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602-771-1601
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inquiries@azgs.az.gov

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131

45,000 50,000 55,000 60,000 65,000 70,000

R. 12 E. R. 13 E.

T. 3. S.
T. 4 S.

20,000 15,000 10,000 5,000

36 1 6 5 4 3 2

12 9 10 11

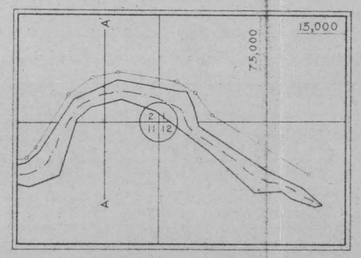
1+6 LOWER RIVERSIDE SITE

3/2 10/11 UPPER RIVERSIDE SITE

9+10

1740 1720 1700 1680

A A



·LEGEND·

Found Corner
Mining Claim

1,000 0 1,000 2,000 3,000
Scale in Feet

DEPARTMENT OF THE INTERIOR
UNITED STATES INDIAN SERVICE
IRRIGATION DIVISION
A. L. WATHEN, DIRECTOR H. V. CLOTTS, ASST. DIRECTOR

SAN CARLOS PROJECT — COOLIDGE, ARIZONA

BUTTES DAM

RESERVOIR

DESIGNED	RECOMMENDED
DRAWN K. M. F. - J.B.S.	APPROVED
TRACED R. L. S. - J.O.B.	
SHEET 2 of 2	SEPT. 15, 1941

OUR MOTTO: — WHAT THERE IS IN IT, NO MORE NO LESS.

EDMUND E. PHILLIPS, Vice-Pres.—Gen. Mgr. M. E. PHILLIPS, Secretary

THE COLORADO ASSAYING COMPANY
(INCORPORATED)

ASSAYERS AND CHEMISTS

303—623-2842 2244 BROADWAY

DENVER, COLORADO 80201 Feb. 6, 1970

REPORT ON DETERMINATIONS MADE FOR—

Mr. S. B. Waters,
872 Davis Drive
Abilene, Texas.

SAMPLE MARKS	METALS	Amount per Ton Ozs.	Amount per Ton Hds.	PER CENT	Value per Ton Dollars	Value per Ton Cents
#1	Gold	.03			1.	05
	Silver	.40				80
	Copper			31.40	251.	20
#2	Gold	.01				35
	Silver	.20				40
	Copper			4.50	36.	00
#3	Gold	trace				
	Silver	trace				
	Copper			0.36	2.	88

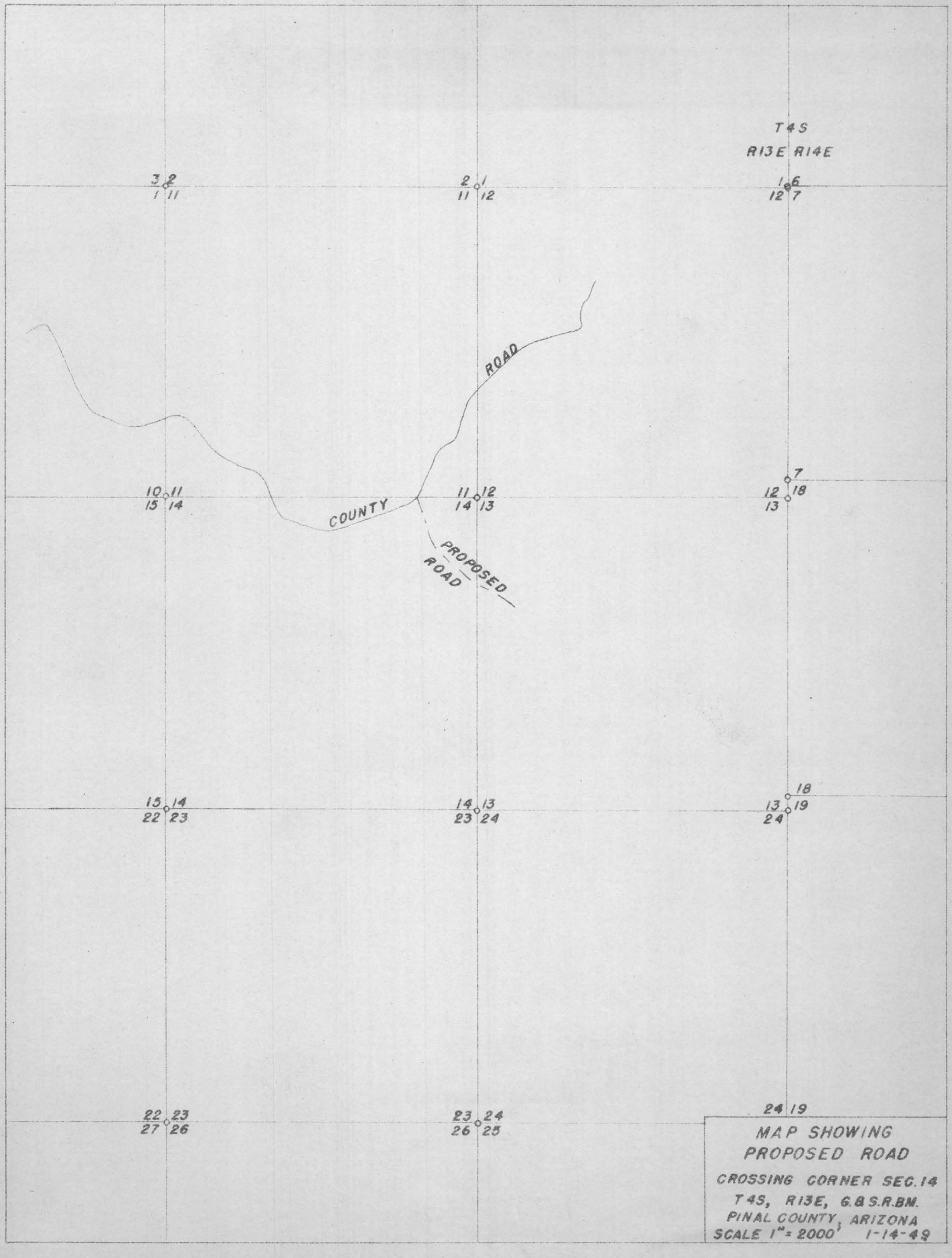
E. L. S. GRADES

GOLD AT $35. PER OUNCE SILVER AT $2. PER OUNCE

LEAD AT _____ PER UNIT COPPER AT $8. PER UNIT

THE COLORADO ASSAYING COMPANY

By Ed Phillips



MAP SHOWING
PROPOSED ROAD
CROSSING CORNER SEC. 14
T 4 S, R 13 E, G. & S. R. BM.
PINAL COUNTY, ARIZONA
SCALE 1" = 2000' 1-14-49

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EDMUND E. PHILLIPS, Vice-Pres.—Gen. Mgr.

M. E. PHILLIPS, Secretary

THE COLORADO ASSAYING COMPANY

(INCORPORATED)

ASSAYERS AND CHEMISTS

303—623-2842 2244 BROADWAY

DENVER, COLORADO 80201 Jan. 21, 1970

REPORT ON DETERMINATIONS MADE FOR—

Mr. Seldon B. Waters
872 Davis Drive
Abilene, Texas.

