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Tucson, Arizona 85701
520-770-3500
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James Doyle Sell Mining Collection

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% Core Recovery	Mineralization	Alteration	Structure	Rock Type

PROJECT Box Q Wash PAGE 1
D.D.H. No. BW-1 SCALE 1" = 200' BY LCA
CO-ORD. COLLAR EL. ≈2100' DATE

CORE ASSAYS			
INTERVAL		MINERAL	
FROM	TO	Cu	Mo

0 0-30 Alluvium Tan - unconsol. - Strongly Arkosic

30-550 Gravel - Gray - Moderately consol.

Gravel is Arkosic - Pebbles with yellow transported Limonite are common.

200

400

550-1140

600 Sandy Gravel - Light Brown - Arkosic
Very similar to interval 30-550 but w/ alternating sandy beds.

800

1000

1140-1220 Sand - Lt. Brownish Gray

1200

1220-1450
Gravel - Gray - Arkosic
Grains w/ yel. transport Lim are common. Unit increasingly sandy toward base

1400

1450-1740 Clayey Sand - Gray -
Limonite sparse to absent.

1600

1740-2060
Sand & interbedded siltstone micaceous
(Spot core 1950-1957 - Siltstone - Tan V.F.G. thin beds - Qtzit beds is flat - Pumpkinite? on fractures)

1800

2000

% Core Recovery	Mineralization	Alteration	Structure	Rock Type

PROJECT Box Q PAGE 2
D.D.H. No. BW-1 SCALE BY
CO-ORD. COLLAR EL. DATE

CORE ASSAYS			
INTERVAL		MINERAL	
FROM	TO	Cu	Mo

2000

2060-2160 Tuff - White - V.F.G. Fresh Qtzite

2160-2302. T.D.
do 1740-2060

2200

2400

Summary

Hole BW-1 was collared in unconsolidated alluvium. Drilling intersected 1450 feet of arkosic sand and gravel in which limestone pebbles were common. The interval 1450-2060 consisted of sand, clayey sand and interbedded siltstone. The siltstone was coal and found to be micaceous with thin flat bedding laminae. Drilling intersected a white bentonite tuff in the interval 2060-2160 and passed again into a sequence of interbedded sand and siltstone. Drilling was stopped by choice at 2302 still in the alluvial ~~rocks~~ section.

L.C.G.

L. CLARK ARNOLD
CONSULTING GEOLOGIST Ariz. Reg. #8883

September 16, 1991

Mr. J. David Lowell
Route #3 P.O. Box 197
Nogales, AZ 85621

Dear Dave,

At last the long awaited Red Hills file aka Box O Wash Area #7-21. I'm afraid the delay resulted from difficulties in recovering my copy of the airport storeroom key from Sharon Bice. I also thought I had something in my geographic files but I was mistaken. There may be some old Quintana information in your Pinal County file which refers to the 1971 Quintana project in which we drilled a deep hole at the south end of the outcrop and failed to reach bedrock. As I recall we concluded that the altered granite and oxide copper was part of a fault slice sitting atop unaltered Precambrian granite; but the recollection is hazy.

While I have you on the line -- I was at Grasberg from late June until the end of August this year and will be leaving Saturday for another eight-week tour returning November 20 just in time for Amy's wedding on November 30 which is the Saturday of Thanksgiving weekend. I have already been measured for my tuxedo and Ross Humphreys pointed out that if, for some reason I was unable to make it make from darkest Indonesia by November 30, the same dimensions could easily be used for a pine box.

Steve Van Nort mentioned that in the near and mid term future you plan to spend more time in the U.S. and somewhat less in Chile. In case you plan to spend part of that time porphyry hunting I should mention that in the last several years I have "run across" several fairly decent covered porphyry targets of the sort that we tested in the course of the CAP. Copper exploration has been a four letter word for nearly ten years now but there is some evidence that may be changing -- we might hope! If this sort of thing sounds at all interesting we might get together when I return in November and see if there is any way we could capitalize on this thinking.

Hope the file is helpful. I notice two copies of Gordie's geophysical report -- why don't you keep one if you don't already have a copy in your files. Please return the rest at your convenience.

All the best as ever,

Clark

Clark

201 East Rudasill Road Tucson, Arizona 85704-6024
602/742-0991

4-12-72

Red Hills Prospect
10 mi due E of Florence
Pinal Co.

E-W grd dike swarm in Pre-Є oracle Gr.

E-W fissures with spec, py minor cpy

no pervasive alt.

30° fault beneath Red Hill (westernmost hill)

Fault interpreted as steep normal fault rotated 60° eastward — or simply a post-tilt fault (as at San Manuel)

Interp: similar to San M + Kal

Recom. 3 ± 2500' holes — in Box O hills — Bonnie Clair grp — Bell Western leased by Red Hills — (6 sections) —

Visit — 4-17-72 — JJC — WLK — JCB — JDS

Por dikes — similar to San M por — associated copper min — mainly as narrow veins and joints — some wet altered (supergene) dike in west end of pit — Laramide intrusive very coarse grained — resembles Pre-Є Gr, but lacks large feldsp phenos — also lacks dikes — White tail(?) dips E 30°-60° — not well indurated — mainly Pre-C Gr frags — but similar to so called Cloud B. at Purcell Window.

over

Concl – Red Hills may be underlain by primary ore zone – but chances of a duplicate of San M. appear slim and depth may be over 5000' – absence of stock, or off shoots on east (where ore zone should be nearer surface) is not encouraging – but S M type prov is somewhat unique – Thus this is favorable for Red H. – Similar geol environment is main plus factor –

JHC

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

October 30, 1972

FILE MEMORANDUM

Red Hills Prospect
Pinal County, Arizona

Kaiser Exploration drilled in Section 2, T5S, R11E:

1) one hole northeast of SW corner was drilled to approx. 2200 feet in "barren" Oracle granite;

2) one hole southeast of NW corner was drilled to approx. 800 feet cutting zones of sericitic alteration with some low primary copper values;

3) one hole northwest of SE corner was drilled to approx. 800 feet cutting zones of sericitic alteration with some low primary copper values.

Above information from Don Kennedy who reviewed Kaiser's drill logs. Apparently the two 800' holes located an EM anomaly, if you can believe that, and the 2200-foot hole was drilled off the EM anomaly.

W. L. Kurtz

W. L. Kurtz

WLK:lad

cc: JDSell
JRKing

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

J. H. C.

OCT 31 1972

October 31, 1972

FILE MEMORANDUM

Red Hills
Pinal County, Arizona

On October 27 and October 30 John King and Norm Whaley relocated the Lois claims in the name of M. L. Robinson (locater) and J. R. King (witness) in sections 23, 24, 25, T4S, R11E.

The possibility exists of making an agreement with Red Hills Mining Company.

W. L. Kurtz

WLK:lad

cc: RBCrist
JHCourtright

J.H.C.

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 5, 1973

Mr. T. C. Osborne
Assistant Director of Exploration
New York Office

Exploration Appropriation Request
Red Hills Project
Pinal County, Arizona

Dear Sir:

The Red Hills (Price) copper prospect has been known for a long time as an area with weak copper oxide mineralization associated with Laramide porphyry dikes that are intrusive into the Precambrian Oracle granite. Our interest in the property was renewed when a similarity between the Red Hills prospect and the Kalamazoo-San Manuel area was pointed out by John Balla. During the first part of 1972 Mr. King mapped the area in some detail and his mapping revealed a post-mineral, predacite eastward tilting that led to the defining of a target area for porphyry copper exploration. Mr. King's report is enclosed.

We believe the Laramide dikes and the associated weak copper mineralization and propylitic alteration represent the outer manifestations of a porphyry copper system that has been faulted and tilted eastward. The attached geologic map shows the surface geology. The diagramatic cross-section shows our geologic interpretation and the position of the porphyry copper target. A minimum of three 3500-foot to 5000-foot drill holes will be required to effect a minimum exploration test of the Red Hills prospect.

The land status as currently known is shown on the attached map. During October we were hopeful of reaching a satisfactory agreement with Red Hills Mining Company and staked 108 claims to cover open land with mineral potential. Subsequently, internal problems in Red Hills Mining Company did not allow us to consumate an equitable agreement. We believe that the Red Hills Mining Company ground will again be available to us on favorable terms.

Because the land located by Asarco has definite porphyry copper exploration potential, I recommend that at this time we monument our claims, stake additional ground, and perform the necessary location work on the claims and the State prospecting permit, which will hold the land until August, 1974. This land position should help us in negotiating an equitable agreement with Red Hills Mining Company. Exploration drilling would be deferred until we learn whether we can acquire the Red Hills property. The drilling could be done over a several-year period by fulfilling assessment work obligations.

I have discussed the Red Hills prospect with Mr. Courtright and he is in agreement that it represents a legitimate porphyry copper target.

I estimate the costs to complete the land acquisition as follows:

State Prospecting Permit	$ 1,300
Monument Claims	4,700
Location Work	12,400
Overhead/Supervision	1,600
Total	$20,000

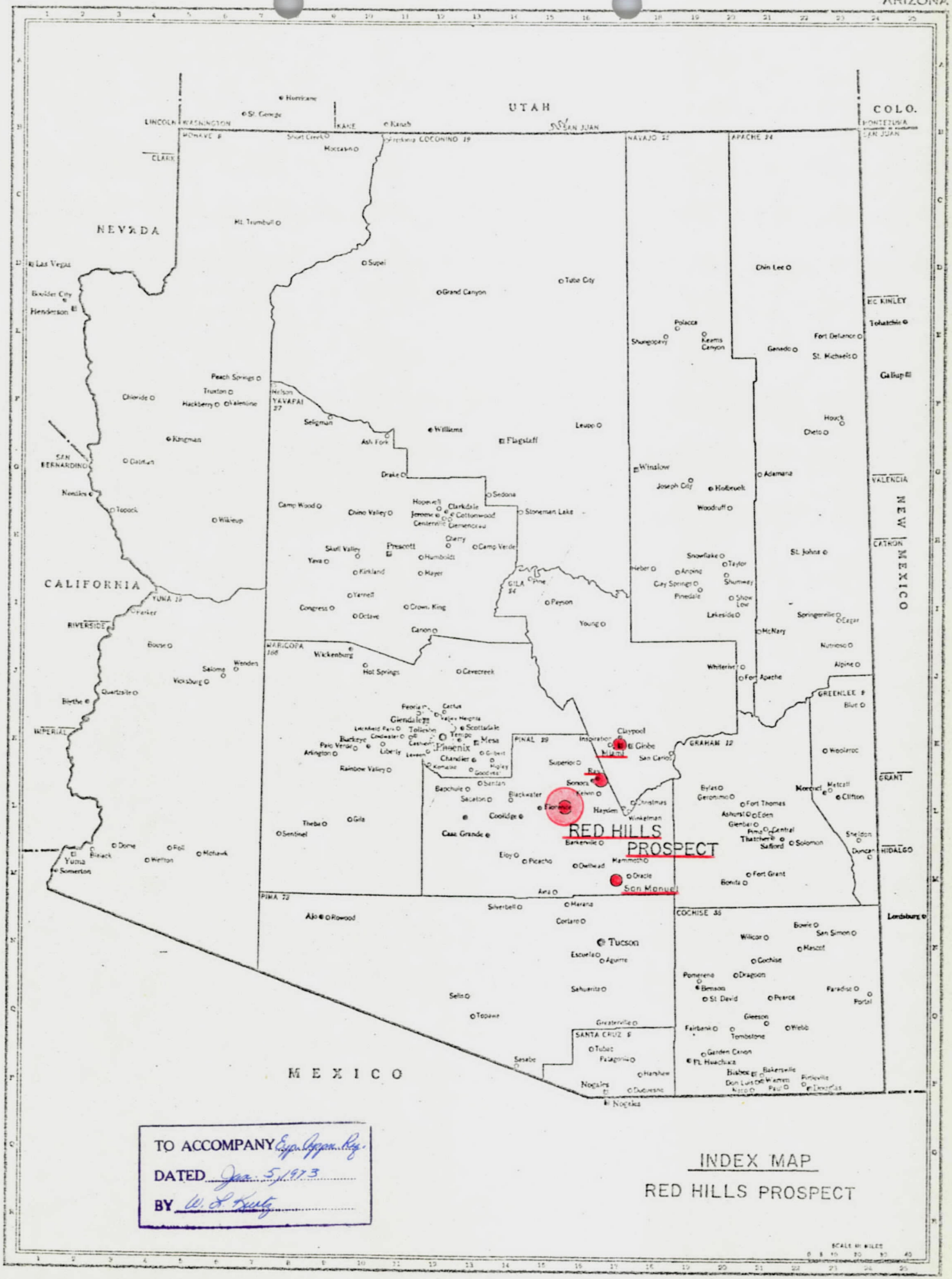
If you approve, please request Exploration Appropriation in the amount of $20,000. Forms 302M and 302MA are attached.

Respectfully submitted,

W. L. Kurtz

WLK:lab
Enc. & Attachs.

cc: JHCourtright - w/enc. & attachs.
RBCrist - w/forms only
JRKing - w/o enc. or attachs.
ADCoumides - w/forms only



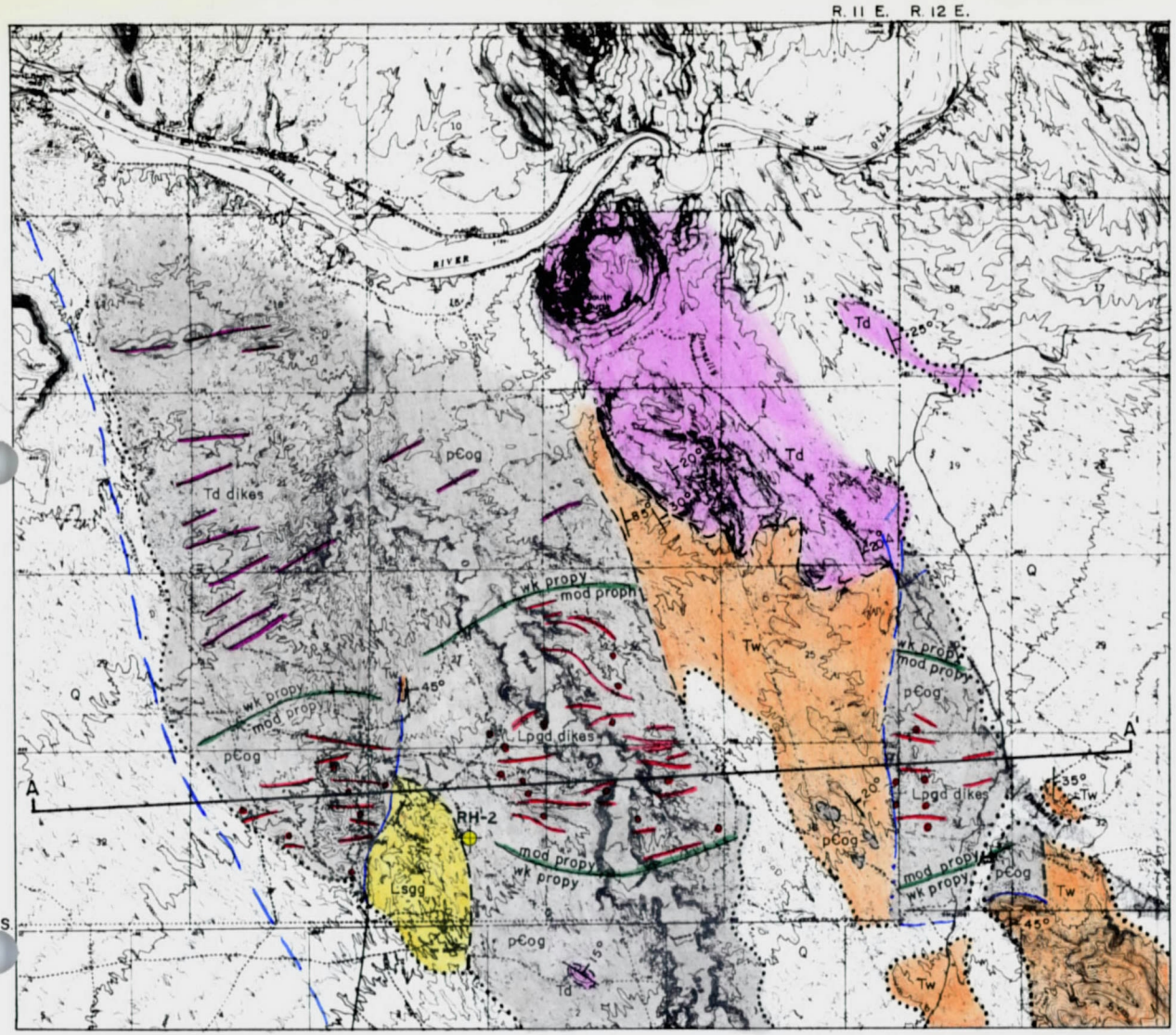
TO ACCOMPANY Exp. Appr. Rep.

