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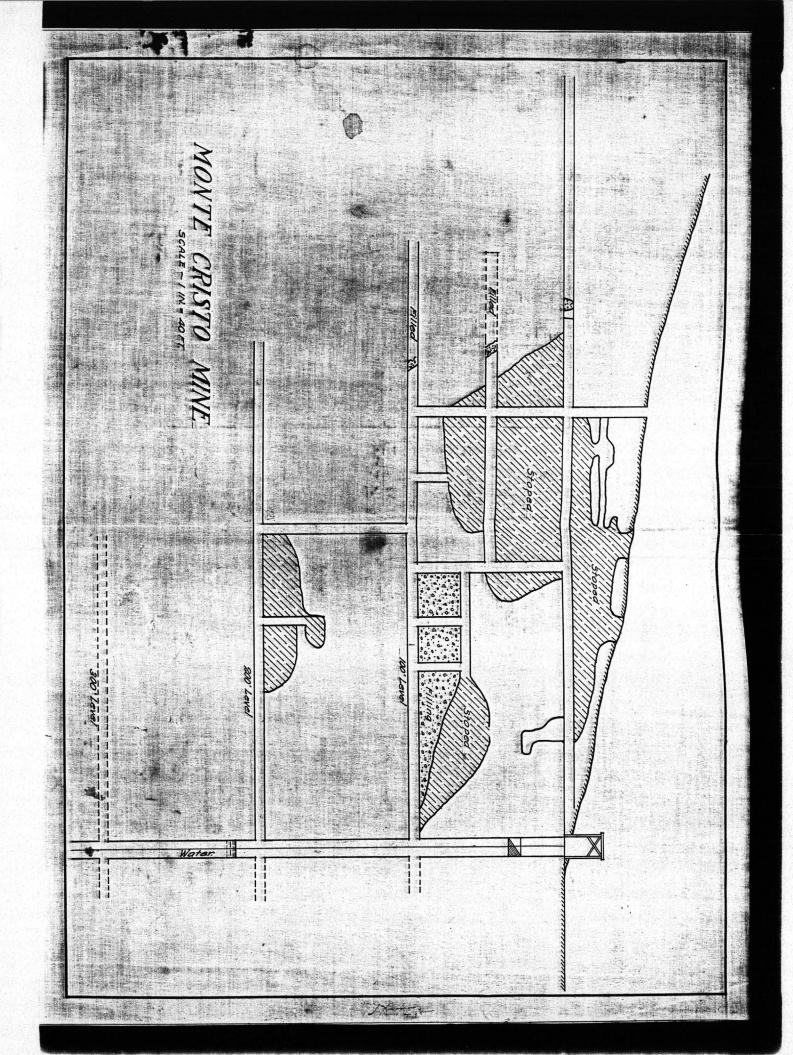
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ARIZONA YAVAPAI COUNTY BLUEBELL MINE

The Bluebell Mine is owned by Sherwood B. Owens of Tucson, Arizona. It has produced approximately 1.2 million tons grading 3% copper,  $l^{\frac{1}{2}}$  ounces silver, and 0.04 ounces gold per ton from a series of five lenses mined to a depth of 1,500 feet. There is about 150,000 tons of reserve above the 1500 level left. The water stands at the 500 foot level, and to that point, the shaft from which the levels are turned is in fair condition. Nobody has seen it below the 500 level within the last 25 years. The property shut down in 1930. Samples on the bottom level indicate that the ore is as strong there as it is everywhere else.

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At the present time, the Iron King, and adjoining mine, is developed to the 2200 level and is still going down. While this is no guarantee, it does suggest that the Bluebell ore chutes may go down.

There are no decent maps of the property, but there is a long section containing assays from the files of the former manager, Colvocoress. It may be that there are other lenses, but this is not something that could be counted on.

In order to get the Bluebell into operation, it would be necessary to install a mine plant and pump out the 1500 foot shaft to have a look. This job probably would cost \$50,000.00.

In developing the Iron King Mine, the Shattuck
Denn Mining Co. discovered that original developments had
only mined a few of the numerous en echelon sulphide chutes
that existed. It may be that a similar situation exists
at the Bluebell but probably the only way you could find
out would be to do a considerable amount of actual
physical exploration. However, the first thing that
ought to be done is to map in detail the upper accessible
workings in the surface of the property. If this is
favorable, it might be that pumping the property out would
be worthwhile. The ore is not at all oxidized, however,
and it would be a clean, easily handled material.

Current costs at Iron King are about \$10.75 per ton. After marketing, etc., this would indicate a cost of copper of nearly 20¢ per pound which, of course, would not make this property particularly attractive at metal prices anything under perhaps 33¢.

I suggest that the Bluebell is a property which might be investigated only if serious attention were given to the DeSoto which is held by the same owner.