SAMPLE MARKS	METALS	Amount per Ton Ozs.	Amount per Ton Hds.	PER CENT	Value per Ton Dollars	Value per Ton Cents
Sample from RIVERSIDE Group of Claims	Gold	0.	06		$2.	10
	Silver	1.	20		2.	40
	Copper			7.20%	$57.	60

GOLD AT $35. PER OUNCE SILVER AT $2. PER OUNCE

LEAD AT _____ PER UNIT COPPER AT $8. PER UNIT

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By Ed Phillips

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THE COLORADO ASSAYING COMPANY

(INCORPORATED)

ASSAYERS AND CHEMISTS

2244 BROADWAY

DENVER, COLORADO 80201 April 14, 1970

REPORT ON DETERMINATIONS MADE FOR — Mr. S. B. Waters,
Abilene, Texas.

SAMPLE MARKS	METALS	Amount per Ton Ozs.	Amount per Ton Hds.	PER CENT	Value per Ton Dollars	Value per Ton Cents
#2	Gold	trace				
	Silver	0.	20		$.	40
	Copper			1.86%	18.	60
This is a gossen prospect						

GOLD AT _____ PER OUNCE SILVER AT $2. PER OUNCE

LEAD AT _____ PER UNIT COPPER AT $10. PER UNIT

THE COLORADO ASSAYING COMPANY

By Ed P Phillips

OUR MOTTO: — WHAT THERE IS IN IT, NO MORE NO LESS.

EDMUND E. PHILLIPS, Vice-Pres.—Gen. Mgr. M. E. PHILLIPS, Secretary

THE COLORADO ASSAYING COMPANY

(INCORPORATED)

ASSAYERS AND CHEMISTS

303—623-2842 2244 BROADWAY

DENVER, COLO. 80201 Feb. 24, 1970

SAMPLE SUBMITTED BY

Mr. Seldon B. Waters
872 Davis Drive
Abilene, Texas. 79605

SPECTROGRAPHIC ANALYSIS

SAMPLE NO. RIVERSIDE GROUP
* Claim #1 *

PERCENTAGES ARE APPROXIMATE

Antimony		Indium		Scandium	
Arsenic		Iron	10.-15.%	Silicon	Major
Aluminum	1.-2.	Iridium		Samarium	
Boron	.001	Lanthanum		Strontium	
Barium		Lead	.03	Sodium	.05-.1
Beryllium	.002	Lithium		Tantalum	
Bismuth	.1-.2	Lutecium		Terbium	
Calcium	.5	Magnesium	.2-.3	Thallium	
Columbium		Manganese	.001-.01	Thulium	
Cadmium		Mercury		Thorium	
Cerium		Molybdenum	.002	Tin	.005
Cobalt		Neodymium		Titanium	.03-.05
Chromium	.001	Nickel	.001	Tungsten	
Caesium		Osmium		Uranium	
Copper	.1-.2	Palladium		Vanadium	.002
Dysprosium		Potassium	.03-.1	Yttrium	
Erbium		Praseodymium		Ytterbium	
Europium		Platinum		Zinc	trace
Gallium	.002	Radium		Zirconium	.003
Gadolinium		Rubidium			
Germanium		Rhenium			
Hafnium		Rhodium			
Holmium		Ruthenium			

Uranium, Rare Earths - none.

Gold .02 oz./ton - 72¢ per ton.
Silver .20 oz./ton -40¢ per ton
Copper 34.25% at $9. per unit
-$308.25 per ton.

REMARKS: This sample consists mostly of the bright blue Chrysocolla (copper silicate) and the dark brown impure Chrysocolla (mixed with iron oxide).
The green mineral is Malachite (copper carbonate).
This sample is a valuable Copper ore.

THE COLORADO ASSAYING COMPANY

By Ed Phillips

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Arsenic		Iron	10.-15.%	Silicon	Major
Aluminum	1.-2.	Iridium		Samarium	
Boron	.001	Lanthanum		Strontium	
Barium		Lead	.03	Sodium	.05-.1
Beryllium	.002	Lithium		Tantalum	
Bismuth	.1-.2	Lutecium		Terbium	
Calcium	.5	Magnesium	.2-.3	Thallium	
Columbium		Manganese	.001-.01	Thulium	
Cadmium		Mercury		Thorium	
Cerium		Molybdenum	.002	Tin	.005
Cobalt		Neodymium		Titanium	.03-.05
Chromium	.001	Nickel	.001	Tungsten	
Caesium		Osmium		Uranium	
Copper	.1-.2	Palladium		Vanadium	.002
Dysprosium		Potassium	.03-.1	Yttrium	
Erbium		Praseodymium		Ytterbium	
Europium		Platinum		Zinc	trace
Gallium	.002	Radium		Zirconium	.003
Gadolinium		Rubidium			
Germanium		Rhenium			
Hafnium		Rhodium			
Holmium		Ruthenium			

Uranium, Rare Earths - none.

Gold .02 oz./ton - 72¢ per ton.
Silver .20 oz./ton -40¢ per ton
Copper 34.25% at $9. per unit
-$308.25 per ton.

REMARKS: This sample consists mostly of the bright blue Chrysocolla (copper silicate) and the dark brown impure Chrysocolla (mixed with iron oxide).
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THE COLORADO ASSAYING COMPANY

(INCORPORATED)

ASSAYERS AND CHEMISTS

2244 BROADWAY

DENVER, COLORADO 80201 April 14, 1970

REPORT ON DETERMINATIONS MADE FOR — Mr. S. B. Waters,
Abilene, Texas.

SAMPLE MARKS	METALS	Amount per Ton Ozs.	Amount per Ton Hds.	PER CENT	Value per Ton Dollars	Value per Ton Cents
#1 Sample						
	Sulphur			0.05%		
	Copper			6.72%		

COPPER LEACHING TEST

The Copper ore, containing green Malachite was ground to 30 to 40 mesh.

One portion was leached 48 hours with 2½% (by weight) sulphuric acid solution.
The Copper recovered was 6.66%, or a 99.11% recovery rate.
The sulphuric acid consumed was 426 pounds per ton of ore treated to recover 133.2 pounds of copper.

A second portion was leached 48 hours with a 5% sulphuric acid solution.
The Copper reocvered was 6.68%, or a 99.40% recovery rate.
The sulphuric acid consumed was 706 pounds per ton of ore treated to recover 133.6 pounds of copper.

The acid consumption to treat this ore is quite high, however, the copper could no doubt be recovered satisfactorily and with less impurities by using acid concentrations nearer ½% and not over 1%.

Part of the acid consumed in these tests in recovered when the copper is precipitated as metal.

GOLD AT_____PER OUNCE SILVER AT_____PER OUNCE
LEAD AT_____PER UNIT COPPER AT_____PER UNIT

THE COLORADO ASSAYING COMPANY

By Ed Phillips

SELDON B. WATERS

Mining Engineer & Geologist Consultant Service
Phone 677-6348 - 872 Davis Drive
ABILENE, TEXAS 79605

Arizona Minerals Texas Minerals New Mexico Minerals

Introduction: My Riverside Group of Mining Claims located in Penal County Arizona. These claims are also known as the Lucky Strike Group. This group of claims consist of six (6) claims.

The purpose of this report is to merely acquaint you with the location of the claims and such information that I have ascertained there upon. Included with this we will attach maps and some assay work. The plans I have in mind are simply this:

1. To start mining in a small way.

2. To follow through with a complete exploration program. If such program is as we expect it will be, we plan on building a concentration plant upon the claims.

History: The Lucky Strike claims are in an area that is well known because it is close to the famous Kennecott copper mine at Ray, Arizona. Numerous old prospect pits on the Lucky Strike claims indicate that the area had been prospected long ago; possibly as early as the turn of the century. Some old claim monuments, probably no longer valid, were also observed, one of which was marked Alpha 9, and this probably pre-dates the Lucky Strike claims by several years. It was also possible to identify some newer monuments pertaining to the Lucky Strike claims. Numerous small red and blue surveyors flags found in the area indicate that it had been surveyed by geophysical and/or geochemical methods, probably within the last several months.