DATED Jan. 5, 1973

BY W. L. Kurtz

INDEX MAP

RED HILLS PROSPECT



EXPLANATION

Q	Quaternary gravels (includes Gila conglomerate)
Td	Tertiary dacite
Tw	Tertiary Whitetail conglomerate

POST-MIN
PRE-MIN

Lpgd	Laramide porphyritic granodiorite (sericite alt & sulfide min are associated w/Lpgd dike swarms)
Lsgg	Laramide(?) Southern Grayback granodiorite
pЄog	Precambrian Oracle Granite (includes diabase)

Copper oxide occurrences

Approximate limit of mod propylitic alteration

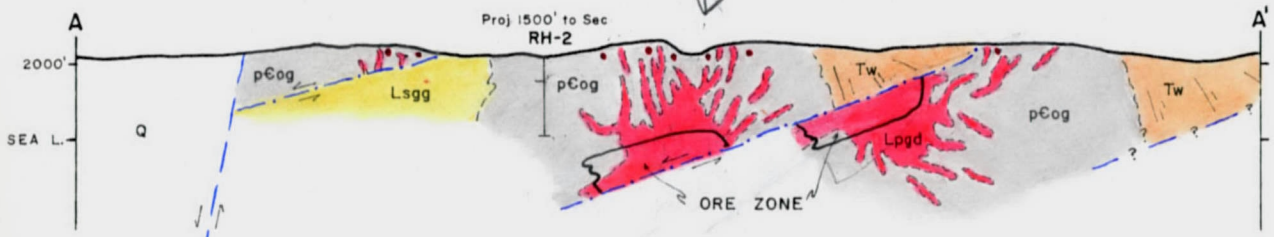
Fault - dashed where covered or inferred

25° Strike & dip

RH-2 Diamond drill hole

TO ACCOMPANY Exp. Copper Rep.
DATED Jan. 5, 1973
BY W. L. Kurtz

Ore zone likely much deeper than than depicted (2000' below surface)
JHC

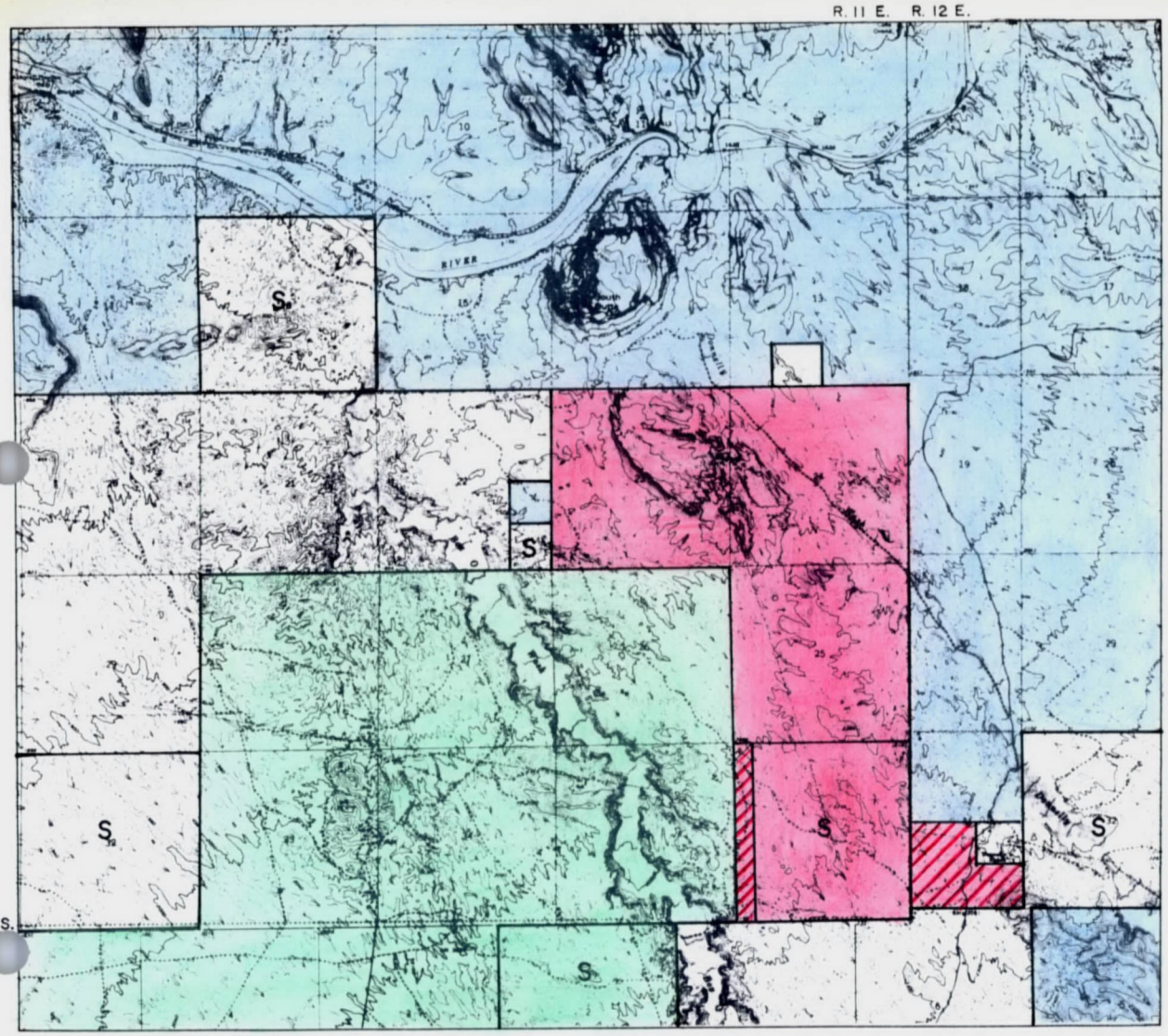


DIAGRAMATIC CROSS SECTION
Showing Possible Location of Porphyry Copper Deposit

GENERAL GEOLOGY
RED HILLS PROSPECT
Pinal County, Arizona
SCALE: 1" = 1 mile

J.R.K. Jan. 1973

MVK 2577



EXPLANATION

- Red Hills Mining Company
- ASARCO claims staked / to be staked
- Withdrawn PLO 3835 (Middle Gila River Project)
- S — State land

N

TO ACCOMPANY Exp. Appm. Rep.
DATED Jan. 5, 1973
BY W. L. Kurtz

PRELIMINARY

LAND STATUS

RED HILLS PROSPECT

Pinal County, Arizona

SCALE: 1" = 1 mile

W.L.K. Jan. 1973

MVK 2578

PRINTED IN USA. 9/69

FORM 302-M

New York No. .....

AUTHORIZATION FOR MINERAL EXPLORATION

January 5, 19 73

Originating Office ....SWED - Tucson.....

DESCRIPTION:

LOCATION OF PROSPECT/PROJECT: Red Hills Project, Pinal County, Arizona Secs. 23, 24, 25, 36, T 4 S, R 11 E, approximately 12 miles east of Florence, Arizona.

PARTNERS:

Partner's Per Cent .....

COMPANY: [X] ASARCO

[ ] Subsidiary. Specify .....

WORK CONTEMPLATED:

Monument and perform location work on 124 lode mining claims and fulfill requirements on one State Prospecting Permit to acquire a land position over a porphyry copper target.

Total estimated cost (FORM 302-MA ATTACHED) $.20,000.00.....

Reviewed by .....
Acct. Mgr. or Chief Acct.

Approved by .....
Vice President

Recommended by .....
Supervisor

Approved by .....
Comptroller

Account Chargeable to .....
To be designated by Comptroller

Approved by Advisory Committee

.....19 ...

Approved by Board of Directors

.....19 .....

.....
Secretary

FORM 302-MA

Printed in U.S.A.

PROSPECT Red Hills Project

COST ESTIMATE, MINERAL EXPLORATION

OFFICE SWED - Tucson

LOCATION Pinal County, Arizona

W. L. Kurtz

No.	Type of Work	Salaries/Wages Days	Salaries/Wages Amount	Material	Fees, Rent, Services	Traveling	Taxes	Other	Total Estimate Cost
501	Outright Purchase								
502	Option Payments								
503	Bonus Payments								
504	Minimum Royalties-								
	Deductible from								
	Future Production								
505	Minimum Royalties-Not								
	Deductible from								
	Future Production								
506	Rental Payments				1,300				1,300
507	Staking Claims		1,000		17,100	300			18,400
511	Surface Excavating								
512	Underground "								
521	Surface Drilling								
522	Underground "								
530	Geologic								
540	Sampling, Assaying, Lab.								
550	Geophysics								
560	Geochem								
570	Engineering								
580	Construction (temp.)								
590	Construction (perm.)								
610	Administration, Field								
	Offices and Camps								
620	Administration, General		300						300
641	Autos and Vehiclea								
642	Aircraft and Boats								
650	Partner's Share								
	ASARCO'S SHARE		1,300		18,400	300			20,000
661	Commission or Fees								
663	Exchange								
	TOTAL		1,300		18,400	300			20,000

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 12, 1973

MEMORANDUM FOR: J. J. Collins

Red Hills Prospect
Pinal County, Arizona

In connection with appraisal of the Red Hills prospect, I phoned Dave Lowell regarding geochem results in the Kalamazoo "window".

Although only "soil surveys" were mentioned in Lowell's paper (Econ. Geol. Vol. 63, 1968) he advised that rock chips from outcrops were included and both averaged around 400 ppm Cu. Corresponding values with ±2% disseminated pyrite were encountered in drill holes collared in the window and this mineralization continued to depths well over 1500'. Below, the higher pyrite (phyllic) zone was cut and the ore grade potassic zone reached at around 3000'.

The Red Hills outcrops contain areas of anomalous copper, but pervasive mineralization comparable to that at Kalamazoo is not present. However, hole A-2 encountered a sharp increase at 600', from 100 ppm to around 400 ppm Cu. The hole continued to 2470' (bottom) in reportedly similar mineralization, but available assay data stops at 1000'. The pick up at 600' could represent the outer fringe of a chloritic zone which, if comparable to Kalamazoo, would lie around 3000' above a potassic zone with ore-grade copper. Thus, the required depth of exploratory drilling could range from 3500' to 5000', as estimated by Bill Kurtz (letter of 1/5/73). Such depths entail high risks in exploration and development; however, the possibility of ore occurrence much nearer the surface ---- lying beneath a faulted segment of Whitetail conglomerate, as proposed by Mr. Kurtz ---- tends to improve the odds. I consider the program that he has recommended (1/5/73) to be worthy of support.

J. H. Courtright
J. H. Courtright

JHC:lab

cc: WLKurtz

OFFICE OF THE SECRETARY

New York, N.Y., January 12, 1973

RECEIVED
JAN 17 1973
EXPLORATION DEPT.

Mr. J. J. Collins

The following is an extract from the minutes of the Advisory Committee meeting held on January 10, 1973:

J. H. C.
JAN 17 1973

Exploration Authorization #0047-00
Red Hills Project
Pinal County, Arizona (Cu)

It was reported by Company Geologists that study and detail mapping of a well-known area of weak copper oxide mineralization about 10 miles east of Florence, Arizona has indicated the possibility that the weak surface indications represent the outer shell of a major porphyry copper zone. A portion of this target area has been covered by 108 Asarco claims and Company Geologists request an exploration authorization in the amount of $20,000 to monument and perform location work on these mining claims and to fulfill requirements on a state prospecting permit so as to acquire a land position on this porphyry copper target at the Red Hills Project, Pinal County, Arizona.

There was approved an exploration authorization in the amount of $20,000 for work at the Red Hills Project, Pinal County, Arizona, a possible copper project.

J. F. Hornbostel, Jr.

Encl.
JFH:pg
FGHamrick
HQStringham - 2 w/encl.
JHCourtright
WLKurtz w/encl.
RBCrist
ADCoumides w/encl.

J. H. C.

APR 5 1973

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

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

April 4, 1973

Mr. G. Glasscock
Bell Western Corp.
711 Citizens Bank Bldg.
Houston, Texas 77002

Dear Mr. Glasscock:

This will confirm our phone conversation of Monday concerning Bell Western's property near Florence, Arizona.

I presented certain terms under which ASARCO would agree to explore the property and you refused to accept these terms. If you are unable to explore this property yourself, or are unable to option it to others under the terms you outlined, ASARCO would again be happy to discuss the property with you.

Very truly yours,

W. L. Kurtz
Manager of Exploration

WLK:lb

cc: JHCourtright
RBCrist
JRKing

Blind note on ASARCO copies:

Bell Western Terms:

Months	Payment	Work Committment
0-12	$ 1,000/mo.	2 - 3,000' holes
13-18	2,000/mo.	None
19-24	3,000/mo.	Assessment work as minimum
Year		
3	50,000	"
4	50,000	"
5	100,000	"
6	100,000	"
End of payments		

5% NSR upon production with provision to buy out 1/2 of NSR for 5 million

Kurtz offer:

Year	Payments	Work Committment
1-4	$1,000/mo.	1st year 2 - 3,000' holes; then $100,000 yearly committment
5-6	2,000/mo.	

Sliding NSR that had 3% for material with net smelter value of 5.50-6.50

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

April 24, 1973

TO: W.L. Kurtz

FROM: J.R. King

ADDENDA TO RED HILLS REPORT
RED HILLS PROSPECT
PINAL COUNTY, ARIZONA

CONCLUSIONS

The Box-O Wash target area as outlined in the initial report is still considered the most favorable target area. This area is the iocus of the Laramide porphyritic granodiorite dike swarm and the center of weak hydrothermal mineralization and alteration.

The Whitetail basin lying to the east of the Box-O area may conceal a probable faulted portion of the proposed porphyry copper system and, thus, has favorable exploration potential.

The total target area is geologically, geographically, geochemically, and geophysically anomalous in relation to the surrounding district. The rock types, alteration intensity, mineralization intensity, structural setting, post-mineral sedimentary setting, tectonic history, and aeromagnetic patterns are a duplication of the Kalamazoo window. Table (A) illustrates how remarkably well the Box-O area mirrors the setting at the San Manuel, Kalamazoo porphyry copper deposit.

