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COURTLAND-GLEESON
Cu, Au (Pb, Zn, Ag)
Map Reference #13

AVAILABLE LEASE PURCHASE/JV
COCHISE COUNTY, AZ
NH-12-03-01

SUMMARY *Paleozoic-age Abrigo limestone hosts massive gold-copper carbonate replacement deposits (CRD) that are of Jurassic (Bisbee) age. The Star Hill deposit contains an estimated 650,000 tons grading 3.1% Cu and 0.12 opt Au. Several areas remain untested that could substantially expand this resource base.*

PROPERTY *Santa Fe Pacific Gold (SFPG) controls approximately five square miles of this historic mining district through leases of patented and unpatented claims, company held claims, and two Arizona state prospecting permits. The area is located 15 miles due east of Tombstone, approximately 80 miles southeast of Tucson, Arizona.*

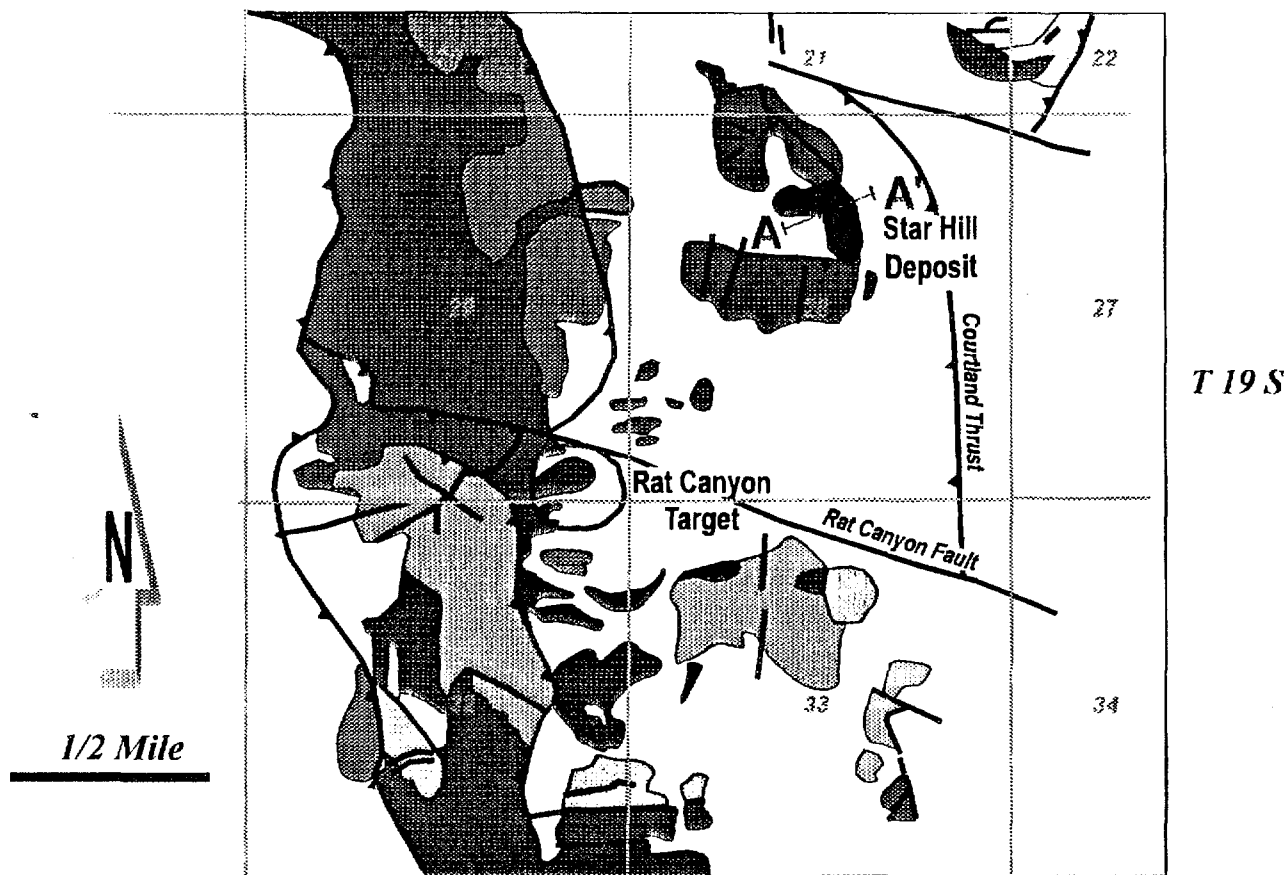
GEOLOGY *Multiple Jurassic-age monzonites intrude the lower Paleozoic carbonate section including Abrigo, Martin and Escabrosa limestones. Associated mineralization is an early Pb-Zn low grade skarn stage followed by Cu-Au carbonate replacement, upon which is superimposed a Tertiary-age gold event. Massive pyritic replacements are 10's to 100's of feet thick with margins further replaced by chalcopyrite/gold mineralization. The Star Hill deposit appears to be a preserved section of Abrigo limestone in a recumbent overturned fold, thrust over barren Cretaceous Bisbee formation. North-south and east-west structural intersections likely influence mineralization and the emplacement of multi-phased intrusion breccias which act as conduits to the carbonate replacements. (See map and cross section on back.)*

PREVIOUS EXPLORATION *The area has been widely explored by major mining companies since the mid-1960's. Union Oil partially delineated a chalcocite resource in intrusives, which in turn caused deeper exploration to be conducted by SFPG, resulting in the Star Hill discovery. SFPG has drilled 44 core holes through the deposit and the lower thrust surface on approximately 200' centers. In addition, IP/resistivity, ground magnetic surveys, as well as wide spaced drill holes in outlying areas, have defined other blind targets.*

EXPLORATION TARGET *Closer spaced surface drilling followed by a phased underground exploration program from a shaft or decline could likely triple the current resource estimate at Star Hill. Other near-surface drill targets at Maud Jill, Rat Canyon, the Flux Pit and the Northwest Extension of Star Hill offer additional opportunities to expand the resource base.*

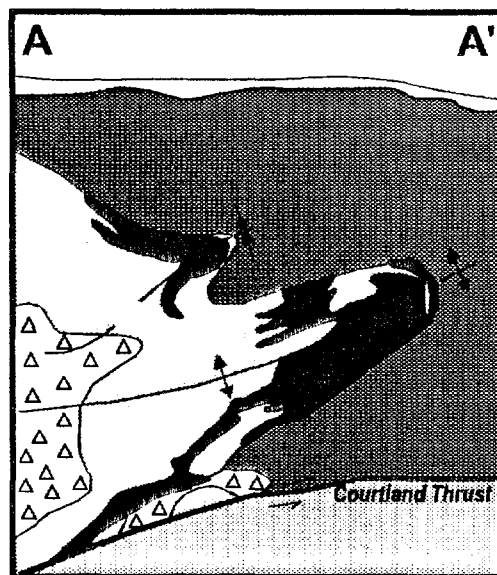
GENERALIZED GEOLOGY

T 25 E



CROSS SECTION STAR HILL DEPOSIT

1/2 Mile



Explanation

	Alluvium		Abrigo Limestone
	Bisbee Formation		Bolsa Quartzite
	Horquilla Limestone		Jurassic Intrusive Complex
	Escabrosa Limestone		Breccia Phases
	Martin Limestone		Au/Cu Replacement



SANTA FE PACIFIC
GOLD CORPORATION

*Courtland/
Gleeson*

PROGRESS REPORT
COURTLAND ANOMALY DRILLING RESULTS

Cochise County, Arizona

CAP II, LLC

David M. Brown

November 18, 1996

BACKGROUND AND INTRODUCTION

The Courtland pediment area, located approximately 15 miles east of Tombstone, Arizona (Figure 1) is the first target selected for drill testing by the CAP II Group, out of some 4-5 initial anomalies defined through enzyme leach soil sampling of Arizona-New Mexico pediment areas. The CAP II enzyme leach target area lies well to the east of previous exploration in the Courtland-Gleeson District by Bear Creek Mining and other companies. Previous exploration by these companies primarily tested concealed porphyry copper mineralization of probable Jurassic age. Most of this mineralization occurs in deep thrust plates or below pyritic leached capping. Prior exploration has been guided mainly by aeromagnetics, I.P., and extensive blind drilling, supplemented by leached capping interpretation or jasperoid geochemistry.

Between July and November of 1996 two deep rotary drill holes were completed in the pediment target area, in order to investigate what appears to be a classic "enzyme leach" signature of a buried porphyry copper system (CAP II, Interim Report, July 31, 1996). The two holes (CT96-1 and CT96-2) were located on the southern and eastern fringes of an elliptical-shaped 2 mi. x 3 mi. Cu/Au/As geochem anomaly. The purpose of this brief report is to describe and analyze the results of these drill holes, and to make recommendations for follow-up of the initial results.

SUMMARY OF DRILLING RESULTS

The locations of the two CAP II holes are shown relative to the district geology on Figure 2 and to the gold and copper enzyme leach anomalies on Figures 4 and 5. Hole CT96-1 is situated near the south edge of the peripheral Au and Cu anomalies; hole CT96-2 is close to the eastern margin of the anomalies. Hole 96-1 was terminated at a depth of 2330 feet, after a 10-foot spot core was taken from Cretaceous sediments which were encountered near 2,000 feet. Hole 96-2 was terminated at a depth of 2290 feet, within hornblende-bearing Tertiary volcanics.

The results of the two drill holes are summarized as follows:

CT96-1	0-960'	Alluvium
	960'-1220'	Tertiary andesite
	1220'-2050'	Laramide(?) quartz latite tuff
	2050'-2330'	Cretaceous Bisbee Group sediments*
	T.D.	
		* Post Mineral (?)
CT96-2	0-1100'	Alluvium
	1100'-2290'	Tertiary volcanics and clay-rich sediments*
	T.D.	
		* Post Mineral, with apparent fragments of pre-Tertiary granitic rocks in the conglomeratic intervals

GEOCHEMICAL RESULTS OF DRILL SAMPLES

Samples from holes CT96-1 (0-920') and CT96-2 (0-1100') were submitted for enzyme leach analysis as soil/overburden material, with a composite sample taken every 20 feet. The results from CT96-1 indicate systematic downward changes for a number of elements, particularly Au, As, Ba, Cu, V, W, and Ni. Enzyme leach results from CT96-2 have not been received and analyzed at this time. The systematic, rather than random, results from CT96-1 suggest a valid anomaly, although the results cannot be reliably interpreted yet without additional corroborative support from other drill holes.

Selected bedrock samples from hole CT96-1 were submitted for conventional assaying, in order to check for subtle anomalies indicative of a nearby source. Of note is the gold anomaly recorded from a depth of 2140' - 2320', which represents a systematically-increasing interval of gold assays from 0.015 - 0.90 ppm. The origin of this weak anomaly is not known, since the drill cuttings of Cretaceous arkose and siltstone displayed no evidence of alteration, other than weak sericite/clay and traces of oxidized pyrite. Similar gold anomalies have been reported (Fred Jenkins, Santa Fe Pacific) from Bisbee host rocks at the Commonwealth Mine, a Tertiary epithermal silver district located about 12 miles north of the project area.

DISCUSSION AND INTERPRETATION OF DRILLING RESULTS

The results of the first two holes at Courtland have not provided any direct evidence of a concealed porphyry deposit within the enzyme leach anomaly. Furthermore the holes have shown that depths to premineral bedrock are greater than anticipated, due to the presence of significant thicknesses of Cretaceous and Tertiary volcanics and clastic sediments. These consolidated postmineral units, coupled with up to 1,000 feet of unconsolidated overburden, have so far frustrated any type of look at premineral bedrock (Jurassic age intrusives and Paleozoic sediments).

