CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

ARIZONA CONSOLIDATED GOLD AND COPPER MINES COMPANY

1951

To Charles H. Running
Director Mineral Research Dept,
Phoenix Arizona
with My compliments
John F Johnson

A REPORT

TO THE STOCKHOLDERS

OF

ARIZONA CONSOLIDATED

GOLD AND COPPER MINES COMPANY

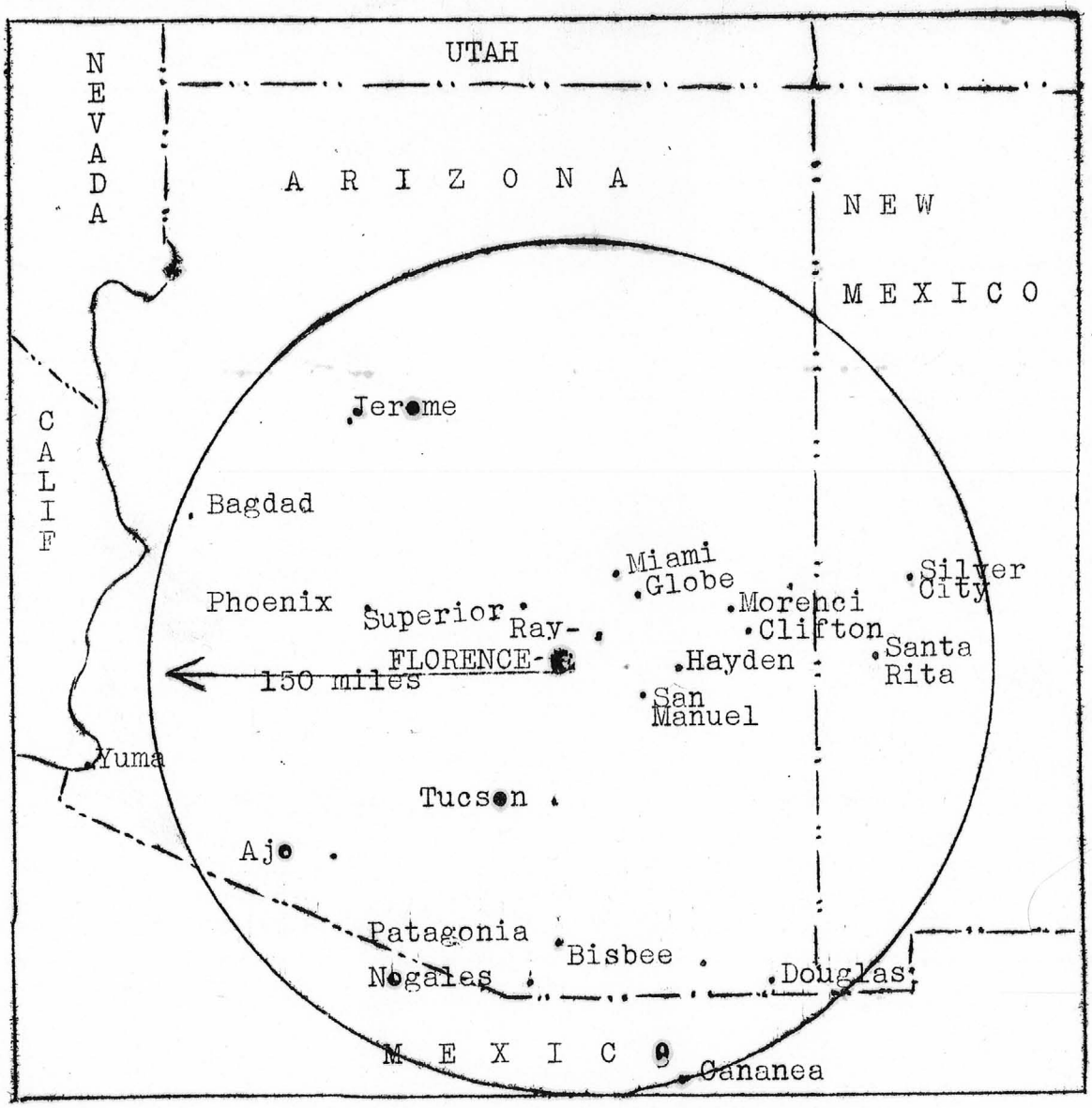
HOME OFFICE

122 SOUTH MESA BOULEVARD

MESA, ARIZONA

MAY 25, 1951.

THE WORLD'S FOREMOST COPPER MINING REGION is sketched below. Arizona, long recognized as the lead-



ing copper producing state in the United States, now is producing close to half of the nation's entire copper out-put.