Drill Hole RH-2, although not penetrating economic copper mineralization, did encounter a sufficient change in alteration and mineralization at depth to suggest the permissable presence of a nearby porphyry copper deposit.

REGIONAL GEOLOGY

Attachment A shows the geology of the Grayback, North Butte, Ninety-Six Hills N.W., and Ninety-Six Hills N.E. quadrangles at a scale of one inch to the mile. The geology shown in the northeast corner of the map is in part a compilation from work by E.A. Schmidt and H. Cornwall. The geology along the southern quarter of the map was compiled from field work restricted to road reconnaissance.

Precambrian Oracle "granite" (1420 my, K-Ar) and associated aplite are the oldest rocks found in the map area. Diabase sills intrude the Oracle granite and aplite and are Precambrian in age (1140 my, K-Ar at Ray). The aplite and diabase are not differentiated on the regional map. In the southern part of the map area, east of Ninety-Six Hills, the Oracle granite displays a gneissoid texture and an unusually high biotite content.

A distinctive medium to fine-grained, two-mica granite is found cropping out in the Ninety-Six Hills - Middle Mountain area, and to the northwest of Mt. Grayback. These rocks are equigranular, gneissic granites and are felt to be Precambrian in age, roughly equivalent to the "Solitude" granite (800-900 my, K-Ar).

To the north of Ninety-Six Hills lies a coarse-grained two-mica granite stock (Ltmg), which is considered to be the oldest Laramide(?) stock in the area. It displays a very gradational contact with the Laramide(?) Southern Grayback "granodiorite" (Lsgg) to the north.

The Southern Grayback "granodiorite" is a coarse-grained, one-mica (biotite), quartz monzonite that crops out along the Florence-Kelvin highway in the vicinity of Box-O Wash and to the east of Red Hills. This stock, along with the previously mentioned Laramide(?) two-mica granite stock, weathers to a distinctive grayish-white grus leaving characteristic boulder-field appearing outcrops. Numerous barren andesitic sills and dikes are intruding the Southern Grayback "granodiorite" in Sections 17, 20, and 21, and are not differentiated on the geologic map. Both the Southern Grayback "granodiorite" and the Laramide(?) two-mica granite could easily be Precambrian in age.

A previously unrecognized Laramide(?) granite porphyry stock is shown cropping out in Box-O Wash north of the Florence-Kelvin road. This porphyritic intrusive is anomalous in that it appears either to be a crystal "mush" intrusion or in part a granitized sedimentary rock. Large subhedral and anhedral phenocrysts of orthoclase, quartz, and plagioclase are suspended in an anhedral groundmass of orthoclase, quartz, plagioclase, biotite and muscovite. To the southeast this intrusive is in fault contact with the Southern Grayback granodiorite and to the northwest it displays ambiguous gradational contacts with the Precambrian Oracle granite.

Three quartz diorite stocks crop out in the map area. These rocks are medium to fine-grained, equigranular hornblende-biotite quartz diorites and are probably correlative to the Sonora diorite (69 my, K-Ar) as described by E.A. Schmidt. With older rocks, the quartz diorite shows sharp intrusive contacts; however, with the Grayback granodiorite stock, the quartz diorite shows a non-definable gradational contact. It is possible that the quartz diorite may be an intrusive phase of the Grayback stock.

The Grayback granodiorite stock is an internally zoned Laramide intrusive (62 my, K-Ar, 63 my fission track) and is correlated to the Granite Mountain porphyry at Ray. The Grayback varies from a medium-grained, equigranular granodiorite border phase; to a coarse-grained, equigranular granodiorite phase; to a coarse-grained, porphyritic quartz monzonite core phase. The Grayback stock is cut by numerous genetically related aplitic bodies (Sections 23 and 14), by Tertiary(?) andesitic sills and dikes, and by Tertiary(?) porphyritic rhyolite dikes.

The Laramide porphyritic granodiorite dikes intrude only Precambrian Oracle granite and diabase. In the Red Hills area, porphyritic granodiorite dikes form a dike swarm which is delineated by the abundance, the wrapping outcrop patterns, and the areally restricted occurrence of the dikes. The porphyritic granodiorite dikes control hydrothermal alteration and mineralization and, as such, delineate a center of weak propylitic alteration and weak sulfide vein mineralization. These dikes at the Red Hills prospect are exact duplicates (in hand specimen) to the porphyritic granodiorite dikes at San Manuel and at the Kalamazoo window.

Porphyritic quartz monzonite and porphyritic rhyolite dikes are present in parts of the district, but these dikes show neither genetic control of hydrothermal mineralization and alteration, nor anomalous outcrop distribution. The porphyritic quartz monzonite dikes intrude most pre-mineral rocks and some may be Laramide in age. All of the porphyritic rhyolites are post-mineral and are considered mid-Tertiary in age.

Other mid-Tertiary (32-11 my) units mapped are the Miocene Whitetail conglomerate and the younger dacite volcanic sequence. The Whitetail conglomerate strikes north-northwest and dips between 25° and 85° to the east. Each Whitetail block is bounded on the east by west-dipping antithetic faults and on the west by an assumed east-dipping erosional surface. The dips of the conglomerates in each block are generally steeper (up to 85°) near the erosional surface and become shallower (25° minimum) to the east. This indicates deposition of the Whitetail occurred in local basins which were forming during mid-Tertiary rotational tectonism. Included as part of the Whitetail conglomerate are several monolithologic brecciated masses composed of pre-Whitetail rocks. The true nature of these units is speculative since Precambrian Oracle granite and diabase compose most of the mega-breccias and these rocks, by typically weathering to a grus, do not readily form interpretable outcrops. However, the few old pits and adits still open in these areas always exposed monolithologic breccia in the walls. It is proposed that these units are mega-breccias and are therefore fault slivers or blocks which moved onto (or into) Whitetail basins during basin formation. These mega-breccias would be similar to those described by E.A. Schmidt in the Ripsey Wash area; by M. Krieger in the Kelvin area; and by S. Creasey in the San Manuel area.

The dacite volcanic sequence is a catch-all term used to refer to any dacitic volcanic or volcani-clastic unit older than the Gila conglomerate, but younger for the most part than Whitetail conglomerate. This sequence is felt to be correlative to the Apache Leap tuff of the Superior area. In the map area, dacite is in part volcanic and younger than Whitetail, and in part volcani-clastic and interbedded in upper Whitetail. The dacite usually dips between 20° and 30° to the east and is usually bounded on the east by west-dipping antithetic faults.

REGIONAL STRUCTURE

The structure of the Red Hills-Grayback district is a continuation of the structural setting described by E.A. Schmidt in the northern Tortilla Mountains. Two episodes of post-Laramide faulting are recognized (see Attach. A).

The older fault system marks the beginning of Miocene Whitetail deposition with displacement continuing through most of Miocene time. This older period of faulting is marked by two fault systems; one, a north trending, west-dipping antithetic fault series with essentially normal displacement; the other, an east-west trending fault system with "scissors" and/or tear displacement. These faults are considered to be in part rotational and in part tilted normal gravity adjustments are due to either regional, elongate-domal uplift in the region west of the mapped area, or rifting to the west of the area along the San Pedro lineament. This age and type of faulting is equivalent to the faulting that separated and rotated the Kalamazoo and San Manuel ore bodies.

The proposed younger episode of faulting is Pliocene-Pleistocene (Lowell, 1973) in age and related to the Basin and Range faulting. These high-angle faults trend to the northwest and have normal displacements of several thousands of feet (Attach. B). To the west of Red Hills, one such fault has been delineated by geophysical work. The other major northwest trending fault shown on the geologic map is interpretative.

The original pre-Whitetail geology can be systematically reconstructed by unrotating the region and removing the fault displacements, which in effect moves the Red Hills target area 3 to 5 miles closer (depending on interpretation) to the L. Grayback granodiorite. The apparent offset of the Southern Grayback stock into two masses separated on the order of 3 to 5 miles indicates such movement is plausible. Moving the Red Hills prospect area adjacent to (or above) the Grayback granodiorite is significant because:

1. The Grayback granodiorite is correlated to the Granite Mountain porphyry which is the mineralizer at Ray.

2. The Grayback granodiorite stock is internally zoned with a porphyritic core, which is favorable for porphyry copper development.

3. The Red Hills target area would thus lie near the edge of the stock and the internal zoning would point toward the area.

RED HILLS PROSPECT -- Additional Data

Logging of drill hole RH-2 was completed to the bottom of the hole (2470') and assays for copper and molybdenum were obtained to a depth of 2260'. This data is plotted on Attach. C. Red Hills Mining Company's logs and assay data are attached to the appendix of the office copy of this report.

In summary, drill hole RH-2 was collared in Precambrian Oracle granite and drilling encountered only Oracle granite except from 1607' to 1615' and from 2107' to 2437' where diabase was drilled. Table B graphically summarizes the copper and molybdenum content of the hole by averaging to one hundred foot intervals for copper and for molybdenum. Also noted on this graph is the simplified geology and alteration type encountered -- generalized to the appropriate intervals. At 1607' a fault was logged and the significance of this fault is readily demonstrated on the charts.

The assay data from drill hole RH-2 shows copper content to increase with depth (from 100 to 600 feet copper content averages 140 ppm, from 600 to 1540 the core averages slightly over 400 ppm copper, from 1540 to 1610 the core averages over 1600 ppm copper). A strong fault exists at 1607 and below the fault copper content drops and averages less than 375 ppm for the next 500 feet. At 2107 diabase is encountered in which mineralization is diminished (see Attach. C or Red Hills drill logs). Assaying was stopped at 2260 feet.

Molybdenum is reacting much the same as copper (although more sporadically). As can be seen by looking at ~~the chart on the following page~~ TABLE B and at the actual values in the logs, molybdenum increases in average content with depth and increases in range of anomalous value with depth until terminated by the fault at 1607'.

Petrographic examination of the drill core verifies the megascopic logs. Propyllitic hydrothermal alteration is prevalent throughout the Oracle granite and in parts of the diabase. The intensity and pervasiveness of propyllitic alteration is controlled by the abundance of mineralized veins and is predominantly present as selvages to sulfide veins. Propyllitic alteration is characterized by:

1. Pervasive chloritic attacks on primary biotite;

2. Weak epidotization of either magnetite-chlorite centers or plagioclase-chlorite centers;

3. Moderate to weak but pervasive selective sericitization of plagioclase feldspars;

4. Varying amounts of other hydrothermal products; i.e., magnetite, calcite, pyrite, and amorphous clays.

The bottom thirty feet of core (2440-2470) is megascopically and petrographically identical to Oracle granite from the Kalamazoo window and from the 2015 level at the San Manuel mine. The biotites are completely chloritized and the plagioclase feldspar are strongly sericitized. Epidote, pyrite and calcite occur in minor amounts.

Phyllic hydrothermal alteration exists as selvages of sericite, quartz and pyrite to the stronger mineralized fractures. But only from 1400' to 1607' does the phyllic assemblage become prevalent and pervasive enough to be classified as the dominant alteration type. The change in alteration intensity in this interval is due to an increase in the abundance of mineralized fractures. This zone of weak to moderate phyllic alteration is terminated by the fault at 1607'. The Oracle granite below this fault is repetitious of the Oracle granite encountered above 1400'.

A more intense grade of hydrothermal alteration is indicated by the presence of hydrothermal magnetite (1-3% by volume), biotite and chlorite which occur as veins and as selvages to mineralized veins. Hydrothermal magnetite and biotite occur below 600' and are relatively most prevalent in the intervals from 1000' to 1500' and from 1610' to 2000'. J. Guilbert (per communication) describes the root zone of Kalamazoo as containing 2-3% magnetite occurring as veins with associated secondary biotite and chlorite.

Regarding drill hole RH-2, the following conclusions are indicated:

1. Hydrothermal alteration typical of the fringe of the San Manuel-Kalamazoo ore body is encountered throughout the hole.

2. Hydrothermal sulfide mineralization increases in pervasiveness until 1607' where terminated by a fault below which a repetition of mineralization similar to the first 1000' of core occurs.

3. Chalcopyrite and molybdenite increase in abundance until being terminated by the fault and below which a repetition of values similar to the first 1000' of core occurs.

4. Hydrothermal alteration becomes more pervasive and intense with the increase in strength of the sulfide system until encountering the fault at 1607'.

5. Hydrothermal magnetite occurs below 600' in the Oracle granite in abundance and manner similar to the root zone of the Kalamazoo deposit.

GEOPHYSICS

Additional geophysical surveys have been made available since completion of the initial report.

Mining Geophysical Surveys performed for Red Hills Mining Company an additional two lines (22,000 line feet) of I.P.-Resistivity survey using concurrent "a" spacing of 1000' and 2000' and their report is filed in the Tucson Office. Line 5 oriented N30E and lying west of DDH RH-2 indicates (on 2000' "a" spacing) a weak increase in I.P. response with depth. Line 4 oriented N55E and position nearly through DDH RH-2 does not show a definable increase in I.P. response at depth. These results neither confirm nor negate the permissibility of a major porphyry copper deposit.

Geoterrex Limited (Ottawa, Canada) conducted for Getty Oil Co. a low level (500' terrain clearance) airborne magnetometer survey over the Red Hills area. Their preliminary report is filed in the Tucson Office. The Whitetail basin and the deep Q-T basin are delineated by magnetic patterns. Some of the other magnetic patterns are likely to be reflecting topographic effects (i.e., Box-O Wash +100' deep). The most significant feature of their work is the delineation of a strong magnetic high (+300 gammas) over Precambrian Oracle granite and Southern Grayback granodiorite which by themselves should not create such a high. This high is

centered over DDH RH-2 which is postulated to have penetrated the magnetite roots of a tilted porphyry copper deposit and, therefore, this high is accountable. A similar +300 gamma high occurs over the root zone of the Kalamazoo orebody.

ASARCO high altitude aeromagnetics (see Attach. D in pocket) also show a prominent magnetic high (+200 gammas) centering over DDH RH-2. The Box-0 target area is delineated by a pronounced magnetic gradient. This gradient does not coincide with the Whitetail contact but runs directly over the bedrock target area. This feature might be the result of hydrothermal destruction of magnetite associated with the upper parts of a tilted porphyry copper system. A similar magnetic gradient occurs over the Kalamazoo deposit.

GEOCHEMISTRY

Spectrographic analyses were made of selected "R" samples (unaltered Oracle granite grid samples) of "RH" samples (Laramide mineralization of both p€og and Lpgd) and of the 50-foot composite samples of the Oracle granite encountered between 0 and 1000' in DDH RH-2. The analyses and sample location maps are attached to the Tucson Office file copy of this report.

Table C gives a tabulation of those elements which seem to be reacting in some manner and briefly summarizes the reaction. It is apparent that the target area is "active" in terms elemental movement which might be due to the nearby presence of a mineralizing hydrothermal system.

RECOMMENDATIONS

Four diamond drill holes (totaling 16,000' in depth) are recommended as necessary to adequately test the Box-0 area.

I recommend the following work be performed:

1. The Precambrian "block" lying to the east of the main Whitetail basin and the mega-breccia part of the Whitetail basin be mapped. This mapping should emphasize both the pre-mineral and post-mineral geology and needs to be of sufficient detail to show dike trends, possible weak alteration/mineralization centers, and any possible stratigraphy in the Miocene sequence (as shown by Schmidt in the Ripsey Wash sequence). General coverage of Section 6 should be included in the field work.

2. A gravity survey oriented east-west needs to be conducted over the Whitetail and gravel covered areas in order to better evaluate Whitetail basin.