The Cretaceous Bisbee Group, which was intersected in CT96-1 and in nearby Santa Fe holes to the west and south of CT96-1, appears to underlie a significant portion of the pediment area. The redbed clastics and limestone of this formation form the footwall of the regional Courtland Thrust, which is generally interpreted to dip at low angles to the west or southwest (Figure 3). The Bisbee rocks are probably complexly folded, and no reliable estimate can be made of the thickness of this unit, especially since no drill holes are known to have penetrated the underlying autochthonous rocks in the district. Therefore, pre-Bisbee host rocks possibly responsible for the enzyme leach anomaly could be present at a depth of less than 100 feet beneath the bottom of hole CT96-1, or they could be several thousand feet deeper.

INTEGRATION OF DRILLING RESULTS WITH SANTA FE DATA

In late October, Santa Fe Pacific's Courtland data was reviewed in their Reno office. Santa Fe's drilling has defined a complex Cu-Pb-Zn-Au mineralized system near Star Hill (Fig. 2, overlay). The mineralization consists of Cu-Au carbonate replacement deposits in folded Cambrian limestone. Above and lateral to the replacement lenses there is widespread stockwork and disseminated Cu mineralization in Jurassic porphyritic intrusives. In section (Fig. 3) the mineralized system appears to have been rotated nearly 90° and truncated by a flat fault (the Courtland Thrust). The Star Hill area is reported by Santa Fe to contain approximately 40 million tons grading about 0.5% Cu. Gibraltar Mines conducted a feasibility study of Santa Fe's data, and concluded that the chalcocite mineralization is too metallurgically difficult to be economic.

The Santa Fe (and earlier Bear Creek/Minerals Exploration Co.) chalcocite mineralization has not been closed off northeast of the Courtland area. Spotty and low-grade pyrite/chalcocite persists under shallow pediment cover immediately east of Star Hill, within phyllically-altered monzonite porphyries cut by several Santa Fe, MEXCO, and Bear Creek holes. Data from the CAP II drill holes has been correlated with previous drilling in the form of two east-west cross sections (Fig. 3). Comparison of the two sections A-A' and B-B' shows the possibility of a major difference in bedrock geology and alluvial depth going from south to north. Hole CT96-2, although collared approximately one mile farther east than CT96-1, intersected Tertiary bedrock at only 1,100 feet, compared to 960 feet in CT96-1. This suggests that the pediment is much shallower to the north. Alternatively, the Tertiary volcanics in hole CT96-2 may represent an upfaulted ridge bounded by a deeper basin to the west.

Figure 3 also demonstrates that the "upper plate" Copper Belle monzonite porphyry and its associated phyllic alteration and chalcocite mineralization may be significantly thicker and more laterally extensive to the northeast of the Star Hill area than to the southeast of Star Hill. This interpretation is based on examination of Santa Fe and Bear Creek drill hole data and geologic maps. Of particular note is Bear Creek hole CG-11, which bottomed at a depth of 1,200 feet in sericitized porphyry, without encountering the Courtland Thrust (Section A-A', Fig. 3). Projecting the thrust plane eastward at the regional dip would place its apex several thousand feet farther east than along section line B-B' to the south. The effect of this extrapolation is to suggest an eastward "bulge" in the Courtland Thrust position, due possibly to right lateral strike-slip or oblique-slip movement along a concealed transverse fault (Fig. 2).

The evidence from drilling and surface geology suggests that a major structural discontinuity exists near the Courtland Road, which follows the east-west section line immediately south of section A-A' (Figure 2). The existence of this break is supported by Bear Creek aeromagnetic data, which shows a subtle ENE elongate saddle north of the road (Fig. 2), separating distinctive NW-striking closed high's and low's to the north and south. The approximate center of the doughnut-shaped enzyme leach anomaly falls within the aeromagnetic positive area, one mile due west of hole CT96-2. A truncated and tilted porphyry center has been inferred as a possible cause of the anomaly, within "lower plate" pre-Cretaceous rocks (Fig. 3, Section A-A'). If this

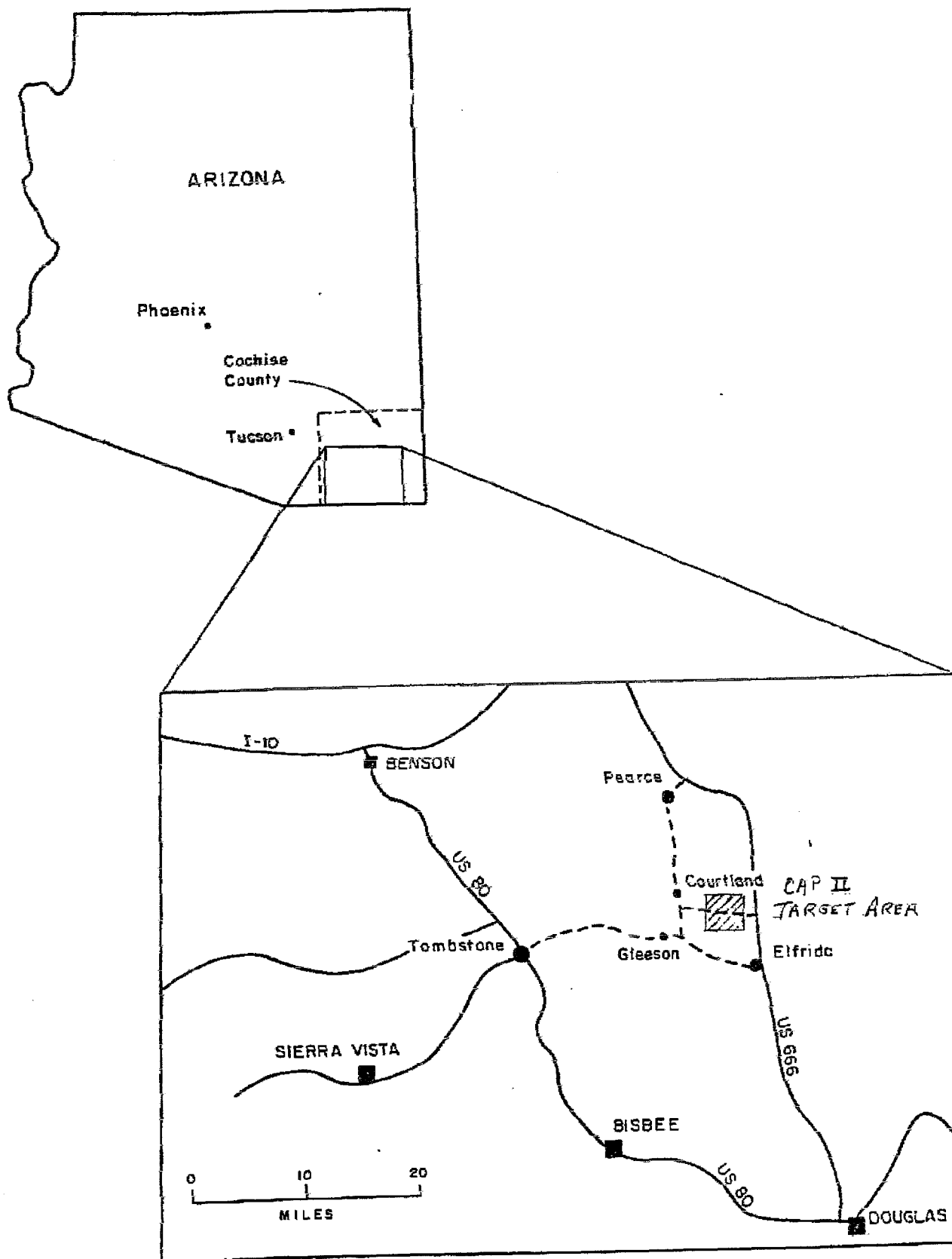
hypothetical porphyry deposit is the root zone of the Copper Belle porphyry slices in the Courtland area to the west, then the Courtland Thrust and related "reverse faults" would have to be an extensional detachment/listric fault system with transport direction toward the southwest, rather than toward the northeast (Fig. 2). This model is not unreasonable, given the gravity slide/detachment tectonics prevalent in other parts of southern Arizona. Furthermore, a detachment scenario would account for the rotated, near horizontal aspect of the Courtland mineralization slices (section B-B', Fig. 3), without appealing to Alpine-style overthrusts and overturned folds. It would also explain the anomalous "underthrusting" of successively lower thrust plates noted in published papers on the Courtland-Gleeson District. A progressively westward translation of shallower plates would be the predicted sense of displacement in an extensional terrain.

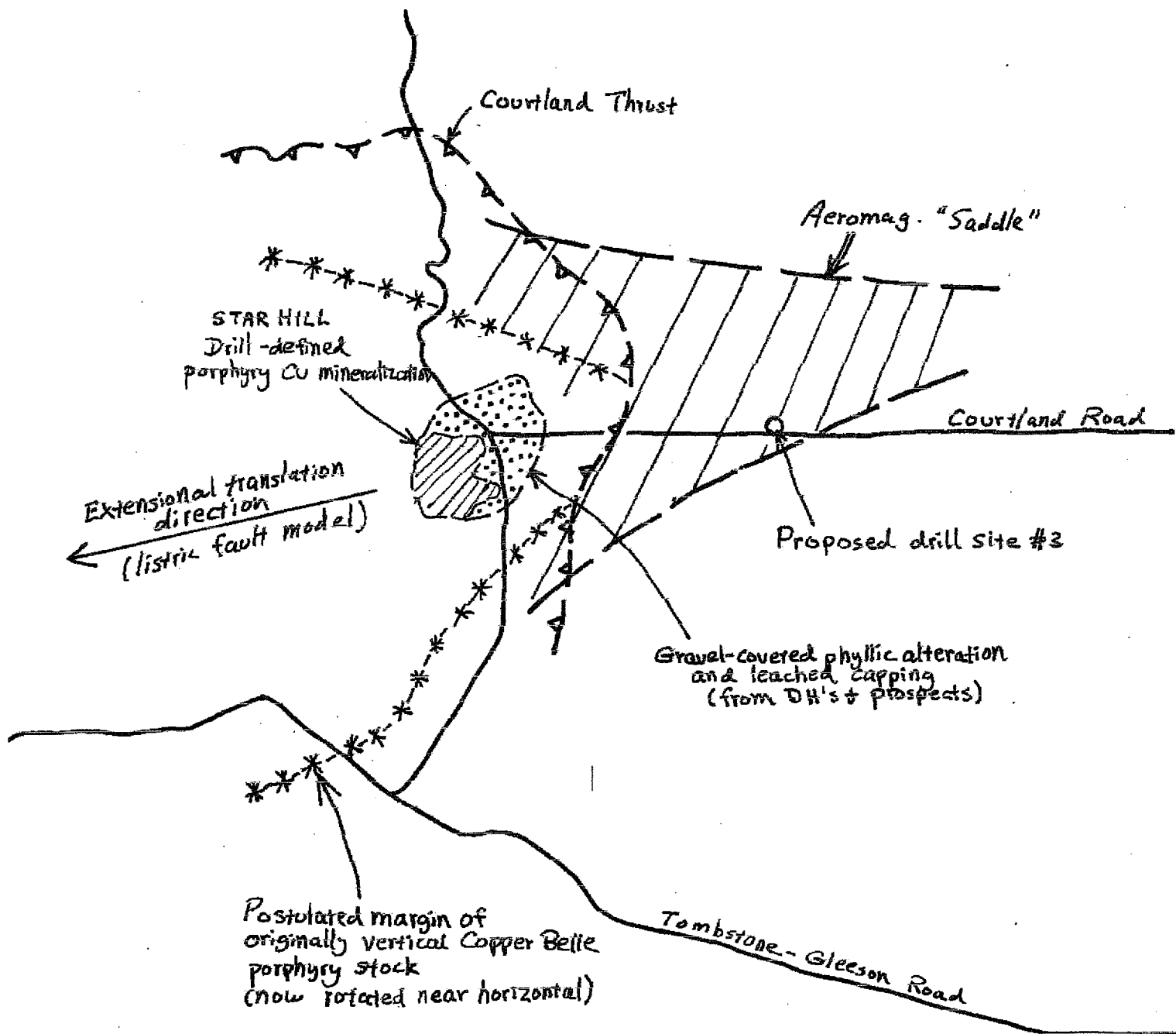
CONCLUSIONS AND RECOMMENDATIONS

Although CAP II drilling has so far failed to explain the enzyme leach anomalies in the Courtland pediment area, the drilling results cannot preclude a buried pre-Cretaceous porphyry source at a depth greater than the limits of the current drilling. In a district as structurally complex as Courtland, it would be premature to write off the entire 8-10 square mile target area on the basis of only two holes. Furthermore, reinterpretation of district geologic and geophysical data seems to indicate a vector toward the top of a possible dismembered and rotated buried porphyry deposit to the ENE of the Star Hill mineralized area (Figure 2). The alluvial depth of this target, which falls close to the center of the enzyme leach anomaly, may be considerably less than 1,000 feet. To date this part of the pediment has not been tested by any previous drill holes, and it is largely on CAP II - controlled ground.

