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# SUBMITTAL OF THE CHOLLA MOUNTAIN PORPHYRY COPPER PROSPECT, COOLIDGE, ARIZONA

By
William A. Rehrig

February 1992

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TO:

FROM: Wm. A. Rehrig, AGS Inc.

DATE: January 28, 199

SUBJECT: SUBMITTAL OF THE CHOLLA MOUNTAIN PORPHYRY COPPER PROSPECT, COOLIDGE, ARIZONA

## SUMMARY AND CONCLUSIONS

A blind porphyry system has been discovered on pedimented ground south and east of Cholla Mountain, located a few miles north of the town of Coolidge, Arizona. The discovery was the result of regional mapping, work at the nearby Posten Butte orebody, and the extraordinary linear continuity of Laramide intrusive/hydrothermal zones in the crust. A wide-spaced initial drilling program outlined a broad zone of low-grade copper in the up to 0.1 to 0.2% range, with most mineralization controlled by near-vertical fracturing and little intergranular or pervasive hydrothermal alteration. A few holes however recorded significant quartz-sericite, silicification, and propylitic alteration with grades closer to 0.3% copper. Considering the distance between drill holes and the lack of angle holes, there may be justification for further drilling on the shallow pediment.

Both alteration and mineralization appear to increase in strength and continuity eastward toward and presumably into a structural graben which despite its depth (i.e., >1,200 ft) appears to hide a significant exploration target. This target is predicated on the following likelihoods: (1) Presence of favorable Precambrian granitic hostrocks intruded by Laramide "ore magma"; (2) Depocenter for large amounts of groundwater copper funneled into the graben from elevated copper bearing areas to the east and west; (3) Significant supergene enrichment; and (4) Subsurface presence of the top part of the Posten Butte porphyry copper deposit, displaced westward on listric normal, post-mineral faults.

With current progress on insitu leaching of copper, and the favorable depth of the graben target (i.e., beneath shallow aquifers), continued exploration is believed justified.

## Introduction

In accordance with the letter agreement dated 199 between and AGS, the following report describes discovery

of and work performed on a blind porphyry copper system located 3 to 4 mi north-northeast of the town of Coolidge Arizona in sections 1-3 (and adjacent ground), T5S, R8E of Pinal Co., Arizona (Fig. 1).

The delineation and preliminary testing of the Cholla Mountain prospect was the result of two main events in the early porphyry copper program that CONOCO Inc. launched about 1970. These events were: (1) acquisition of the Posten Butte (Florence) porphyry copper deposit, located several miles east of Cholla Mountain, and (2) my own reconnaissance exploration outward from Posten Butte.

The Cholla Mountain prospect came into focus through the results of regional mapping, standard geochemistry and biotite geochemistry, which progressed through 1972 and most of 1973. In mid-1973, land options were negotiated with surface and minerals owners, IP geophysics used to detect conductor anomalies suspected of being caused by sulfide mineralization beneath surface cover, and drilling was initiated.

Drilling consisted of vertical, rotary, rotary/spot core, and diamond core holes all penetrating varying thicknesses of post-mineral Gila Conglomerate and underlying granitic rocks. Some 28 widely spaced exploration holes were drilled in the Cholla Mountain area (Fig. 2) Of these 17 were positioned within the target area as defined by geologic criteria (See below). Drilling persisted from mid-1973 to July, 1974.

## Regional Perspective

Discovery of the Cholla Mountain porphyry system illustrates the concepts and validity of regional structural controls on Laramide magmatism and resulting disseminated copper mineralization. Reconnaissance mapping outward from Posten Butte, eastward along the Gila River to the Ray copper district, and westward to the Sacaton deposit, defined a major Laramide structural zone which we called the Ray Lineament. The lineament consisted of a broad, somewhat en echelon belt of Laramide plutons, dike swarms and fault/vein structures striking roughly ENE from Ray to Sacaton, and passing through both Posten Butte and Cholla Mountain.

That part of the belt or lineament traceable from Florence (Posten Butte) to Sacaton was labeled the "Sacaton-Florence Structural Zone (Fig. 1). This zone, incorporating three porphyry copper deposits, passes through outcropping Laramide batholiths and perhaps hosts rocks consisting of 1.4 b.y. Oracle quartz monzonite. The zone is also defined by a pronounced swarm of N75E-striking dikes, hydrofractures and faults.

Much of the Sacaton-Florence zone is mantled by alluvial cover

and its main exposures are present at the south end of the Southern Sacaton Mountains (Cholla Mtn.), and Eastern Sacaton Mountains (Fig. 1). Definition of the zone evolved from data at Posten Butte, from regional mapping, and from structural data collected by Rehrig and Heidrick (1972 and 1976). At Posten Butte, the ore and alteration zones are decidedly aligned ENE. Surface mapping discovered the ENE dike packages at Cholla Mountain and cutting through the Eastern Sacaton Mountains. Rehrig and Heidrick found that both the internal structure within Laramide stocks and structure displayed in porphyry districts themselves strongly reflected a NE to EW oriented crustal control.

## The Cholla Mountain Prospect

Defining the Prospect: The key geologic criteria which specifically contributed to the focus on the Cholla Mountain area are as follows:

1. The concentration of ENE-trending porphyry dikes which perfectly align along the general trend of the Sacaton-Florence structural zone passing through the Posten Butte orebody.

2. A parallel concentration of quartz, sericite, secondary feldspar and subtle sulfide veinlets and hydrofractures in outcrops at the south end of Cholla Mountain. While this alteration was not impressive by itself, its combination with other factors described here, greatly increased its significance.

3. Recognition of a distinct intrusive phase located at the south end of Cholla Mountain. This phase is unlike other phases of the Sacaton batholith. It is a finer grained, equigranular granodiorite which not only correlates with weak alteration at Cholla Mountain, but looks like the productive granodiorite of the Posten Butte deposit.

4. The wide pedimented area of shallow alluvial cover to the south and east of Cholla Mountain, which at the time had not been drilled.

This covered target area thus fell along a major structural extensional lineament which localized late stage intrusion and subsequent hydrothermal fluids like beads on a string. This is exactly what we were looking for in terms of defineable, explorable lineament control of porphyry mineralization. At Cholla, the "bead" was speculated to be like the Posten Butte orebody; that is, where a particular phase of the Sacaton batholith made intrusive contact with the more receptive Precambrian Oracle quartz monzonite and where mineralization greatly "blossomed" in size and grade.

The prospect became further upgraded when biotite geochemistry

revealed an increasing copper concentration gradient towards the target, especially from the main phase of the batholith into the granodiorite correlated with that at Posten Butte. Copper reached values of 700-800 ppm. In addition, company IP geophysics outlined a broad ENE-trending anomaly coincident with the Ray Lineament and underlying pediment south and east of Cholla Mountain.

Drilling Results: Available drill hole summaries are found in the appendix to this report. The following discussion summaries the results of the drill program.

Holes 18, 19, 20 and 21 along the Gila River channel, and Holes 22-27 to the north (Fig. 2) were vertical rotary holes through post mineral conglomerate only cutting short intervals into Laramide intrusive rocks. From drill cuttings only holes 20 and 21 record any noteable alteration (argill. of plag.& sericite, Kspar on fractures). In hole 20, limonite and pyrite casts were noted.

The rest of the holes drilled in sections 2, 3 and 35 (Fig. 2) were vertical diamond core holes, and the rocks cut all exhibited varying degrees of porphyry style alteration and copper/molybdenum mineralization of subore grades. The hostrocks consist almost exclusively of Laramide stock and dike rocks of granodioritic composition, cut by porphyry dacite-granodiorite dikes. Rarely, short drill core intervals of Precambrian Oracle quartz monzonite porphyry were noted.

For the most part, alteration and sulfide/oxide metallization are rigidly fracture/fault controlled with much less amounts of disperse or intergranular alteration (except weak choritization of biotite and argillization of plagioclase). More pervasive quartz sericite alteration was noted in Hole 28 and intervals of pervasive silicification were recorded in Holes 7, 8, 15 and 17. In Hole 5, the typical alteration is described as propylitic, which we assume is of a pervasive type. Thus in a few holes, particularly those toward the east of the Cholla propsect, more pervasive alteration may be indicative of the fringes of a bonafide porphyry copper deposit in the Lowell and Guilbert alteration model sense. This implication is drawn on Figure 3.

More typical is alteration/mineralization concentrated along a myriad of close spaced fractures, joints and faults. Generally, structures are steeply dipping to vertical; however, zones of flat or gently dipping fractures were noted in some holes. It is assummed that most of the subparallel mineralized fractures are sheeted hydrofractures striking ENE parallel to the Sacaton-Florence Structural Zone. Joints and fractures typically display quartz (with thin silica selvages), sericite (commonly coarse-grained), and earlier secondary Kspar or lesser amounts of fine-grained secondary biotite.

Mineralization consists of mixed iron-copper oxides, gypsum, copper pitch, tenorite in the oxide zone, and pyrite, chalcopyrite and traces of chalcocite and molybenite from the sulfide zone. Generally, the character of limonites is suggestive of oxidation of pyrite>chalcopyrite, without significant chalcocite enrichment, at least from rocks of the shallow pedimented area. In Hole 28 however, approximately 300 ft of stockwork fracturing, faulting and brecciated intrusive rocks carry significant amounts of hematite after chalcocite and scattered copper oxide minerals.

Of interest is the thickness of oxidized capping throughout the drilled area. Thicknesses vary from about 200 ft to as much as 800 ft in Hole 7. In Hole 5, 200 ft of oxidized mineralization was encountered with the hole TDed in this material. Thus a significant total amount of copper has been liberated by oxidation.