3. K-Ar age dates should be determined for the Laramide(?) granite porphyry of Box-0 Wash, for the Laramide(?) southern Grayback granodiorite, and for the Tertiary dacite.

John R. King

J.R. KING

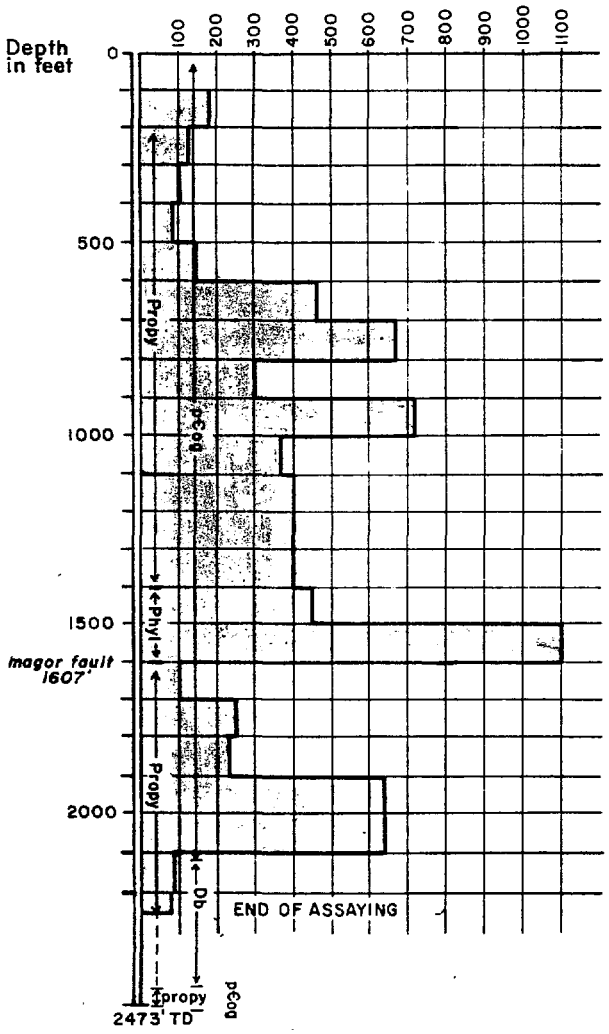
TABLE A

	SAN MANUEL PORPHYRY CU DEPOSIT	RED HILLS PORPHYRY CU PROSPECT
	Kalamazoo Window	Box-O Wash Target
Geology (Premineral)	a) Precambrian Oracle granite and diabase. b) Intruded by Laramide (67 m.y.) granodiorite porphyry stock and associated dike swarm - responsible for hydrothermal mineralization and alteration and formation of billion ton porphyry copper deposit roughly 3500' by 8000' and cylindrical in shape.	a) Precambrian Oracle granite and diabase. b) Intruded by Laramide (63 m.y.?) porphyritic granodiorite dike swarm (identical in hand specimen to Kalamazoo granodiorite porphyry) responsible for hydrothermal alteration and mineralization centering over an area plus 6000' by 4000'.
Geology (Post mineral)	a) Miocene conglomerates dipping easterly, displaying a nonconformity with premineral rocks to the west and bounded by antithetic faults on the east. Regionally either cut by younger volcanic rhyolites or overlain by rhyolitic volcaniclastic sedimentary rocks.	a) Miocene conglomerates dipping to the east, showning a nonconformity with premineral rocks to the west and bounded by antithetic faults to the east. Regionally overlain and interbedded with younger rhyolitic volcaniclastic sequence.
Hydrothermal Mineralization & Alteration (in outcrop)	a) Weakly pyritic, 1% total sulfide mainly as veins. b) Propyllitic alteration of both p€og & Lpgd occuring as selvages to veins and as a pervasive alteration -- controlled by Lpgd dike swarm.	a) Weakly pyritic, 1% total sulfide mainly as veins. b) Propyllitic alteration of both p€og & Lpgd occurring as selvages to veins and as a pervasive alteration -- controlled by Lpgd dike swarm.
Hydrothermal Mineralization & Alteration (encountered in drill holes)	a) Phyllic alteration at +1000' aver. 300 ppm Cu and increasing in grade with depth. b) Hydrothermal magnetite as veins and selvage disseminations in roots of the deposit 2-3% by volume (includes possible magmatic magnetite) -- personal communication, J. Guilbert.	DDH RH-2 (located 1000' south of target area and over southern edge of projected "root" zone) a) Phyllic alteration at 1400' average +750 ppm for 200' then bottomed by fault. b) Hydrothermal magnetite as veins and selvage disseminations in roots of the deposit 2-3% by volume.
Geochemistry	a) weak(?) copper anomaly b) unverified iron anomaly c) unverified weak molybdenum anomaly	a) weak copper anomaly (+80 ppm) b) weak indication of iron anomalism c) weak indication of Mo build-up
Post Mineral Structural Interpretation	a) High angle normal faulting west block down splitting ore body in half. b) Regional rotation aver. 60° (with possible continuing movement of blocks thereby forming Miocene Basins bounded by antithetic faults on the east). c) Renewed normal faulting forming Q basins.	a) High angle normal faulting west block down splitting postulated ore body in half. b) Regional rotation aver. 70° (with possible continuing movement of blocks thereby forming Miocene Basins bounded by antithetic faults on the east). c) Renewed normal faulting forming Q basins.
Aeromagnetics	Large magnetic high (+300 gammas) over "root" zone of Kalamazoo.	Large magnetic high (+300 gammas) over proposed "root" zone.

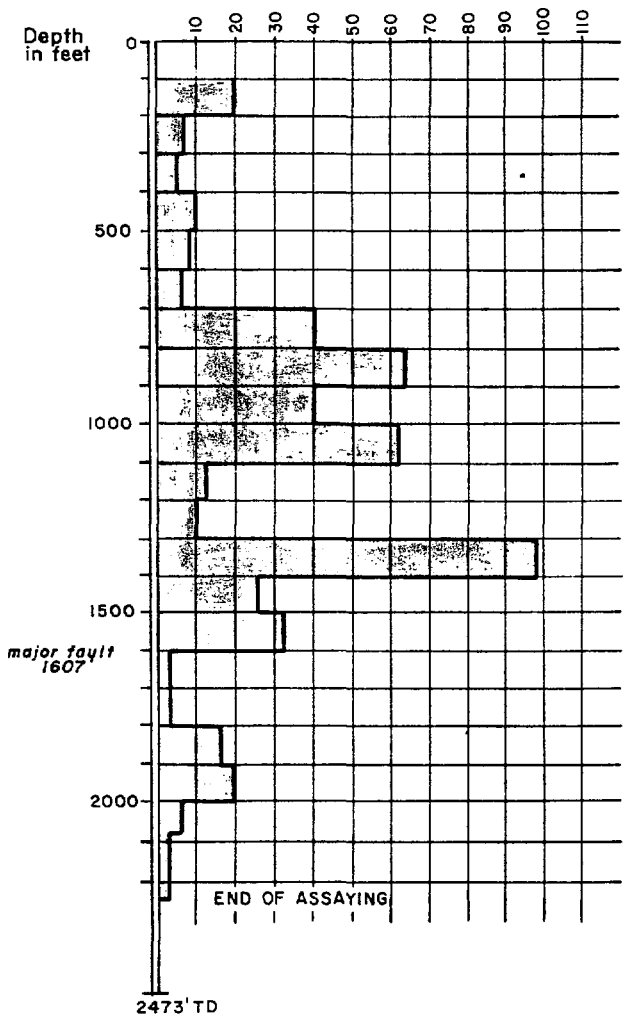
TABLE B

DRILL HOLE RH-2

Cu Average to 100'



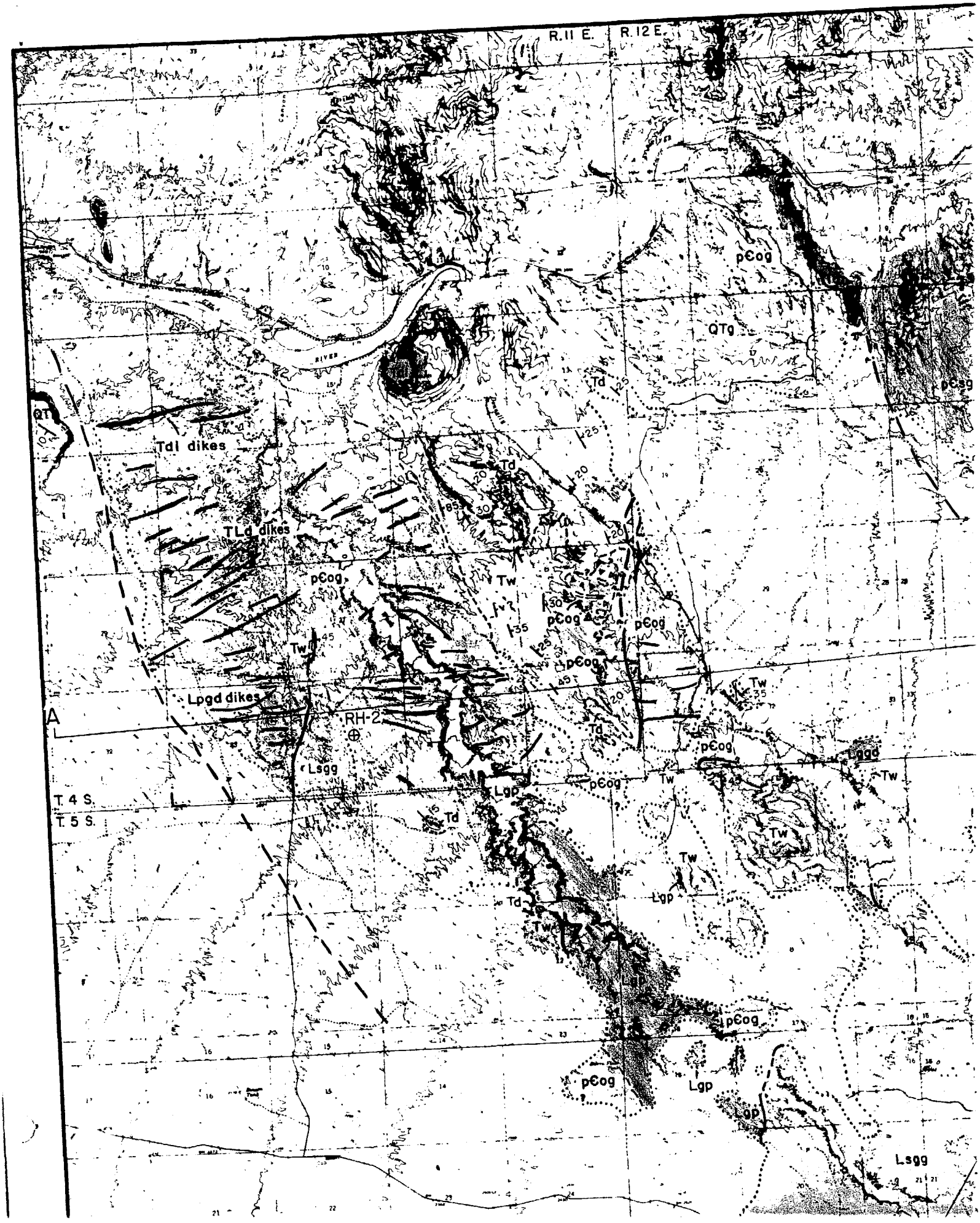
Mo Average to 100'



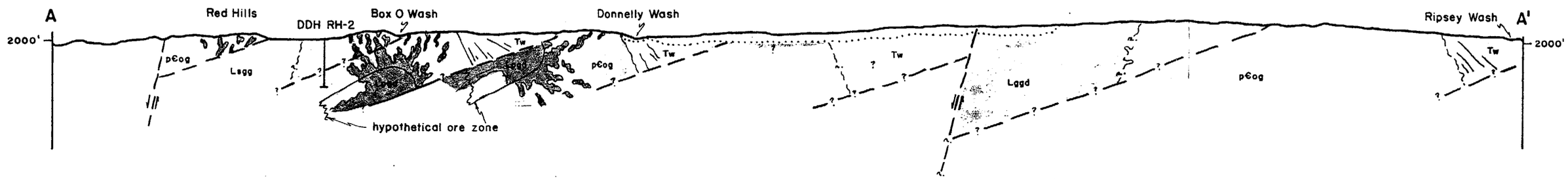
SPECTOGRAPHIC ANALYSES – SUMMARY

Elements	"R" Samples – Unmineralized p€og		Composite 50' Samples of p€og from DDH-RH2	"RH" Samples of p€og & Lpgd affected by the hydrothermal system
	Average Abundance over Red Hills plate	Average Abundance over Box O area	Average Abundance unless otherwise noted	Average Abundance
Fe	1%	2%	3%	9%
		possible increase with depth		
Ca	≤ 1%	≤ 1%	> 1%	≤ 1%
		increases with depth-highest value in drill hole		
Mg	.2%	.2%	≥.4%	.2%
		increases with depth		
B	10 ppm	10 ppm	< 10 ppm	10 ppm
		possible loss with depth		
Ba	500 ppm	300 ppm	500 ppm	200
		questionable increase with depth		
Co	≤ .5 ppm	5 ppm	8 ppm	5 ppm
		increases with depth		
Cr	25 ppm	25 ppm	50 ppm at 300' 15 ppm at 900'	50 ppm
		possible decrease with depth		
Cu	100 ppm	200 ppm	300 ppm	300 ppm
		definite increase with depth		
Mn	1000 ppm	1250 ppm	1750 ppm av. at 400' 600 ppm av. at 800'	800 ppm
		possible decrease with depth		
Sc	10 ppm	10 ppm	20 ppm	10 ppm
		increase with depth		
Sr	150 ppm	175 ppm	200 ppm	75 ppm
		increase with depth		
Ti	1500 ppm	2000 ppm	3000 ppm	200 ppm
		definite increase with depth		
V	40 ppm	50 ppm	85 ppm	125 ppm
		increase with depth		
Zr	150 ppm	200 ppm	225 ppm	150 ppm

(Red Hills, Pinal Co Ariz) MVK 2


R.11 E.
R.12 E.
RIVER
pЄog
QTg
pЄsg
Td
Tdl dikes
TLd dikes
Tw
pЄog
Lpgd dikes
RH-2
Lsgg
Lgp
Lggd
A
T. 4 S.
T. 5 S.

ATTACHMENT B



Looking Northerly

SECTION A-A'

DIAGRAMATIC GEOLOGIC SECTION

SEE ATT. A FOR EXPLANATION

RED HILLS

Pinal County, Arizona

Scale : 1" = 1 mile

JRK

April 1973

MVK 2600

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 11, 1973

J. H. C.
JUN 11 1973

Mr. T. C. Osborne
New York Office

Red Hills
Pinal County, Arizona

The attached map updates the land situation at Red Hills and the enclosure reviews the negotiations with Bell Western. I talked with Bell Western's attorney on June 8, 1973, and he informed me that Bell Western is close to consummating an agreement with Phelps Dodge. I informed him that we were now in a position to offer Bell Western considerably better than my April 4, 1973 offer. Phelps Dodge has recently staked some claims in the area (see attached map).

ASARCO held land:

130 Lois claims -- assessment work not due until summer 1974

State Prospecting Permit

Sec 32, T4S, R11E -- $5,600 due Feb. 20, 1974
Sec 36, T4S, R11E -- $6,400 due Feb. 20, 1974
Sec 2, T5S, R11E -- $6,310 due May 21, 1974

I would not recommend starting a bidding contest with PD for this prospect. As you know, we have a good land position that has exploration potential. We will keep close surveillance of Bell Western's and PD's activities.