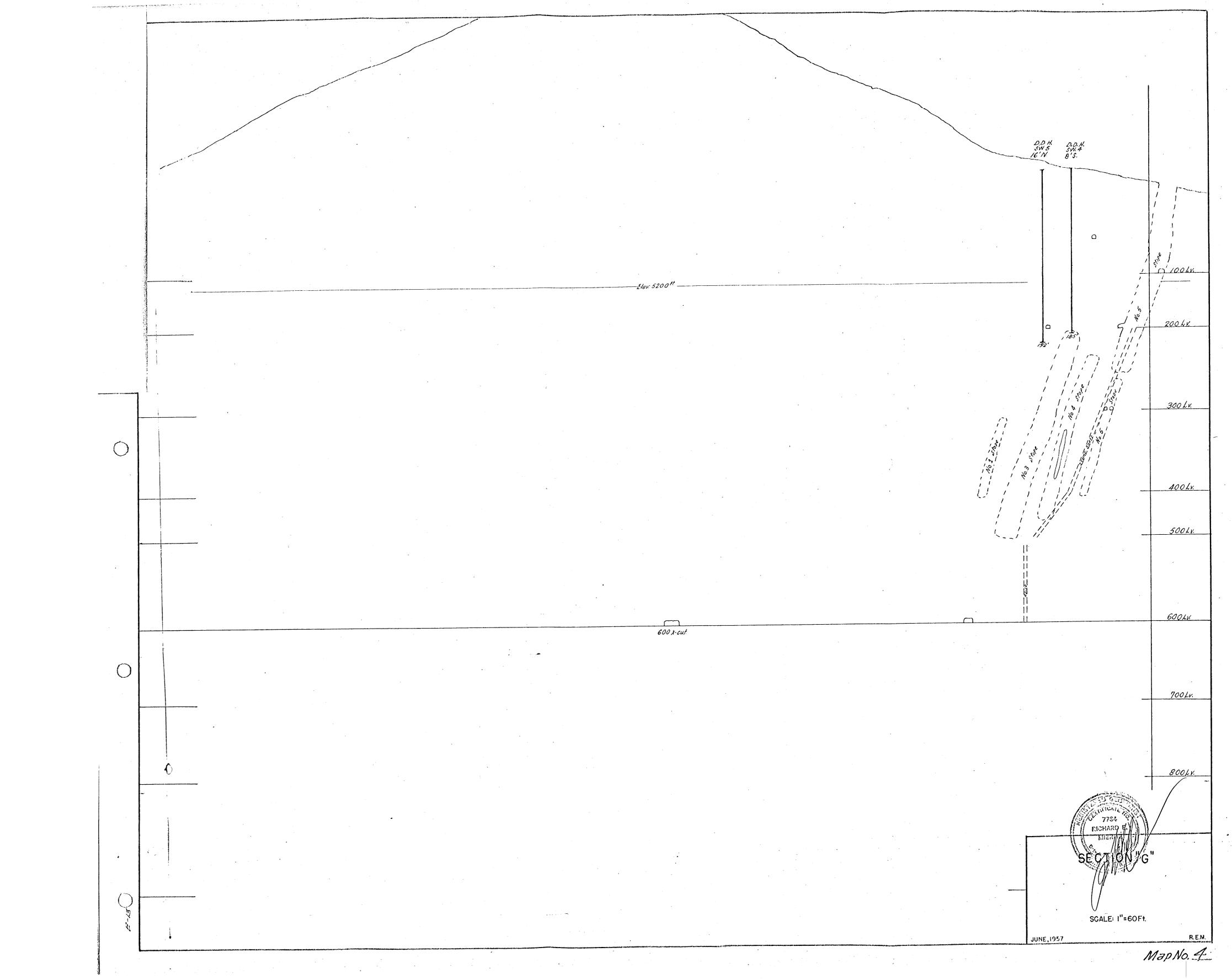
Respectfully,

MANNING W. COX

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GEOLOGIC

and

POTENTIAL TARGET

REPORT

on the

DESOTO MINE

and

- BLUE BELL MINE

UNIT:

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Yavapai Country, Arisona

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R. S. Micrita Mining Concultant Phoenix, Aminona

March 15, 1970

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### INTRODUCTION

Mr. Sherwood B. Owens, Tucson, Arizona, requested the writer to complete a geological study, suggest ore deposit potentials and targets, if any, based on the study, and to indicate operational ideas for a "unitization" of his two copper properties; the Blue Bell and DeSoto, 4 airline miles apart and located approximately four miles and nine miles south and southwest respectively from Mayer, Yavapai County, Arizona.

The writer has viewed, studied and correlated all data available to him including geological maps, drill logs and assays, mine maps, aerial photos, etc and he has personally visited the properties on several occasions. The writer is therefore quite familiar with the properties; historically, geologically, and exploratory-wise.

#### CONCLUSIONS

As a result of this study, the writers knowledge of a perience with the DeSoto and Blue Bell Mines, the for conclusions are forwarded for your consideration:

- (1) Both properties exhibit several exciting potentials and targets worthy of concentrated exploration,
- (2) Both properties have been recipients of hap-hazard, spasmodic, sporadic operation and exploration programs which leaves much to be desired in the way of a well organized, well planned and executed exploration program to delimit the potential deposits and provide sufficient sound data on which to adequately base a feasibility study for economics and operation,
- (3) The DeSoto property possesses such potentials as oxide copper mineralization on and near surface between the present East and West zones at the mine, sulphide copper mineralization below the oxide copper zone between the East and West zones either as the typical lenticular mineralization common to the area or as a body of disseminated mineralization of sufficient grade to permit open pit operation and thirdly, a virgin area southwest of the present workings.
- (4) The Blue Bell property possesses such potentials as copper oxide mineralization south of the Main Shaft on the Blue Buck patented claim, a mineralized quartz porphyry exposure on the patented Blue Thunder claim, unmined sulphide copper ore below the 1200 level, an unexplored and undeveloped sulphide potential below the 1500 level and the potential of a minimum 20,000,000 gallons water in the flooded Blue Bell mine which could contain "copper in solution" and if not originally pregnant, then utilized to re-circulate with sufficient acid

for copper recovery in a precipitation plant or as a source of "plant water" for a "common flotation mill" serving both properties.

- (5) Each potential by itself cannot constitute a "project", however, collectively considering these potentials could well provide a substantial, unit managed economic operation after exploration results on all the potentials have been thoroughly studied, and
- (6) All potentials can be explored by core drilling, percussion drilling or rotary drilling, the choice being dictated by the potential itself.