On the basis of the observations presented above, it is recommended that at least one additional rotary hole be drilled north of the Courtland Road (Fig. 2, overlay), in order to test the suspected aeromagnetic "saddle" and its possible source - the truncated half of a porphyry system dislocated by low angle faulting. The location of the proposed third hole is near the south edge of Section 23, on one of three sites in that section awaiting drilling approval by the State of Arizona. The estimated total depth of the hole is 1,200 feet, assuming that bedrock is at approximately 800-900 feet, as indicated by gravity data and previous drilling results.

It is also recommended that additional enzyme leach samples be taken from the target area, in order to fill in gaps and provide better resolution of the anomalies. The additional samples are needed primarily in the northwest part of the area, between Mexican Hat Mountain and the NW corner of the CAP II State leases (Figure 2).





OVERLAY FOR FIGURE 2
DRILLING TARGET INTERPRETATION

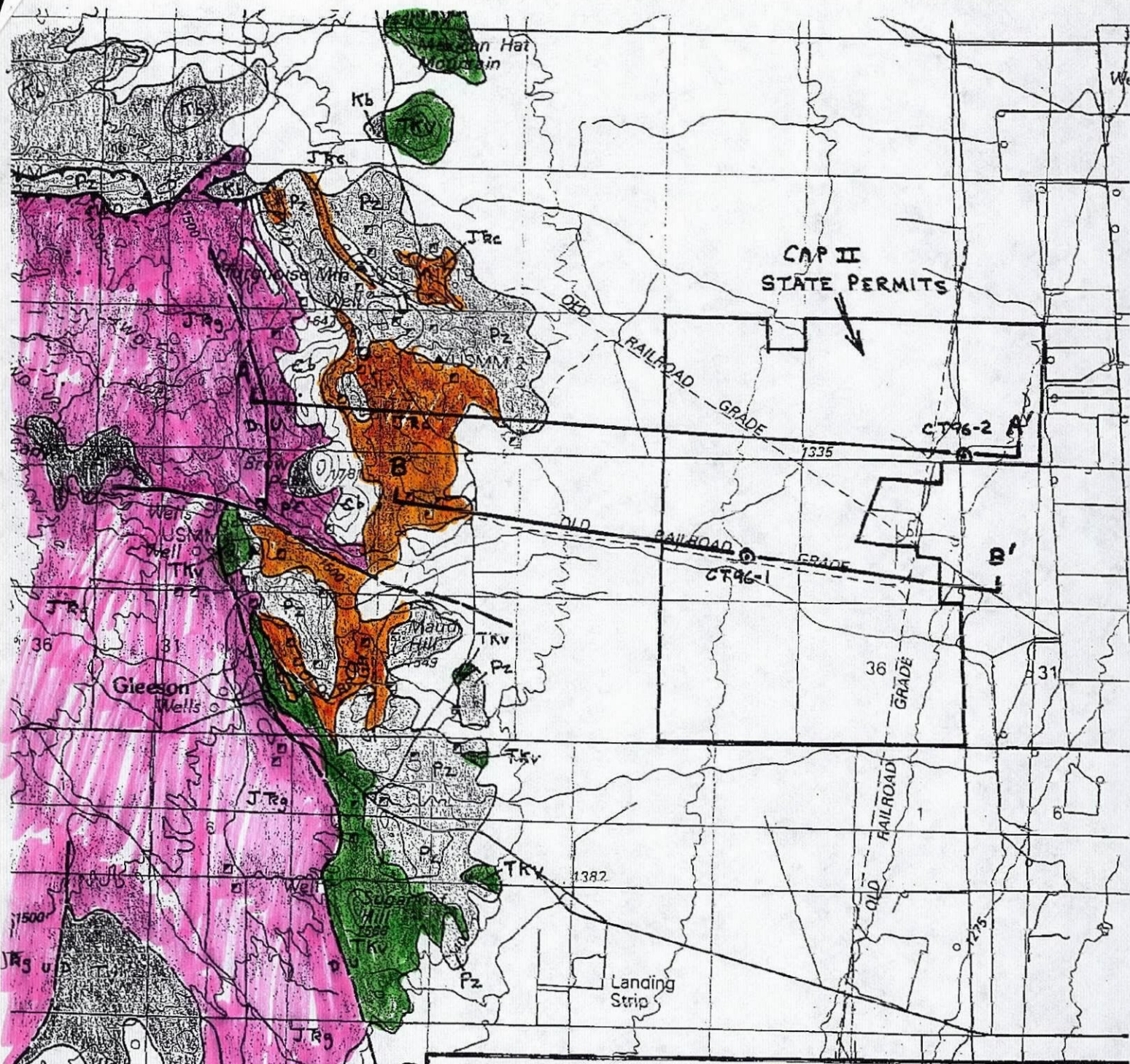


FIGURE 2
GENERALIZED GEOLOGIC MAP OF THE COURTLAND AREA
COCHISE CO., ARIZONA

LITHOLOGY

- Alluvium
- Tertiary volcanics
- Laramide volcanics
- Cretaceous Bisbee Group
- Copper Belle Monzonite Porphyry
- Gleason Quartz Monzonite
- Paleozoic Limestone
- Bolsa Quartzite
- Pinal Schist

STRUCTURE

- Thrust Fault
- Normal Fault
- CAP II Drill Hole

SCALE
1" = 1 Mi.

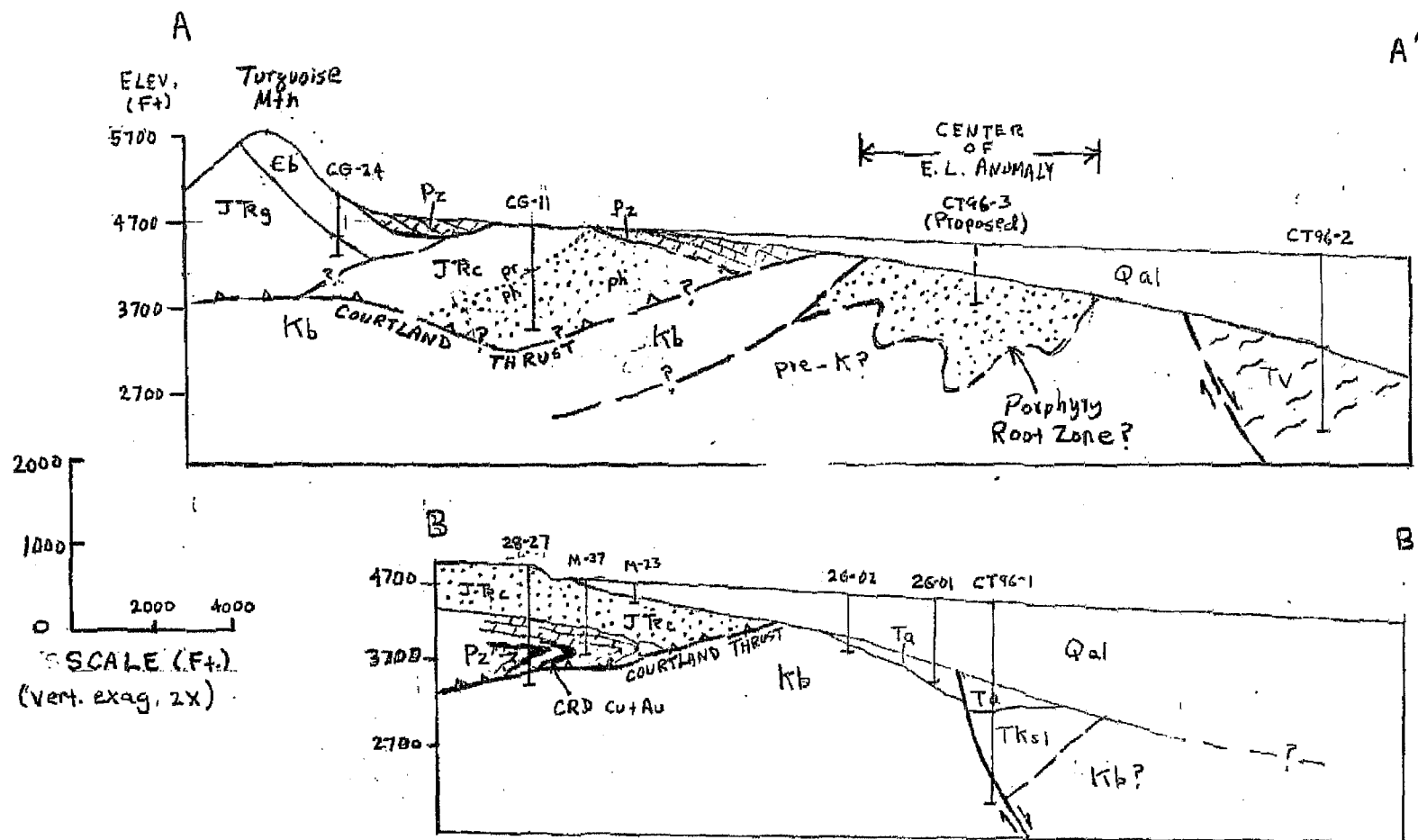


FIGURE 3
CROSS SECTIONS THROUGH CAP II DRILL HOLES, COURTLAND AREA

LITHOLOGY	
	Qal Alluvium
	Tv Tertiary volcanics, undifferentiated
	Ta Tertiary Andesite Flows
	TKsl Laramide Sugarloaf Peak Tuff
	Kb Cretaceous Bisbee Group Sediments
	JRe Copper Belle Monzonite Porphyry
	JTrg Gleeson Quartz Monzonite
	Pz Paleozoic Sediments (Cb = Bolsa Quartzite)

STRUCTURE/ALTERATION	
	Low Angle Fault (Thrust or Detachment)
	High Angle Normal Fault
Drill Hole	
CT:	CAP II
CG:	Bear Creek Mining Co.
M:	Minerals Expl. Co.
26-x:	Santa Fe Pacific
Alteration	
	pr = propylitic
	ph = phyllic