In terms of copper concentrations, none of the holes drilled on the shallow part of the pediment cut any significant intervals of ore grade (i.e., >0.5% copper). In Holes 17, 7, 8, 5, 17 and sparingly in Holes 4 and 28, assays greater than 0.1% copper are typical. Holes 7, 8 yielded assays in the 0.2 to 0.3% range with rare 10 ft intervals as high as 0.6%. Copper oxide minerals were common in a number of drill holes. Of interest (See below) is the comment from Hole 5 summary stating, "Limonite stained, altered boulders and exotic copper oxides were found in Gila Conglomerate from 1570' to 1730' (approximate bedrock contact)."

From IP electrical survey data and drilling, it became evident that bedrock east of Drill Holes 5, 7 and 14 was significantly deeper than in ground to the west. This discrepancy was believed due to a northerly trending normal fault system defining a structural graben located between Cholla Mountain pediment and ASARCO ground in section 31 (Figs. 2 and 3). Strong fault zones were encountered in Holes 5 and 7 and Hole 6, located ~2,000 ft farther east bottomed in conglomerate at 1,218 ft, well into the graben.

## Further Exploration Potential

Although information gained from a limited and wide spaced drilling (i.e., >1,000 ft) program by CONOCO suggests limited potential for discovery of sizeable tonnages of ore grade copper, the final evaluation of the property I believe is not yet completed, especially considering present day conditions of copper price and mining techniques. Further exploration potential hinges on several key questions:

1. Is the Cholla Mountain porphyry system a bonafide porphyry copper deposit in the classical sense (a la Guilbert and Lowell

alteration/mineralization model)? This model calls for definable and pervasive alteration and mineral zonation (i.e., propylitic, quartz-sericite, potassic). Mineralization at Cholla is a mixed assemblage of Kspar, quartz sericite, with little alteration away from mineralized fractures and faults. It reflects rigid control along a through going structural zone, but one seemingly devoid of consistency either in copper grade, or mineral-alteration zonation.

I see the system rather as a telescoped structural zone of deeper seated hydrothermal leakage which may transgress outward from some nearby porphyry orebody.

2. Where then is the higher grade porphyry target with respect to what was drilled? The collective evidence from the work performed indicates that mineralization (plus alteration) gets stronger and more continuous towards the east. This effectively eliminates the need to worry about ground on the Gila River Indian Reservation, located west of Cholla Mountain. On the down side however, exploration eastward is faced with bedrock at appreciable depths (i.e., >1,500 ft) within a graben (Figs. 2 and 3).

3. Is a deep exploration play in the downdropped graben block worth consideration? Experience at the Posten Butte orebody suggests that porphyry copper mineralization is strongly enhanced where other structural zones cross the Ray Lineament, and where the mineralized Laramide porphyry makes intrusive contact with Oracle quartz monzonite. Drill hole data from north and east of Cholla Mountain indicates the presence of Oracle qmp which may project south into the graben.

Furthermore, the graben may house the higher grade, uppermost part of the Posten Butte porphyry copper deposit. My work at the deposit and Florence region indicated that the Posten Butte deposit may represent the deeper parts of an originally vertical deposit which has been strongly tilted toward the east and possibly cut by listric normal faults (Fig. 3). Such extensional faulting may have removed the higher sulfide, upper portions of the orebody and transported it some distance to the west. This would explain why we were consistently logging potassic and deep potassic alteration at Posten Butte without seeing much quartz-seriicite-pyrite or propylitic alteration.

This proposed scenario of rotated and fault displaced Laramide orebodies has been proven at San Manuel-Kalamazoo, and has even been discussed between Sacaton and the deep Casa Grande deposit.

There are as well other factors of favorability which were not evident in the early 1970's. Because of the enormous shallow groundwater flow along the Gila River, shallow mineralization such as exists at the Posten Butte deposit, may never be economically dewatered and mined. Ironically however, deep

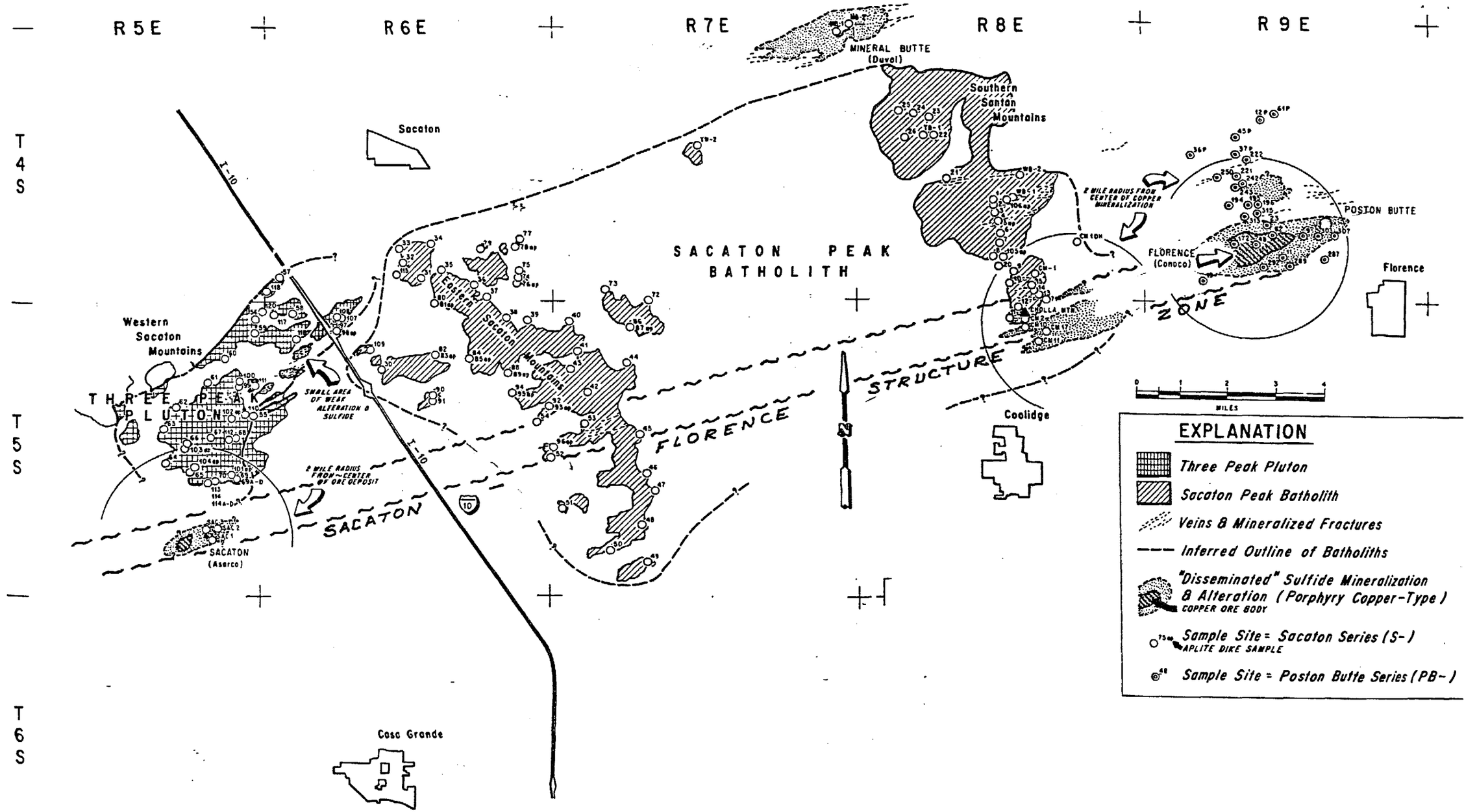
mineralization may prove more economically viable, if it can effectively be mined by insitu leach methods. Such methods are currently being evaluated with favorable results at the Casa Grande copper deposit. There the key favorability factor is that the deposit sits well below the water table used for farming and cultural uses. Thus leach solutions going and coming can be effectively controlled and are isolated from near surface aquifers.