### THE PROPERTIES

Mr. Sherwood B. Owens, Tucson, Arizona, is the cyner two properties--Blue Bell and DeSoto Mines.

### (1) DeSoto

This property has 18 patented mining claims, a padented milissite and 14 unpatented lode mining claims, in unsurveyed territory except for a Meridian line, but would be in Sec. 6, T. 10 N., R. 1 E. in Yavapai County, Arizona. (See Claim Map for names).

## (2) Blue Bell

This property has 7 ptatented mining claims and 2 unpatented lode mining claims in unsurveyed territory but would be in Sec. 15 of T. 11 N., R. 1 E. in Yavapai County, Arizona. (See Claim Map for names)

## ACCESSIBILITY

Each property is accessible by automobile -- to certain pointsthe Hot Number Adit Level (600 Lv.) at the DeSoto and the Main Shaft at the Blue Bell.

Travel to each property from Phoenix is north on Interstate Route 17 to the Bumble Bee-Crown King interchange. From this point travel is over a County maintained gravel road through Bumble Bee, Cleator and 1.2 miles beyond to a right hand junction which is the DeSoto Hine access road and marked as such. This access road was constructed and supervised by the writer in year 1957. It is 3.5 miles from this junction to the Mine.

Travel to the Blue Bell Mine from Phonnix is also north on Interstate Route 17 to Cordes-Mayer interchange and then on State Route 69 to Mayer. Just south of Mayer, a County maintained graveled ranchers road bears to the west and then

southward to the Blue Bell Mine--about 4 miles.

Access in a direct route between both properties is only possible by 4 wheel drive vehicles from the Main Shaft at the Blue Bell south to Cleator and then the same route as described previously from Cleator on. The writer completed this trip in year 1957. A more direct new route should be possible but it has not been investigated by the writer.

### HISTORY

Both properties have had an exciting history dating back to the turn of the century. Euch sulphide ore, 3% or better, was mined from eliptical lenses from the surface to the 900 level in the DeSoto and from surface to the 1200 level in the Blue Bell Mine until about year 1923 when both mines were closed due to the low copper price. The lense centers contained 6-7% copper values.

Since the "close down", several lease holders have tried various types of small operations such as mining 3-6% sulphide copper ore from some of the old stopes or pillars for direct shipping ore, shipping 8 to 12% oxide copper ore, utilizing open stopes as leaching vats and filling with surface oxide copper ore and "collecting" the pregnant solution on an accessible old level, some sporadic shallow drilling, etc. All were unsuccessful because each attacked a servation never fully completed and in most cases—all completely completely under financed.

# GENERAL GEOLOGY and MINERALIZATION

The geologic conditions--rock types and mineralization-se state both properties are identical, but ofcourse, each also replants "peculiarities " or digressions, one from the other.

The country rock is schist and related metamorphosed rocks of pre-cambriam age. Each has a strong silicified zone in which copper and pyritic mineralization occurs as eliptical lenses, mostly in echelon both horizontally and vertically with the 70-800 down dip length usually 2 to 5 times the lense strike length.

The ore in each property consists of pyrite, chalcopyrite and some chalcocite-as the lense type mineralization. Each lense, according to old reports, contained up to 6-7% copper and the underground cutoff was 3% copper.

Each property also has an area of oxide copper mineralization closely associated with the lense type sulphide copper mineralization. Each property also has a quartz porphyry closely related to the existing mineralized zone.

### POTENTIAL TARGETS

Both properties have several potential but varied targets, all of which must be considered collectively and explored completely.

Although geological and other information available is not necessarily meager, it is somewhat "piecemeal" - due mostly to the past several "one shot" lease-holders who have carried nothing to completion. Detailed surface geolgical mapping is therefore a definite pre-requisite to adequately "program" exploration plans for the respective targets.

### DeSoto Property

The writer opinions that three potential targets exist the possible property. Previous lease-holders have meagerly sterror ed to singularly explore two of the potentials but again to failed to proceed sufficiently far to obtain adequate information for systematic evaluation.

## Potential No. 1

The first of these targets is the oxide conner area - as a mass - between the present workings (cast zone) and what the writer terms the "west zone". Oxide copper is known to exist as a capping over the "mined sulphides" along the strike of the zone, west into the hanging wall and east into the foot wall. One lease holder drilled 5 holes at the northeast end of the mined zone from surface to depths from 136 to 257 ft. (See Sections "G", "H", "J"). Holes 1, 2 & 3 showed good copper values. Assays for holes 4 & 5 are not available. Another lease holder open pitted an area at the portal of Adit No.2 (Map No. 3), shipped 2,512 tons oxide copper ore from the footwall averaging 1.45% copper in 1968. This area is approximately 300 ft. south along the East ore zone strike from the drilled area. This "bulk sample" grade is comparable to that encountered in the drilled area. Coupling this information with existing geologic evidence would suggest to the writer a half million tons of indicated ore for the drilled area and 1,000,000 tons inferred ore along the strike to the open pit, both to a depth of 150 ft. This tonnage should average 1.2% copper, mostly as oxide.

An earlier lease-holder "leached" the stopes by spraying acid water on the upper stope walls, collected the pregnant solution on the 600 level, precipitated cement copper and shipped 61 to 82% cement in 1961-62. This demonstrates the solubility ease of the existing ore.

The overall target lies between the East and West zones. (See Map No. 3). This 600 foot square is inferred by the existing geologic conditions and this block to a depth of 150 feet could have a 4 million ton potential including the previously mentioned 1,500,000 tons, indicated and inferred.

Airtract holes at a (-) 600 to the southeast and normal

to the regional strike of the formations should be drilled to 200 foot depths on a grid pattern of 100 ft. initially and if radical copper value distribution dictates, then similar drilling at a grid pattern of 50 feet is required. This is a 4 to 8000 foot drill program.