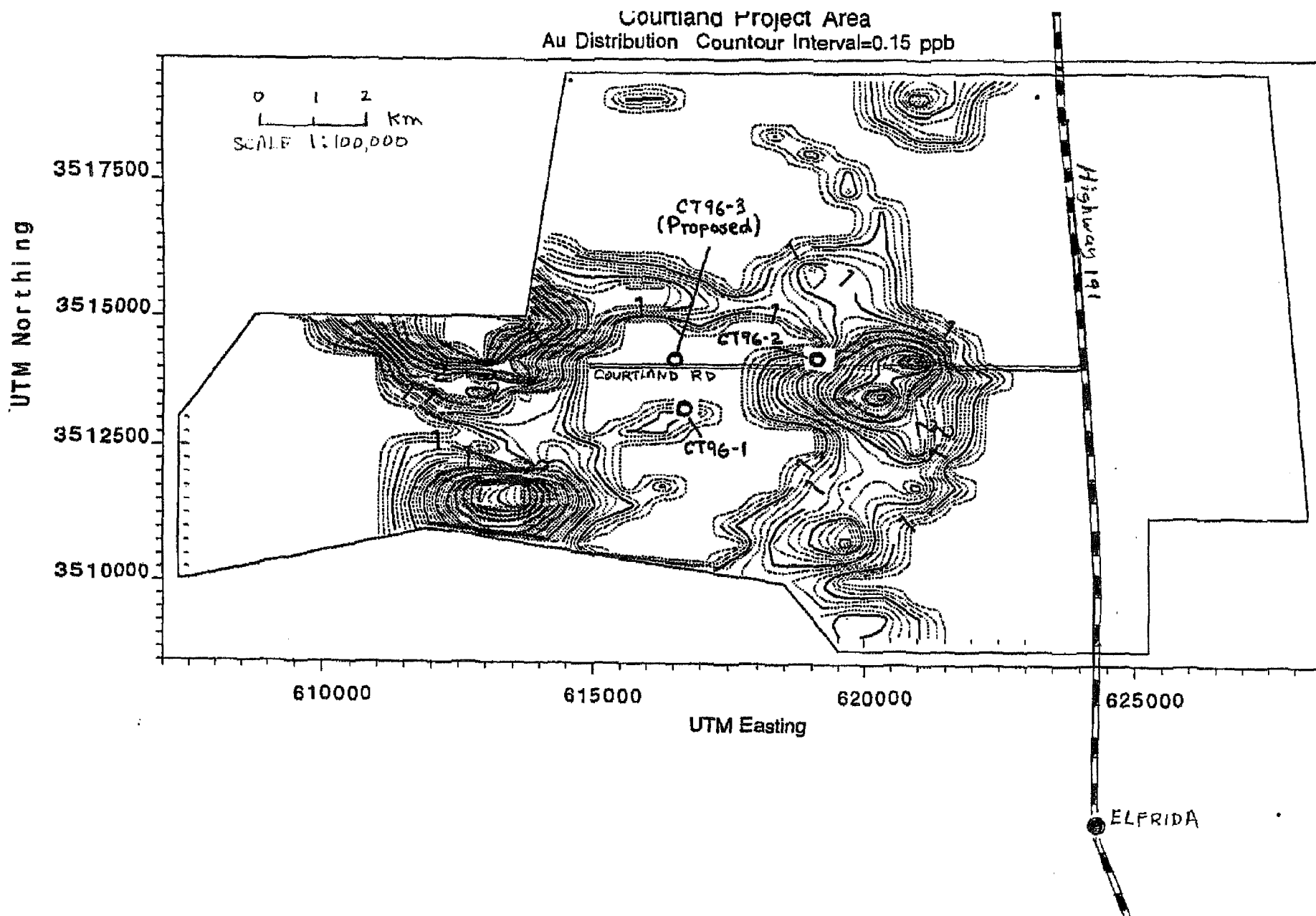


FIGURE 4
LOCATION OF CAP II DRILL HOLES RELATIVE TO ENZYME LEACH GOLD ANOMALY

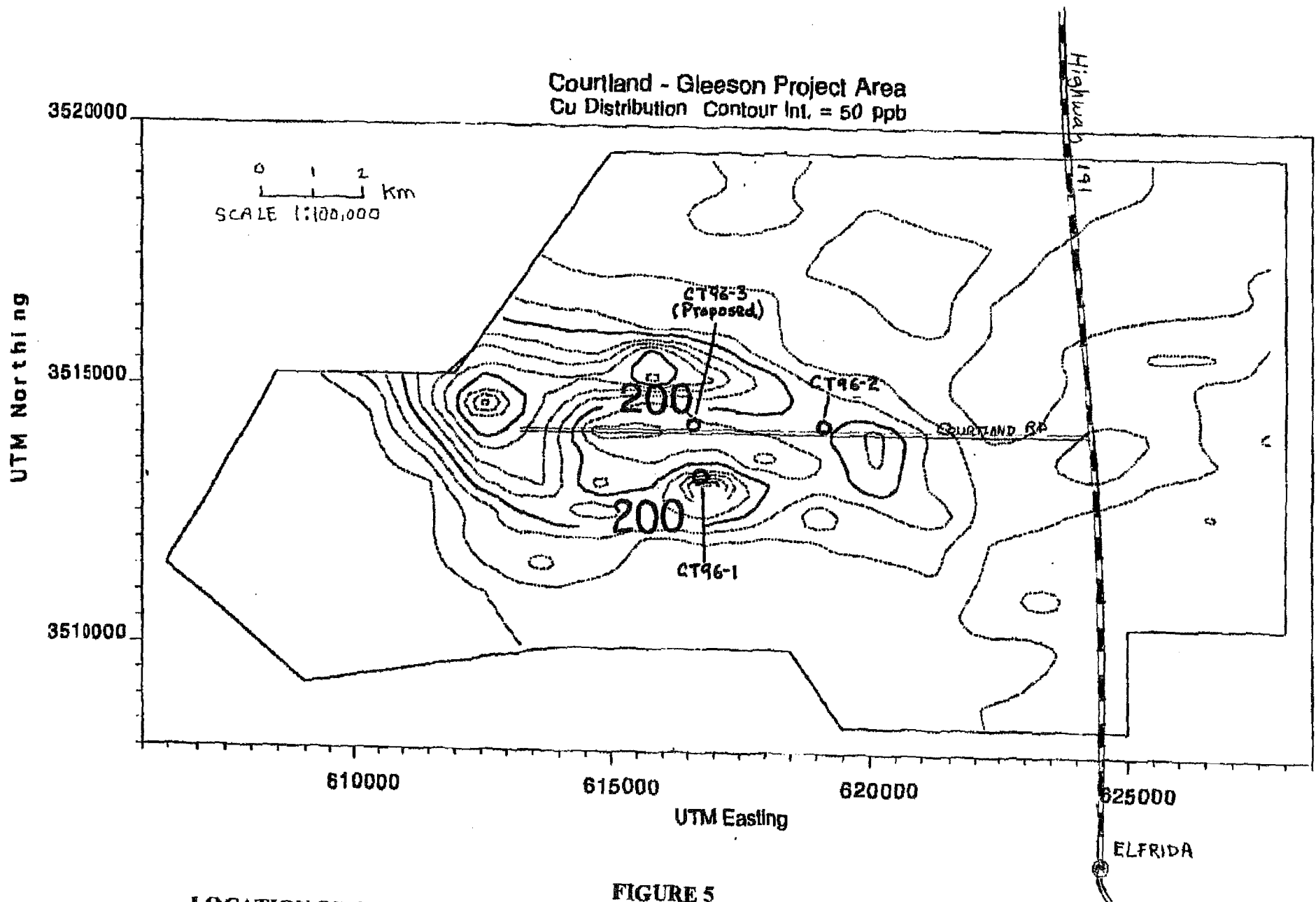
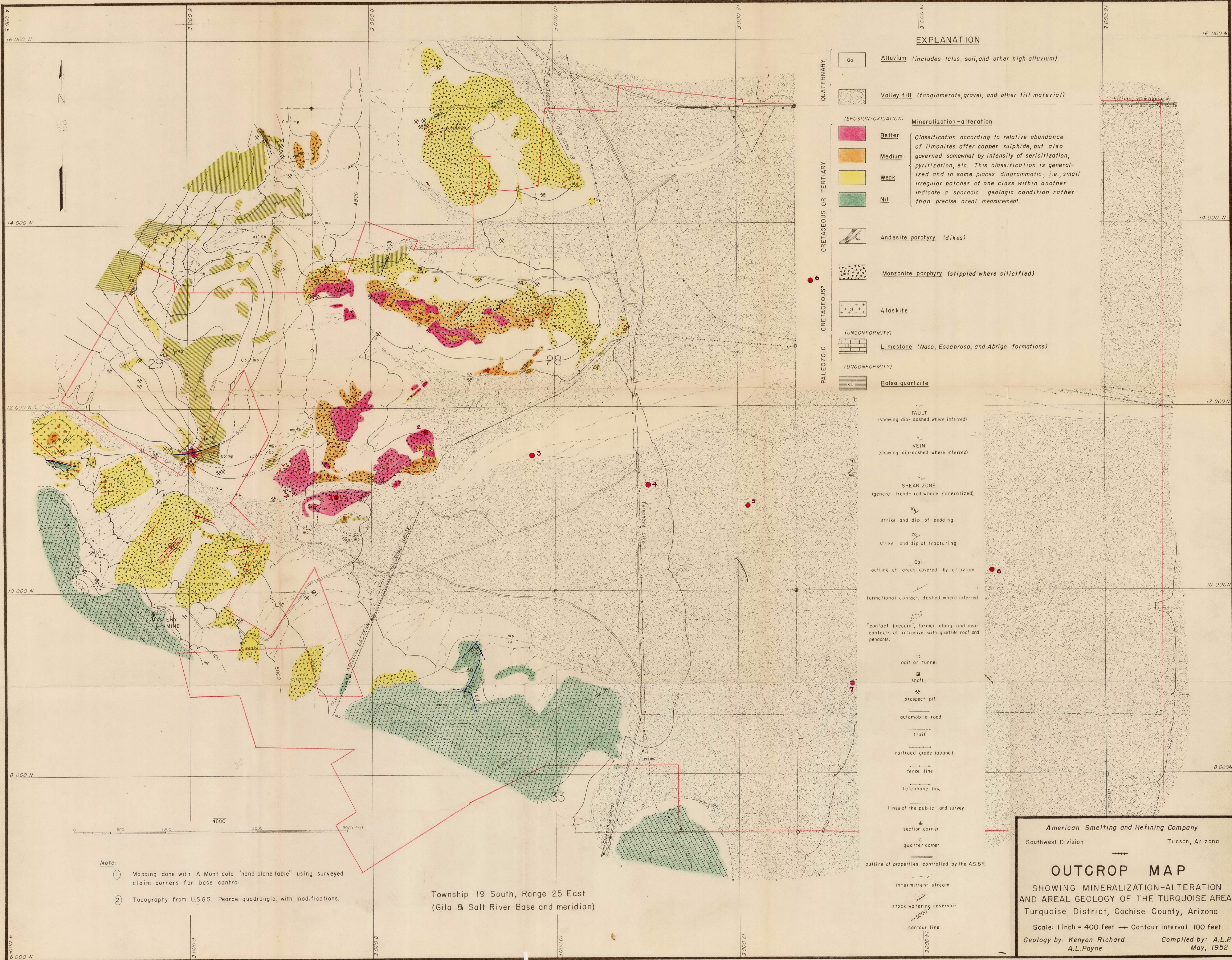


FIGURE 5
LOCATION OF CAP II DRILL HOLES RELATIVE TO ENZYME LEACH COPPER ANOMALY



00-3.2013.2A

J. H. C.

DEC 17 1969

W.E.S.