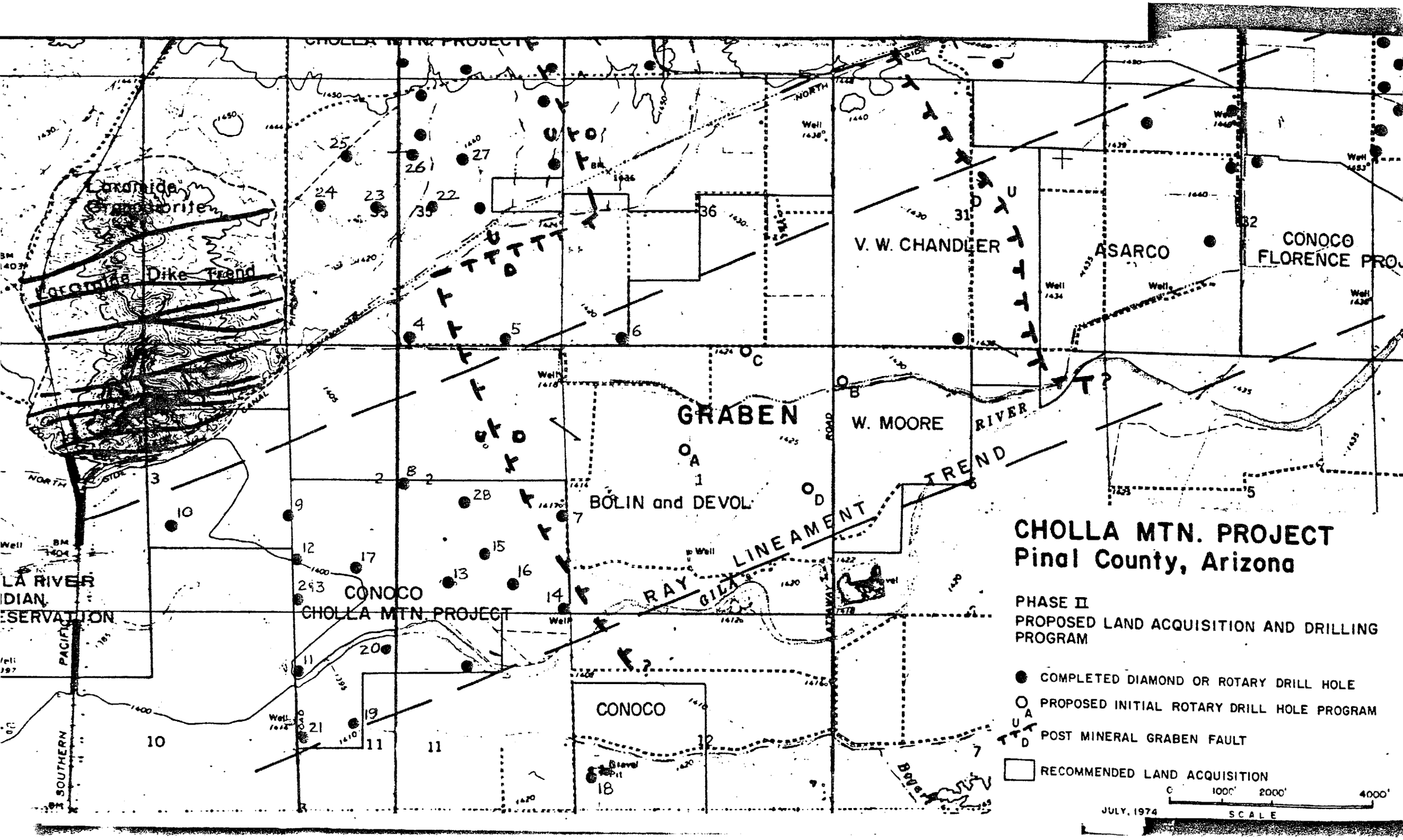
The same potential may exist in the graben east of Cholla Mountain. A 200 ft interval of basal Gila Conglomerate in Hole 5 situated along the faulted boundary of the graben contained considerable exotic copper oxide material, indicative of aqueous copper mobility into the graben.

A further indication of wholesale groundwater copper migration in this setting comes from elevated copper contents within biotite (actually vermiculite) contained in post mineral conglomerates of the Cholla graben. From Holes 5, 7 and 14 the mica was analyzed for copper resulting in moderately to highly anomalous values (Fig. 4) and with values increasing with depth of sample. The deepest biotite sample (still 200 ft above bedrock) in Hole 5 ran 2,000 ppm.

The increasing copper in biotite with depth in and along the west edge of the graben reflects a funneling of cupiferous groundwaters from oxidizing sulfides on the shallow pediment to the southwest and west of Hole 5, into the graben as shown on Figure 4. This process could have resulted in considerable supergene enrichment of copper in the graben if sulfides are present there along the Sacaton-Florence Structural Zone (See Fig. 3). This target mineralization, at a depth suitable for in place leaching, appears quite likely, given the data presented herein.

Thus, in conclusion, although the costs for testing mineralization within the graben east of Cholla Mountain would be relatively high, the rewards and chances of finding higher grade, possibly enriched copper mineralization are also considered to be high. Given the preliminary successes realized by insitu research, this deeper mineralization, if substantiated, could constitute an extremely valuable long term economic reserve for in North America.


R5E
R6E
R7E
R8E
R9E
T 4 S
T 5 S
T 6 S
MINERAL BUTTE (Duval)
Southern Santan Mountains
Sacaton
SACATON PEAK BATHOLITH
Western Sacaton Mountains
THREE PEAK PLUTON
Eastern Sacaton Mountains
SMALL AREA OF WEAK ALTERATION & SULFIDE
2 MILE RADIUS FROM CENTER OF ORE DEPOSIT
SACATON (Asarco)
SACATON
FLORENCE
STRUCTURE
ZONE
2 MILE RADIUS FROM CENTER OF COPPER MINERALIZATION
FLORENCE (Conoco)
POSTON BUTTE
Florence
Coolidge
Casa Grande
I-10
MILES
EXPLANATION
Three Peak Pluton
Sacaton Peak Batholith
Veins & Mineralized Fractures
Inferred Outline of Batholiths
"Disseminated" Sulfide Mineralization & Alteration (Porphyry Copper-Type)
COPPER ORE BODY
Sample Site = Sacaton Series (S-)
APLITE DIKE SAMPLE
Sample Site = Poston Butte Series (PB-)


CHOLLA MTN. PROJECT
Pinal County, Arizona
PHASE II
PROPOSED LAND ACQUISITION AND DRILLING PROGRAM
COMPLETED DIAMOND OR ROTARY DRILL HOLE
PROPOSED INITIAL ROTARY DRILL HOLE PROGRAM
POST MINERAL GRABEN FAULT
RECOMMENDED LAND ACQUISITION
0 1000' 2000' 4000'
SCALE
JULY, 1974
GRABEN
RAY LINEAMENT TREND
GILA RIVER
V. W. CHANDLER
ASARCO
CONOCO FLORENCE PROJ
W. MOORE
BOLIN and DEVOL
CONOCO
CHOLLA MTN. PROJECT
Laramide Dike Trend
LA RIVER
IDIAN
ESERVATION
SOUTHERN PACIFIC
NORTH SIDE
ATTAWAY ROAD
Well
Gravel Pit

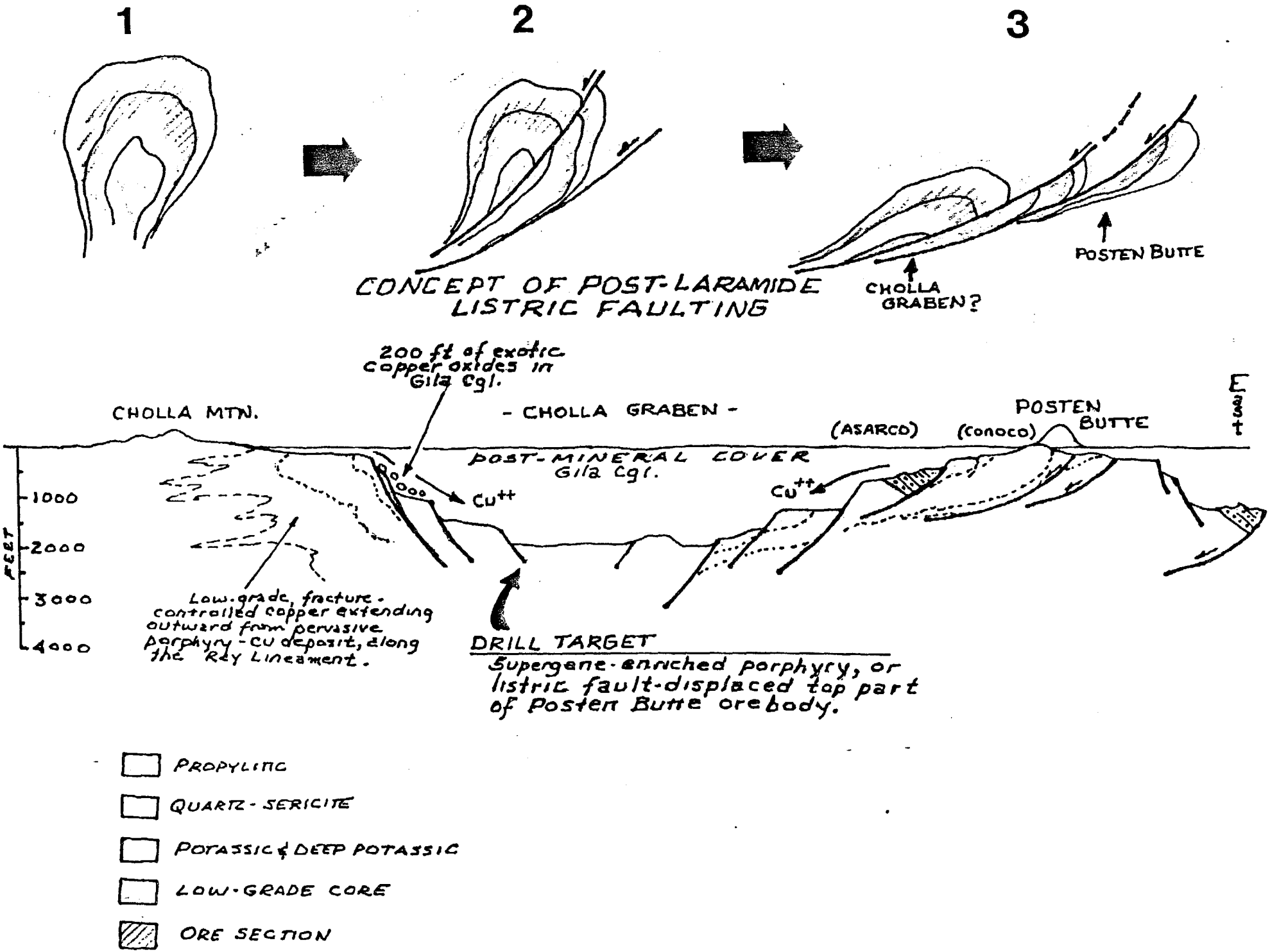

1
2
3
POSTEN BUTTE
CHOLLA GRABEN?
CONCEPT OF POST-LARAMIDE LISTRIC FAULTING
200 ft of exotic copper oxides in Gila Cgl.
West
East
CHOLLA MTN.
- CHOLLA GRABEN -
(ASARCO)
(Conoco)
POSTEN BUTTE
POST-MINERAL COVER Gila Cgl.
Cu++
Cu++
1000
2000
3000
4000
FEET
Low-grade, fracture-controlled copper extending outward from pervasive porphyry-Cu deposit, along the Ray Lineament.
DRILL TARGET
Supergene-enriched porphyry, or listric fault-displaced top part of Posten Butte orebody.
PROPYLITIC
QUARTZ-SERICITE
POTASSIC & DEEP POTASSIC
LOW-GRADE CORE
ORE SECTION