## Potential No. 2

Depth-wise, from the surface to the 600 level and below, the area between the "east zone" and "west zone" has not been explored for sulphide copper mineralization. The writer strongly suspects such mineralization is present-again because of surface geologic conditions observed as well as the limited sampling of the south wall of the 600 level cross-cut between these two zones. True, values are low but trends are indicated. Moreover, the 600 level cross-cut is driven "cutside" of the mineralization in the "east zone". The "east zone" does have a diprake to the southwest and the cross-cut would therefor not exhibit mineralization other than that of a very weak nature.

Being optimistic, but still realistic, this potential block of 600 feet by 600 feet by 400 feet in depth (below the 150 foot depth for the "oxide copper" depth) would indicate a potential of some 11,000,000 tons reserve or combined with the "oxide reserve", a total of 15 million tons of 1.0% copper content.

This block must be diamond core drilled at minus 60° to the southeast and normal to the regional strike of the formations to depths of approximately 750 feet on an initial grid pattern of 200 feet to wide space explore "the block". The previously drilled 200 foot airtrack holes can be utilized - if adequately prepared before hand - thus saving 200 feet of core drilling on each hole. If encouraging mineralization is indicated by the initial core drilling, the grid pattern should be recoined from the duced to a 100 foot spacing and if radical copper values are present then a 50 foot grid pattern is dictated.

This program could require about 10,000 feet or core drilling if carried to completion.

## Potential No. 3

This potential area lies approximately 3500 feet was west of the present workings in the area of the claim known as Favorite, Ironclad and Arizona Chief. The area is not mapped geologically, has a fair amount of soil cover but was traversed by the writer in year 1957 at which time favorable limonitic outcropping areas were observed which could easily indicate strong mineralization in the area. Silicification was also noted.

The initial requirement on this target is a complete detailed geologic mapping and then perhaps a limited geo-chemical program in the soil cover areas - if necessary. A limited drill program could then be planned after a complete analysis of the geologic mapping and geo-chemical survey has been made.

# ANALYSIS of TARGET SUCCESS at DESOTO

The behaviors of mineral deposits are very unpredictable and the two obvious potential targets at the DeSoto are no exception. These targets are categorized as an "oxide tonnage" and 'sulphide tonnage" or as two separate distinct operations. This breakdown would conclude that each class of reserve must contain sufficient copper value to be individually economically successful. A sound exploration program will resolve this question.

One phase to the above "typed" tonnage is the fact that exide copper minerals and sulphide minerals might be so "mixed" that the copper content of each could not individually support separate operations. If the results of the planned exploration program indicate the existence of this criteria, there should be no need for concern because the netallurgical L.P.F. (leach, precipitate, float) or some variation of it, can be successfully and economically used. Inspiration Copper at Miami, Arizona uses this method successfully with their "mixed ore".

There are some indications that this characteristic may exist. It is well known that copper oxide minerals carry to some depth at both the DeSoto and Blue Bell mines - as well as in other mines in the area. There is also an indication of this characteristic in the assay results of three drill holes (SW 1, SW 2 and SW 3) located near the northeast "fringe" of the DeSoto mine zone of mineralization and also located west the projection of stopes to the surface or in the hanging stopp of the mineralized zone and in an area of weak to notice the limonitic decomposed schist as mapped by the writer of the Geologic Map, Sections "H", "J",).

## Blue Bell Property

It is the opinion of the writer that four potentials exist the Blue Bell property and these targets are worthy of consideration and exploration, again, considered collectively, not individually. Together they could provide the basis for an operation and such coupled with the DeSoto potentials could provide an operation of moderate size by todays standards.

Except for a detailed surface geologic map and the writers own knowledge of the property resulting from several visits in the past and his review and study of the small amount of "old information", there is little information available.

None of the four targets have ever been explored and therefor can be considered as "virgin targets".

## Potential No. 1

The main Blue Bell copper sulphide mineralization terminated at the south end by a fault. An underground search for its extension by the "old times" was fruitless. South of this fault and the "Main Shaft", copper oxides are however, visible on the surface in and along the south drainage in an area approximately 200 feet wide and at least 600 feet long.

Several years ago, Mr. C. W. Walker, Mayer, sunk a 50 ft. shaft and drove a 30 ft. west crosscut at the bottom, all work near the "wash" center and about 150 ft. south of the Main Shaft. Copper oxide mineralization is present the full depth of the shaft. Mr. Walker also excavated small pits in the banks of the drainage south of his shaft and each exposes copper oxides. Soil cover and talus in the area prevents complete observation of the suspected wide spread oxide mineralization. Mr. Walkers pit samples suggest in excess of 2.5% copper. Shaft samples by Mr. H. G. Peacock, U. S. S. & R. Co. geologist, averaged 3.5% copper and those for the crosscut averaged 3.23%. He estimated 250,000 tons.

The target area with above dimensions could provide 10,000 tons/ft. depth or 1,000,000 tons to a 100 ft. depth. The writer believes a 1% average could be maintained.

Airtrack drill holes to at least 100 foot depths should be drilled on a 100 foot spaced grid pattern and at 50 foot spacing if erratic values dictate this necessity. Such an exploration program would require 2000 feet or more of the drilling.

## Potential No. 2

This potential is definitely "virgin" as brought to the foreground by the detailed geologic mapping by Manning Cox, prominent consulting geologist.

A mineralized quartz porphyry outcrops on the Blue Thunder claim at the south end of the property. Presence of the quartz porphyry and its associated limonitic gossan staining are very encouraging indicators. Surface dimensions of this target approximate 200 by 400 plus feet but what its behavior would be at depth can not be ascertained at this time. The suspected mineralization would be disseminated copper sulphides.