JAN 7 1969

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 16, 1969

W.E.S.

JAN

TO: J. H. Courtright

FROM: S. R. Davis

Bearcat Prospect
Turquoise District
Cochise County, Arizona

The Bearcat Prospect consists of three unpatented lode claims, Bearcat numbers 1 through 3. They are located 2.5 miles south of Gleeson, on and adjoining the High Lonesome Road. They were located by M. C. Thompson of Elfrida who submitted them to ASARCO for examination.

The property was visited November 26, at which time a surface examination and geologic sketch map of the claims and surrounding area was made (see attachment "A"). Six rock chip samples were taken and their locations plotted on the sketch map.

The area is one of gentle relief, the larger part of which is pediment and sub-outcrop of the Gleeson quartz monzonite. Two small hills and Outlaw Mountain to the southwest consist of late Tertiary andesite and rhyolite and overlay the quartz monzonite. The andesite contains abundant magnetite but appears otherwise unaltered and is most probably post-mineral. The rhyolite has a high content of quartz eyes and fragments but shows little if any alteration or mineralization and is also post-mineral.

Mineralization occurs in a NW trending 4" to 6" near vertical quartz vein in the quartz monzonite. Occasional flecks of free gold are visible on a fresh break but are very thin, closely resembling gold leaf. Very fine bladed crystals of wulfenite occur at random throughout the mineralized quartz vein and result in a slightly anomalous (38.8 PPM) molybdenum value. Several other NW and NE trending quartz veins occur in the area but none of those checked contained significant mineralization (see attachment "B").

J. H. Courtright
Page 2
December 16, 1969

Bearcat Prospect
Turquoise District
Cochise County, Arizona

Samples SG-1, 2 and 6 are 20' chip samples in the quartz monzonite, SG-3 and 4 are 20' chip samples in the quartz monzonite with included vein material, and SG-5 is the chip sample of the best mineralized quartz vein.

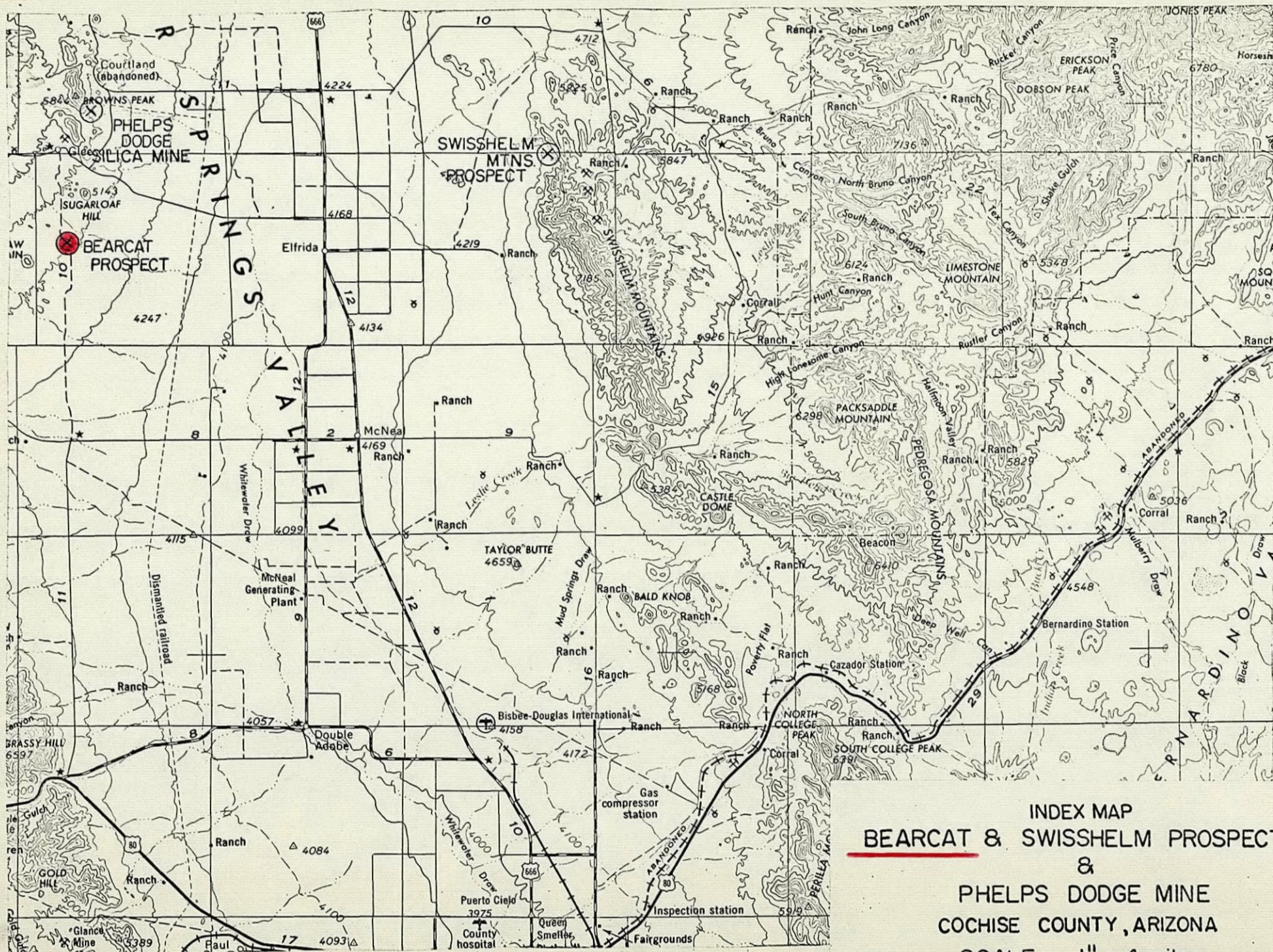
The quartz monzonite is relatively fresh within a few inches of the quartz veins, the only wall rock alteration being a slight silicification and an occasional pyrite cast. Even if the veins were all as well mineralized as in SG-5, the wide (10' - 40') spacing of the known veins would not be economic. Probability of downdip development of the vein system is conjectural. A very limited possibility exists that in the general area of the Bearcat claims an economic occurrence of limited size may exist in the form of closely spaced parallel veins or vein intersections under alluvial cover. This potential is not of a size or nature to interest ASARCO and is, therefore, of no further interest.

S. R. Davis

S. R. Davis

SRD/kvs

cc: WESaegart



ATTACHMENT A

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

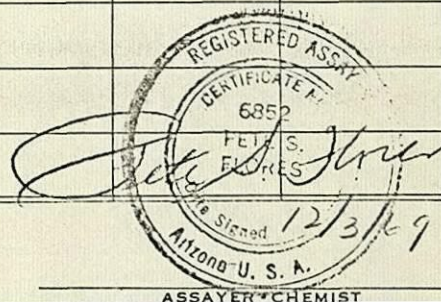
SAMPLE SUBMITTED BY American Smelting & Refining Company
Mr. S. R. Davis

DATE Dec. 3, 1969

[illegible]

Note: Au, Ag in oz per ton.

CHARGES \$ 76.50



ASSAYER & CHEMIST



AMERICAN SMELTING AND REFINING COMPANY
SOUTHWESTERN EXPLORATION DEPARTMENT
P.O. BOX 5795, TUCSON, ARIZONA 85703

J. H. COURTRIGHT
CHIEF GEOLOGIST
W. E. SAEGART
ASSISTANT CHIEF GEOLOGIST

December 11, 1969

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

Mr. M. C. Thompson
Route 1, Box 82-B
Elfrida, Arizona 85610

*Thompson Prospects
(Bearcat)
etc*

Dear Sir:

Enclosed herein you will find a xerox copy of the fire assays and geochemical trace analysis run on the samples collected on your gold properties. The gold and silver are by fire assay and reported in ounces per ton, and copper and molybdenum are by geochemical analysis and reported in Parts Per Million (1,000 PPM = 0.10%, 10,000 PPM = 1.0%).

Also enclosed are two geologic sketches showing the general area geology of both prospects and their respective sample locations. Samples SG-1 through SG-6 are from the South Gleeson-Bearcat prospect, SM-1 through SM-7 are from the Swisshelm Mountains prospect. Please disregard SF-1 as it was from another property and merely included with this sample lot.

Sample number SG-5 is of the best quartz vein material and contained visible free gold and a few of the very fine, bladed, yellow and green crystals that I tentatively identified as wulfenite, a lead molybdate. It appears as though they were wulfenite crystals as that sample ran 38.8 PPM molybdenum, the highest value. Sample SM-7 was the high grade - high iron dump sample which was taken for verification of the original discovery; it also contained visible free gold.

The results of the surrounding and adjacent samples tend to indicate that the mineralization ends abruptly and is not more widespread than what was originally found. I had expressed to you my fears that this might well be the case and the problems it would pose to any development of these prospects. I am sure you realize what your waste to ore ratio would be in the small excavation in the Swisshelms, and that even with a six-inch vein on the Bearcat claims a five-foot heading would result in a nine to one waste to ore ratio. This is far too much dilution for the vein to carry even if the grade were much higher.

Silver values are also slightly higher in the two high-grade samples; however, they are still less than 50¢ per ton and would not add significantly to the value of the rock.

Mr. M. C. Thompson
Page 2
December 11, 1969

Due to the limited width of both occurrences, ASARCO would not be inclined to further explore or sample either property. There is little if any chance that an ore occurrence of acceptable size would occur on your Swisshelm Mtns. lease; however, a chance of a larger mineral occurrence exists in the area of your Bearcat claims. The possibility of a parallel system of veins or a convergence of several veins would allow for a larger mineralized zone and less dilution.


I am sorry this is the way it turned out and wish you the best of luck in the future. I appreciate your considering ASARCO with your prospects and thank you for your time and efforts in showing me around. Please feel free to call on us with any promising prospects which you may encounter in the future.

Very truly yours,

Steven R. Davis

Steven R. Davis
Geologist

SRD/kvs
Enclosures

cc: JHCourtright 
WESaegart

MR. RFW
 READ AND RETURN ☒
 PREPARE ANSWERS ☐ HANDLE ☐
 FILE ☐ INITIALS ☐

AMERICAN SMELTING AND REFINING COMPANY
 Tucson Arizona

J. H. C.

December 15, 1969

DEC 17 1969

TO: J. H. Courtright

FROM: S. R. Davis

Phelps Dodge Silica Mine
 Turquoise District
Cochise County, Arizona

During the course of a prospect examination on November 26 near Gleeson, Arizona, a visit was made to the nearby Phelps Dodge Silica Mine. Information on the size and nature of operations may be of interest as the property lies within the area of the Turquoise Prospect drilled by ASARCO in 1952-53.

The property is controlled by Minerals Exploration Company of Tucson and is presently being operated by Jack Gilbert Construction Company of Elfrida, Arizona. Minerals Exploration Co. has done considerable drilling in the area and are planning a moderate program again this winter; however, little or no accessory mineralization exists in the silica being mined. A sample of the silica ore was submitted to American Analytical in Tucson for gold, silver, copper and molybdenum determinations and the results are included on attachment "A".