FIG 3

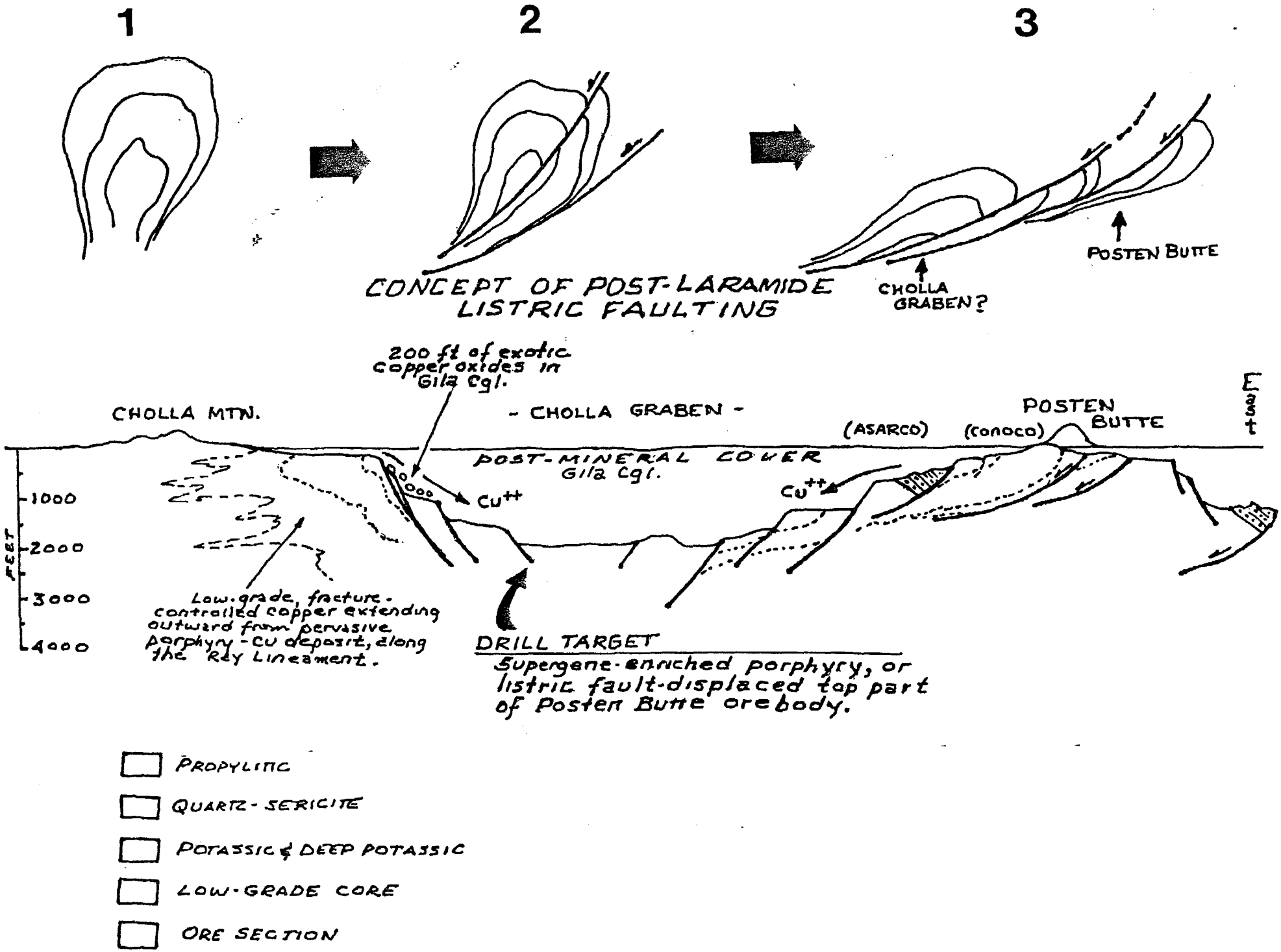
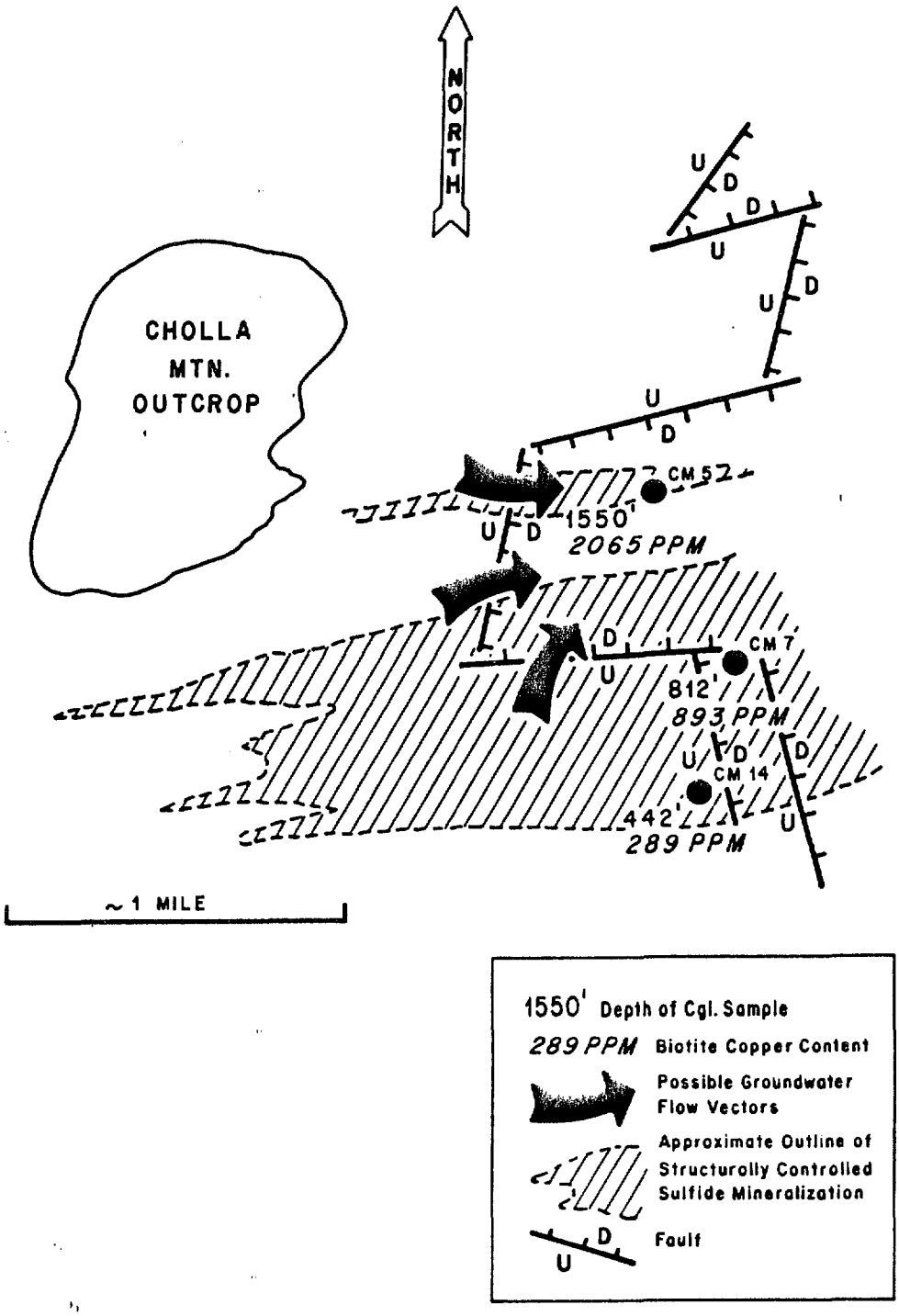

1
2
3
CONCEPT OF POST-LARAMIDE LISTRIC FAULTING
POSTEN BUTTE
CHOLLA GRABEN?
West
East
CHOLLA MTN.
- CHOLLA GRABEN -
POSTEN BUTTE
(ASARCO)
(CONOCO)
200 ft of exotic copper oxides in Gila Cgl.
POST-MINERAL COVER Gila Cgl.
Cu++
Cu++
FEET
1000
2000
3000
4000
Low-grade, fracture-controlled copper extending outward from pervasive porphyry-Cu deposit, along the Rey Lineament.
DRILL TARGET
Supergene-enriched porphyry, or listric fault-displaced top part of Posten Butte orebody.
PROPYLITIC
QUARTZ-SERICITE
POTASSIC & DEEP POTASSIC
LOW-GRADE CORE
ORE SECTION

FIG. 3




BIOTITE -COPPER IN POST-MINERAL CONGLOMERATES EAST OF CHOLLA MTN., ARIZONA

Map showing subcropping faults and sulfide zones at the Cholla Mtn. prospect, west of Florence. Also plotted are the concentrations of copper found in biotite mineral fractions separated from three post-mineral fanglomerate samples. In Drill Holes CM7 and 14, samples were taken 18 and 33 feet above bedrock, respectively. The sample from CM5 came from 170 feet above bedrock.