Character of the Host Rocks: The prominent hill which underlies the Lucky Strike claims is composed almost entirely of granite of two slightly different types. The principal granitic rock, which appears to be the older of the two types, is composed almost entirely of extremely large grains of quartz and feldspars and a few flakes of mica. It appears to have been intruded by a finer-grained granite or monzonite prophyry in which large phenocrysts of quartz and feldspar are set in a fine grained, greenish gray matrix or groundmass. This rock has been moderately altered whereas the coarse grained granite appears to be perfectly fresh. The younger rock appears to form a very wide, dike-like mass that trends about N. 70-80° E. across the summit of the prominent hill. This younger rock has not been mineralized but mineralized zones occur scattered throughout the older granite.

Character of the Mineralized Zones: Numerous, tabular, vein-like zones occur at random within the coarse grained granite on the Lucky Strike claims. Most of these are shown at an exaggerated scale on the attached geological sketch map. It is to be noted that the mineralized zones seem to be concentrated in three areas, as follows: (1) on the north side of the prominent hill, (2) on the south side of the hill, and (3) within a broad zone lying north of the Kelvin-Florence road.

These vein-like deposits have a strike ranging from about N. 60°E. to N. 80°E. On the west side of the property the veins generally dip steeply to the north and on the east side the dip is teeply to the south, but some of the veins are vertical. These mineralized zones are quartz veins ranging in width from a few inches to about four feet wide. The wall rocks along the veins have been strongly silicified. The veins have been deeply oxidized and the outcrops there are characterized by the presence of limonite, hematite and locally by secondary copper minerals. In some of the outcrops there are veins a few inches wide and a few feet long that are relatively rich in secondary copper, but these seem to be too small and widely scattered to be of much importance.

This writer found no evidence that disseminated copper might be present in the country rock between the veins, however, the lack of evidence may be due partly to the lack of fresh exposures. There is no widespread gossan, staining, or alteration to suggest that the granites contain disseminated copper such as is required for a porphry-type ore deposit. Near the middle of the north side of the Lucky Strike 5 claim there is a small cluster of irregrlar limonite-filled fractures that suggest a stock-work type of structure but it seems to be too small to be of importance. At the present stage of development it appears that the best possibility of producing copper from the Lucky Strike claims lies in the quartz veins, some of which may contain enough copper gold and silver to permit small scale mining and shipping ore directly to a nearby smelter.

Possible drill holes: After mapping the principal mineralized zones on the Lucky Strike claims (see attached map) this writer located sites for five possible drill holes. These are to be inclined diamond drill holes intended to test for copper ore in vein-like deposits and in the country rock on either side of the veins.

It is considered that diamond drilling will be commensed immediately. First to ascertain the thickness of the malchitite copper ore. We know of one hole that was drilled to a depth of 1,850 feet. It showed very good commercial quality starting and continuing of copper ore at a total depth. Kennecott Copper Company is operating open pit at a depth of 1,185 feet and are prepared to carry this open pit several thousand feet more if needed. This purposed exploration will supply me with complete tonage. Also valuable information to evaluate the properties through out, however, estimations have been made by competent mining engineers that we have more than 30 million tons of possible commercial production. If copper is found disseminated in the granite then additional drilling, probably by rotary methods, would be indicated.

Conclusions and Recommendations: On the Lucky Strike claims there are several small vein-like depostis containing quartz, limonite and secondary copper minerals and there is a slight possibility that there may be some copper disseminated in the granite between the veins. To test these possibilities drill sites for five possible holes were prepared from which inclined core drill holes could be drilled across some of the more important mineralized zones. If the wall rock is significantly mineralized then additional drilling, probably by rotary methods would be indicated. If mineralization is confined to the veins then there would be little reason to search for an open-pit ore body, but some of the veins might be mined on a small scale for direct shipment of ore to a nearby smelter at Hayden.

Due to the fact that prior information was ascertained from the surface exposure we have just recently completed roadways covering all the important outcrops. Such outcrops have been stripped of all surface over burdens. As well as a new road that has been built along the riverside of these claims. Building this road we cut through several highly commercial veins containing deposits that will average more than 10% up to 39% copper. We are including one of these with this report. I am offering you this report solely for this purpose, to help make you acquainted with what I consider one of the most outstanding copper ore producing mines that we have in the nation at this moment. It will bear your investigation on the ground, if such investigation is made with competent mining engineers.

We have newly paved highways, railroads on lease, high lines on lease, plus the mighty Gila River which passes the eastern end of these claims.

Respectfully submitted,

Seldon B. Waters

SELDON B. WATERS

Mining Engineer & Geologist Consultant Service
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Arizona Minerals | Texas Minerals | New Mexico Minerals

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VICTOR OPPENHEIM & ASSOCIATES
CONSULTING GEOLOGISTS & ENGINEERS
REPUBLIC NATIONAL BANK BLDG.
DALLAS, TEXAS 75201

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Respectfully submitted,

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CONSULTING GEOLOGISTS & ENGINEERS
REPUBLIC NATIONAL BANK BLDG.
DALLAS, TEXAS 75201

From: John F. White, Asst. Geologist — Safford, Arizona

To : J. Hope, Chief Geologist — April 4, 1950

THE RIVERSIDE COPPER DEPOSIT,

PINAL COUNY, ARIZONA

E. N. PENNEBAKER
POST OFFICE BOX 817
SCOTTSDALE, ARIZONA
85252

Summary and Conclusions

The Riverside copper deposit is in the Tortilla Mountains about 6 miles south of Ray, Arizona. The area consists chiefly of pre-Cambrian granite, quartz porphyry, diabase, and granitic porphyry. In addition, many dike rocks, a small breccia plug, Gila conglomerate, and late gravels occur.

The quartz porphyry, named Sultana quartz porphyry, is older than pre-Cambrian granite and is the oldest rock in the area. Both rocks were injected by large masses of diabase in probably Cambrian time. During Late Cretaceous or Early Tertiary a granitic stock, called the Wilkins granite, was intruded and later thrust faulted over pre-Cambrian granite. After a short interval of time, the area was mineralized by porphyry copper and vein type mineralization.

Post-mineral intrusive activity occurred and was probably associated with the period of Late Tertiary volcanism. Other late events were faulting, development of the Tortilla Range, a long period of erosion, deposition of the Gila conglomerate, and deposition of late gravels.

There have been differences of opinion regarding the age of the diabase in the region. One major intrusion of disbase took place some time prior to the Late Cretaceous or Early Tertiary granitic intrusion. Minor intrusions of similar diabase occurred at a much later time.

Most of the mineralization was concentrated in and near the northeast tip of the Wilkins stock. This area was fractured, altered, and mineralized mainly with quartz, pyrite, and chalcopyrite. Recent oxidation has produced a leached capping. The late history of the Range and other evidence indicates shallow

oxidation accompanied by very minor enrichment.

Introduction

The Riverside deposit is in the Tortilla Mountains near the Gila River and is 6 miles south of Ray and one mile south of Kelvin. The elevation ranges from 1700 to 3000 feet.

Physical Features

The Tortilla Mountains are a northwesterly trending range of the Basin and Range type with a prominent structural valley on the east. The Gila River occupies the valley to a point northeast of Riverside and then makes a sharp bend westward cutting across the Range just to the north of the property.