A sketch map (attachment "B") shows the approximate position of the open cut, mine layout, and probable bedrock geology. Geology out of the pit area was taken from the 1952 map and report on the Turquoise area by Kenyon Richard and A. L. Payne. Also shown are the locations of ASARCO drill holes 1 and 2.

Production is entirely from the Bolsa quartzite and is at the rate of 600 to 700 tons per day. Haulage is performed by six 25 ton truck and trailer rigs which make the 72 mile round trip to the Douglas Smelter four times daily. During periods of peak smelter demand, the trucks may be required to make a fifth daily trip.

The principal problems encountered in the operation are due to the steep topography on the west pit wall and an increasing alumina content with depth (approaching the base of oxidation). An attempt was made to sell the crushed fines as road aggregate, but was given up due to washing and screening problems brought on by the high clay content.

S. R. Davis
 S. R. Davis

SRD/kvs
 Attachments
 cc: WESaegart

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

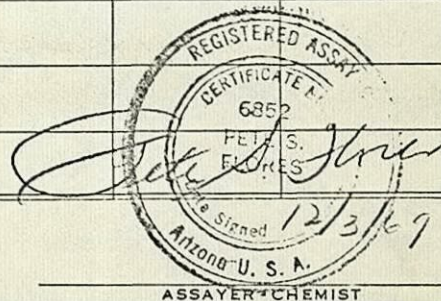
SAMPLE SUBMITTED BY American Smelting & Refining Company
Mr. S. R. Davis

DATE Dec. 3, 1969

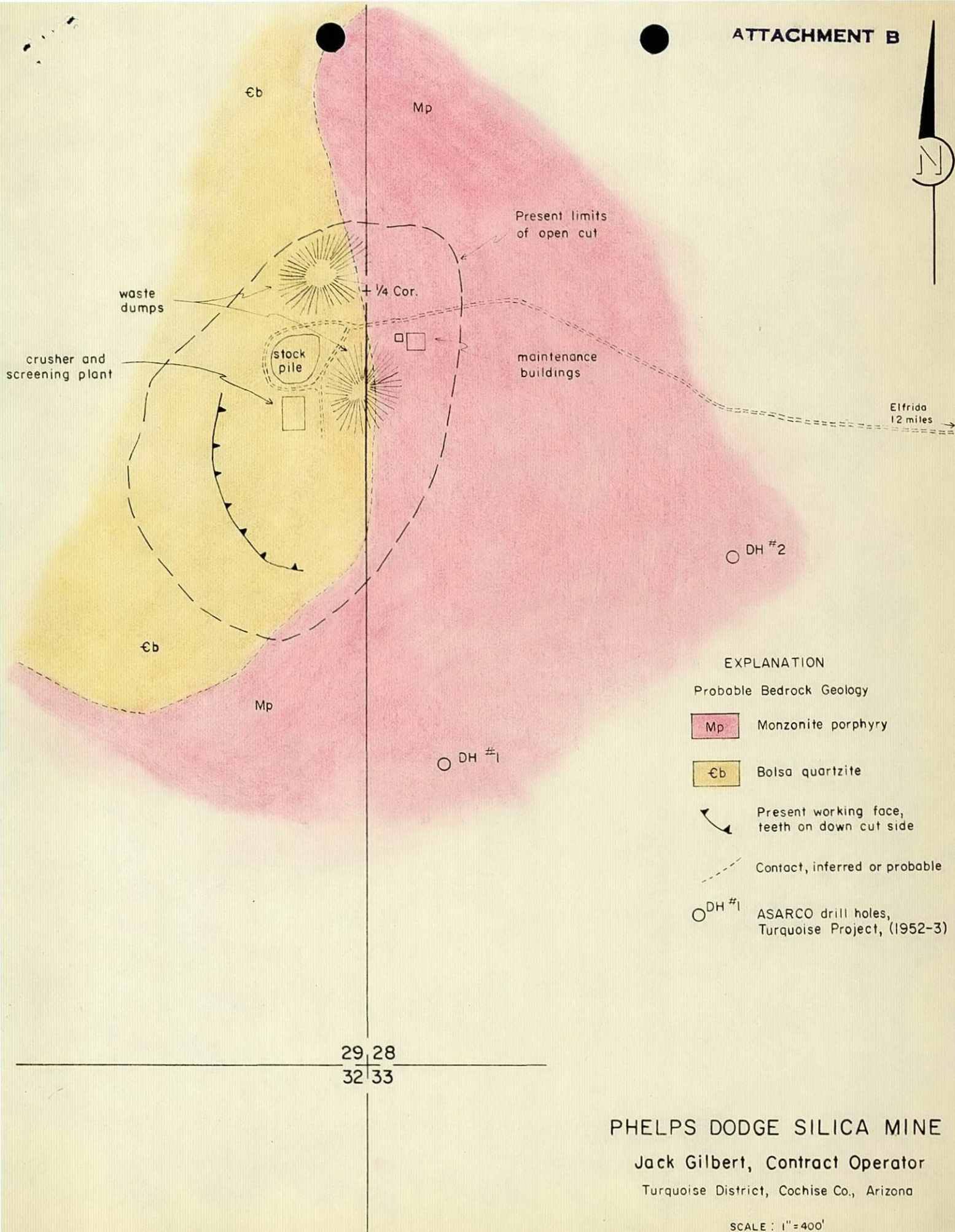
[illegible]

Note: Au, Ag in oz per ton.

CHARGES \$ 76.50



ASSAYER & CHEMIST



PHELPS DODGE SILICA MINE

Jack Gilbert, Contract Operator

Turquoise District, Cochise Co., Arizona

Dec. 9, 1969

SCALE: 1" = 400'

CJE

SRD

2222

February 26, 1964

Mr. E. Grover Heinrichs
Heinrichs Geoexploration Company
806 West Grant Road
Tucson, Arizona 85703

Dear Grover:

This will acknowledge with thanks the logs and maps of your drilling in the Turquoise area.

This will also acknowledge your letter of February 18 stating that you would also like to have our detailed geologic and assay logs. These are enclosed herewith.

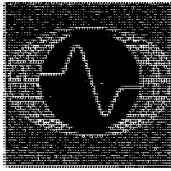
Yours very truly,

J. H. COURTRIGHT

JHC/jk
Enclosures

RECEIVED
FEB 20 1964

J. H. C.
FEB 24 1964



HEINRICH'S GEOEXPLORATION COMPANY

806 WEST GRANT ROAD, TUCSON, ARIZONA, 85703. P.O. BOX 5671. PHONE: (AREA CODE 602) 623-0578

February 18, 1964

Mr. J. H. Courtright
American Smelting and Refining Company
Southwestern Exploration Department
813 Valley National Bldg.,
Tucson, Arizona.

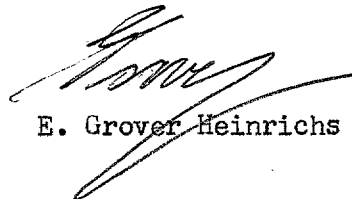
Dear Harold:

Thank you for the sections and plan map of the Turquoise drilling, Courtland Gleeson area. I think I will take you up on the detailed logs, as you know they could help in any future work we might get involved in.

So I would appreciate it very much if you will send the logs.

May I remind you again that we have much data available on the area of the Minerals Exploration Company's property that is now essentially open file. If you care for copies, please let me know.

Sincerely,



E. Grover Heinrichs

EGH/cp

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 23, 1953

Mr. W. R. Landwehr, Chief Geologist
Western Mining Department
Salt Lake City Office

TURQUOISE DISTRICT
Gochise County, Ariz.

Dear Sir:

In reply to your letter of June 16th, I have checked with Mr. Courtright and he informs me that representative analyses including sulphur and iron have already been made. He says the pyrite content is 7 or 8 per cent.

Also, spectrographic analyses have been made.

This information will be included in our operating and summarizing reports. Mr. Mieritz was in the process of accumulating and compiling drill logs, costs, and a distribution of the operations, when he suddenly resigned. We are now taking up the loose ends on this job when time from other work permits but it will probably be several weeks before it is completed.

Yours very truly,

Original Signed By
K. Richard

KENYON RICHARD

KR:ar

cc: JHCourtright✓

A I R M A I L

MINING DEPARTMENT

San Francisco, California

April 24, 1953

AIR MAIL

Mr. J. H. Courtright
American Smelting and Refining Co.
813 Valley National Bldg.
Tucson, Arizona

ARIZONA, COCHISE COUNTY
TURQUOISE DISTRICT
TURQUOISE PROJECT

Dear Sir:

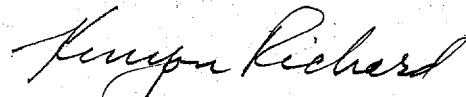
In regard to preparing final data on the Turquoise Project, I had in mind that Dick Meiritz should compile the cost data and write a letter similar to the one Tony Payne wrote to F. V. Richard December 29, 1951 under the heading "Summary of Costs-Sunnyside Project". I would suggest that you bring Payne's letter to Mr. Snedden's attention and see if he agrees that Payne's method of summarizing the Sunnyside costs could be applied with very little change, if any, to the Turquoise project.

Payne also wrote a rather extensive file memorandum dated December 27, 1951 on "Drilling Records and Calculations of the Sunnyside Project". This memorandum contains a considerable amount of geological data and an analysis of drilling results. This sort of thing is not necessary for the Turquoise project but Meiritz should (1) draft composite logs for all the holes, (2) make up new copies of the outcrop map of our (Payne & Richard) Turquoise report of August 11, 1952 showing the positions of holes actually drilled, (3) make up appropriate sections (probably his monthly report sections would be adequate) and (4) write a letter summarizing drill performance, sampling methods, etc.

Meiritz can do this work when he is not occupied otherwise upon fluorspar investigations.

When Meiritz' Turquoise data is assembled, I will write an "obituary" review of the Turquoise project. This will be shorter than the Sunnyside review because the problems involved are much simpler than those of Sunnyside.

Very truly yours,


, Kenyon Richard

KR:mb
cc:WRLandwehr
FVRichard
TASnedden
LKWilson
REMeiritz

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

April 23, 1953

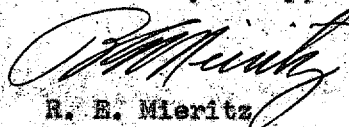
Mr. T. A. Snedden, Manager
Southwestern Division
American Smelting and Refining Co.
Tucson, Arizona

Dear Sir:

The attached is a list of the churn drill sampling equipment and supplies which were sent to the Silver Bell Unit on April 21, 1953. This equipment was used at the Turquoise Project during the past three months.

The above referred to equipment may in the near future be required for other exploration projects out of the Tucson office and it is therefore suggested the equipment be held in abeyance until called for.

Yours very truly,



R. E. Mieritz

cc: D. Purvis
JHCourtright ✓

April 23, 1953

The following items were sent to the Silver Bell Unit on April 21, 1953.

