/rc
Enclosures

Post Office Box 4028 / Albuquerque, New Mexico 87196 / (505) 255-7601

JDS — I'm not interested but handle as you see fit

Kurt
12/4/92

Alpine Exploration Group

3113 East Table Mountain Road, Tucson, Arizona 85718 USA
Phone (602) 577-2068, Fax (602) 299-0887

Mapping and Map Analysis

December 1, 1992

Attn: Mr James D Sell, Manager Southwestern US
Asarco Incorporated
PO Box 5747, 1150 North 7th Ave
Tucson, Arizona, USA 85703

Dear Jim;

In a continuing effort to find a niche that works I decided to get back to basics, using the tools I have developed over the last couple of years. Based on map analysis (GIS) and a bit of field work I recently located a block of twenty claims in the near Tucson, the target being a porphyry copper deposit similar to others in southeast Arizona.

If you are interested in seeing a report on the claims please contact me. After we have a confidentiality agreement I will be glad to send you a copy of the report.

Best regards,

Henry Truebe

ASARCO Incorp.
DEC 3 1992
SW Exploration