The topography in the Riverside area is especially rugged and steep. Most areas contain little or no soil, or vegetation. Rapid erosion is in progress and has been influenced by the effects of mineralization and structure. The mineralized areas are more resistant to erosion, the two largest areas forming exceptionally steep sided hills. Other major features are the two largest washes, Evans Wash and Copper Canyon, which were developed along strong faults.

History

A considerable number of old workings occur, the most extensive being those of the Arizona Sultana. The production of the area is not known but is probably very small. Two holes were churn drilled about 1912. Reportedly, one hole indicated 60 feet of "concentrating ore."

The present work dates from the scouting of the Tortilla Range in the summer of 1948 when a porphyry copper type of mineralized area

was found. Detailed mapping on plane tables commenced in October 1948, and the more important areas were completed by April 1949. The work was done by Vern Tompkins and myself.

ROCK TYPES

Pre-Cambrian Granite

One of the oldest rocks is coarse grained, porphyritic granite similar in texture, composition, and weathering to the pre-Cambrian granite of the Range. Approximately 6 miles south in the Tortilla Range, the granite is overlain by the pre-Cambrian Apache group in depositional contact.

Sultana Quartz Porphyry

The quartz porphyry east of Evans Wash, hereafter referred to as the Sultana quartz porphyry, is distinct from the Wilkins granite and associated quartz porphyry near Copper Canyon. The Sultana quartz porphyry covers a large area east of Evans Wash and is intimately associated with pre-Cambrian granite. It is found also west of the Wash but only as a few small patches also in pre-Cambrian granite.

The quartz porphyry shows considerable variation from place to place. In general it appears to be a remnant, older rock that was partly assimilated by pre-Cambrian granite. The contacts with pre-Cambrian are everywhere extremely gradational, irregular, and spotty. A large body of solid quartz porphyry breaks into small irregular patches of decreasing size and frequency away from the main body. The small, isolated patches at places a few inches in size, appear to be inclusions in the pre-Cambrian. Thus the placing of contacts is somewhat arbitrary and many small patches of quartz porphyry and areas of slightly modified pre-Cambrian were mapped as pre-Cambrian granite.

Typically, pre-Cambrian granite grades to a light gray, fine grained, granitic rock with large quartz phenocrysts. In places the rock resembles the quartz porphyry associated with the much later Wilkins granite. In places the ground mass is finer grained than the Wilkins and is close to aphanitic, but all variations up to normal pre-Cambrian occur. Several parts contain quartz grains elongated and oriented in parallel directions. The grains are anhedral, as much as one-fourth inch long, and glassy when broken. The ground mass is grainitic, fine grained, and contains clear quartz, a clear glassy feldspar, and a white frosty feldspar. The color of the rock varies from light gray to light pink. Muscovite and chlorite are common. Some areas are composed of an intermediate rock half way between well developed quartz porphyry and normal pre-Cambrian granite.

The relative ages of the two rocks are open to question. No case of pre-Cambrian granite cutting quartz porphyry was observed. The inclusions probably indicate the quartz porphyry is older than at least some of the granite. One small dike of quartz porphyry cuts both pre-Cambrian and Sultana quartz porphyry. Exactly similar dikes cut diabase which is later than the Sultana quartz porphyry. These dikes are probably associated with the Wilkins granite.

Diabase

East of Evans Wash are large bodies of diabase which intruded pre-Cambrian granite and Sultana quartz porphyry. The diabase is similar to the diabase occurring throughout the Range and in many places in the region. It is medium to coarse grained but due to alteration the grain size is difficult to estimate.

Irregular shaped, roughly parallel bodies, many of which are dike like, cut pre-Cambrian granite and Sultana quartz porphyry. This produces a roughly north-south, banded appearance to the area.

The diabase contacts are irregular, block like, and mostly steep dipping. However, in several places sill like bodies of flat dip are present. Most of the contacts are sharp, but in one place diabase partly assimilated pre-Cambrian granite. Diabase grades into granite within a short distance and contains feldspars and quartz of the granite in the intermediate zone. In some places the feldspars of the granite have been pinkened along the border zone. Generally the diabase is finer grained on the edges. Minor faulting has occurred along some of the contacts. The nature of the contacts indicates the diabase was emplaced by displacement of the surrounding rocks along planes of weakness.

Some difference of opinion exists as to the age of injection of the diabase regarded as probably Mesozoic by Ransome, younger pre-Cambrian by Darton, and post-middle Cambrian by Short. They considered there were or might be in the case of Ransome two ages of diabase intrusion one major and one much younger and of minor importance. The work in the area supports the concept of one, relatively old, major intrusion, and much younger minor intrusions.

Granitic Porphyries

Much of the Range shown as pre-Cambrian on Ransome's generalised map is composed of fine grained granitic porphyries occurring as large dikes and irregular stock like intrusions ranging from granite to quartz diorite in composition. During a fairly long interval, related rocks of varied granitic composition were emplaced under approximately similar

conditions. The age of intrusion is regarded as Late Cretaceous to Early Tertiary. In the area mapped these rocks have been grouped into quartz porphyry and Wilkins granite and are regarded as parts of the same rock body.

Wilkins Granite and Quartz Porphyry

The large area of Wilkins granite and quartz porphyry near Copper Canyon is part of a large, irregular shaped stock enlarging to the south which intruded pre- Cambrian granite.

The rock is light colored, harder, and more resistant to erosion than the pre-Cambrian granite. The texture is generally porphyritic, but the number of phenocrysts vary. The phenocrysts consist of medium grained quartz and in places some feldspar. The number of quartz phenocrysts ranges from very few to abundant. If phenocrysts were abundant, the rock was called quartz porphyry, and if phenocrysts were widely scattered, it was called Wilkins granite. In places the number of phenocrysts changes considerably within a few feet. The ground mass of Wilkins and quartz porphyry is identical and is fine grained and granitic. No cross cutting relations or contacts were seen. There seems no reason to consider them as different rock bodies but merely as small local variations within one intrusion. Hereafter both rocks will be referred to as Wilkins granite.

The intrusive contacts with the pre-Cambrian are irregular and steep. The contact zone is generally fairly sharp being gradational within a few feet. Typically the Wilkins will grade into rock containing quartz phenocrysts, then into rock containing quartz and feldspar phenocrysts, and finally into usual pre-Cambrian. The quartz and feldspar are distinctive to the pre-Cambrian granite and are regarded as unreplaced quartz and feldspar.

As well as being in intrusive contact, the Wilkins is in fault contact with the pre-Cambrian. The dip of the fault known as the Flat fault ranges from 10 to 30 degrees southerly. The Wilkins was thrust faulted north over pre-Cambrian an unknown distance.

Complementary Dikes

The oldest dikes are complementary to the Wilkins granite. They are few in number, weak, unpersistent, and usually are under one foot side but range up to 6 feet wide. Some are near the stock and were cut by later satellitic dikes. Other similar dikes cut pre-Cambrian granite and diabase east of Evans Wash and indicate the Wilkins is younger than the diabase. Although the Wilkins is not in contact with diabase in the area, similar fine grained granitic bodies intruded diabase in other places in the Range.

Satellitic Dikes

Felsic and mafic dikes intruded Wilkins and pre-Cambrian granite. They are numerous, persistent, and are abundant in the pre-Cambrian north of the Wilkins. Composition ranges from rhyolite to andesite porphyry to diabase. The texture grades from aphanitic to fine grained and feldspar phenocrysts are common except in the very basic members. The dikes range in width from a usual four feet up to 20 feet. The time of intrusion is closely placed being after solidification and cooling of the Wilkins and before mineralization.

The basic dikes are probably younger than the acid. However, only two cases of definite cross cutting were observed. In both cases basic dikes, approaching diabase in composition, cut the light colored, acid dikes.