WL K
W. L. Kurtz

WLK:lb
Attach. & Enc.

cc: JHCourtright
RBCrist

Osborne
Fidelity Oil Co.
J. H. C.
JUN 18 1973

RECEIVED
JUN 18 1973
EXPLORATION DEPT.

Air Mail

June 13, 1973

Mr. W. L. Kurtz
Tucson Office

Arizona
Red Hills, Pinal Co.

Dear Mr. Kurtz:

In response to your letter of June 11, If this project is worth two 3000 ft. drill holes, then the Bell Western terms are not too difficult. Although I saw the property with you, I do not have the background to compare it with Kalamazoo orother deep prospects in Arizona, and by copy to Mr. Courtright I solicit his opinion as to the advisability of the prospective drilling expenditure. I agree that we do not wish to start a bidding contest with PD, but if we all could agree on the geological parameters, then I don't think the Bell Western terms are a real stumbling block.

Very truly yours,

ORIGINAL SIGNED BY
T. C. OSBORNE

T. C. Osborne

cc: JHCourtright

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 19, 1973

MEMORANDUM FOR: J.J. COLLINS

RED HILLS
PINAL COUNTY, ARIZONA

Re: Mr. Osborne's letter of June 13th to Mr. Kurtz.

I have already commented on this prospect (memo of January 12th) stating ......"the required depth of exploratory drilling could range from 3500' to 5000'..... Such depths entail high risks in exploration and development; however, the possibility of ore occurrences much nearer the surface ----- lying beneath a faulted segment of the Whitetail conglomerate, as proposed by Mr. Kurtz, tends to improve the odds. I consider the program that he has recommended (1/5/73) to be worthy of support."

I concur with the general concept (Messrs. Kurtz, King, Balla) that the Red Hills area outcrops bear a close resemblance to the Kalamazoo window in respects to rock type, alteration and mineralization. However, small stocklike porphyry intrusives which occur along with the dikes at the Kalamazoo surface are not present at Red Hills. This may be of no particular significance, but it could indicate a position farther out on the fringe and thus a greater distance to the ore zone than in the case of the Kalamazoo outcrops.

I believe the chance is rather remote that an exact duplication of conditions at San Manuel-Kalamazoo (where the off-setting fault precisely slices the axis of a cylindrical ore zone) will be found at Red Hills, but the evidence for post-mineral tilting and faulting comparable to that at San Manuel is impressive, and it is possible that a major portion of the inferred ore zone underlies the Whitetail conglomerate which occupies ground currently held by ASARCO. This, of course, does not reduce the desirability of obtaining control of the Bell Western property.

Considering the possible depth of the target, the uncertainty as to the amount of displacement on the post-mineral faults, and the large size of the area involved, three or four 5000' holes may be required to carry out an adequate initial test of the prospect. Although the cost would be substantial, the odds are regarded as favorable in that the potential value of the target could amount to several hundred times the price of the initial gamble.

J.H. Courtright
J.H. COURTRIGHT

JHC:kre

cc: W.L. Kurtz

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

August 16, 1973

MEMORANDUM FOR: FILE

KALAMAZOO GEOCHEM

In connection with evaluation of the Red Hills prospect, I contacted Dave Lowell regarding the copper anomaly over the Kalamazoo deposit as reported in his paper (Econ. Geol., Vol. 63, 1968).

He provided a xerox copy of the sample location map, stating that the samples were mostly rock chip and that they were taken to avoid inclusion of any of the visible copper vein mineralization. The sample grid spacing is 500' N-S and 1000' E-W.

The map showed an anomalous area about 2000' wide extending westerly around 5000' from the edge of post-mineral cover (Gila(?) conglomerate). Within this area values range from around 60 ppm to 1000 ppm Cu with 1 to 3 ppm Mo. The average is around 300 ppm. Drill holes showed a similar range in copper content from the outcrop down to the ore zone 3000' below. Apparently the phyllic zone with increased pyrite was encountered at 1500'-2000' below the outcrop.

Comparing these results with those of Red Hills suggests that if an ore zone does exist there, it is likely at a greater depth than at Kalamazoo.

J.H. Courtright
J.H. COURTRIGHT

JHC:kre

cc: J.J. Collins
W.L. Kurtz

J. H C.

SEP 28 1973

CASA Grande Dispatch
9/26/73

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

November 8, 1973

J. H. C.
NOV 12 1973

Mr. T. C. Osborne
Asst. Director of Exploration
New York Office

Supplemental Exploration
Authorization Request
Red Hills Project
Pinal County, Arizona

Dear Sir:

During January 1973 ASARCO performed location work on its Federal lode claims and paid rental on its State Prospecting Permits to acquire a land position over a porphyry copper target at Red Hills. At that time we did not request drilling funds because we anticipated acquiring the adjoining ground held by the Red Hills Mining Company. This adjoining ground is now held under option by the Phelps Dodge Corporation.

The work committment of $5,600 on our State Prospecting Permit for section 36 must be completed by February 20, 1974. I now recommend the drilling of a 3500-5000 foot diamond drill hole in section 36 to test the porphyry copper exploration target that exists on our land (see attached map). This hole will also fulfill 1973-74 assessment work requirements on our 130 Federal lode claims.

I estimate costs to complete this work and the work requirements on State section 2, due May 27, 1974, as follows:

Drilling	$ 60,000
State Section 2	6,300
Legal, contingencies	3,700
	$ 70,000

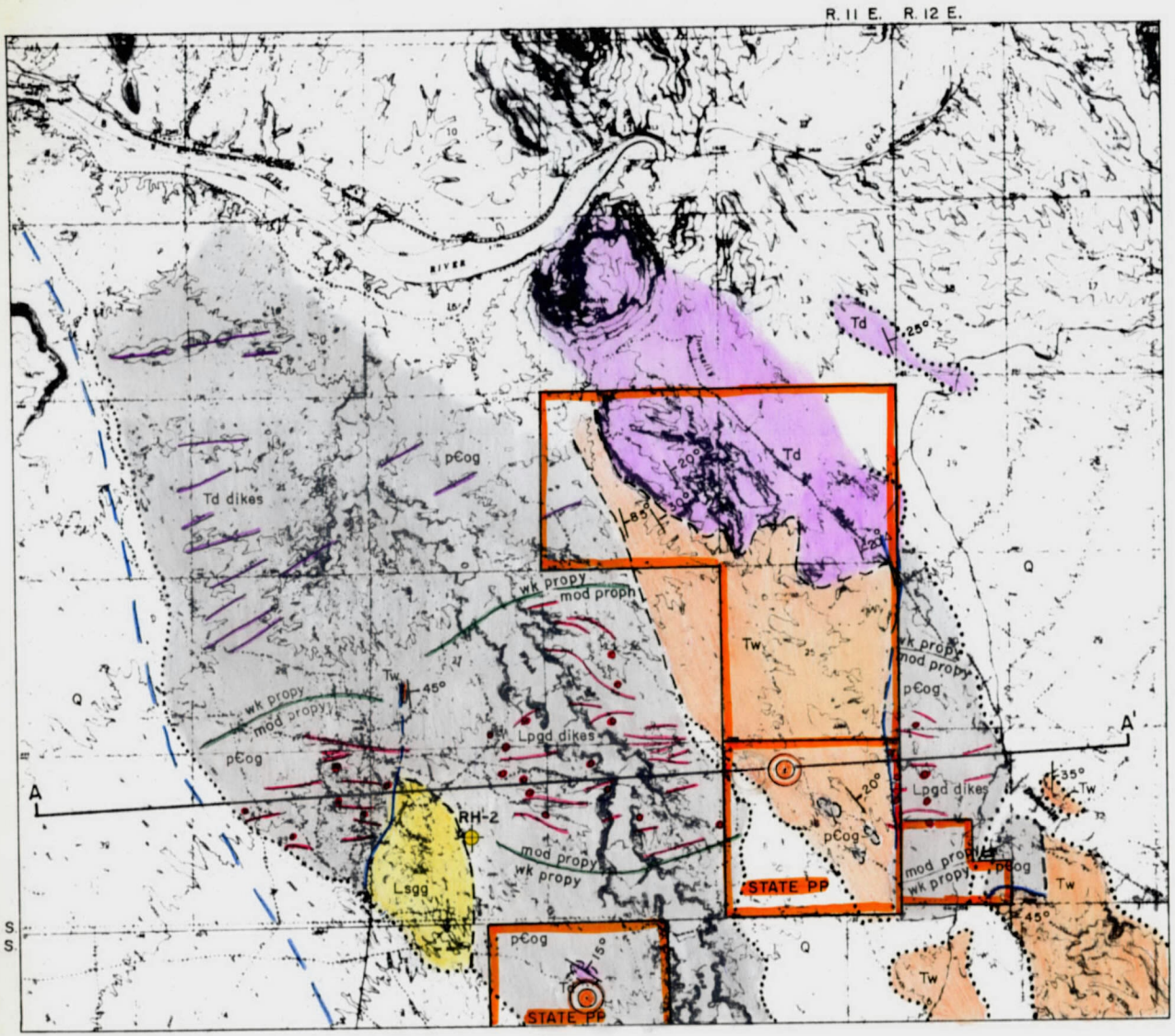
If you approve, please request a Supplemental Exploration Authorization for this amount. Forms 302-EA and 302-EB are enclosed.

Respectfully submitted,

W. L. Kurtz

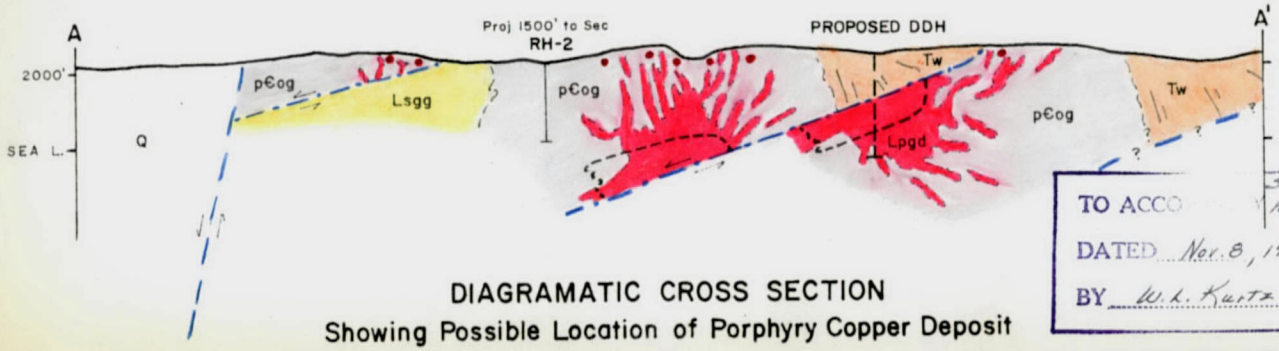
WLK:lb
Encs: Forms & Map

cc: JHCourtright - w/encs.
RBCrist - w/o encs.
JRKing - w/o encs.
JDSell - w/o encs.
ADCoumides - w/Forms only



EXPLANATION

Q	Quaternary gravels (includes Gila conglomerate)
Td	Tertiary dacite
Tw	Tertiary Whitetail conglomerate
POST-MIN / PRE-MIN	
Lpgd	Laramide porphyritic granodiorite (sericite alt & sulfide min are associated w/Lpgd dike swarms)
Lsgg	Laramide(?) Southern Grayback granodiorite
pЄog	Precambrian Oracle Granite (includes diabase)
	ASARCO state PP; Federal Lode
	Copper oxide occurrences
	Approximate limit of mod propylitic alteration
	Fault - dashed where covered or inferred
25°	Strike & dip
RH-2	Diamond drill hole
	Proposed drill hole



DIAGRAMATIC CROSS SECTION
Showing Possible Location of Porphyry Copper Deposit

TO ACCO Supp. Exp. Path. Request
DATED Nov. 8, 1973
BY W. L. Kurtz

GENERAL GEOLOGY
RED HILLS PROSPECT
Pinal County, Arizona
SCALE: 1" = 1 mile

J.R.K. Jan. 1973
Revised-Nov. 1973-W.L.K.

MVK 2689

PRINTED IN USA 9/68

FORM 302-EB

New York No. .....

APPLICATION FOR SUPPLEMENTAL EXPLORATION AUTHORIZATION

November 8, 1973

Originating Office SWED - Tucson

Application is hereby made for supplemental Authorization to cover cost, in excess of original estimate, of work authorized by New York.

No. 0047-00 - Red Hills Project, Pinal County, Arizona

Present total Estimated Cost (Form 302-EA attached)	$ 90,000
Amount previously authorized (date 1/10/73)	$ 20,000
Balance for which Authorization is now requested	$ 70,000

ADDITIONAL WORK CONTEMPLATED:

Complete one drill hole to a depth between 3500-5000 feet to test for porphyry copper mineralization and complete work requirements on State Prospecting Permit on section 2.

EXPLANATION OF INCREASED COST:

To make an initial exploration test on our land previously acquired at the Red Hills porphyry copper prospect.

Reviewed by ..... Acct. Mgr. or Chief Acct.

Approved by ..... Vice President

Recommended by ..... Supervisor

Approved by ..... Comptroller

Account Chargeable to .....
To be designated by Comptroller

Approved by Advisory Committee

.....19.....

Approved by Board of Directors

.....19.....

.....
Secretary

FORM 302-EA

Printed in U.S.A.

COST ESTIMATE, MINERAL EXPLORATION

PROSPECT Red Hills Project

LOCATION Pinal County, Arizona

OFFICE SWED - Tucson

BY W. L. Kurtz

No.	Type of Work	Salaries/Wages Days	Salaries/Wages Amount	Material	Fees, Rent, Services	Traveling	Taxes	Other	Total Estimate Cost
501	Outright Purchase								
502	Option Payments								
503	Bonus Payments								
504	Minimum Royalties-								
	Deductible from								
	Future Production								
505	Minimum Royalties-Not								
	Deductible from								
	Future Production								
506	Rental Payments				1,300				1,300
507	Staking Claims		1,000		17,100	300			18,400
511	Surface Excavating								
512	Underground "								
521	Surface Drilling				65,000				65,000
522	Underground "								
530	Geologic								
540	Sampling, Assaying, Lab.								
550	Geophysics								
560	Geochem								
570	Engineering								
580	Construction (temp.)								
590	Construction (perm.)								
610	Administration, Field		4,000			1,000			5,000
	Offices and Camps								
620	Administration, General		300						300
641	Autos and Vehicles								
642	Aircraft and Boats								
650	Partner's Share								
	ASARCO'S SHARE		5,300		83,400	1,300			90,000
661	Commission or Fees								
663	Exchange								
	TOTAL		5,300		83,400	1,300			90,000

RECEIVED
DEC 10 1973
EXPLORATION DEPT.

OFFICE OF THE SECRETARY

New York, N.Y., December 6, 1973

Mr. J. J. Collins

The following is an extract from the minutes of the Advisory Committee Meeting held November 28, 1973:

J. M.
DEC 10 1973

Exploration Authorization #0047-01
Red Hills Project
Pinal County, Arizona (Cu)

It was reported by Company Geologists that at a meeting of the Advisory Committee held on January 10, 1973 there was approved an expenditure in the amount of $20,000 for the performance of location work on mining claims and to fulfill requirements on a State Prospecting Permit covering an area in the vicinity of this project where weak surface indications may represent the outer shell of a major porphyry copper zone. It was further reported that Company Geologists request an exploration authorization in the amount of $70,000 in order to complete one drill hole next year to a depth between 3,500 and 5,000 feet to test the possibility that a faulted portion of the deeper part of the zone may lie at depths up to several thousand feet under post mineral rocks on the Asarco ground.