# Bear Creek Mining Company

Tucson Office

December 15, 1976

Mr. H. L. Bauer, Jr.
Bear Creek Mining Company
1826 Kennecott Building
10 East South Temple
Salt Lake City, Utah 84133

Dear Herm:

Subject: Possible Covered Porphyry Copper Target
South of Cholla Mtn, Pinal County, Az.

In the enclosed report, Roger Andrews suggests a gravel covered porphyry copper target along the inferred edge of the 'Sacaton Batholith' south of Cholla Mountain a few miles west of Conoco's Poston Butte deposit.

Because of a nearby railroad track, pipelines, and numerous grounded fences in the area, IP will be of limited value in evaluating this target. The most effective test would be to rotary drill a series of peep holes through the thin gravel cover.

We will consider the merits of this area for further land acquisition and possible drilling relative to other prospects in the district after the 1977 budget is finalized.

Sincerely,

Jerry

G. D. Van Voorhis

GDV:ct
Encl.
cc: G. F. Joklik (wo/encl.)
D. T. O'Brian
P. M. Wright

# Bear Creek Mining Company

Tucson Office

MEMORANDUM

TO: G. D. Van Voorhis DATE: November 17, 1976

FROM: R. K. Andrews

SUBJECT: A GRAVEL-COVERED ORE TARGET SOUTH OF CHOLLA MOUNTAIN, PINAL COUNTY, ARIZONA

Recent evaluation of the area between Stanfield and Florence has led to the definition of a large, coherent Laramide intrusion which we currently refer to as the 'Sacaton Batholith.' This feature is interpreted to be at least thirty miles long and up to ten miles wide. Four porphyry copper systems are now known to occur adjacent to the contact of the batholith, Mineral Butte, Poston Butte, Sacaton and Hanna-Getty. The potential for further economically significant discoveries along the covered contacts of the batholith, which are largely unexplored at this time, is rated as excellent. Detailed geologic and geophysical work in this area is now getting under way, and is scheduled to continue into 1977.

However, our preliminary work to date has led to the identification of a localized gravel-covered target immediately to the south of Cholla Mountain, and about two miles north of the city of Coolidge. It is predicted that the concealed southern contact of the Sacaton batholith trends about N70°E through this area. Five miles to the east-northeast, Conoco's Poston Butte deposit is aligned about N70°E, parallel to the projection of the concealed contact of the batholith.

Figure 1 is a generalized geologic map of the area surrounding Cholla Mountain. Laramide intrusive rocks crop out at Cholla Mountain, Walker Butte, and in the Sacaton Mountains in the southwest part of the map. The contact of the Laramide rocks with Precambrian granite hosts is exposed for a strike length of two miles only on the north side of Walker Butte. However, using magnetic data (Overlay 1a) in combination with internal grain-size characteristics within the outcropping intrusive rocks, the concealed contacts of the intrusion can be traced under gravel cover with, hopefully, reasonable accuracy. The interpreted trace of the intrusive contact is shown on Overlay 1b. This overlay also shows the location of the Mineral Butte and Poston Butte systems close to the edges of the intrusion.

Interest was drawn to the Cholla Mountain target area largely as a result of the coincidence of the inferred intrusive contact with shallow gravels (indicated by gravity data) and a covered, 100-gamma magnetic anomaly that resembles the anomaly over the eastern part of the Poston Butte deposit (Overlay 1a). Both anomalies seem to occur along a common N70°E trend. This magnetic anomaly may well reflect a granodioritic intrusion, similar to the intrusion at Poston Butte, or some form of magnetite introduction along a regional intrusive contact. In any event it represents a strongly anomalous ~~fracture~~ feature in an area of low magnetic signature.

Previous geologic mapping in the Walker Butte-Cholla Mountain area by Wray (1972) shows that mineralization and alteration in this area occurs preferentially along the contact of the 'Sacaton granite' with Precambrian host rocks north of Walker Butte (Overlay 1b). A quartz monzonite porphyry 'border' phase is present adjacent to the contact here. This porphyry border phase is also present at Cholla Mountain to the south, although the rocks between Cholla Mountain and Walker Butte are dominantly the less porphyritic quartz monzonite 'core' phase. This suggests that the south margin of the intrusion might well be present immediately south of Cholla Mountain.

Alteration and mineralization is also largely absent throughout much of the 'core' phase of the intrusion but becomes more prevalent towards the south edge of Cholla Mountain (Overlay 1b) within the border phase. This reinforces the 'mirror image' appearance of Walker Butte and Cholla Mountain, and tends to substantiate the likely proximity of the southern intrusive contact near Cholla Mountain.

The geology of Cholla Mountain is shown in more detail in Figure 2. An approximate outline of the concealed magnetic source is added for reference. Laramide intrusive rocks that crop out at Cholla Mountain consist mostly of the quartz monzonite porphyry 'border' phase. Recent gravels surround the outcrop on three sides. A strong N70°E dike swarm is developed here, but most of the dikes are relatively fresh and unaltered, with most of the mineralization occurring in the quartz monzonitic host rocks.

Overlay 2a shows the distribution of mineralized veins and shears, and the area of most intense quartz veining. Oxide copper minerals occur along many of the veins or shears, being most closely associated with quartz veins of up to two feet in width. These veins strike N60-70°E, roughly parallel to the dike swarm. Near the southeast edge of Cholla Mountain, weak quartz and quartz-orthoclase veining that is fairly pervasive throughout Cholla Mountain becomes more abundant. In some areas, quartz in veins up to one-half inch across accounts for up to ten percent of the rock volume. The orientation of the veins

is random, and they are commonly barren of sulfide minerals. Wray, in his 1972 report, remarks on the similarity between this rock and the weakly mineralized central stock at Mineral Butte, which is completely surrounded by strongly mineralized granite.

Overlay 2b shows a strong tendency for mineralization and alteration to increase towards the south edge of Cholla Mountain, being strongest at the north edge of the concealed magnetic source. If mineralization continues to increase in intensity beneath cover to the south, then Precambrian granites adjacent to the postulated Laramide intrusive contact might well be expected to host ore-grade mineralization.

Additional data plotted on Overlay 2a include a summary of the land position. We have an existing application for prospecting permits on State land in Section 11, and consideration is being given to staking federal land in Section 12 to the east. All of the remaining land in the area is private surface and minerals. The Gila River Indian Reservation probably includes about ten percent of the target area. Further detailed work in this area is proposed before a drill test can be recommended, but in this event a certain amount of private land would have to be optioned.

Finally, the locations of several Conoco drill holes are shown near the north edge of the map. Chips of unmineralized and unaltered Laramide(?) porphyry have been collected from these sites. No other drilling is known in the area.

R. K. Andrews

RKA:ct

Reference:

Wray, W. B., 1972, Cholla Mountain and Walker Butte, Pinal County, Arizona, KES-GRD report.

## ADDENDUM

Recent field checks have led to identification of an old diamond drill hole about 1000 feet northeast of the common corner of Sections 2, 3, 10 and 11. Chips from this hole consist of about 50% quartz diorite porphyry, 30% quartz monzonite and 20% vein material (mostly quartz veins), and unclassifiable rocks. These rocks are probably all of Laramide age. The chips indicate that the hole went out of the monzonite into the quartz diorite where, judging by many fragments of caved material, it was lost. Thickness of gravels here is unknown. A rotary drill site is located about 3000 feet east of the diamond drill hole, but no bedrock chips were found here.