The writer suggests an initial two hole core drill program directed in a southeast direction at a (-) 60 to 65° degree angle. Results of these holes would determine further drilling requirements. Geophysical surveys may be applicable but further surface work is required first.

### Potential No. 3

This potential involves the use of the water now flooding the Blue Bell mine proper as a source of water and a possible carrier of copper already in solution. The writer estimates in excess of 20,000,000 gallons water available to execute a possible potential.

During operations prior to 1923 there are notes and references to the fact that the mine made "small" amounts of water. It is also reported and noted that the water was acid and carried copper in solution and that at several deep levels near the "main shaft" small precipitational ting tanks were installed to de-solutionize and voice the water of its copper content.

Since the "close down" in 1923, the mine has slowed steadily flooded itself to within about 300 feet surface.

The writer is of the opinion that much of this was considered acidity derived from the pyritic mineralization and include turn the acid water reacted with some of the copper of the minerals known to be present at depth as well as reacting with the sulphide minerals exposed on the walls of the stopes, drifts and crosscuts. Surface exposurewise of the workings, this would represent many many square feet. The very slow ascending rate of water movement, 25 feet per year or about 3/4 inch per day, would allow a fair reaction time.

All the water in the flooded mine <u>will not</u> contain copper because some of it will not have come in contact with the exposed walls of the mine workings. This condition being, of course, a matter of circulation and circulation no doubt was at a minimum -- merely a rising level.

With these conditions in mind, it is the writers opinion that this volume of water could easily contain an average of 5 grams copper per liter (41.8 lbs/1000 gals.) or 836,000 pounds of copper for the estimated 20 million gallons.

The writer is also cognisant of the fact that little to no copper would be present in the water but such thought does not reject the potential target since the important feature of the potential is the volume of water. If mother nature was not successful to the expectations of the writer, it is always possible to add sufficient acid to the water, recirculate same and utilize the mine as a huge leach vat, - the walls of the workings as the ore and for additional ore--from potential No. 1.

The circulation route envisioned is to pump from the

bottom (about the 1200 level) and feed as a spray into the open stopes on the surface. To accomplish this, a six to eight inch vertical rotary hole approximately 1500 feet deep must be drilled accurately to intersect one of the stopes above the 1200 level (See Blue Bell Longitudinal Projection Map).

It is thought that this water could be completely circulated about three times before the ferric sulphate build up became excessive and rendered the water useless.

## Potential No. 4

This target constitutes exploring the lower reaches (below the 1500 foot level) of the Blue Bell mine for additional eliptical high grade copper lenses common to what was mined in the upper level in the early days. If exploration is successful on this target, underground mining would be required. There are several underground mines of economic operation in Arizona.

Old maps indicate that stope preparations were progressing on the 1350 and 1500 levels and that sizeable stopes were in progress on the 800, 1000 and 1200 levels at the time of the "close down". The writer believes much ore remains above the latter mentioned levels.

History-wise, a nearby mine (Iron King) of similar geologic and mineralogic characteristics attained a depth of 2500 feet before it was recently closed down. Mineralization in the district is thus quite deep scated in character and could be expected at a 2000 foot depth at the Blue Bell mine.

An initial two hole core drill program is required to substantiate the existance of copper mineralization at a projected 2000 foot depth near the "main shaft" of the Blue Bell mine. Each hole should be drilled vertically to intersect the continuation of ore lenses designated as No. 1 and No. 45 as shown on the Longitudinal Projectual Engineering tion of the Blue Bell stopes.

The writer estimates a target potential of at 162373 750,000 tons with a grade of 35 copper or better

# ANALYSIS of TARGET SUCCESS at BLUE BELL.

Fortunately each potential is not entire dependent on its and Potential No. 1 and Potential No. 3 can be combined to avoid construction some leach vats.

Similarly, Potential No. 2 and Potential No. 4 can be combined to provide a good grade ore as a mill feed to a flotation mill.

The writer is of the opinion that each potential can be successful in its exploration program. All potentials, when combined, can provide an economic, profitable operation and particularly so if combined with the potentials previously discussed for the DeSoto property.

A "unitized" operation utilizing the two properties will "open up" the immediate and the surrounding area. Many smaller mines would look to this operation to receive their milling ores.

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March 15, 1970

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PAI COUNTY

John to advertisement he DeSoto Mine is owned by Sherwood B. Owens, of Tucson, Arizona. It consists of 18 patented lode locations and one mill site, located in the Crazy Basin Mining District south of Prescott, Arizona at an elevation of about 5,000 feet. The property was formerly operated by the Southwest Metals Company and to the time of shutdown in 1930 had yielded approximately 280,000 tons of 4% copper ore from narrow elongate lenses in the schists. Surrounding these high-grade lenses, the material grades out into barren rock.

The zone which has been explored is approximately 1,000 feet long, 300 feet wide and is open to a depth of about 800 feet. Within this zone are numerous crosscuts. Preliminary sampling made in 1935 by George Colvocoress indicated that the crosscuts in general ran a little better than 1% copper. There are enough of these to strongly suggest the possibility that the entire envelope around the old highgrade orebodies may contain 1% or better copper. If this is the case, there can be as much as 8 to 10 million tons of material grading 1% or better copper which can be mined as an open pit with a 1 to 1 stripping ratio.

Using costs which are current in open pit operations in this area, it would appear that with a 1 to 1 ratio. total mining costs should be about 80d per ton. total milling 80¢ per ton, amortization 50¢ per ton, and general

overhead 25¢ per ton, for a total of \$2.35 per ton. The cost of marketing copper is about 4¢ per pound. This would indicate that recovering 20 pounds of copper from these ores would give a copper cost of about 15¢ per pound. Probably the minimum size plant which could handle 1% rock starting from scratch would be a 2,000 ton mill. Such a mill with its accessory facilities, road, camp, capitalized stripping and preliminary operating costs, will cost not less than 3, and perhaps 3½ million dollars.