There was approved an exploration authorization in the amount of $70,000 for the completion of one drill hole and certain work requirements at the Red Hills Project, Pinal County, Arizona, a possible copper area.

J. F. Hornbostel, Jr.
Assistant Secretary

JFH:lm
Enc.
FGHamrick w/enc.
HQStringham w/enc. (2)
TCOsborne
JHCourtright
RBCrist
WLKurtz w/enc.
ADCoumides w/enc.

J.H.C.

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

February 6, 1974

J. H. C.

MAR 15 1974

TO: W. L. Kurtz

FROM: J. R. King

Red Hills Project
Pinal County, Arizona
Geologic Progress Report
January 1974

As of Feb. 5th, drill hole RHP-1 was at a depth of 2066 feet. NX coring started at 1554 feet and encountered 512 feet of intensely faulted and sheared "mega-breccia". The upper contact of the mega-breccia with Whitetail conglomerate is picked at 1480 feet on the basis of the sudden decrease in rock bit life and drill rate penetration. This tectonic mega-breccia consists of Precambrian Oracle granite except from 1898' to 1972', where a brecciated Laramide porphyritic granodiorite dike exists. Except for minor amounts of epidote (less than 0.5%) and pyrite (trace) associated with the dike, the mega-breccia is barren of definitive hydrothermal attack. Oxidation is present throughout the core as hematite coats most fractures.

The two most probable geologic situations (see Att. A) indicated by the core are:

Possibility one: Regional rotation of 40° would provide an upper-plate penetration at 1480 feet and the true thickness drilled so far would be approx. 500 feet. The mega-breccia in this case would be upper-plate rock intensely broken and sheared by synthetic structures to the master fault. Lower-plate penetration should be occurring within 200 feet.

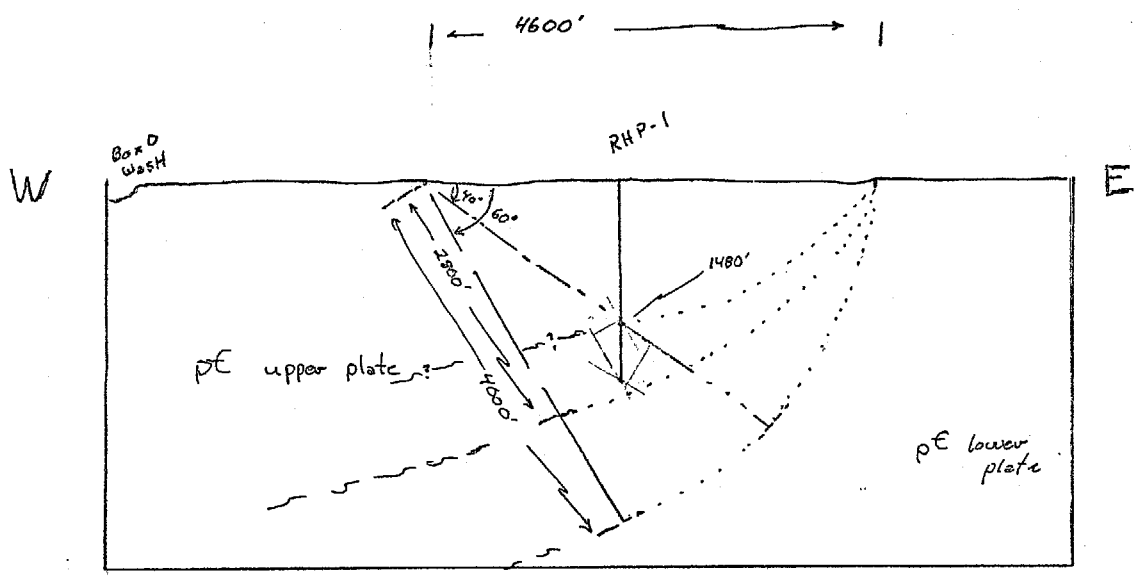
Possibility two: Rotation of 60° would indicate the mega-breccia is a post-mineral slide breccia in Whitetail conglomerate. At this time, the true thickness is approx. 300 feet. Lower-plate penetration could occur at any depth between 2100 feet and 3500 feet.

John R. King

John R. King

JRK:lb
Attach.

AH A



1:24000

Possiblities

1 Rotation ≈ 40°, upper plate penetration 1480'; have drilled to ≈ 2070 (600') therefore "true thickness" penetration ≈ 500', because of intense faulting and brecciation ∈ the lower plate maybe encountered within 200 feet.

2 Rotation = 60° megablock penetration having only a "true thickness" of approx 300' (← at this time)

J.H.C.

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

March 1, 1974

J. H. C.

MAR 15 1974

TO: W. L. Kurtz

FROM: J. R. King

Red Hills Project
Pinal County, Arizona
Geologic Progress Report
February 1974

As of February 25th, drill hole RHP-1 was at a depth of 2345 feet with the NX rods stuck at 2335 feet. 279 feet of NX core were drilled since the 5th of February.

The core still has the appearance of a tectonic mega-breccia. The rock is crushed, sheared, broken and faulted Precambrian Oracle granite. The true thickness of the breccia, penetrated to date, would vary between approximately 450 feet and 700 feet depending on a rotation of either 60° or 40°.

With depth, chloritic and green sericitic(?) alteration is increasing in intensity and pervasiveness. By 2300 feet the alteration is pervasive to all of the mega-breccia blocks, but is variable in intensity with respect to individual blocks. Mineralization accompanying the alteration is predominantly specularite with minor pyrite (<1% by volume) and is increasing in volume percent with depth. Definite evidence that the alteration and mineralization are hydrothermal in origin is lacking, possibly due to the extreme brecciation and crushing of the rock.

Estimated balance of authorization is $36,500.

John R. King
John R. King

JRK:lb

JHC

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

March 27, 1974

TO: W. L. Kurtz

FROM: J. R. King

Red Hills Project
Pinal County, Arizona
Geologic Progress Report
March 1974

Drill hole RHP-1 was bottomed at a depth of 2672 feet on March 19th and 327 feet of BX core had been drilled.

Well-broken, brecciated, and faulted Precambrian Oracle granite continued to depth of 2489' where a major fault zone was encountered (see Att.). This fault is thirty-six feet in width, intensely gouged (chloritic), and has an apparent angle of 10-30°. Below this fault a definite rock-type change occurs and the new rock is a coarse-grained, equigranular, quartz monzonite, probably equivalent to either Laramide(?) Southern Greyback granodiorite or the Laramide Greyback granodiorite.

Above the fault the Oracle granite is pervasively altered and mineralized; however, this alteration and especially the mineralization is variable to individual breccia blocks. With depth (above the fault) mineralization and alteration increase in intensity and pervasiveness (see Att.). Below 2350 feet the abundance and grain size of pyrite increased while specularite decreased in abundance. The alteration is typified by pervasive sericitization of plagioclase feldspars and intense, pervasive chloritization of biotite. As the most intense alteration is associated with sulfide and specularite mineralization, it is concluded that this is indicative of a hydrothermal event similar to the alteration and mineralization mapped in outcrop in the Red Hills and Box-O Hills areas.

Below the fault (2489-2525) the Laramide(?) quartz monzonite is unmineralized and only weakly altered (chlorite, epidote). The implications of this rock and the drill hole in general on regional structural interpretations and porphyry copper potential will be dwelt with in a Summary Project Report (shortly forthcoming). This report will contain revised geologic cross-sections and specific recommendations.

Estimated balance of authorization is $29,000.

J. R. King

J. R. King

JRK:lb
Attach.

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

J. H. C.
MAY 13 1974

April 2, 1974

TO: W. L. Kurtz

FROM: J. R. King

Red Hills Project
Pinal County, Arizona
Summary Report

The primary porphyry copper target as delineated in previous reports is still permissive and warrants further exploration. A secondary target exists on ASARCO controlled land, but is considered of low potential. I recommend keeping a low-keyed exploration profile in the area, in hopes Phelps Dodge will drop their option with Bell Western. If such does occur, then ASARCO should approach Bell Western with intention of drilling two diamond drill holes, each being at least +2500 feet deep. If Phelps Dodge does not terminate their option, I recommend we approach them concerning a joint venture. I feel we should keep the State lease on Sec. 2 and not take a chance of losing our land position.

The geology, structure, mineralization and alteration encountered in drill hole RHP-1 are described in the monthly reports and are summarized on Attachment A. Only pertinent facts will be reiterated in this report. The geologic logs are attached as an addenda to this report.

Tertiary Whitetail conglomerate is encountered to a depth of 1480' (Att. A). From 1480 feet to 1976 feet brecciated Precambrian Oracle granite and Laramide porphyritic granodiorite (1898' to 1976') exist. This megaunit is presently interpreted as being an intrabasin, megabreccia, slide block. The brecciation of the unit appears to be an open, release type of breakage and fragmentation typical of gravity sliding. Unbroken, partially rounded blocks two inches to ten feet in thickness are bounded by a variety of structural features. These features are in part ball-bearing faults with crushed rock as the interstitial matrix, in part chlorite-hematite fault gouge (one inch to eight feet in thickness), and in part zones of intense fragmentation. Oxidation is present as hematite coatings and slickensides along fractures and as hematite flooding of whole rock.

From 1976' to 2022' a strong fault exists. It is variable in form, changing from an intense chlorite-hematite gouge to a cataclastic roller-block breccia.

Below this structure, brecciated Oracle granite is again encountered; however, due to several small but significant geologic and tectonic differences, the granite is interpreted to be of the "Box-0" plate rather than part of an intrabasin gravity slide. Open tectonic megabreccia structures (ball-bearing faults, shearing, cataclastic fragmentation) are still present;

however, the fault gouge zones are now smaller (1 inch to 3 feet) and are almost completely comprised of chlorite and amorphous clay. Within 100 feet below the fault pervasive oxidation has disappeared and the slickensides and fracture coatings are strictly chlorite. The brecciation and consistent, low-angle faulting are explained by having the drill penetrate the toe of the Box-0 plate as depicted on the cross-section (Att. B).

The alteration and mineralization exhibited in the Box-0 plate (2022' to 2489') increase (although sporadically) in pervasiveness and intensity with depth. The alteration assemblage (chlorite and green sericite) and mineral assemblage (pyrite and specularite) are a repeat of the hydrothermal assemblages mapped in outcrop in the Red Hills and Box-0 Hills area. Geochemical analyses of selected intervals of the core are displayed on Att. A.

A major fault forms the lower boundary to the Box-0 plate. This fault is a low angle (10°-30°), 36-foot wide tectonic structure comprised in part by tight chlorite gouge, in part by chloritic augen cataclasite, and in part by crushed micro-breccia.

Partially consumed in the lower 6 feet of this structure and below it is a medium-grained, biotite quartz monzonite. It is a totally different rock from the Oracle granite. Comparing the quartz monzonite, both in hand specimen and petrographically, to outcrop samples, the quartz monzonite is provisionally correlated as part of the Laramide Greyback granodiorite (see Att. C). This is a very tentative conclusion, however, as the Southern Greyback granodiorite shows many similarities with the quartz monzonite of RHP-1 (i.e., lack of hornblende, and biotites that are both wispy and booky). The age of this quartz monzonite is also argumentative until a reliable age is established for the Southern Greyback granodiorite. Brecciation and low-angle faulting of the quartz monzonite exists only near the overlying major fault and with depth these structures completely disappear. Good repetitious jointing without any slickensides is prevalent in the bottom of the hole. The quartz monzonite is unmineralized; however, it is weakly altered (chloritization and epidozation of the mafics).

The following structural and geologic conclusions can be reasoned from the above interpretations and are depicted on the revised geologic cross-sections (Att. B) and regional geologic map (Att. C).

A penetration of the Box-0 plate at approx. 2000' would indicate regional rotation of that plate of 45° (instead of 60° as previously envisioned). This in turn would steepen the major bounding antithetic faults to approximately 30° and would also steepen the axis of the proposed porphyry copper model. Drill hole RHP-1 in its penetration of the Box-0 plate would have missed the hypothetical porphyry copper by as much as 4500 feet. The alteration and mineralization of the Box-0 plate encountered in RHP-1 are similar to that mapped in outcrop in the Red Hills and Box-0 Hills and are compatible

to a lateral fringe zone of a San Manuel porphyry copper model. It is worth noting the lack of hydrothermal magnetite in RHP-1 and the presence of hydrothermal magnetite encountered in RH-2. This distribution of magnetite is explainable by tilting a porphyry copper deposit in such a manner as depicted on the cross-section (Att. B).

A simple regional interpretation of the geology is apparent if it is accepted that RHP-1 is bottomed in Laramide quartz monzonite and that the Southern Greyback granodiorite and the quartz monzonite of RHP-1 are genetically related to the Laramide Greyback granodiorite (as shown on Atts. B & C). By lumping these igneous rocks, a large Laramide pluton would appear to underlie most of the district. Prior to mid-Tertiary rotation and antithetic faulting, a stock and associated dike swarm of Laramide porphyritic granodiorite differentiated as an apophysis above the larger Laramide (Greyback) pluton. The quartz monzonite of RHP-1 and the Southern Greyback granodiorite below the Red Hills plate are therefore depicted on the cross-section as part of the Greyback pluton and lie below the hypothetical porphyry copper deposit and associated porphyry stock.

The depth to the hypothetical ore zone is unknown. However, the deeper one envisions the ore, the greater is the probability that part of the ore zone has been faulted. Any faulted portion of the ore zone would lie in the Donnelly Wash plate and necessarily lie to the east of drill hole RHP-1. This possible drill target would be approximately 2000 feet to the east of RHP-1. One 1500-foot drill hole is necessary to evaluate this target. It is my opinion that this target is secondary in potential, as weakly altered and mineralized Oracle granite crops out less than 1000 feet to the east.

In conclusion, new interpretations and revised hypotheses are cited as additional evidence enhancing the possible presence of the tilted porphyry copper deposit lying at depth between drill holes RH-2 and RHP-1. Enough data have been gained from RHP-1 to allow the postulation of a geologic model that simply explains the geologic history of the region.