In the 300 mile wide circle, shown above which embraces a part of New Mexico and the northern part of the Republic of Mexico, is found more copper production than in any area of like size in the world. Often described as the "lake" of all of the copper mines of the region, by noted geologist and mining engineers, is the property of the ARIZONA CONSOLIDATED GOLD AND COPPER MINES COMPANY near Florence, Arizona. Located in the center of the region the property is believed to be the richest undeveloped copper field in the world.

THE STORY OF

ARIZONA CONSOLIDATED GOLD AND COPPER MINES CO.

Secrets of the Red Hills

Eighty miles east of Phoenix, capital of Arizona, lie the Red Hills. Hidden beneath their cacti studded knolls is believed to be the richest, undeveloped copper field in the world.

On the surface the Red Hills hold a wealth of beauty. Giant sahuaro, prickley pear and many other kinds of cacti contrast beautifully with the red of the hills. All this beauty, together with the 365 days of sunshine for which the hills are famous, make it an ideal picnic location.

But the Red Hills were not always safe for picnicers. Once harsh yells of victorious Apaches echoed through its draws and gullies. Indians, led by the fearful Geronimo, swooped and preyed on lonely prospectors to revenge for wrongs, both imagined and real, and left their victims bleeding to forever stain those low brooding hills a copperish red.

The Red Hills heard not only the sound of Apache war screams but also the rhythm of marching feet. General Miles and his gallant band of 500 Mormon soldiers, called the Morman Battalion, marched over the property on their way to Tucson during the Mexican War of 1848.

But the urge of man to discover the gold, wealth and fame hidden by the earth, defied even slow starvation, blinding thirst or sudden death which the hills held. One of these venturous men of fortune was Juan Dearmitt, born near the Red Hills, raised in the shadow of the mysterious Superstition Mountains and nurtured on stories of the treasure waiting to be discovered by the "lucky" prospector.

While Jacob Walsh was guarding the secret of his fabulous "Lost Dutchman Mine", Juan Dearmitt prospected and searched through the Red Hills for thirty-four years. His sole companion during the last twelve years was an old white dog, Blanco, who was stone deaf but possessed a good nose and kept his master's camp cleared of Arizona's deadly rattlesnakes. During this time he found and mined gold, silver and copper.

"Times have changed", says old Juan looking into the dimming past, "the people and even the weather has changed. There used to be more rain. Many white cranes could be seen on the old Gila; ducks and geese came by the thousands. Why, even the rattlesnakes are nearly all gone. The desert flora itself has changed. Out here in the Red Hills where I prospected for years it is safe for anyone now, but in the early days it was a dangerous spot. It was an Apache hangout, and many a gold seeker left his bones here. I remember my father had a partner whose name was Dick Halstead. Halstead was inclined to prospect occasionally and once he wandered off into the Red Hills where he received much encouragement. As his trips to the Red Hills became more frequent, my father warned him the Apache would get him. But Halstead was a good shot and a fearless man; he also rode a horse that he placed great faith in. The horse had been trained to follow while his master would run and shoot. One day Halstead went into those hills with a man named Pierson. Suddenly they were attacked by Apaches. He put up a running fight and played his part well; his horse followed just as he had been trained to do, and when the shooting was over the faithful animal stood by with shivering flank and distended nostrils,

waiting to be mounted, so he could leap to safety with is master. But Halstead never mounted his horse again."

At last reaching the age of eighty and having a bad heart, old Juan gave his mining claims to his nephew, Ben Alvarez. Not being a mining man Alvarez sold his uncle's claims to John F. Johnson.

John F. Johnson was born in Santa Barbara, Brazil. At the age of one his parents returned to their native Sweden where Johnson was raised and educated. In 1913 he came to the United States where he served in the first World War. Before coming to the Red Hills he prospected in Idaho, Utah and other parts of Arizona. When Johnson saw the Dearmitt claims he knew immediately that they held a vast wealth of copper ore.

But John Johnson was faced with a problem. Being a man of vision in addition to having a great deal of mining experience, he could see that this was a vast copper field that extended far beyond the Dearmitt claims. The entire area must be held by one concern or nothing but conflict would arise. There was much work to be done in locating all the ground under one head and he dared not employ white men to help him for fear they would stake out claims for themselves.

He spent six years in surveying and mapping the many ore out-crops and at the end of this time had located more than 1600 acres of copper bearing ground.

How well he kept the Red Hills to himself was shown later when the property inevitably came to the attention of the larger copper companies. Their engineers were astounded to find such a property under their very "noses" and never to have heard of it before.

During the six years Mr. Johnson labored to collect this wealth under one head, he found that the Red Hills still held danger and adventure. Twice he almost lost his life. On one occasion while working in a shaft, he was watching 35 pounds of dynamite being lowered to him on a rope when suddenly it broke. The dynamite came hurtling down, bringing with it certain death. But luckily a ladder leaning at an angle broke its fall. Although every stick of dynamite was broken, it did not explode and Johnson, weak and shaking, climbed safely out of the shaft.