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Obviously, the DeSoto is not a proven orebody. but there is a very strong suggestion that a very large amount of copper, possibly as much as 200 million pounds of recoverable copper may exist in the hill. In order to demonstrate the existence of this deposit, it will first be necessary to make a preliminary examination, which I shall do on the 20th of November. If this examination is favorable, it would then seem necessary to spend between \$7,000 and \$10,000 for a detailed sampling and mapping job to indicate the feasibility of further work. If this preliminary work is unfavorable, the property would be dropped. If it appears that there is an excellent chance of developing a major amount of copper, it will be necessary to perhaps do as much as 10,000 feet of drilling, or say \$50,000 worth of drilling. Preliminary access roads, etc. will cost at least another \$25,000.

Recapitulating, it probably will take a minimum of \$85,000. and possibly considerably more to demonstrate

the existence of a major amount of copper at the DeSoto property.

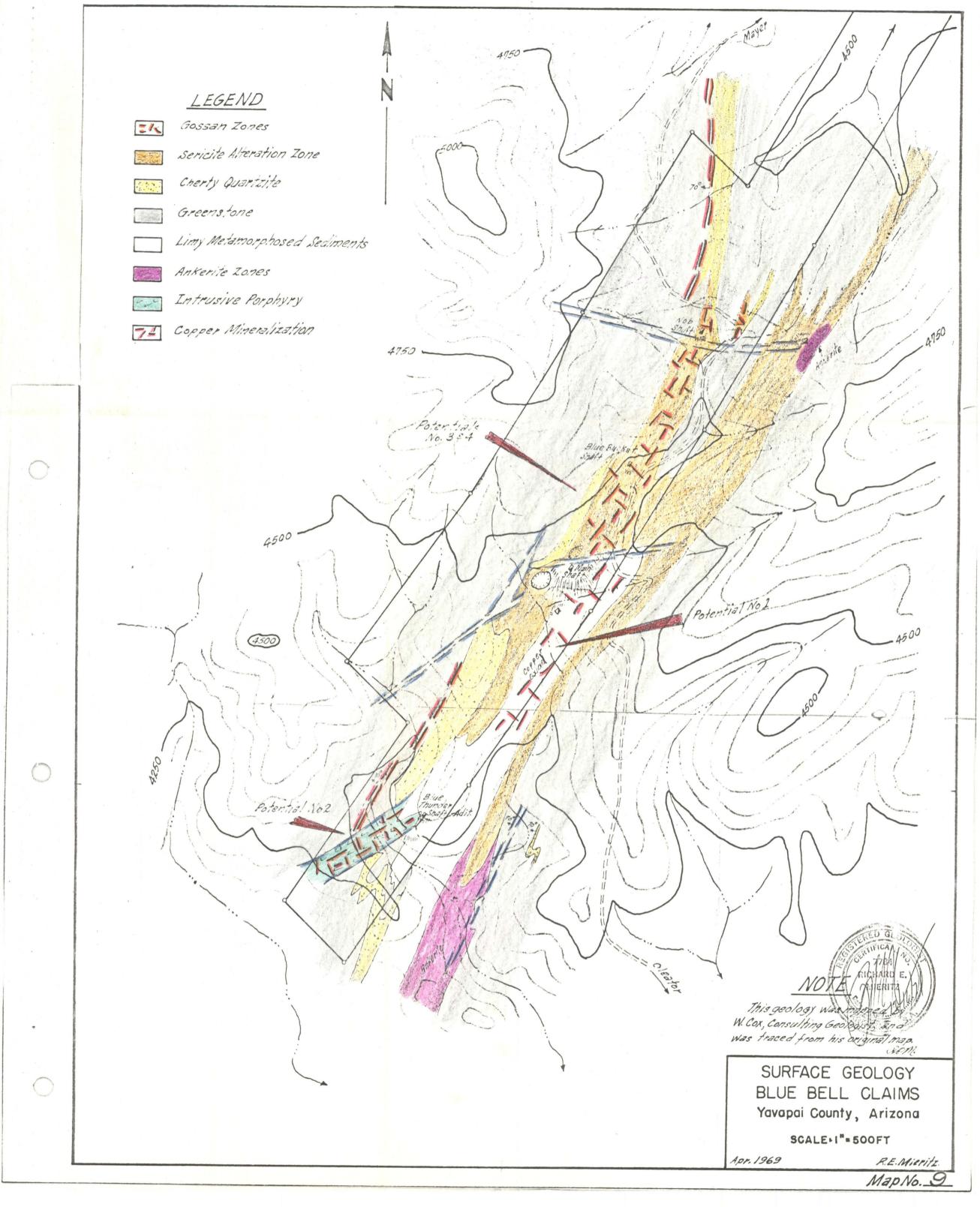
Until I, myself, have had a chance to study the proposition on the ground, I am not in a position to make any recommendations.