The prominent east-west dike structure contrasts with the conspicuous north-south structure east of Evans. Almost all of the dikes have a fairly

constant east-west strike and steep dip chiefly to the south.

The occurrence of a different, somewhat similar, diabase as satellitic dikes adds further weight to the argument that the Wilkins granite is younger than the large diabase bodies to the east, and also that there was one, relatively old, major diabase intrusion and later minor intrusions which were separated by a large interval of time. At several places dikes of different composition occupy the same fracture zone. Thus light cream colored dikes, andesite porphyry, and diabase occupy the same zone and in places occur side by side. The satellitic diabase bodies are closely related to the other satellitic dikes in closeness of occurrence, time of injection, size, and structural trend. They are also much more altered than the diabase to the east, and in places they grade into an andesite porphyry containing feldspar phenocrysts. All of these characteristics are in contrast to the eastern diabase and can be grouped as; extreme differences in size, striking differences in attitude, and differences in association, in alteration, and probably in composition.

Post-Mineral rocks

Several types of post-mineral rocks occur, including andesite dikes, diabasic breccia, later andesite, a quartz porphyry dike, Gila conglomerate, and late gravels. The igneous rocks may be associated with the Late Tertiary volcanism of the region.

Andesite Dikes

Two large andesite porphyry dikes occur east of Evans Wash. Both trend north-south and have similar characteristics. The largest is 75 feet wide and is just east of the Wash. Its surface weathers white giving the appearance of rhyolite. However the fresh surface is medium

dark gray. The groundmass is aphanitic and surrounds large plagioclase phenocrysts. The dike cut a small granitic dike which is probably a Wilkins complementary dike. No mineralized zones cut the andesite, and it is probably post-mineral.

Diabasic Breccia (Basic Breccia on Map)

A small plug like body, approximately 1000 feet across, lies on the east side of the Evans fault. It is composed of a mixture of older rock fragments solidly held together by a younger diabase. Fragments and magma were injected into pre-Cambrian granite, Sultana quartz porphyry, and diabase. Minor faulting and minor assimilation accompanied the intrusion.

The composition of the breccia is variable. A small part on the northeast margin is composed predominently of brecciated quartz porphyry and pre-Cambrian granite with little or no diabase. One part contains large amounts of quartzite, limestone, diabase, granite and other rocks. The western part is composed chiefly of diabase and smaller amounts of pre-Cambrian granite and quartz porphyry.

The fragments are generally angular and range in size from a few inches to 12 feet or more. Many of them are partly replaced on the edges by younger diabase which is very similar, altered, and difficult to distinguish from the older diabase. The younger diabase is finer grained and at least in places somewhat lighter in color.

An eastern division of the breccia, containing quartzite and other distinguishing fragments, were mapped separately. The contacts between the two parts are fairly sharp and may indicate slightly different ages of formation. The fragments found in the eastern part were pre-Cambrian granite, Sultana quartz porphyry, diabase, parts of the pre-Cambrian Apache

group, Troy quartzite, and limestones. The most abundant fragments are quartzites which in places compose most of the rock. Most of them are part of the Dripping Spring quartzites and are similar to those found in the southern part of the Range. Troy quartzite is also represented but in smaller amounts. Barnes conglomerate, Pioneer shale, brown and light gray massive limestones, and minor amounts of other fragments including muscovite schist, and fine grained, cleavable, gray shale are present. Epidote is common along the edges of granitic fragments. Isolated mineralized fragments occur within the eastern breccia and indicate conclusively that it is post-mineral.

The breccia area to the west contains diabase, pre-Cambrian granite, quartz porphyry, and andesite dike fragments. All show considerable effects of assimilation by diabase along the edges. Epidote developed particularly on the boundaries of diabase and pre-Cambrian granite. The supposed older and younger diabase could not be distinguished, and parts of this area indicated on the map as breccia may be chiefly older diabase.

The contacts of breccia with pre-Cambrian granite, quartz porphyry, and diabase are fairly sharp, block like, and intrusive. Some of them show minor effects of replacement and faulting.

Breccia Dike

A dike of breccia intruded diabase about 3000 feet south of the breccia plug. It is composed principally of rounded, stream like pebbles held together by a small amount of aphanitic, greenish rock. The pebbles are rounded fragments chiefly of pre-Cambrian granite, but some are diabase and Sultana quartz porphyry. They range in size from sand to 4 inches across. In places the dike resembles sandstone and in other places conglomerate.

Gila Conglomerate

Large quantities of Gila conglomerate were deposited in the valley east of the Range and also to the west. Only one relatively small body is present in the area mapped. Here the Gila is in fault contact with pre-Cambrian granite, Sultana quartz porphyry, and diabase. The fault is narrow, strikes northerly, and is approximately vertical.

The Gila is typical but unusually coarse especially in the southern part where there are boulders as much as 10 feet across. It is composed mainly of pre-Cambrian granite and subordinate amounts of diabase.

The bedding is poorly developed and attitudes are difficult to measure. The strike is about N. 20 W. and the dip steepens from 45 degrees east to 75 near the contact. The same steepening was noted near the older rock contact about 5 miles south. The dip of the Gila in the main part of the valley is gentle usually to the east.

Late Gravels

The late gravels, perhaps in part Pleistocene, are of four distinct types and include cemented gravel, Gila River gravel, wash gravel, and talus.

Cemented Gravel

Conspicuous, brightly colored, strongly cemented gravels are common in Copper Canyon. They occur in patches chiefly along the bottom of the Canyon and are as much as 10 feet thick. Small patches are also on the west side of Evans Wash and on the east and west sides of Copper Canyon.

The gravels are confined to the large mineralized areas and are very locally derived. They are composed of sharply angular, poorly sorted fragments which range in size from sand to boulders. At least most of the material was derived almost in place, and little downstream transportation

could have accompanied its formation. Red, yellow, and brown limonite cements are most common. In spots or beds, green and blue copper carbonate cements the fragments, in other locations black manganese oxide is the cement. The dip where measurable is slightly north, but in many places no bedding is present.

At one time the cemented gravels were much more extensive than at present. They are being worn down, and due to their resistance to erosion large boulders of the cemented gravel are common. The present bodies are erosional remnants of gravels that once filled parts of Copper Canyon and Evans Wash. Cemented gravels occur at elevations up to 200 feet above the Canyon floor. These gravels are not forming at the present time and the conditions of formation must have been different. Evidence suggests they were formed after a time of rapid erosion which formed the present valleys, and during a time of aggradation or filling of the valleys. This would explain the more local derivation compared to the present wash gravels; the occurrences as erosional remnants both on the valley floor and high up on the valley sides; and the formation and deposition of the large amounts of cement which are not now forming. The combination of rapid erosion followed by aggradation would be especially favorable for leaching. Thus relatively unleached gravel would be available to supply the cement as the present capping is almost completely leached. Since the formation of the gravels, renewed downcutting has taken place and scoured out most of the older gravel.

Boulders of a hard, distinctive andesite are present over much of the area even on hilltops and ridges. Their source is a large dike located about one-half mile south of the mapped area. The occurrence of the boulders also suggests that at least a large part of the area was covered at a recent time by valley fill from the higher parts of the Range to the south.

Gila River Gravel

In the bend of the Gila River a considerable area is covered by stream gravels as much as 50 feet thick. They lie in a flat position overlying Gila conglomerate and older rocks.

Small areas and remnants of these gravels also occur over much of the remaining, relatively flat area near the Arizona Sultana. More recent erosion has modified the area by cutting shallow, steep sided gulleys and leaving remnant stream gravels on higher ground. The Gila River must have been several hundred feet higher than at present and moved several thousand feet to the north during Recent time.