- 39 - Small sample pans (concentrate pans)
- 30 - 1 pint waxed containers
- 1 - piece of green rolling cloth, plastic
- 1 - Miners gold pan
- 1 - bundle of 100 sample sacks, canvas
- 2 - 25 foot sections of 3/4 " black rubber water hose
- 1 - Jones type single tier dry splitter
- 4 - galvanized pans for Jones splitter
- 1 - 7 foot steel bar.
- 1 - axe, double edge
- 1 - axe, single edge
- 2 - long handle shovels, one with broken handle
- 1 - hatchet, roofing
- 1 - 4 lb. single jack
- 1 - 25 lb. kitchen scale
- 1 - 8" square
- 1 - 6 " wire brush
- 1 - 4 tier Jones type wet splitter
- 1 - Steel dump box, 12" wide
- 1 - galvanized launder, 12 " wide
- 1 - Wooden dump box stand
- 1 - 4' x 8' steel plate, 3/8" thick, with 2" pipe as legs.
- 9 - round galvanized wash tubs
- 2 - square galvanized wash tubs
- 4 - pcs. galvanized pipe, 3/4" x 20 ft.
- 1 - pc. " " " 3/4" x 10 ft.
- 1 - pc. " " " 3/4" x 12 ft.
- 1 - pc. " " " 1" x 14 ft.
- 64 - pcs. Iron fence posts.
- 3 - 12' wooden cattle gates
- plus or minus 3000 feet barbed wire

MINING DEPARTMENT

San Francisco, Calif.
April 14, 1953

FILE MEMORANDUM:

ARIZONA, COCHISE COUNTY
TURQUOISE DISTRICT
TURQUOISE PROJECT

During telephone conversations on April 13 with Messrs. Landwehr and Courtright, it was decided drilling at Turquoise should be stopped upon completion of the present hole, No. 8, at a depth of 650 or 700 feet. This assumes, of course, that there is no significant change in the character of material before the final depth is reached. On April 12 the hole was at a depth of 440'; bedrock had been encountered at about 300' and consisted of unmineralized Cretaceous volcanics similar to the formation cut in Hole No. 7B.

The principal reasons for this decision are as follows:

- 1) Holes Nos. 6, 7B, and 8 have effectively demonstrated that a zone of alteration-mineralization of important size does not extend NE, E or SE from the main zone prospected by the first 5 holes.
- 2) The low copper assays of the first five holes indicate there is little hope for the occurrence of small ore bodies either between these wide-spaced holes or to the N or S of them.

The question of property retention has not yet been discussed. This will be taken care of before the next option payments are due on July 3, 1953.

A report summarizing the objectives, methods, results, and costs of this exploration project will be prepared when these data have all been collected.

Original Signed by
KENYON RICHARD

Kenyon Richard

KR:mb

cc: WRLandwehr
TASnedden
LKWilson
JHCourtright



AMERICAN SMELTING AND REFINING COMPANY
San Francisco California

March 30, 1953

Mr. W. R. Landwehr, Chief Geologist
American Smelting and Refining Company
Western Mining Department
600 Pacific National Life Bldg.
Salt Lake City 1, Utah

TURQUOISE PROJECT

Dear Sir:

As suggested in our telephone conversation this morning, following are approximate coordinates of Turquoise drill holes.

<u>Hole No.</u>	<u>N</u>	<u>E</u>	<u>Remarks</u>
6	13,420	12,750	Finished
7	9,050	13,270	Drilling
8	10,170	14,770	Proposed

Mr. Courtright and I think that Hole No. 8 probably should be drilled regardless of the results of Hole No. 7, principally because the first five holes have shown an undiminished continuity of strong alteration in an easterly direction. The unexpected penetration of sedimentary rocks in Hole No. 6 does not necessarily affect the continuation farther eastward of this main alteration zone. If weak alteration is encountered in Hole No. 7, the door would still be open to the east.

After the results of Hole No. 7 are at hand and Hole No. 8 is nearing completion, the program can be evaluated and a decision made as to whether or not additional drilling is warranted. Probably at that time our recommendation will be that the project be abandoned. Also, I think that at that time there should be a substantial unexpended balance in the appropriation.

Very truly yours,

KR:mb
cc:JHCourtright
TASnedden

Kenyon Richard

February 28, 1953

MEMORANDUM TO: Mr. D. J. Pope

ARIZONA, COCHISE CO.
TURQUOISE DISTRICT
GEOPHYSICAL SURVEY

Messrs. Richard and Courtright have asked that Mr. Lacy make a magnetometer survey of the Turquoise deposit in order to determine whether or not altered monzonite can be distinguished from the unaltered, and whether the monzonite mass as a whole can be delimited. The object of the survey is to obtain information that would be applied on similar deposits, such as that in the Organ Mountains.

The cost is estimated at \$1,000. In my opinion, the matter need not be taken up with New York, for in our cost estimate there is an item of \$10,000 for contingencies.

Turquoise seems to be an ideal deposit upon which to carry on such research work, for we have determined that it is a disseminated deposit with characteristic alteration, and much of it is covered by alluvium similar to the areas in which we hope to find other such deposits. I, therefore, recommend that permission be given to make the survey.

ORIGINAL SIGNED BY
W. R. LANDWEHR

W. R. LANDWEHR

WRL:sl

cc:R. J. Lacy

K. E. Richard

J. H. Courtright ✓

February 19, 1953

Mr. W. R. Landwehr, Chief Geologist
Western Mining Department
B u i l d i n g

Dear Sir:

On February 13 this year Mr. L. M. Wilson submitted to you a cost estimate for a proposed geophysical survey in the Turquoise district, Cochise County, Arizona. Enclosed is an overlay (for map No. 1038 by Richard and Payne) which shows the proposed traverse locations of subject survey.

Copies of map No. 1038 with traverse locations marked thereon are being sent to the men listed below.

Attached is a revision to Wilson's cost estimate. It gives corrected figures for parts I and IV of the appendix.

Yours very truly,

C. K. Moss

CKM:si
cc:KERichard, w/attach.
JHCourtright
LAHewitt

W. R. L.
FEB 20 1953

WESTERN MINING DEPARTMENT
Salt Lake City, Utah

February 14, 1953

Mr. K. E. Richard
American Smelting and Refining Company
405 Montgomery Street
San Francisco 4, California

ARIZONA, COCHISE CO.
TURQUOISE DISTRICT
GEOPHYSICAL SURVEY

Dear Sir:

There is attached hereto a copy of Mr. L. M. Wilson's letter to me of February 13, giving a preliminary estimate of the cost of electrical resistivity and magnetic surveys at Turquoise, which he prepared at my request.

As I discussed with you over the telephone, the unexpected depth of overburden of Hole No. 3 may make advisable such a survey, and the cost estimate was made in anticipation of that necessity. We concluded that a final decision would await the results of Hole No. 3, but we can at least be thinking about the matter so there will be no delay if we decide to undertake it.

Very truly yours,

ORIGINAL SIGNED BY
W. R. LANDWEHR

W. R. Landwehr

WRL:sl
cc:TASnedden, w/enc.
JHCourtright ✓"

February 13, 1953

Mr. W. B. Landwehr, Chief Geologist
Western Mining Department
Building

ARIZONA, COCHISE COUNTY
TURQUOISE DISTRICT
GEOPHYSICAL SURVEY
COST ESTIMATE

Dear Sir:

A geophysical survey in the Turquoise area would involve the use of magnetic and electrical resistivity surveys. The magnetic survey would be used, primarily, to determine the monzonite-sedimentary contacts under alluvium and, secondarily, to determine whether or not altered monzonite zones can be located under alluvium and fill. The electrical resistivity study would be used to determine depths to bedrock.

The cost of a preliminary magnetic survey is estimated at \$180.00 for 25,000 feet of profile line, and this would require one week.

A first preliminary electrical survey would cost about \$855.00 for 9,800 feet of profile line requiring two weeks. Should the preliminary work indicate that the method is applicable at Turquoise, then additional work, giving more complete coverage, would be undertaken. This additional work would cover the area in which drilling is planned. 38,000 feet of line would be covered in this latter stage, costing about \$2,300.00 and taking an additional four or five weeks.

To summarize, the magnetic survey would cost about \$180.00 and would take one week. The complete preliminary electrical survey would cost approximately \$3,155.00 and would take six weeks. Except for the first few days of a given survey, which would be used for testing purposes, the choice of area would be dependent upon the drilling requirements. The survey can be broken off at any stage should the preceding survey results appear unfavorable.

An appendix is attached outlining cost estimates.

Very truly yours,

L. M. Wilson

LMW:sl

cc: T.A. Snedden, w/attach.

K.E. Richard "

J.H. Courtright "✓

R.J. Lacy "

L.A. Hewitt "

APPENDIXI COST SUMMARY

Magnetic survey	\$178
Electrical survey, 1st preliminary	855
Electrical survey, additional survey	<u>2,279</u>
TOTAL	\$3,302

Additional surveys:

Magnetic	\$0.70 per station
Electrical	7.60 per station

II PRELIMINARY MAGNETIC SURVEY COSTS

Proposed profile lines:	25,100 feet
Proposed station spacing:	100 feet
Proposed stations:	251
Survey rate (with occasional jeep transportation back to base check stations) flat, open country: 75 stations/day	
Survey time (including office work): 6 days	
Salary of one geophysicist:	\$80.00
Living expenses:	30.00
Jeep transportation, instrument repairs, calibration and misc.	50.00
Surveying @ \$0.70 per station	<u>18.00</u>
TOTAL	\$178.00

III PRELIMINARY ELECTRICAL SURVEY COSTS

Proposed profile lines:	9,800 feet
Proposed station spacing:*	100 feet
Proposed stations	98
Proposed "set-ups" (includes special)	200
Survey rate:	12.5 sta./day
Survey time (includes time used for calculations, etc.)	14 days
Salary of one geophysicist	\$200
Salary of 4 laborers @ \$1.50 per man-hour, or \$12.00 per man-day	530.00
Living expenses of geophysicist	60.00
Transportation	10.00
Survey costs @ \$0.70 per sta. (some stations previously surveyed for magnetic survey)	<u>55.00</u>
TOTAL	\$855.00

* Variable, perhaps much greater spacing, and thus fewer stations.

APPENDIX - continued

IV ADDITIONAL ELECTRICAL SURVEY COSTS

Proposed profile lines:	38,000 feet
Proposed station spacing:	100 feet
Proposed stations:	380
Proposed "set-ups" (includes special):	775
Survey rate:	12.5 sta./day
Survey time (includes time used for calculations, etc.):	3 weeks
Salary, one geophysicist	\$500
Salary, 4 laborers (@ \$1.50 per man-hour, or \$12.00 per man-day)	1488
Transportation	32
Survey costs @ \$0.70 per station	<u>259</u>
TOTAL	\$2,279