John R. King

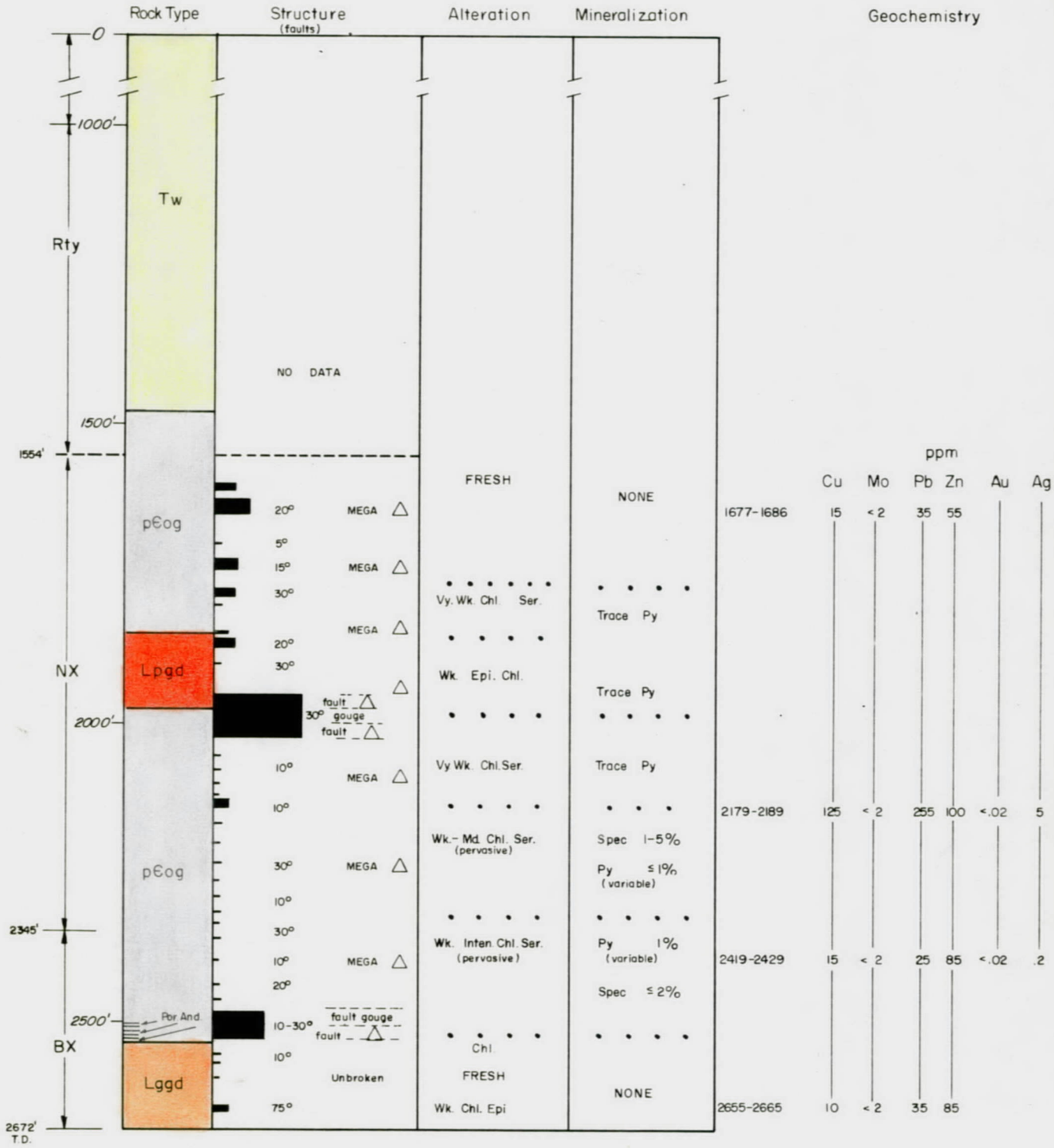
John R. King

JRK:lb
Attachs.

The essentially fresh & barren tgsd in the bottom of RHP1 suggests that portion is not in proximity to an ore shell as suggested by the cross-section. Further, the speculant in the pt-Og above the fault supports the top of the alt-min column while the magnetite in RH-2 suggests a deeper portion of the same. It may be that the entire mineral potential is in the Box O section and eastward from the location shown as hypothetical. A 2000-ft hole as proposed would certainly test this block as now postulated by K.

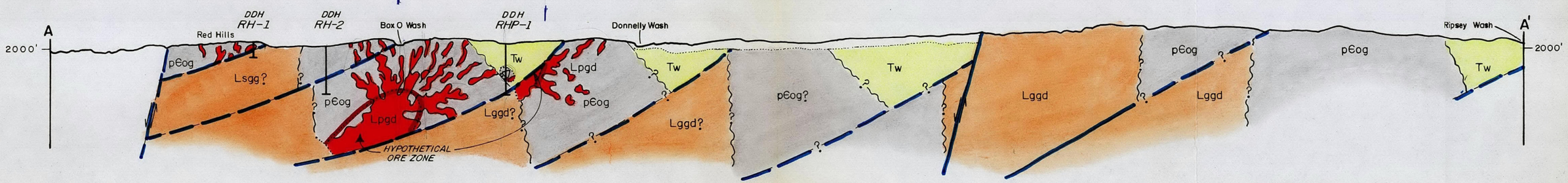
ATTACHMENT A

SUMMARY GEOLOGIC LOG RHP-1 0' to 2672'



see GEOLOGIC MAP – Red Hills for geologic explanation

ATTACHMENT B



Looking Northerly

SECTION A–A'

DIAGRAMATIC GEOLOGIC SECTION

· Revised : March 25, 1974 ·

RED HILLS

Pinal County, Arizona

scale 1" = 1 mile

note:
see Geologic map for explanation

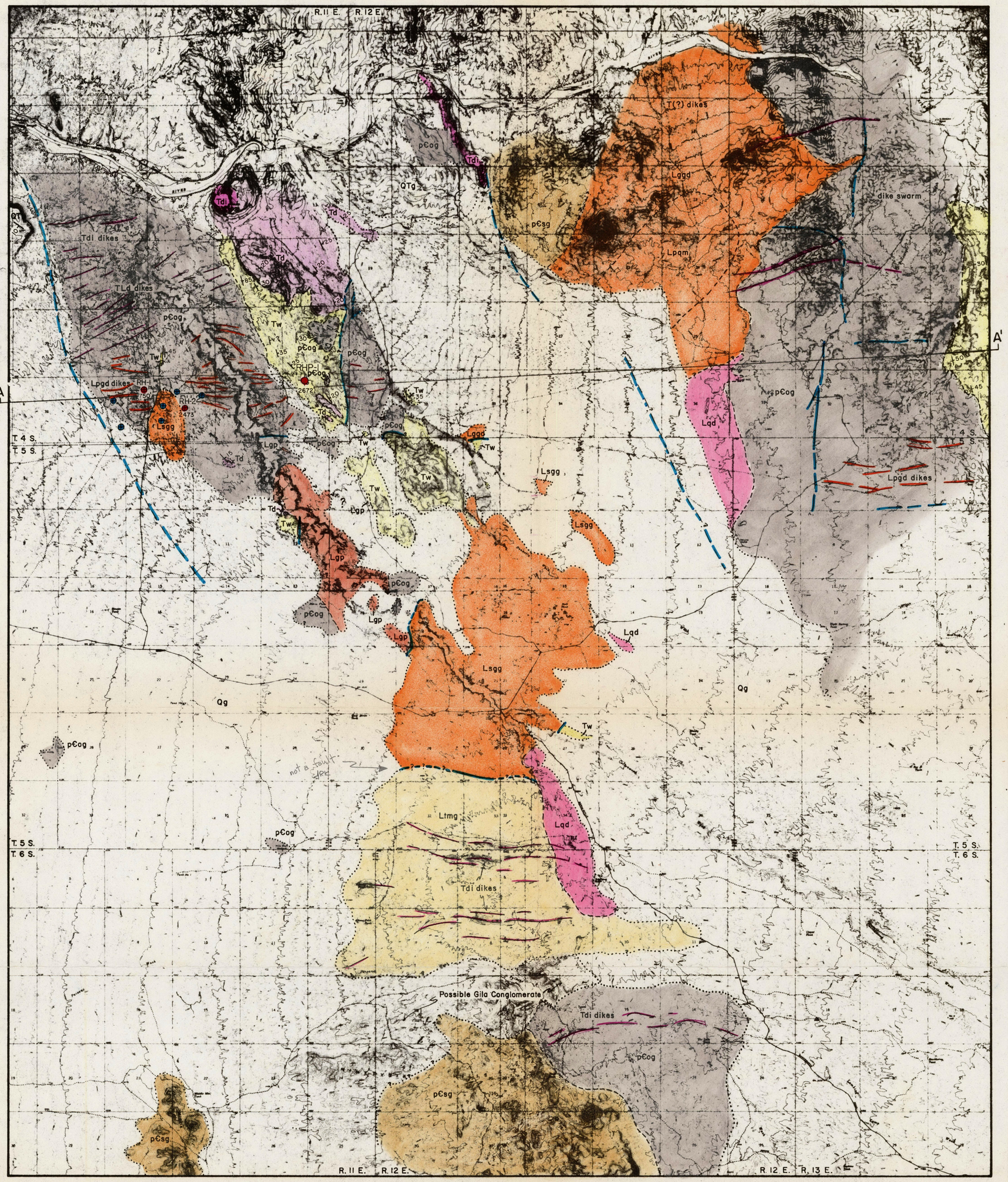
JRK

April 1973

MVK/DAM 2600 a

~~ATTACHMENT A~~

ATTACHMENT C



EXPLANATION

Q / QTg / QTb	Quaternary gravels, Quaternary-Tertiary Gila conglomerate (QTg) & basalt flows (QTb)
Td / Tdi	Tertiary dacite [extrusive welded tuffs, volcani-clastic sedimentary rocks, intrusive (Tdi); a catchall term for dacite volcanics & sedimentary equivalents & is interbedded with upper Whitetail conglomerate (possible equivalent to Superior Apache Leap tuff, 20 my K-Ar)]
Tw	Tertiary Whitetail conglomerate [32 my K-Ar (equivalent to the Ripsey Wash sequence of E.A. Schmitt) includes interbedded fine grained volcani-clastic units]
TLd	Tertiary-Laramide quartz latite dikes (age uncertain)

POST MINERAL

PRE MINERAL

Lpgd	Laramide porphyritic granodiorite dikes & inferred stock (63 my K-Ar)
Lggd / Lpqm	Laramide Greyback granodiorite & porphyritic quartz monzonite core (63 my K-Ar) [probably correlative to the Granite Mtn. stock of Ray area, includes apalite & andesitic sills & dikes]
Lqd	Laramide quartz diorite [probably correlative to either Hackberry or Sonora diorite (71 my K-Ar)]
Lgp	Laramide granite porphyry of Box O Wash (age uncertain)
Lsgg	Laramide (?) southern Greyback granodiorite [a one mica, hornblende deficient, coarse-grained quartz monzonite, in gradational contact with Ltmg, includes andesite sills & dikes (age uncertain)] NOTE- *Now undifferentiated from Lggd/Lpqm*
Ltmg	Laramide (?) two mica granite [a two mica, course-grained granite (age uncertain)]
pЄsg	Precambrian Solitude granite [a two mica, medium-grained granite, possibly correlative to the Solitude granite described by J.C. Balla (800-900 my K-Ar)]
pЄog	Precambrian Oracle granite [porphyritic quartz monzonite, includes apalite and diabase sills & dikes (1420 my K-Ar)]

Contacts with Qg

Bedrock Contacts

Faults - Dashed Where Inferred

Strike & Dip

Breccia & Breccia Masses

RHP-1 / 2672' — ASARCO DDH with Number & Final Depth

Phelps Dodge & Red Hills Mining Co. DDH

N

RED HILLS

REVISED

RECONNAISSANCE GEOLOGY

of the

Grayback, North Butte, 96 Hills NW,

& 96 Hills NE Quadrangles

Pinal County, Arizona

Scale: 1" = 1 mile

JRK ~~April 1973~~

Rev. March, 1974

MVK 2599a

SKYLINE LABS, INC.
Hawley & Hawley, Assayers and Chemists Division
P.O. Box 50106, 1700 W. Grant Rd., Tucson, Arizona 85703

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION	GOLD ppm	SILVER ppm	LEAD ppm	ZINC ppm	COPPER ppm	MO ppm
RHP-1 1677-1686			35	55	15	< 2
RHP-1 2655-2665			35	85	10	< 2
RHP-1 2179-2189	<0.02	5.0	255	100	125	< 2
RHP-1 2419-2429	<0.02	<0.2	25	85	15	< 2

TO: American Smelting & Refining Company
Southwestern Exploration Division
P.O. Box 5747
Tucson, Arizona 85703
Attn.: Mrs. J. King

REMARKS: Trace analysis
2 Gold @ $2.00
2 Silver @ $1.50
4 Copper, Lead & Zinc @ $2.10
4 Molybdenum @ $1.25

CERTIFIED BY:

CHARGES:
PREPARATION $ 3.00
ANALYSIS $ 20.40

ACCT.: AMERICAN SMELTING & REFINING COMPANY

DATE REC'D: 3/15/74 DATE COMPL.: 3/15/74 740418 $ 23.40

Rotary to 1556
NX - from 1556 to 2345 then BXcore

PROJECT Red Hills — HOLE NO. RHP-1
Collar elev. — Final depth 2672
Coord N. — Coord E.
Inclination — Page 1 of 5
Logged by JRK
Date start — Date finish 19 March 74

DEPTH from	DEPTH to	int'vl	% CORE RECOV.		ASSAY				STRUCTURE Primary Faults	Secondary Faults	Jointing ∘ / FREQ/foot	ROCK TYPE and REMARKS
1556	1602	46'		pEog					Mega breccia		60° 2	Precambrian Oracle granite strongly porphyritic, oxidized along fractures
										30°	10 4	well broken - sheared, largest core length - 3", popcorn core @ 1591
										50°		unaltered unmineralized
1602	1617	15		pEog					Fault breccia			strong shearing - breakage
1617	1628	11		pEog					Mega breccia		10° 4	as above. - - -
											70° 1	
1628	1655	27		"					Fault zone			intensely broken, sheared, Δed -; grades from broken to popcorn Δ
												to rollen block gouge zone (w/ latex coring very well) to " "
					(1677-1686-Geochem)							to broken Δ, oxidized unmin. unaltered
1655	1685	30		"					breccia			well broken, strongly porphyritic, " " & unmin.
1685	1689	4	40'	"	Mega Δ				breccia			well shattered " " " "
1689	1695	6									45° 1	one breccia block
~~1695~~	~~1888~~										70° 1	
											10° 1	
1685	1703	4							Fault breccia			-5° to core - well shattered - oxidized
1703	1725	22							Mega Δ		30° 1	as prev. described, variable Δation to total shattering
												longest piece of core 4" long oxid, unaltered-unmin.
1725	1743	18							Fault zone			gouge - rollen blocks, slickensides, 1-2 small Δ frags have
									15°	45°		green chlorite-sericite alteration, unmin.
1743	~~1750~~	7		pEog					Mega breccia		45° 5	moderately porphyritic, oxid on fract. & relevantly
			23								60° 2	unaltered - unmineralized
~~1750~~	1766	16										1750-1766 - coarsely porphyritic
1766	1781	15		"					Fault zone			strongly faulted, sheared, rollen block, popcorn
									30°			
1781	1798	17		pEog					Mega breccia			still well oxidized, porphyritic, very coarse grained
												unmin. occassional feldspar-shows green sericite attack.
1798	1803	5		"					Fault zone			1st appearance of green sericite in fault zone
									30°			
1803	1821	18		"					Mega breccia		70° 2	as above - oxidized (yellowish orange) shows some good mega Δ
											45° 3	structure - ie large (6"-2') blocks w/ crushed (partially) zones
											10° 1	between
1821	1822	1							Fault			small gouge fault zone
1822	1855	33							Mega breccia		70° 3	pEog generally darker (high mafic content?) increased chloritization
											10° 2	very dark green, by 1850 occasion chlor/green sericite of
												inversion of plag, unmin, possible wk alteration
												several small faults (20-45°)
1855	1870	15							Fault Δ			major crush / gouge zone, pEog lighter colored (less mafic/chlor) than above
												1860-1868 - less broken but chlor stringers / cracking ubiquitously present
												1868-70 very intense gouge

PROJECT Red Hills — HOLE NO. RHP-1
Collar elev. — Final depth 2672
Coord N. — Coord E.
Inclination — Page 2 of 5
Logged by JRK
Date start — Date finish