Another time, while working in a 4 by 10 foot shaft, Johnson shouted for the man on top to throw down a coil of hose. Unknown to either man, a large rattlesnake was coiled up in the hose. Just as the top man was about to throw it down the hole, he was attracted by the antics of their cat, Merinda. She was behaving just as she did when she saw a rattlesnake. This put the top man on guard and he saw the snake among the hose. Had it not been for Merinda, hose and snake would have joined him in his 4 by 10 foot shaft. No doubt Merinda was treated like royalty for a considerable period thereafter.

In 1945 Johnson wrote to his brothers, Carl and Kenneth, who lived in Bridgeport, Connecticut, and whom he had not seen for about 35 years. He told them he owned a large copper property near Florence, Arizona, and invited them to come and see it for themselves. Carl came to Arizona in May and became very enthused. He returned to Connecticut and with Kenneth and some close friends gathered all the money they could to help push this great venture.

During the time John Johnson was surveying the Red Hills he was having a great deal of trouble with his eyes. One day

fortune smiled on him in the form of two men, Dr. Phil H. Loveless and C. C. Pemberton, who came from Phoenix to visit the mine. Loveless, a nationally noted eye surgeon, noticed the trouble John was having. He suggested that he come to his Phoenix office for a check-up. Dr. Loveless became interested in both Johnson and his property. He performed one operation on his eyes and flew with him to Indianapolis, Indiana, where two more operations were performed. Although one eye was completely gone, 70% vision was retained in the other.

Loveless and Pemberton became interested in the mine. Their friends too joined in the venture and the ARIZONA CONSOLIDATED GOLD AND COPPER MINES COMPANY was born. The firm was incorporated under the laws of the State of Arizona in 1948.

Geologist, H. N. Wolcott,
Engaged to make Geological
Reconnaissance Report

In December of 1946, prior to the formation of a corporation, Mr. Johnson engaged the services of Mr. H. N. Wolcott, geologist and mining engineer registered by the State of Arizona, to conduct a geological reconnaissance on the claims which at this time numbered only thirty. Mr. Wolcott is nationally known and his findings and opinions are highly regarded in mining circles. The purpose of the report of an independent geologist and mining engineer was to confirm Johnson's own findings in regard to the property. The report would also show if other engineers shared the same viewpoint as ours as to procedure in the development of the property.

Johnson was quite pleased with Mr. Wolcott's report and continued on with his work of development and the acquisition of additional claims until now, in 1951, the property consists of

ninety claims. Seventy-three of these claims are owned entirely by the corporation and the balance are under the absolute control of the corporation and will shortly be entirely owned by our firm.

Report of Geologist and Mining Engineer, H. N. Wolcott

The report of Mr. Wolcott made in December of 1946 is too long to reproduce in its entirety at this time but here are a few direct quotes from the report:

"All claims are full size (600' x 1500') and are held by location in the name of John F. Johnson, Mesa, Ariz. The property lies approximately four miles north of the Florence-Ray Highway, with which it connects by a very well graded road. To reach the mine from Florence requires about 25 minutes of easy driving, and the road can be traveled in any season of the year. Copper smelters at Superior and Hayden are approximately 40 miles distance from the property and each may be reached either by railroad from Florence as the shipping point, or direct by truck haulage on good highways. A high-tension power line from Coolidge Dam crosses one corner of the property, but no effort has been made, as yet, to utilize this power."

Topography

"The topography around the Arizona Copper Group is marked by low, rolling hills and fairly wide, shallow sand-washes. There are no precipitous slopes, and any point on the property could be made accessible to

trucks or cars with a minimum of expense. The average elevation is 2,000 feet above sea level".

GEOLOGY

"Rock Formations

Granote and quartz-monzonite are the predominant basal rocks in this locality, and certainly they are the oldest. The granite is, in all probality, pre-Cambrian in age, and the quartz-monzonite may be equally as old. there is yet, however, no clear evidence upon which to base any estimate as to relative ages of the two formations."

"Structure

The most notable structure feature in this locality is a series or system of roughly parallel east-west faults and fracture zones which appear over an area of several square miles. Within the boundaries of the Arrizona Copper group the fractures are closely spaced--so close in places that they give almost an appearance of sheeting. A great majority of these faults and fractures exhibit a remarkable uniformity of strike and dip. The average trend is about N80°E, and the dip varies from verticle to about 75° to the northwest. Between the major breaks there is a network of minor cross-fractures, but none of these shows any evidence of appreciable movement. They were probably caused by stresses which developed in the blocks between the faults. Although the the cross-fractures do not have a marked uniform strike-trend as that of the

major fracture zones, there is a noticable tendency toward a N45°E direction. This diagonal trend suggests a lateral movement off the fault blocks as well as a verticle or steeply inclined movement of normal faults. No evidence of thrust faulting has been observed in the area. Most of the faulting probably took place during the intrusion of the granite and quartz-monzonite by the later rocks mentioned above."