Wash Gravel and Talus

The main washes, Copper Canyon and Evans Wash, contain the typical, loose, unconsolidated wash gravel of the region.

An appreciable thickness of talus is rare as almost the entire area is bedrock. Several feet of talus have accumulated in places along the west slope of Copper Canyon and overlie pre-Cambrian granite. In places it is loosely held together by caliche.

AGE RELATIONS

		Probable Age
Oldest	1. Sultana Quartz Porphyry	Pre-Cambrian
	2. Pre-Cambrian Granite	"
	3. Apache Group	"
	4. Troy Quartzite	Cambrian
	5. Diabase	"
	6. Wilkins Granite	Early Tertiary
	1. Acid and Basic Dikes, including Diabase	
	2. Mineralization	
	7. Andesite Dikes	Late Tertiary
	Diabasic Breccia	
	Andesite Dikes	
	Quartz Porphyry Dike	
	8. Gila Conglomerate	Pliocene
Youngest	9. Late Gravels	Pleistocene and Recent

FAULTING

Several periods of faulting occurred. The oldest faulting was minor and connected with the intrusion of the diabase. A period of faulting was associated with the Late Cretacious or Early Tertiary granitic intrusion and is represented by one major fault and a large number of minor breaks which accompanied dike injection and mineralization. Faulting took place along with the later period of dike intrusion and also accompanied the formation of the Range. Two large faults the Evans and Riverside are post-mineral.

Flat Fault

Although faulting probably preceeded and accompanied the granitic intrusion, no positive evidence of this is shown on the area. However, soon after solidification of the Wilkins granite, a portion of the Wilkins was thrust faulted over pre-Cambrian granite an unknown distance.

This fault, called the Flat fault dips from 10 to 30 degrees southerly and strikes in general northwesterly. The fault zone thickness ranges from 3 to 30 feet. It contains heavy gouge and breccia. Parts of the fault on the west side of Copper Canyon are mineralized thus dating its movement closely. The eastern portion of the fault may have had a small post-mineral movement.

Minor, abundant faulting accompanied dike injection and mineralization. A distinct characteristic of this age of faults is their prominent and constant strike approximately east-west and steep dip generally to the south. Almost all of these faults are either mineralized or occupied at least in part by dikes. The amount of movement in general was small and in some of the mineralized zones amounted to only a few feet.

Riverside Fault

The Riverside fault, which is well exposed along Copper Canyon, cut the Flat fault and displaced the mineralized areas. The strike is northwesterly and the dip is from 50 to 80 degrees east. The width of the fault zone ranges from 2 to 10 feet.

The fault is definitely post-mineral. All of the large number of mineralized zones are displaced, and the fault zone shows no effects of mineralization. Breccia fragments contain mineralized fractures. The fractures of each fragment are oriented at random in contrast to the constant attitude outside the fault. The fault is post-mineral and pre-cemented gravel.

Movements were considerable. A consideration of all the features on the opposite sides of the fault indicate a northward and downward movement of the east side. The order of magnitude of the movements is 700 feet on the strike plus about 200 feet of vertical movement. Thus a probable horizontal displacement on the order of 1000 feet is indicated.

Evans Fault

The Evans fault is the largest and divides the area into two contrasting parts containing different rock types and different structural patterns.

The fault strikes northerly through Evans Wash and is only exposed in the southern part of the area. Here the fault zone is up to 50 feet side, contains heavy gouge, and dips about 80 degrees. Clay alteration is prominent along the fault zone.

The dating of the origin of the fault is not possible due to lack of eivdance. However, large movements have taken place since the intrusion of post-mineral dikes and the diabasic breccia.

Gila Fault

The Gila fault separates Gila conglomerate and older rocks and is probably part of the fault zone that occurs along the front of the range. The fault is narrow, strikes northerly, and is vertical.

The older rocks have been faulted up against Gila conglomerate. The sharp steepening of the Gila dip towards the fault also suggests the western block moved upward. The age of the last movement is post-Gila conglomerate and pre-Gila River gravel.

MINERALIZATION

Mineralization occurred throughout the area but was concentrated in and near the northeast tip of the Wilkins stock. This area, consisting of pre-Cambrian and Wilkins granite has been fractured, altered, and mineralized by porphyry copper type mineralization.

Four distinct mineralized parts occur. The northeast and northwest parts are in pre-Cambrian granite, the southwest part is entirely in Wilkins, and the southeast part is in Wilkins and pre-Cambrian granite.

Age of Mineralization

Although the time of mineralization was closely associated with the time of emplacement of the Wilkins stock, it was distinctly later and separated by several events which must have taken considerable time. After emplacement of the stock and after a presumably long period of crystallization, the Wilkins was thrust faulted over pre-Cambrian granite. Also numerous pre-mineral dikes differing in composition and age were injected. Thus periods of cyrstallization, faulting, and dike injection took place after emplacement of the stock and before the period of mineralization.

Primary Mineralization

Primary mineralization closely followed and accompanied fracturing and alteration of the rock bodies. The minerals introduced were chiefly quartz, relatively large amounts of pyrite, and smaller amounts of chalcopyrite. They were deposited chiefly as veinlets along fractures and also as disseminated particles.

The vein quartz shows considerable variation in texture and mode of occurrence. It is generally fine grained and is at places microcrystalline.

In places small druzy cavities contain crystals as much as one-fourth inch long. The quartz occurs as small veinlets throughout the large mineralized areas and also in shear zones. More than one age of quartz is present as some cross cutting quartz of different color and texture occurs.

Although the surface is well oxidized, small specks and veinlets of pyrite are common. Pyrite was by far the most abundant primary mineral and occurred as veinlets and disseminated particles. At least much of the pyrite is later than much of the quartz. Pyrite and fractures originally containing pyrite cut across quartz and also often lie in the center portion of quartz veinlets.

Chalcopyrite was noted in only four places in the large mineralized areas, but indications of its presence before oxidation are common. Chalcopyrite occurred chiefly in veinlets but also as small disseminated grains. The chalcopyrite in the main areas is in small remnant veinlets or grains which are usually partly replaced by secondary chalcocite. Just to the west of the mapped area, chalcopyrite veinlets are present over a distance of 100 feet. Some of the shear zones east of the main area contain a few specks of chalcopyrite.

Assays of the capping indicate low values of gold and silver on the order of a trace of gold and a few hundreths of silver. Other primary minerals are localized along shear zones and may occur locally in the capping.

Fracturing

The overall fracturing and formation of veinlets varied in intensity, in width, and in composition of veinlets in different areas. The area containing the greatest intensity of veinlets is in the southwest body on the Eagle Eye claim. Here the major veinlets occur every two or three inches. The area containing the thickest veinlets, often one-half inch wide is in the northwest pre-Cambrian body.

The fracture pattern or veinlet pattern is prominent and is composed primarily of one strong system of fracture which have a predominent attitude of N. 85 E. and dip 85 degrees south except in the north pre-Cambrian areas. This is a representative average of the fractures in this system. Along with the prominent pattern are weaker patterns which may locally be prominent. In the north pre-Cambrian area the pattern is not as definite and varies more. A representative attitude is N. 80 E. and dip 70 degrees south. In general almost all the mineral age structures, including vein type mineralization, have a prominent and constant attitude. The most common attitude is N. 80 E. and dip 80 degrees south.

Alteration

Hydrothermal alteration was closely associated with mineralization and has effected all mineralized areas. The areas are generally well bleached, but the rock ranges from one composed of chlorite and fresh feldspars to one completely altered and composed of sericite and quartz.