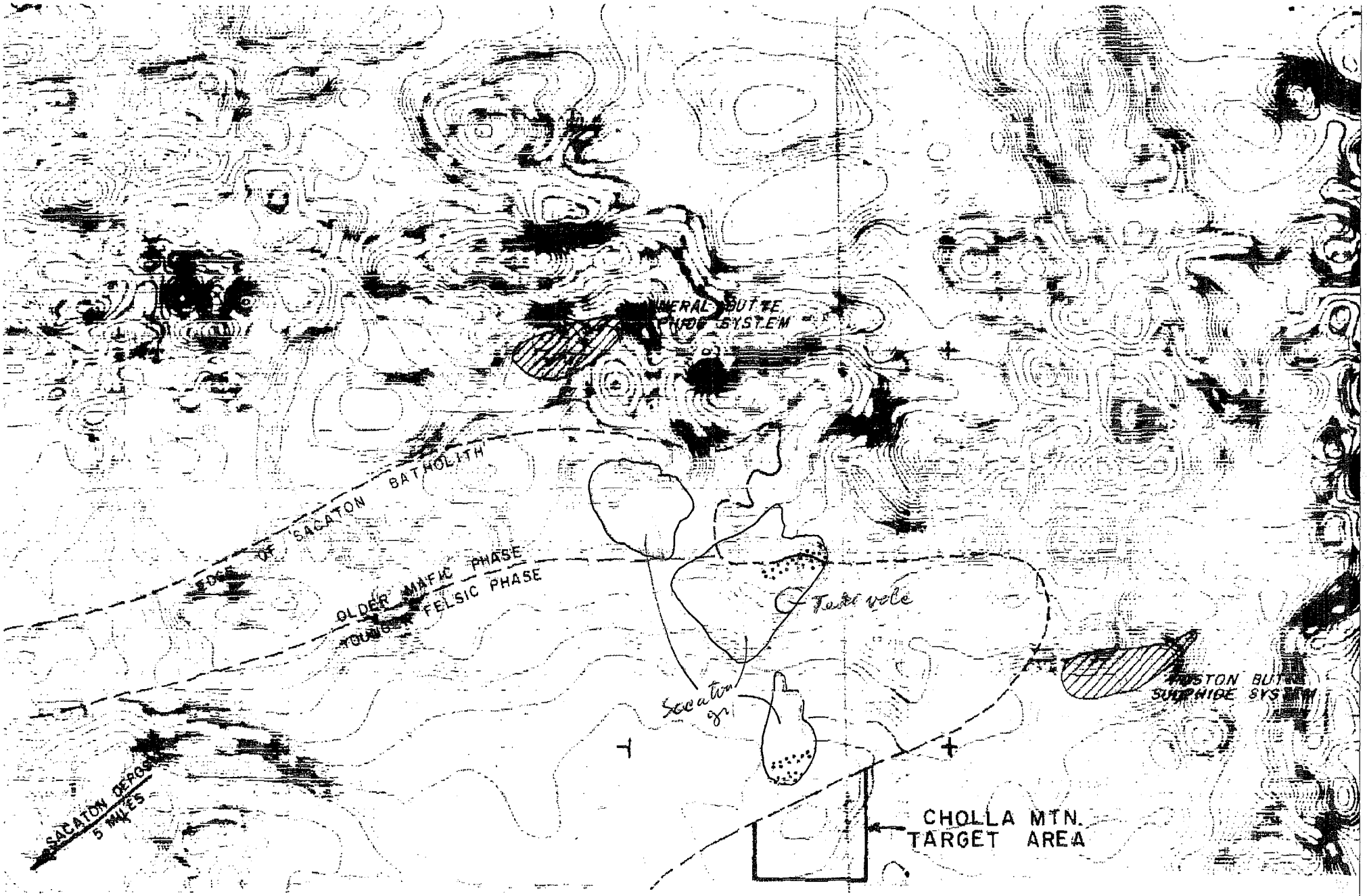
Chips of the monzonite are generally fresh and unaltered. The quartz diorite contains fairly pervasively clay-altered plagioclase. Weak sulfides persist throughout most rocks. Visible molybdenite is present in some vein material.

Assays of three different rock types are as follows:

| | Cu | Mo | Pb | Zn |
|---|---|---|---|---|
| Quartz monzonite | 465 | 6 | 20 | 80 |
| Quartz diorite porphyry | 425 | 18 | 20 | 75 |
| Vein material, etc. | 140 | 161 | 40 | 260 |
| Weighted Average | 380 | 43 | 24 | 114 |

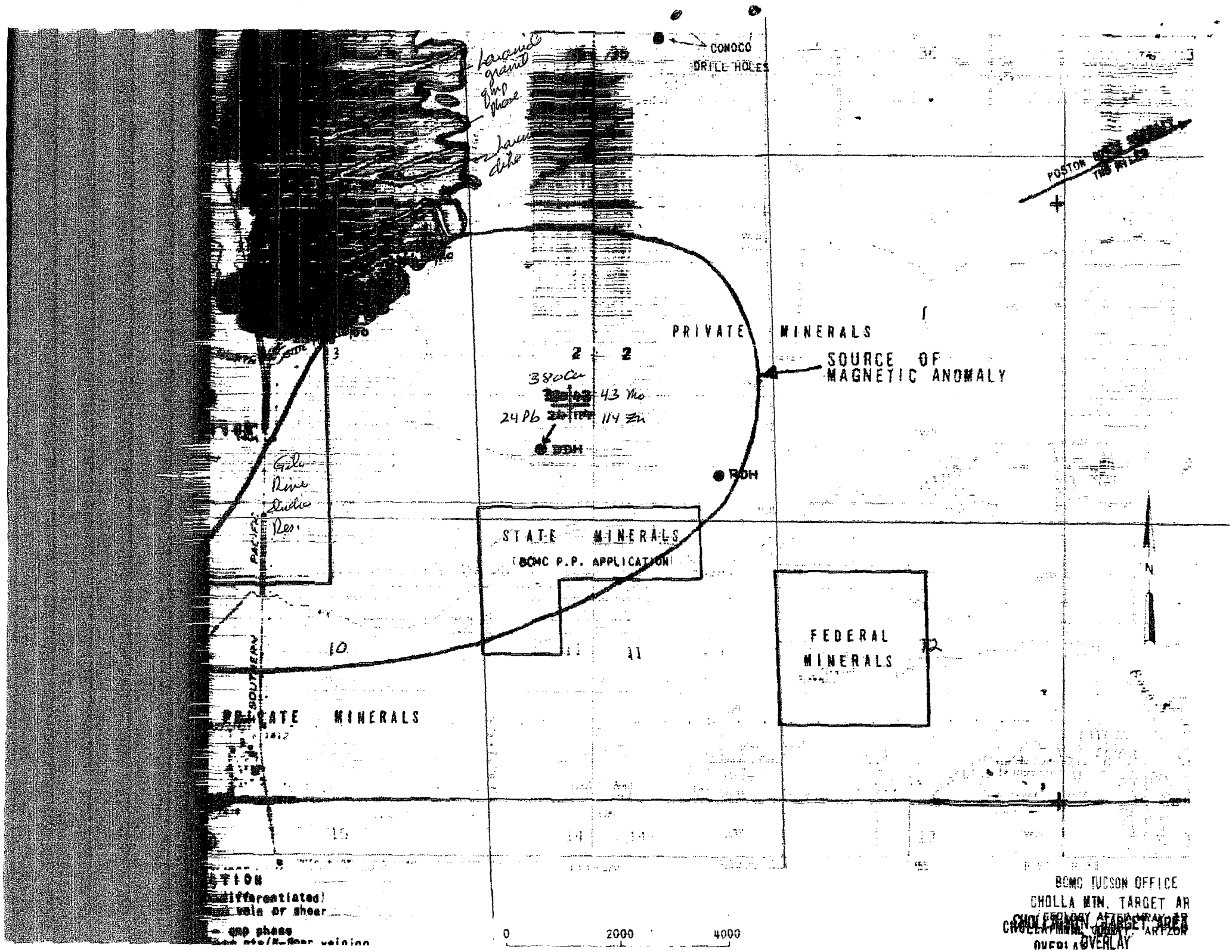
Geochemical samples of whole rock taken at the south end of Cholla Mountain, 4000 feet to the north, show copper varying from 5 to 35 ppm in unmineralized intrusive rock, with one value of 525 ppm in a mineralized shear zone. All Mo values are, however, 1 ppm or less. The geochemistry is summarized in Figure 2b attached as an overlay to Figure 2.

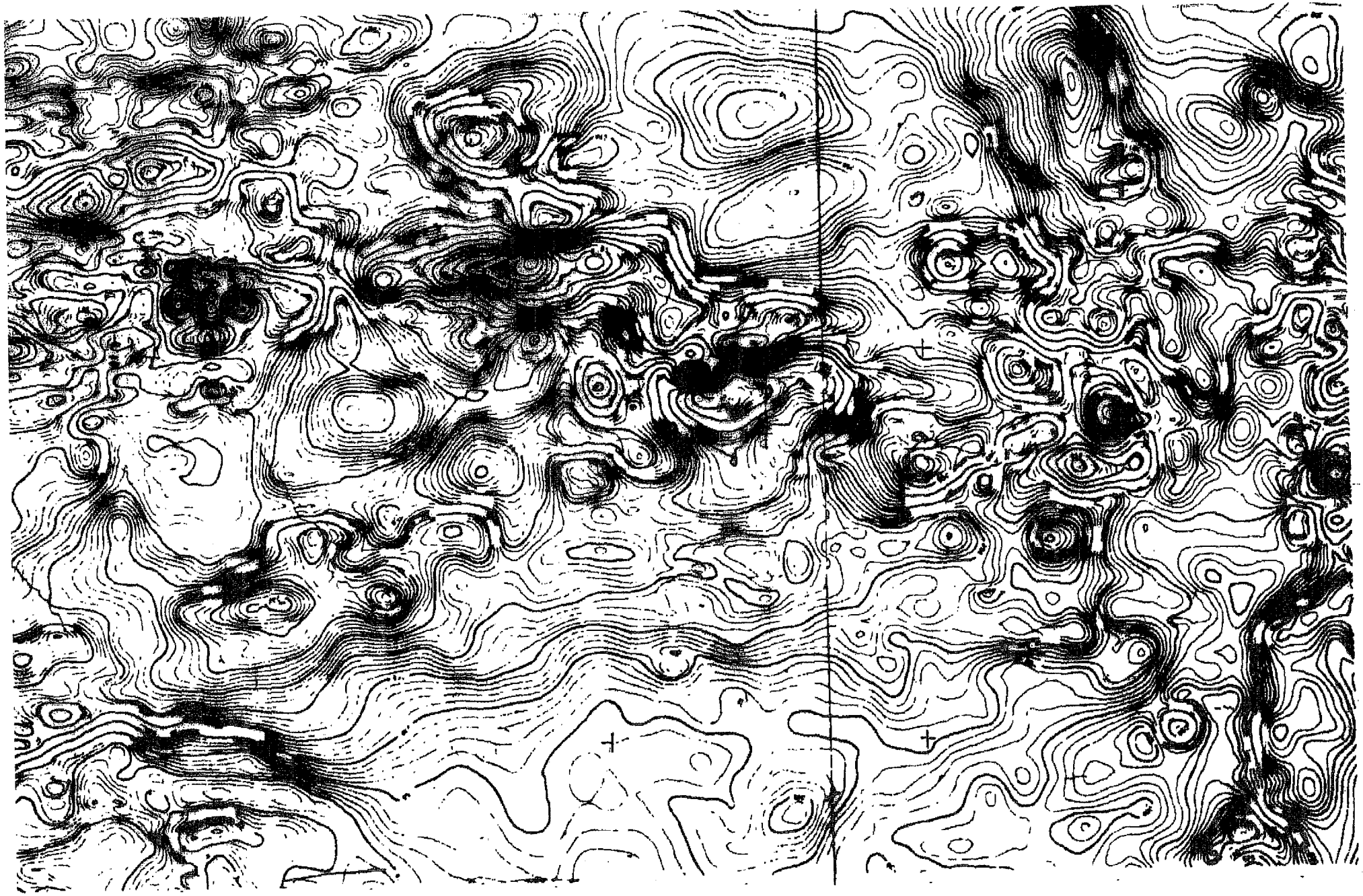
The drill chip geochemical values are highly anomalous for Laramide intrusive rocks of this type, and offer substantial encouragement for continued work in this area.