TURQUOISE GEOPHYSICS

REVISED APPENDIX TO COST ESTIMATE OF FEBRUARY 13, 1953

I Cost Summary

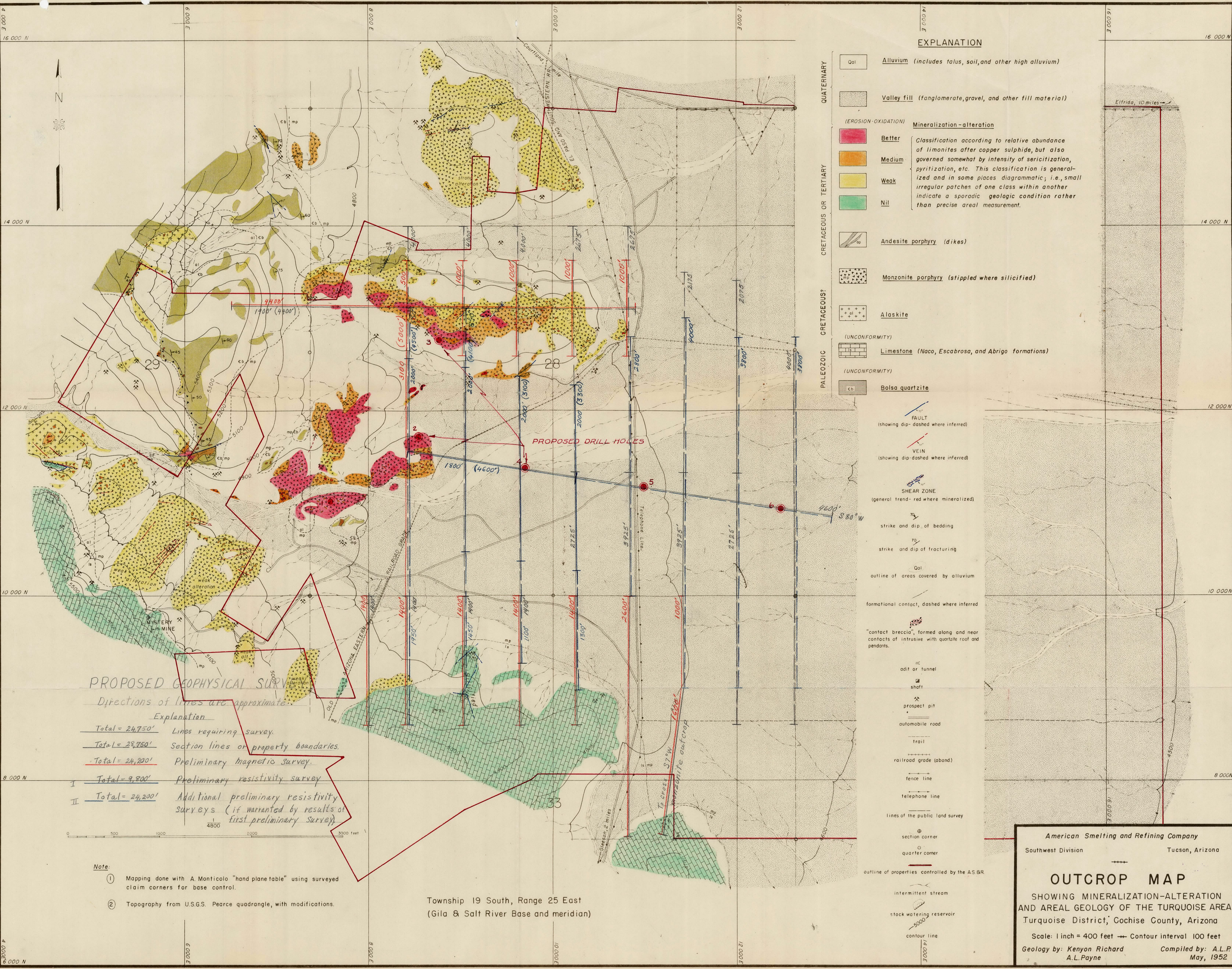
Magnetic survey	\$ 178
Electrical survey, 1st preliminary	855
Electrical survey, additional survey	<u>1555</u> (revised)
	\$2588

Additional surveys:

Magnetic	\$0.70 per station
Electrical	7.60 per station

IV Additional Electrical Survey Costs

Proposed profile lines:	24200 feet
Proposed station spacing:	100 feet
Proposed stations:	242
Proposed "set-ups" (includes special)	500
Survey time (includes time used for calculations, etc.):	4 weeks
Salary, one geophysicist	\$400
Salary, 4 laborers (@ \$1.50 per man-hour or \$12.00 per man-day):	\$960
Transportation	25
Survey costs @ \$0.70 per station	<u>170</u>
TOTAL	\$1555



PROPOSED GEOPHYSICAL SURVEY

Directions of lines are approximate.

Explanation

- | | |
|-----------------|---------------------------------------------------------------------------------------------------|
| Total = 24,750' | Lines requiring survey. |
| Total = 28,750' | Section lines or property boundaries. |
| Total = 24,200' | Preliminary magnetic survey. |
| Total = 9,800' | Preliminary resistivity survey. |
| Total = 24,200' | Additional preliminary resistivity surveys (if warranted by results of first preliminary survey). |

Note:

- Mapping done with A. Monticcolo "hand plane table" using surveyed claim corners for base control.
- Topography from U.S.G.S. Pearce quadrangle, with modifications.

Township 19 South, Range 25 East
(Gila & Salt River Base and meridian)

EXPLANATION

- | | | |
|------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QUATERNARY | Qal | Alluvium (includes talus, soil, and other high alluvium) |
| | | Valley fill (fanglomerate, gravel, and other fill material) |
| | (EROSION-OXIDATION) | Mineralization- alteration |
| | Better | Classification according to relative abundance of limonites after copper sulphide, but also governed somewhat by intensity of sericitization, pyritization, etc. This classification is generalized and in some places diagrammatic; i.e., small irregular patches of one class within another indicate a sporadic geologic condition rather than precise areal measurement. |
| | Medium | |
| | Weak | |
| | Nil | |
| CRETACEOUS OR TERTIARY | ap | Andesite porphyry (dikes) |
| | | Monzonite porphyry (stippled where silicified) |
| CRETACEOUS? | Al | Alaskite |
| | (UNCONFORMITY) | Limestone (Naco, Escabrosa, and Abrigo formations) |
| PALEOZOIC | (UNCONFORMITY) | Bolsa quartzite |
| | | FAULT (showing dip-dashed where inferred) |
| | | VEIN (showing dip-dashed where inferred) |
| | | SHEAR ZONE (general trend- red where mineralized) |
| | | strike and dip of bedding |
| | | strike and dip of fracturing |
| | | Qal |
| | | outline of areas covered by alluvium |
| | | formational contact, dashed where inferred |
| | | "contact breccia", formed along and near contacts of intrusive with quartzite roof and pendants. |
| | | adit or tunnel |
| | | shaft |
| | | prospector pit |
| | | automobile road |
| | | trail |
| | | railroad grade (aband) |
| | | fence line |
| | | telephone line |
| | | lines of the public land survey |
| | | section corner |
| | | quarter corner |
| | | outline of properties controlled by the AS & R |
| | | intermittent stream |
| | | stock watering reservoir |
| | | contour line |

American Smelting and Refining Company

Southwest Division

Tucson, Arizona

OUTCROP MAP

SHOWING MINERALIZATION-ALTERATION
AND AREAL GEOLOGY OF THE TURQUOISE AREA
Turquoise District, Cochise County, Arizona

Scale: 1 inch = 400 feet — Contour interval 100 feet

Geology by: Kenyon Richard
A.L. Payne

Compiled by: A.L.P.
May, 1952

VOID ORAL ORDERS

Oral Orders are often forgotten or misunderstood. Use this blank for all important instructions or requests.

To Mdgedget

CALL MATTENY AND ASK HIM WHAT MONTHLY RENTAL RATE SHOULD
BE ON A 160 cu-ft./min. Chicago Pneumatic Compressor and
on a Jackhammer.

Gas	290 / 40	
Diesel	340 / 40	
J.H.	1-69 LB	38.00
	70-90 "	42.25

uf

Monthly Rental Rate

Date _____

Signed _____

At Elfrida, Arizona
February 5, 1953

Mr. T.A. Snedden, Manager
Southwestern Division
American Smelting and Refining Co.,
813 Valley National Building
Tucson, Arizona

TURQUOISE PROJECT
Monthly Progress Report
January-1953

Dear Sir:

Herewith is a brief summary of the progress made at the Turquoise Project during the above noted period. Plan and Section of holes drilled are attached.

SUMMARY:

A Bucyrus-Erie 24-L churn drill was moved to drill location No. 1 on January 7th. Actual drilling started on January 7th on a one-shift basis, and drilling on a three-shift, six days a week basis was started on January 13th. Drill holes No. 1 and 2 were completed during the month for a total advance of 840 feet.

CHURN DRILLING

Insert (1)

Drill No.	Hole No.	Coordinates*	Elev.*	Feet Drilled	Depth of Hole	Remarks
1	1	11034.7 N 7614.6 E	4841.7	420	420	Complete
1	2	11729.9 N 8598.8 E	4786.2	420	420	Complete
Total				840		

Previous footage 0.0 feet
Advance for period 840.0 feet
Total footage to date 840.0 feet

*Coordinates and elevations are ~~results~~ from
~~of~~ stadia surveys.

DISTRIBUTION OF TIME IN SHIFTS

Drill No.	Hole No.	Drill	Reaming	Casing	Moving	Delays	Drill Shifts
1	1	23	1	5	2	1*	32
1	2	16	-	4	1	-	21
Totals		39	1	9	3	1	53

Average drilling rate per shift = 15.7 feet

*Awaiting delivery of casing.

February 5, 1953

which conforms to proposed location No. 1 (Kenyon Richard's report of Aug 11, '52) was collared

DETAILS OF HOLES:

Hole No. 1

This hole conforms to Kenyon Richard's proposed location No. 1 and was drilled in an area of monzonite outcropping in which live limonite conditions were in evidence. Sulphide mineralization, principally pyritic, was encountered at 70 feet. Samples below this depth failed to indicate appreciable primary or secondary copper mineralization. The highest single assay in the sulphide zone was .23% Cu from 225 to 230 feet. Altered monzonite is the rock type encountered. Completed assay log follows:

From	To	Feet	% Cu	Mineralization
0	70	70	0.02	Leached zone
70	420	350	0.05	Py.

Hole No. 2

This hole, approximately 1200 feet northeast of Hole No. 1, likewise was drilled in an outcropping area of live limonite indications. Sulphide mineralization was encountered at 145 feet. Sparse secondary copper enrichment as chalcocite coatings in the altered monzonite is visible more or less throughout the sulphide zone. Although the enrichment is extremely weak, a tendency for concentration immediately below the leached capping is indicated, as can be seen from the following completed assay log:

From	To	Feet	% Cu	Mineralization
0	145	145	0.01	Leached zone.
145	160	15	0.38	Py, co ^{pyrite, chalcocite}
160	420	260	0.05	Py, co ^{pyrite, Chalcocite and traces chalcocite}

PROPOSED DRILLING:

The next hole to be drilled will be located at approximate coordinates 11440 N and 9770 E. This location conforms to Kenyon Richard's proposed hole No. 4, which is approximately 1200 feet east of drill hole No. 2. In all probability a second hole may be started during the coming period. This hole would be approximately 2400 feet east of hole No. 2 and would correspond to Kenyon Richard's proposed hole No. 5.

GENERAL:

Water test information and results of wells No. 1 and 2 will be reported upon under a separate writing. be included in a separate report.

Mr. Calvin Cole, a trainee engineer from the Ground Hog Unit,

WESTERN MINING DEPARTMENT

Salt Lake City, Utah
January 16, 1953

Mr. T. A. Snadden, Manager
Southwestern Division
American Smelting and Refining Co.
513 Valley National Building
Tucson, Arizona

TURQUOISE
PROGRESS REPORTS

Dear Sir:

Would you please have Mr. Mieritz prepare progress reports on Turquoise drilling addressed to you for the 1st through the 15th and the 16th through the 31st of each month. Also a monthly letter.

The former report need show only footage drilled by holes and to date together with brief comments on the drilling, etc. Copies of this should be distributed promptly after the end of each period to Messrs. Pope, Landwehr and Kenyon Richard. I assume Mr. Courtright will see either Mr. Mieritz's or your copy.

The monthly letter should follow the form used at Silver Bell with 8 $\frac{1}{2}$ x 11 plan and sections through each hole. This report of course would have all available assay data up to the 10th of the following month and should be mailed about the 15th. Distribution would be the same as for the progress reports with the addition of Mr. C. P. Pollock.

You will of course give a brief factual resume of the drilling and results in your monthly outcome letter to Mr. Pope.

Very truly yours

ORIGINAL SIGNED BY
F. V. RICHARD
F. V. RICHARD

FVR:EH
Encl. - extra copy
cc: W. H. Landwehr
K. Richard
J. H. Courtright ✓