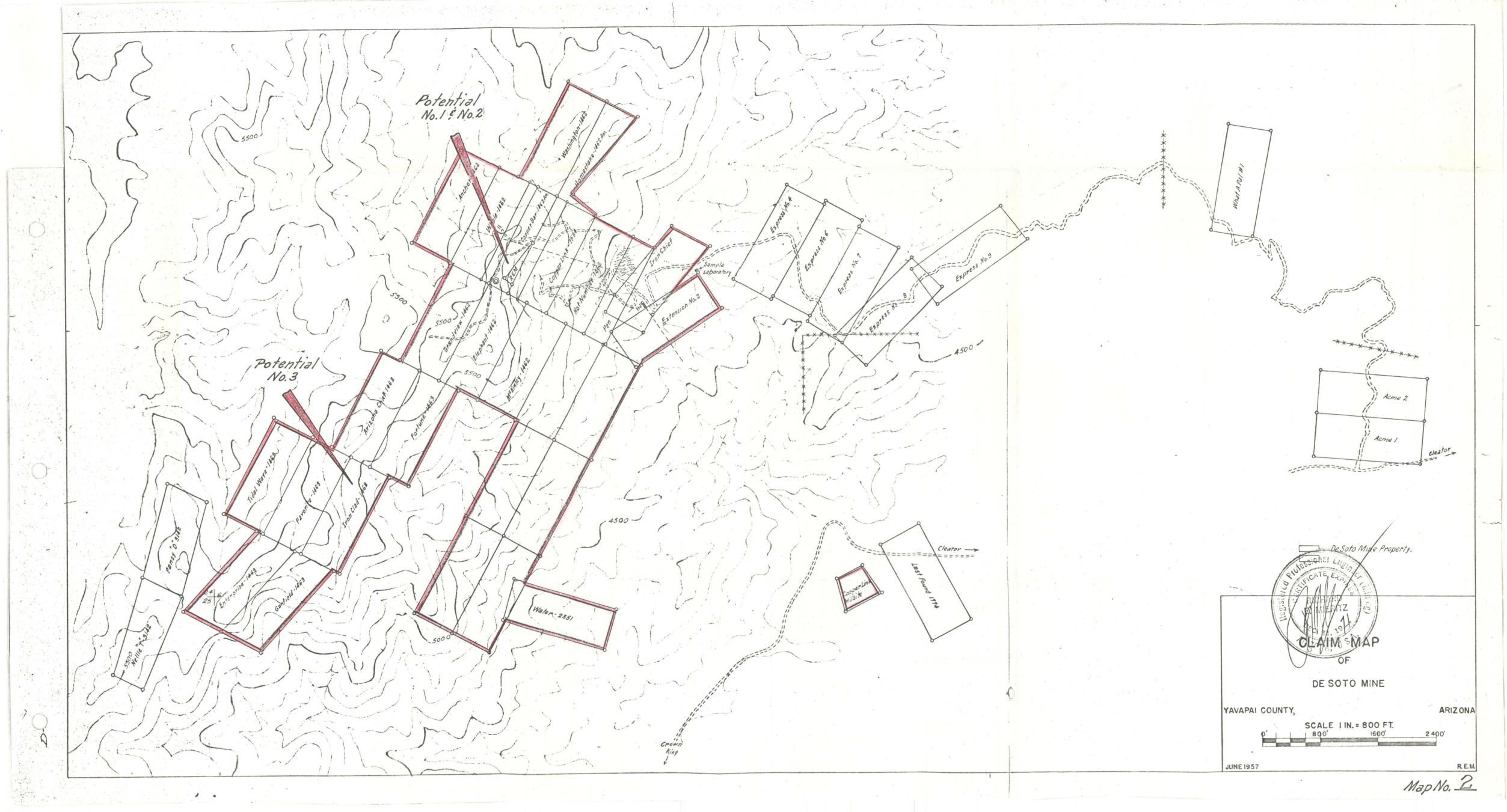
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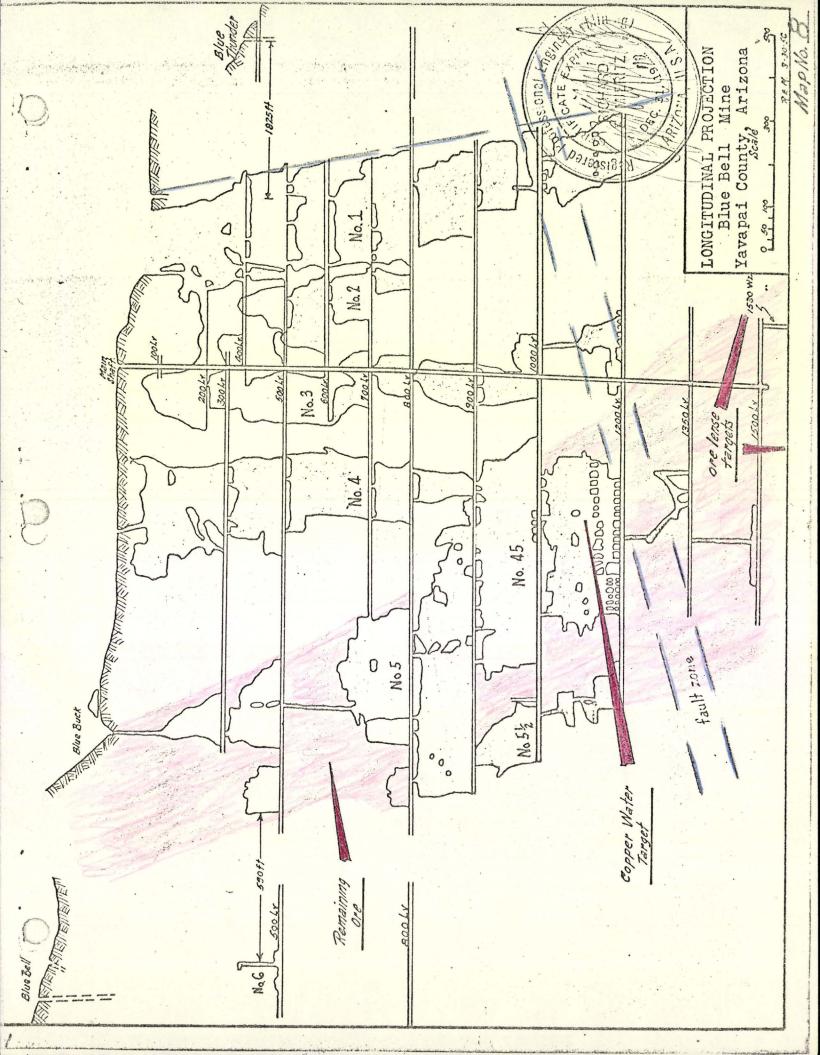
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