Alteration and/or Mineralization in outcrop

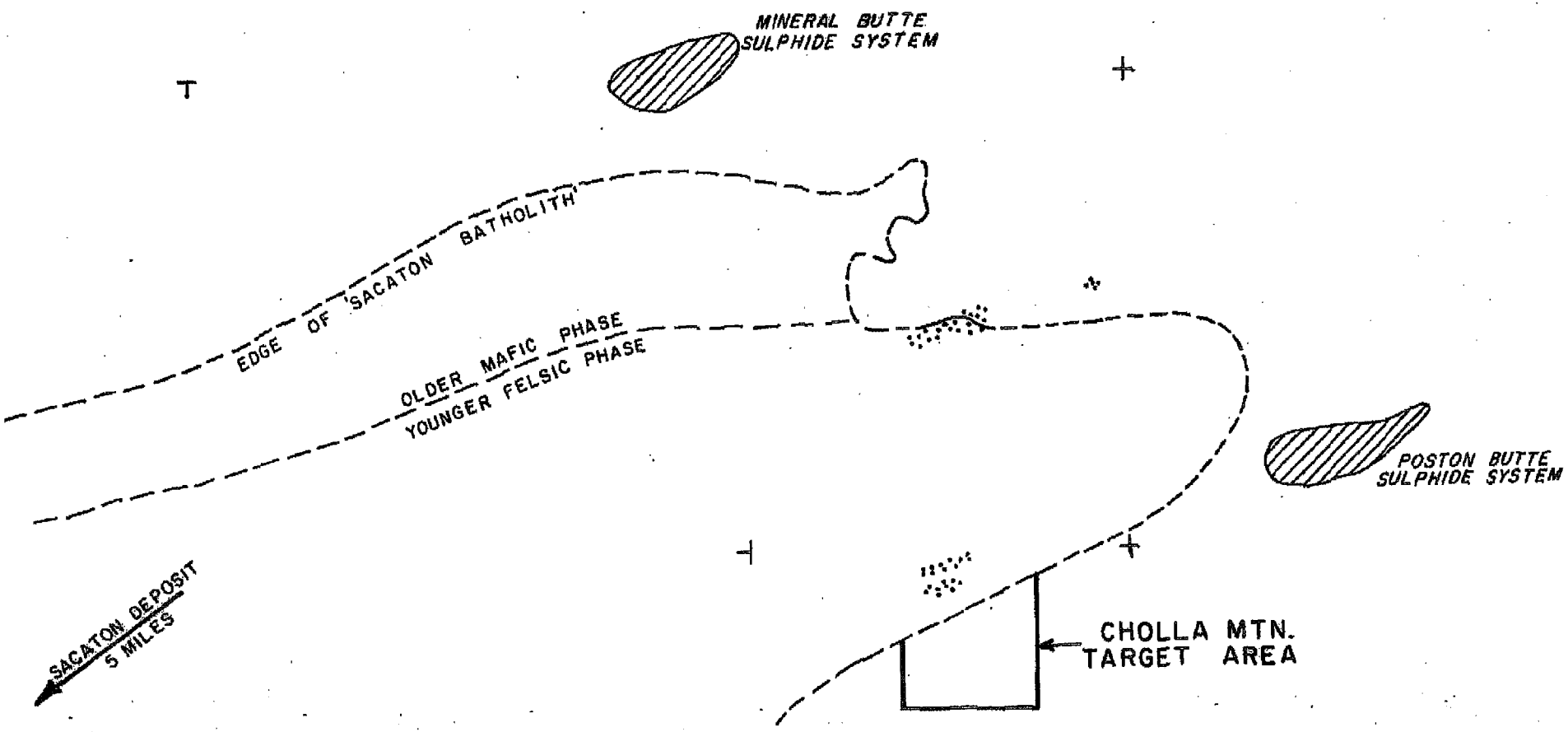
CHOLLA MTN.
AND SURROUNDING AREA
OVERLAY


CONOCO
DRILL HOLES
PRIVATE MINERALS
SOURCE OF
MAGNETIC ANOMALY
380Cu
43 Mo
24 Pb
114 Zn
WDH
RDH
STATE MINERALS
(BOMC P.P. APPLICATION)
FEDERAL
MINERALS
PRIVATE MINERALS
N
0
2000
4000
BOMC TUCSON OFFICE
CHOLLA MTN. TARGET AR
OVERLAY



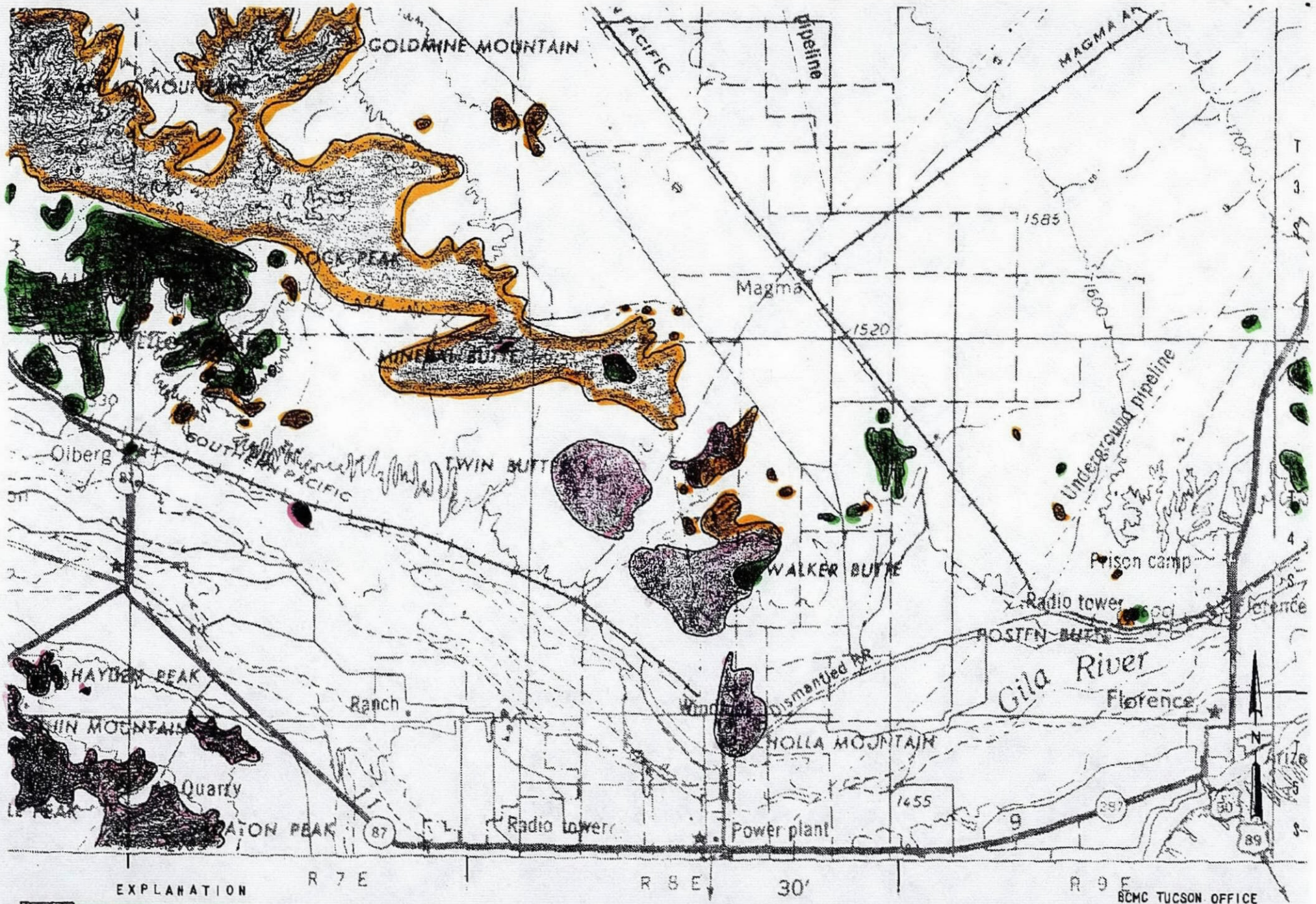
CHOLLA MTN.
AND SURROUNDING AREA
OVERLAY