One type of alteration and perhaps mineralization produced chiefly fine grained silica, minor amounts of sericite, and some clay. The silica is white to cream colored and microcrystalline. In places a breccia of silica was recemented with similar fine grained, chalcedonic material. The replacement of the original rock at places was so complete that all indications of original texture and composition were destroyed. These high silica zones are distinct from the ordinary quartz mineralized shear zones and are wide lens like outcrops which are almost confined to the pre-Cambrian granite. The outcrops have the same, common attitude as other mineral structures and stand out as prominent, rough, east-west ridges. In conclusion part of this type of alteration may have been associated with oxidation and surface processes, or most of it may have been primary quartz mineralization.

Intense alteration to clay occurred in a few small areas and may be hydrothermal. A zone in pre-Cambrian granite along the footwall of the Flat fault contains considerable clay and is as much as 150 feet wide. Strong mineralized zones extend up to the clay zone but do not enter it.

A light pink to maroon tint is noticeable in the feldspars of the Wilkins granite. This color is confined to the mineralized areas, occurs only near the surface, and is probably associated with oxidation or other surface processes.

Oxidation

Oxidation of the original sulphide areas has produced limonite colored hills. The cappings in Wilkins granite are maroon tinged and are visible from a considerable distance whereas the pre-Cambrian areas are light brown and inconspicuous.

The entire surface is well oxidized and leached. Limonite, chiefly after pyrite, is the most common oxidation product and occurs in the usual variety of forms. Jarosite and other similar oxidation products are common and widespread.

Indications of Copper

The indications of copper in the leached capping are chiefly chalcopyrite boxwork and limonite after chalcocite. These indications were used to grade the areas shown on the map as to original, relative copper content. The areas of best capping lie to the west of the Riverside fault and consist of two small areas, one in pre-Cambrian and one in Wilkins granite. On the eastern side of the fault the better capping is in pre-Cambrian granite.

The rock type seems to have influenced oxidation and the formation of chalcocite limonite. Pre-Cambrian granite contains almost all chalcopyrite boxwork and very little chalcocite limonite. Wilkins granite contains almost

all chalcocite limonite and relatively small amounts of chalcopyrite boxwork. This situation occurs over the entire area and is particularly noticeable at contacts where the boxwork type changes within a few feet.

Chalcocite is present as a few isolated remnants in several locations in both Wilkins and pre-Cambrian granite. The best specimens were found in pre-Cambrian west of Evans Wash and consisted of veinlets of partly replaced chalcopyrite and in some cases pure chalcocite. In a few places in Wilkins granite some pyrite was lightly replaced by chalcocite.

Small specks of occasional green copper and turquois are widely scattered in the capping. Green copper is also present in some of the workings, in the cemented gravels, and in a halo as much as 50 feet wide almost surrounding the northwestern pre-Cambrian capping. The larger amounts of green copper do not occur where the limonite content is high.

Depth of Oxidation

Evidence indicates the depth of oxidation is shallow on the order of 100 feet. The evidence consists of the shallow depth of sulphides in and near the mapped area, the amount of sulphides and their wide distribution in the capping, and the post-mineral history of the area.

A large body of well mineralized granite containing large amounts of pyrite is about one-half mile south of the mapped area. A 300 foot shallow tunnel cut fresh pyrite throughout its length. About 1500 feet west of the mapped area is a 100 foot zone containing chalcopyrite veinlets. To the east near the Sultana Arizona, oxidation extends deeper probably to about 100 feet. Scattered sulphides occur throughout the capping and in the shallow workings. Some show sulphides practically at the surface. However, the deepest workings which are about 70 feet still show mostly oxidized material.

It is agreed that much of the oxidation leading to the enriched ores of Ray and Miami took place in pre-Dacite time. In these areas little erosion has taken place on the old pre-Dacite erosion surface. At Riverside the Dacite does not occur even on the highest peaks of the Range. Rapid erosion has taken place, and oxidized capping now present formed in post-Dacite time. Physiographic and structural evidence of the area and Range also indicate general rapid erosion in more recent time with minor breaks in the rapid erosion allowing some local depth to oxidation and perhaps some enrichment.

In conclusion, if it is agreed that oxidation, leaching, and enrichment take a long period of time under essentially static conditions, no great depth of oxidation, leaching, and enrichment can be expected.

Vein Type Mineralization

Vein type mineralization producing chiefly mineralized shear zones occurred throughout the area but was concentrated in the pre-Cambrian granite particularly to the north and east of the porphyry copper mineralized areas.

A maze of mineralized shear zones lie to the north. They follow the common east-west trend of mineral age structures and are as much as 50 feet wide. Many of the zones are highly altered and contain mainly fine grained silica, sericite, and limonite after pyrite. Some copper indication are present locally. The outcrops are typically rough, hard, and limonite stained.

A contrasting type of shear zone, called basic zones on the map, is in the same area. These are dark in color and show up as dark parallel zones which follow the common attitude of mineral age structures. They range from a few feet to 100 or more feet in width. The fractured pre-Cambrian granite was altered by the introduction of iron. In places it is completely

or partially replaced by hematite and magnetite. In general replacement was less intense and occurred mainly along fractures. It formed mainly dark, fine grained minerals probably iron silicates and some hematite and magnetite. In many places the outcrops are dark red stained. This is characteristic of the presence of copper particularly in basic rocks of the Riverside area. Copper carbonates are also common.

The Flat fault on the west side of Copper Canyon contains a small vein composed of oxidized lead minerals, and small amounts of copper, silver, and gold. The vein is about 10 inches wide and unpersistent. A similar vein occurs in one place on the eastern side of the Canyon. The mineralized shear zones south of the main area resemble those occurring on the north, except few basic zones are present. In general they are highly siliceous, and in places contain green copper and the dark red varnish or stain previously mentioned.

Arizona Sultana Mine

Mineralization in the Sultana area produced small mineralized shear zones as much as 15 feet wide. The more important zones cut a 500 foot north-south band of diabase. The cross cutting zones dip steeply usually 80 degrees south and strike about east-west. Movement on these fractures was small, the horizontal component amounting to a few feet with the vertical movement perhaps somewhat greater.

Hypogene mineralization introduced a small amount of quartz, considerable pyrite, some chalcopyrite, and low values of gold and silver. Some alteration accompanied mineralization bleaching the diabase to light gray within and close to the shear zones.

The zones are well oxidized. Practically no boxwork can be found, but the dark red limonitic varnish is common. In places siliceous limonite

of the same color replaced chalcopyrite and pyrite. Veinlets of green copper are common. Pyrite, chalcopyrite, and very small amounts of chalcocite and covellite occur on the mine dumps.

Breccia Mineralization

Isolated mineralized fragments occur in the diabasic breccia plug and range from a few inches to 10 feet across. Most of the large fragments are almost entirely hematite and magnetite with little or no copper. Some small fragments up to 6 inches in size contain appreciable chalcopyrite and copper carbonates. Limonite psudomorphs after pyrite, garnets and quartz veinlets are also present. Diabase and limestone constitute many of the mineralized fragments. The percentage of mineralized fragments in the breccia is small probably not more than one percent.