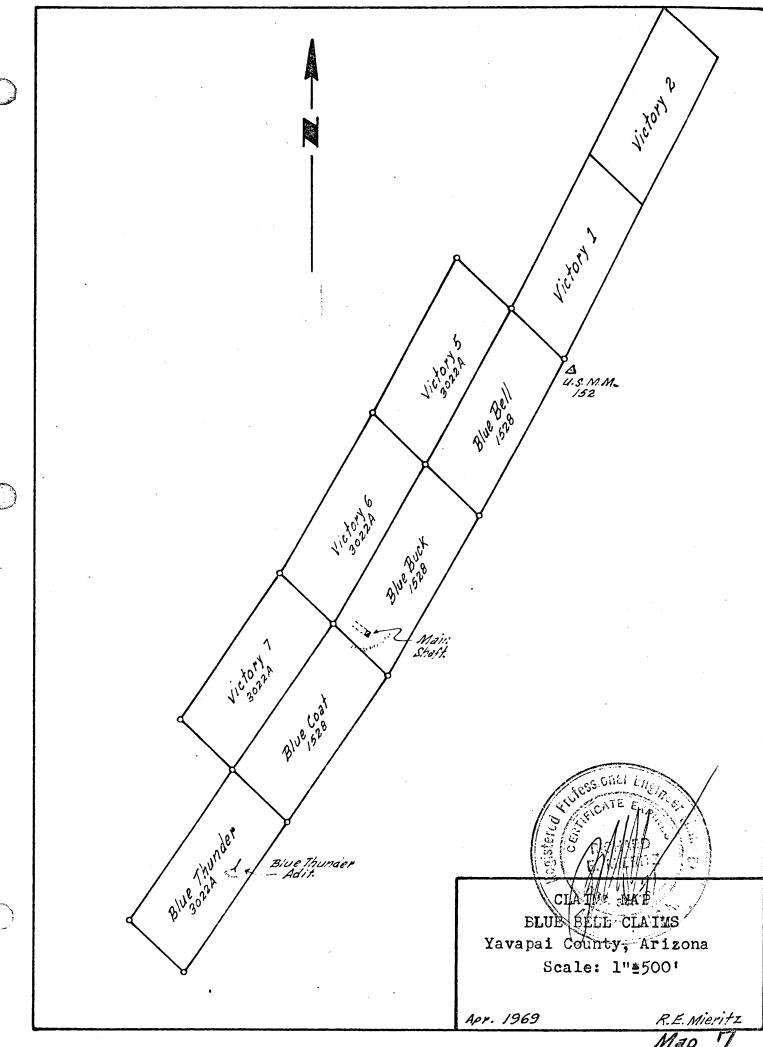
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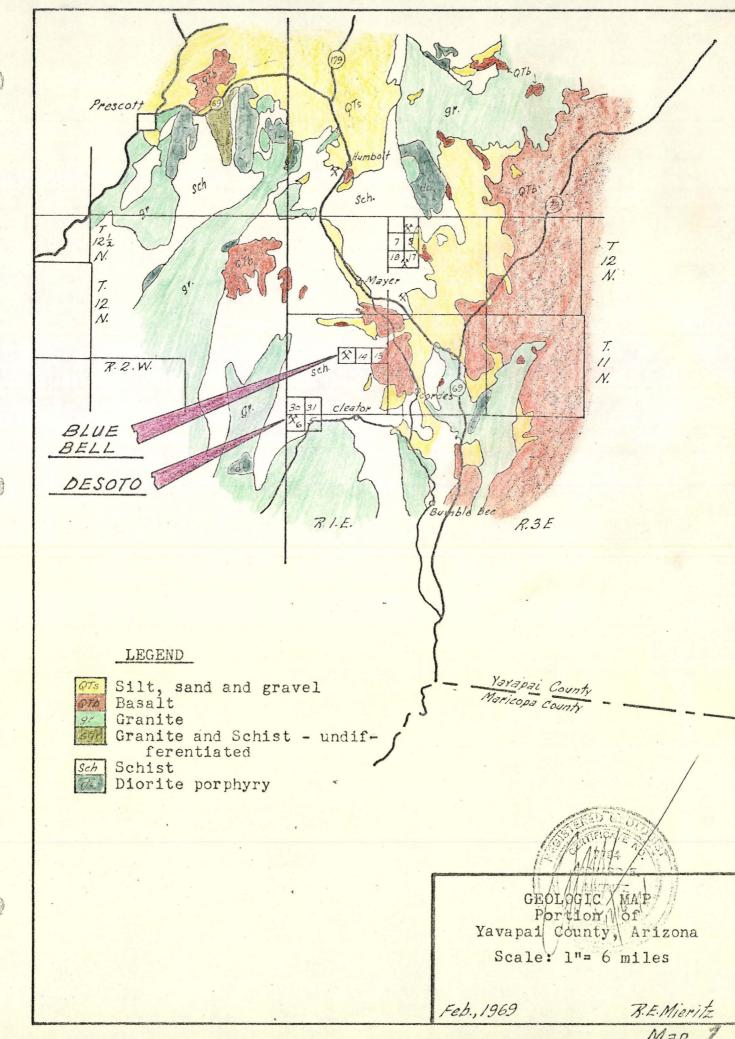








Map



Map