FIGURE 1a




CHOLLA MTN.
AND SURROUNDING AREA
OVERLAY

Alteration and/or Mineralization in outcrop




EXPLANATION

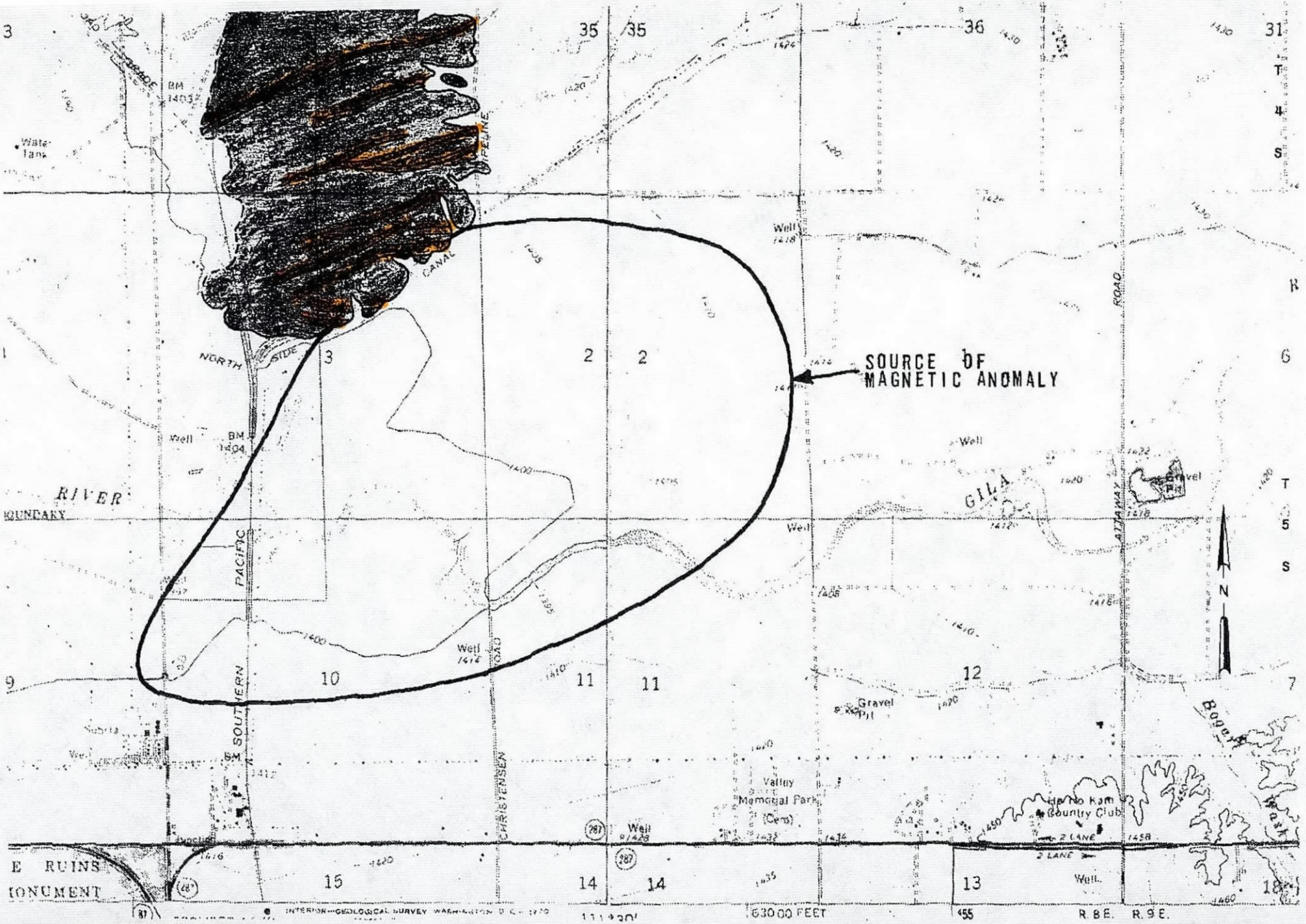
- Tertiary volcanics
- Laramide Sacaton Granite
- Precambrian granites and schists

SCALE: 1:125,000

0 — 5

BCMC TUCSON OFFICE
GEOLOGIC MAP
CHOLLA MTN.
AND SURROUNDING AREA
PINAL COUNTY, ARIZONA

fig. 1




EXPLANATION

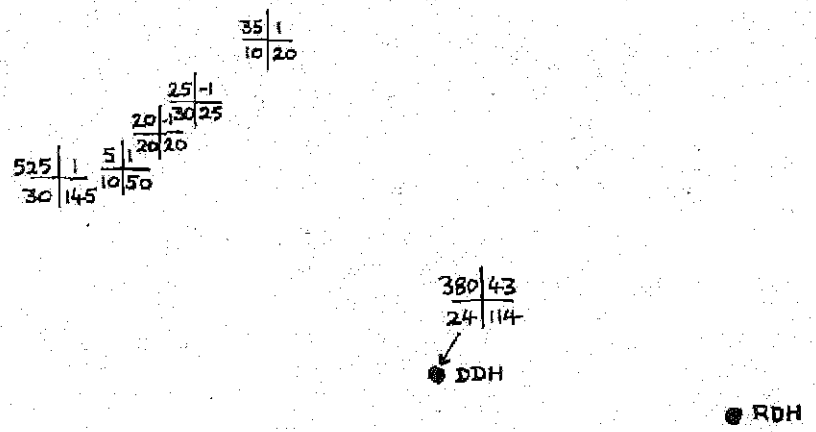
Laramide dikes (undifferentiated)

Laramide granite - qmp phase

0 2000 4000

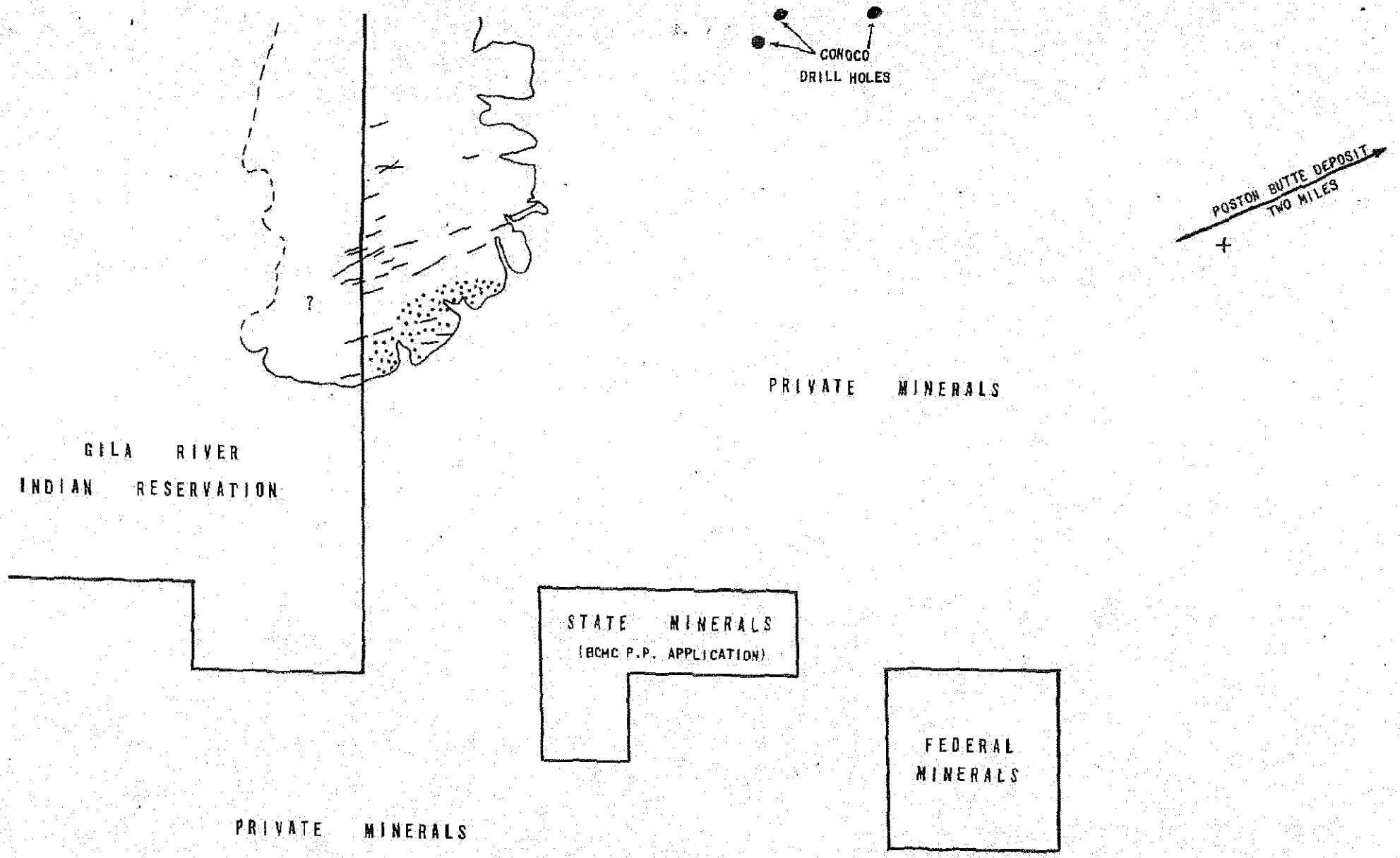
BCMC TUCSON OFFICE
CHOLLA MTN. TARGET AREA
(GEOLOGY AFTER WRAY 1972)
PINAL COUNTY, ARIZONA

Fig. 2




| Cu | Mo |
|---|---|
| Pb | Zn |

CHOLLA MTN. AREA
OVERLAY
fig 2b




— Mineralized vein or shear

*** Most intense qtz/Kspar veining

CHOLLA MTN. TARGET AREA
OVERLAY