DEPTH from	DEPTH to	int'vl	% CORE RECOV.		ASSAY	STRUCTURE Primary Faults	Secondary Faults	Jointing °/FREQ /foot	ROCK TYPE and REMARKS
1870	1895	25		pЄog		Mega Breccia		45° 3	wk ~~chl~~ chloritization(?) of mafics & felds - oxidation - trace to pyrite, well developed Δ structures & FRAGS - rock is well shattered longest piece of core 3"
1895	1898	3				Fault 20-45°			intense gouge red hematite gouge
1898	1976	78		Lpgd					Laramide porphyritic granodiorite - of the Red Hills - Box & Hills dike swarm partially oxidized - feldspars phenos assorbing hematite internally brecciated, ~~bable~~ broken, roller blocks & gouge trace pyrite, epidote, chlorite - mafics & plag Lpgd variable in color, (dark green to light green) in texture (medium grained to fine grained feldspar to qtz-feldspar porph.
			63'			Fault 1959-1976 - 17			faulted at both contacts - 1959-1976 strong gouge & brecc.
1976	2022	46		pЄoa		Fault zone 30° 60°			faulted - intense gouge ~~1874-1~~ 1984-1989 - dk green chlorite & red hematite in gouge, trace amount of pyrite epidote & green sericite on the occasional frag. variable fault zone from total dk green chlor gouge to dk green chlor roller blocks gouge to sheared - broken - Δ frag - only weakly oxidized green ~~sericite~~ sericite-chlorite? present.
2022	2027	5		pЄog		Mega breccia		10° 3 45° 4	Δ breccia blocks - ~~with~~ key its self un min - to a lesser that is spotty not pervasive totally shattered - biggest chip 1/2"
2027	2031	4		"					
2031	2036	5	19'	"				5° 3 45° 3	Δ breccia blocks - shearing - chloritic - slicks increasing in last 2' of core
2036	2041	5		"					totally intensely fract rock, 1/4" longest chip
2041	2054	13				"	"		Well developed mega Δ texture - 1st appearance of chlorite/clay filled interstices between Δ blocks chlor of mafics, weak green sericite? of plag chlor slicks on fracts, Fault @ 2053 - 70°
2054	2058	4	88'	pЄa					Δ breccia blocks bounded by chlorite slicks on enclosed (Precambrian aplite)
2058	2129	71		pЄog		Mega breccia			Large zone of brecciation & breccia block textures ie chlorite streaks & cracks & shears, thin hematite gouge, chlorite/clay filling breccia cavities - spaces variable alteration - ~~total~~ weakly pervasive over small 5' intervals otherwise smaller - unmin. small fault zones 2059 - 10°; 2075 - 45°; 2083 - 30°; 2090 - 70°; 2124 - 20°, 2126 - 45°, 2117 - 45°, some Δ blocks ex 2125 mod well chl/sericitized other " " ex 2113 smaller - light pink color

PROJECT RH Project — HOLE NO. RHP-1

Collar elev. — Final depth 2672

Coord N. — Coord E.

Inclination — Page 3 of 5

Logged by John R. King

Date start — Date finish

DEPTH from	DEPTH to	int'vl	% CORE RECOV.		ASSAY				STRUCTURE FAULTS Prim	STRUCTURE FAULTS Sec.	STRUCTURE Joints # / FREQ per Foot	ROCK TYPE and REMARKS
2129	2142	13		pEog					10°-40°			Intense fault zone - gouge roller blocks of pEog wk to tr oxidation present along thin slicks, dark green chlorite - prevalent over red hematite gouge
2142	2163	21		pEog					MEGA BRECCIA			Breccia emphasized by dark green chlorite ~~stand~~ seams and slicks, minor hem. streaks, some blocks - unaltered others intensely tectonically(?) chloritize & broken cenmin.
2163	2165	2		pEa								apalite - broken and brecciated - internally
2165	2171	6		pEog								Breccia - as above - variable alter, cenmin.
2171	2177	6										FAULT ZONE part true gouge - part rubble, crushed both red hematite & chlorite gouge present.
2177	2233			pEog					MEGA BRECCIA			chloritized/green sericitized feldspar - prevalent - grades into
					(2179-2189 Geochem)					20°		(by 2180) intense-pervasive alteration associated with
										10°		intense fine grained specularite mineralization, pyrite assoc w/ specularite - up to 1% (by vol.), tr copper ox ???
												specularite vein - high angle - 70°-?) Rock is still
												mega Δ - large blocks surrounded by crush-cataclastic matl.
												by 2185 intense min/alt - gone but alter is somewhat
												weakly pervasive, small faults 2201-4 -20°, 2206-10°,
												2227, 2240, 2246 -30°, roller bearings in these faults along
												with mixing of red hematite & green chlorite gouge
2233	2235	2	28	pEa								apalite - well fractured
												~~apalite~~ - ~~well~~
2235	2261	26		pEog				"	"		70° 1	part of the previously mentioned mega Δ - this is ~~not~~ in itself
										10°	5° 2	one large Δ block, feldspar - wk altered - green ser/chl
											45° 1	small fault 2237 -10°
2261	2263	2							10°			Fault zone - gouge - consuming old min/alt structure
												as specularite, ~~chlorite~~ pyrite, chlor/sericite frags in the zone
2263	2298	35		pEog					MEGA BRECCIA			as prev. described - variable blocks in color, oxidation
										10		alteration and mineralization small faults 2272 -30°, 2290-10°
2298	2301	3							30°			fault zone - consuming premineral structure specularite
												pyrite, green ser., dk. chlorite, trace cpy?
2301	2314	13		pEog								alter/min - variable in intensity - wk to INTENSE, pervasiveness
												spotty to total flooding, tr. oxid, crushed ~~etc~~ & mylonitized rock
												but some py still euhedral grains ∴ open not compressive fault
												green ser of plag, chloritized mafic, pyrite, cpy?
2314	2317	3							10°			fault zone - as above crushed min/alter gouge zone

PROJECT Red Hills — HOLE No. RHP-1
Collar elev. — Final depth
Coord N. — Coord E.
Inclination — Page 4 of 5
Logged by JRK
Date start — Date finish

DEPTH from	DEPTH to	int'vl	% CORE RECOV.		ASSAY				STRUCTURE FAULTS PRIM	FAULTS SECOND	JOINTS α / FREQ per foot	ROCK TYPE and REMARKS
2317	2345	28		pЄog								green sericite alteration, chloritization, pyritic mineralization more prevelant & pervasive, min. both dissem and tr. fract control, dk green chlorite streaks prevelant
												NOTE pervasiveness & total volume % of py & green sericite alter has increased w/ depth, no oxidation
	NX -	stuck	in	hole -		reduced			to	Bx		still part of MEGA breccia
2345	2360	15		pЄog								as before pyrite - euhedral in stronger structural zones - ass/w pervas - intense green sericite/chlor alteration specularite always ass/w py
2360	2364	4										fault zone - again well mineralized - (pre faulting) & again well altered
2364	2395	31		pЄog				Mega breccia				as above - variable but pervasive green sericite alteration pyrite in tr to 1% amount, coarse-grained sulfides in small gouge zone 2379, 2391 gouge zones ~~show less~~ & inter Δ areas show less roller block type structure than previously seen possible fault
2395	2398	No Core										
2398	2481			pЄog				Mega breccia				as above - intensity of pervasiveness increasing over greater lengths of core, pЄog still porphyritic (1/2-1" K phenes) gneissic appearence ~~still~~ imparted by alignment of chloritic seams & slicks
					(2419-2429 Good)							pyrite, specularite gouge @ 2447, 2463, 2489 (Box 102 - for geochemistry)
2489	2517	28							10-30°			MAJOR FAULT ZONE - intensely gouged fault - augen cataclastic tex, within intense chloritic gouge 2512-2515 - unusual rock - possible a large sheared! block of diabase consummed in the fault it is also well chloritized
2517	2519	2		por. And.								fine-grained porphyritic andesite, well chloritized, tr diss py feldspar phenes - altered to green ser ???
2519	2525	6		?					30°			a different rock is being consummed in this fault - well broken, crushed gouged - coarse grained intrusive
2525	2528	3		por. And								- as above except small qtz phenes appear - ∴ may be related to ~~Lpd~~ Lpgd
2528	2586	52		Lsgg							60° 3 45° 5 20° 1	Laramide(?) Southern Greybeds granodiorite - ?? - coarse grained qtz-monz-to granodiorite, only minor K phenes (smaller than qtz phenes) pervasively (but wk.) altered to chlor/ser ??, NO MIN. w/ depth very mafic rich - med-grn, sgd inclusions a phase (sphene common) well jtred, faults 2535, 2541, 2563-10°, 2567-10°, 2570

PROJECT Red Hills — HOLE NO. RHP-1

Collar elev. — Final depth 2672

Coord N. — Coord E.

Inclination — Page 5 of 5

Logged by JRK

Date start — Date finish 12 March 74

DEPTH from	DEPTH to	int'vl	% CORE RECOV.		ASSAY	STRUCTURE Faults Prim	Faults Sec	Joints ∘ / FREQ per foot	ROCK TYPE and REMARKS
						15°			cont - from pg 4 - these faults are small (<.5") of gouged rock, no mega Δ tex to Lsgg, rock is well jtned w/ a total density one per one inch / Rock could be pЄ ~~[illegible]~~
2580	2587	7		Lsgg?	Lggd?	15°			fault zone - gouged & slicked Lsgg - chloritized
2587	2592			por Andes					Fine-grained por Andes dike - - differ from previous dikes in that has two generations of ~~the~~ felds. phenocs; one consumed to apple green clay; the other unaltd? - but reactions rimmed and is sub to euhedral. fault 2590
2592	2597	5		Lsgg? → Lggd?		10-45° 5	Fault		partially crushed, gouged, crackle - cataclastic Δ, varing in intensity, chloritization (& greenstone?) is pervasive, trace epidote (diss) in larger blocks, which also show less chloritization & concomittant crush. no min! - tr hematite slicks, would appear the alter mabe related to tectonic movements - not hydro!
2597	2599	2		por Andes					as previous described - Black Biot in gnss.
2599	2642	43							as above - variable tectonic effects - gouge to crush to crackled. again no min!
2642	2657	15				70°-90°			HIGH ANGLE FAULT zone - 1st time have encountered high ∠ fault, gouged, cataclastic Δation w/ Δ blocks alteration appears - tectonic
2657	2672	15		Lsgg ?Lggd?	(2655-2665-Gedma)			60° 2 25° 3 85 1	FRESH - equigranular - medium grained (to coarse) qtz monz to granodior. un min. alter - tr to 1% fine diss. epidote, drilled like bedrock should - well jointed w/out slicks along ~~qtz~~ joints. longest piece of core +3 feet, minor - small chloritic smears - bad alluvium totally unaffect by the above +1000' of brecciation no small faults, joints now w/ new dip direction
END OF HOLE									
									NOTES - !! definitely major rock type change at ≈2500, below fault no mineralization, alteration (except for epi) appears tectonic
									the dikes mabe providing the surface for movement. the dikes below the fault have no equivalent above
									The rock mabe pЄ in age as biotites are not good but are very differ (small size - less wispy) from pЄug Also rock could be related to Lggd - can not make a valid conclusion

JD Sell 5/19/77

Will you make an occasional check (1/month?) of Red Hills area for drill rigs. Exxon apparently has Bell Western ground.

FTG.

AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

February 20, 1975

J. H. C.
FEB 21 1975

FILE MEMORANDUM

see file

Red Hills
Pinal County, Arizona

Guy Buckley, attorney representing Arizona Consolidated Copper and Gold, called and presented his deal for total property (Arizona Consolidated Copper 51% and others 49%): $15,000 down, end price $5 million at end 5th year; 5,000 feet drilling first year.

I reiterated Asarco would only commit to $5,000 down, would want 10 years to pay an upset price of $5 million, and would only commit to completing 5,000 feet of drilling by end of 1976 (2 years).

W. L. Kurtz

WLK:lb

cc: JHCourtright
RBCrist
JRKing

July 12, 1977.

Mr. J. F. O'Betka
O'Betka Realty
Box F
Florence, Arizona 85232

Pioneer Project
Pinal County

Dear Mr. Betka:

This letter is in reference to property presently owned by Mr. Richard Reed, which is in the final stages of purchase by the Helmswheel Ranch Company, a limited partnership.

Mr. Reed has explained to you Asarco's State Prospecting Permits that cover parts of the ranch and our policy of keeping the surface lessee or owner aware of any activity on our part.

We thank you for the vote of confidence in continuation of our relationship.

Mr. Jerry Montgomery of our Salt Lake City office, is expected in this week and will review the property. Surface geology only is programmed.

Very sincerely,

RBC:jlh
c.c. J.D.Sell

ASARCO

Southwestern Exploration Division

July 22, 1977

TO: F. T. Graybeal

FROM: J. D. Sell

Red Hills-Box O Ground Check
Pinal County, Arizona

On July 20 I went into the Red Hills camp to check out any activity. No one is staying there and only a few tracks were in the roads. Most of the tracks led to the ranch house NW of Red Hills (SE corner, Sec. 28, T4S, R11E). While at the old watchman's place I noticed a blue pickup headed east on the powerline on the north side of the area. After a few minutes I started north and picked up fairly new yellow flagging along with the tracks. As I approached the powerline I saw the pickup returning so took off on a side road, turned around and paced the movement to intercept them at the road junction (N center of Sec. 34). They drove right on back, the older passenger waved but the younger driver did not, and headed straight out south. The deep blue Ford pickup, Lic. No. 2JY029, certainly looked like a company-type truck but I did not recognize either of the two people.

I then continued on around to the west and could find no new activity and no one was home at the Ranch House.

A mile south of the Red Hills gate was pink flagging (semi-brittle) and a vehicle had gone west to the section corner 3-4-9-10 (T5S, R11E) tromping all the vegetation (including a ten-foot ocotillo) in its path.

I went on to Box O Wash along the main road but could see no activity.

Returning toward Florence, 1 mile west of the Red Hills cutoff were tracks which ended at a stock tank. 2.3 miles from the cutoff was a newly constructed road (within the past two years) going north which went along the Township 10E & 11E. The graded road terminated 0.3 miles north of the NE corner of Sec. 12 (brass caps are in). At the termination were several 2x2's, some very old, but I could find no vials or papers. Going northward from the end were three hunter-woodcutter roads. The west road also had some downed 2x2's with no identification.

No drilling activity appears in progress or notice of heavy traffice areas other than to the ranch house.

James D. Sell

James D. Sell

JDS:lb

ck dates
any interest ?

To _____

Date 12/2/91 Time _____ ☐ AM ☐ PM

WHILE YOU WERE OUT

M. M. Kenna

of 602 - 280 - 9087

Phone ( ) Voice mail.

Area Code Number Extension

TELEPHONED		PLEASE CALL	
CALLED TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		URGENT	

RETURNED YOUR CALL ☐

Message Red Hills
E. Florence

AMPAD EFFICIENCY

To JDS

Date 11/25 Time 10:13 ☐ AM ☐ PM

WHILE YOU WERE OUT

M Martin McKenna

of _____

Phone (602) 280-9087

Area Code Number Extension

TELEPHONED		PLEASE CALL	✓
CALLED TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		URGENT	

RETURNED YOUR CALL ☐

Message Re claims in the Florence area — Asarco check them out about 20 yrs. ago. He wonder if Asarco might be interested in them. Mary

Operator

AMPAD EFFICIENCY®

REORDER #23-000