April 4, 1950

JFW/mc

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MEMORANDUM

FROM John Hope, Chief Geologist — CITY Kimberly, Nevada

TO A. J. O'Connor, General Manager — DATE July 5, 1949

SUBJECT MEMORANDUM ON THE RIVERSIDE PROJECT

Churn drill hole R-6 was completed on June 25th, at a depth of 457 feet. The data on the hole are as follows:

Hole: R-6
Claim: Sorrell Pup
Lot: 148,507 N
Dep: 145,995 E
Elev: 2200'

Assay Log:

10' to 105' - Trace of copper
105' to 120' - 0.27% Cu. as chalcocite, cuprite, and chalcopyrite
120' to 160' - 1.19% Cu. as chalcocite, cuprite, and chalcopyrite
160' to 240' - 0.34% Cu. as chalcocite, cuprite, and chalcopyrite
240' to 295' - 0.07% Cu. as chalcocite and chalcopyrite
295' to 457' - Trace of copper

Geologic Log:

0' to 110' - Partially oxidized pre-Cambrian granite
110' to 315' - Mineralized and pyritized pre-Cambrian granite
at 315' - Water Table
315' to 457' - Lightly mineralized and pyritized pre-Cambrian granite.

- - - - - -

With the completion of hole R-6, drilling at Riverside was suspended. The total footage drilled on the project to date is 2,064 feet, some 136 feet short of the footage contracted for with Wininger Brothers.

The question has now been raised as to whether another hole some 200 feet to the south of R-6 would be warranted. The 40 feet of ore cut by R-6 between 120 and 160 feet averages 1.19% copper. However, of this percentage, approximately 13% of the copper content is contained as copper oxides, mainly as cuprite. Subtracting the oxide content gives a millable grade of 1.04% copper.

Hole R-6 was drilled in what was believed to be the most favorable point in this area of pre-Cambrian mineralization. Considerable relief limonite after chalcopyrite and chalcocite was mapped in this area and it was hoped that the primary mineralization would be strong enough to make a body of primary ore. As may be noted in the assay log of R-6, primary copper as chalcopyrite drops off rather rapidly below 240 feet and the bottom 162 feet contained only a trace of copper. It is rather evident, then, that the hoped for primary copper is not present. It is probable that the secondary ore column cut by R-6 extends for some distance laterally but no reason is known why the thickness or grade should improve.

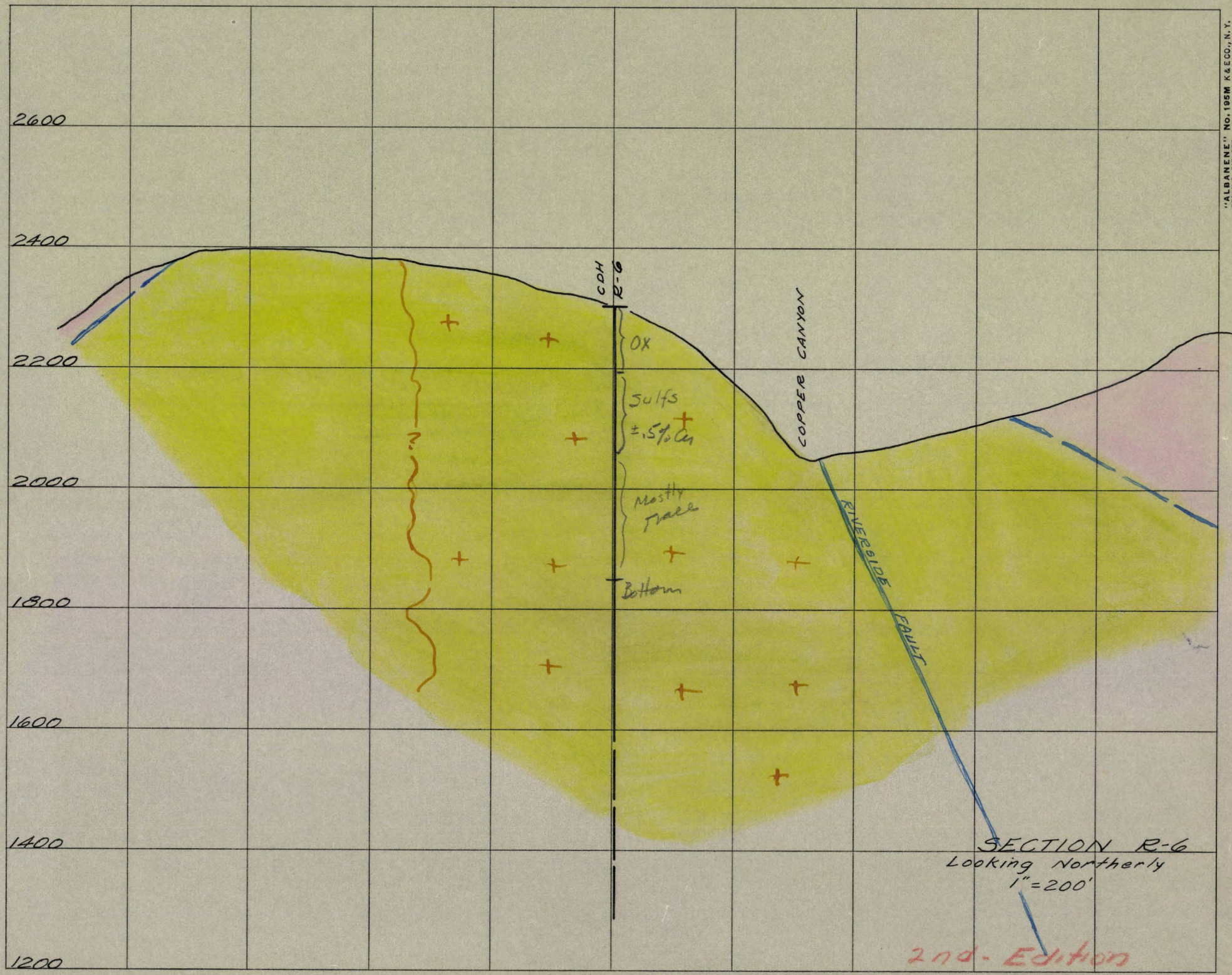
The drilling of another hole at Riverside would involve the expenditure of upwards of $5,000.00. A short but expensive road would be required and drilling costs in the pre-Cambrian granite are rather unpredictable. Such funds would be better spent on the Safford project where the possibilities appear excellent.

It is recommended, therefore, that the consideration of any further drilling on the Riverside project be deferred until the Safford project has been thoroughly investigated.

JH/ms
cc - Mr. E. N. Pennebaker

E. N. PENNEBAKER
POST OFFICE BOX 817
SCOTTSDALE, ARIZONA
85252

John Hope



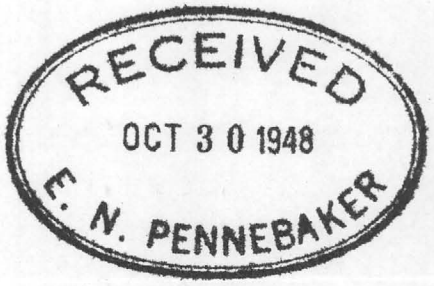
SECTION R-6
Looking Northerly
1" = 200'

2nd - Edition

LAW OFFICES
GUYNN & TWITTY
TITLE & TRUST BUILDING
PHOENIX, ARIZONA

C. LEO GUYNN
HOWARD A. TWITTY

October 29, 1948



Mr. E. N. Pennebaker
Box 2996
Globe, Arizona

Dear Penny:

The only drawings that I had on the proposed Buttes Reservoir project were three copies of sheet 2. Sheet 1 shows contour lines West of the land shown on sheet 2. I did not get copies of sheet 1 since it covered land several miles to the West of the Kelvin area.

If you would like copies of sheet 1, I will be glad to send for them.

With kind personal regards we remain

Very truly yours,

GUYNN & TWITTY

By Howard A. Twitty

HAT:ap