Mineralization and Ore Occurrence

Iron usually in the form of amorphous hematite, but sometimes as platy specularite, is present in the fractures throughtout the property. In the hills described as the 'dome', iron mineralization has discolored the rock between fracture-zones, giving the entire surface a conspicuous dark red color. Quartz also is plentiful and, associated with iron, it forms prominent out-crops along the fault fissure veins. Silification has also occurred along all of the major fracture-zones.

Copper may be found, usually as chrysocolla, sometimes as malachite, in practically every fracture on the property. It occurs on or very near the surface in small lenses and stringers, and in many places it is in sufficient quantity to constitute a low-grade ore."

"The depth to which oxidation may extend in this property can be determined only by exploratory work, but it is probable that this depth will not be excessive. Active operations on an adjoining property have recently encountered chalcopyrite in a vein at a depth of 150 feet, and there is no reason to doubt that similar conditions exist in the Arizona Copper Group.

The most highly mineralized area in this group of claims is an area approximately 2,000 feet wide and 4,000 feet in length, and includes the Red Hills which have been mentioned above.

Conclusions and Recommendations

Surface showings on the Arizona Copper Group are remarkably good. The continuity, uniformity, and the abundance of mineralized fracture-zones and fault fissure veins are such as to justify the expectation that they will persist to a considerable depth. The widespread distribution of oxidized copper on the surface indicates that there is a good chance for satisfactory ore-bodies below the leached surface material."

"It is considered highly probable that high-grade copper ore may be encountered along some of the fault fissure veins on the property. Particular attention is directed to two strong veins which outcrop on the Arizona Copper No. 1 Claim. One of these out-crops shows only iron and quartz on the surface. The other shows copper at various places. It is believed that

proper exploratory work on either vein would prove to be well worthwhile. Many other veins on the property appear to offer very attractive prospects, but the two mentioned above are outstanding.

The justification for a reasonable amount of exploratory work on the Arizona Copper Group cannot be too strongly emphasized. The choice as to the method must, of course, be governed by the expense involved. In view of the extensive area upon which information would be desirable, drilling would secure more comprehensive results than actual underground work. Diamond drilling would be preferable to churn drilling - at least for the preliminary work - since the veins and fractures dip steeply, and an inclined hole would be much more in the nature of a structural cross-cut. If ~~churn~~ Diamond drilling should encounter disseminated copper ore-bodies, churn drilling could follow later for blocking-out purposes".

"In conclusion, it seems worthwhile to repeat that the surface showings on the Arizona Copper Group are such as to thoroughly warrant a reasonable expenditure for the purpose of exploring this ground below the zone of leaching and oxidation."

(Mr. Wolcott recommended in his report that should diamond drilling be decided upon, four areas should be explored first. These were: west end of Arizona Copper Claim No.1; north side of Arizona Copper Calim No. 20 (somewhere near midway between end lines), near center of Arizona Copper No. 19 Claim, and the eastern part of Arizona Copper No. 22 Claim)

Between December 1946 and the Spring of 1951 many many prominent engineers and geologists requested and were granted permission to visit our property. The visiting engineers of some the country's largest mining corporations made wonderful comments on the property but would put nothing in writing as the desire of their corporations was and still is to acquire our property for as low a price as possible. Any report that they might write would only strengthen our corporation's position. The visitation of "other corporation" engineers continues yet and there have been many proposals but none have been, in the judgement of our directors, sufficiently favorable and to the best interest of the stockholders.

Combined Metals Reduction Company

In the Spring of 1948 the Combined Metals Reduction Company of Salt Lake City, Utah became extremely interested in our property and sent down two engineers who spent several days and much time going over the property making drawings and sampling various points. The engineers did not give us any reports but in July of 1948, Mr. J.C. Jensen of Combined Metals, after our rejection of proposed financial arrangement, did mail to Mr. Johnson a copy of the wires, memos and correspondence between his firm, himself, and their engineers who visited our property headed by the well known geologist and engineer Mr. L.G. Thomas.

Following is a facsimile of this correspondence and wires:

WESTERN UNION

t A08
T PFA485 NL PD Florence Ariz 4 1948 May 4 PM 10 04

J.C. Jensen, Care Combined Metals Reduction Co.
218 Felt Bldg Salt Lake City, Utah .

Visited Arizona Copper Today. Can Confirm Data Contained In My Letter Of April 29th To George Snyder. Dissemination Of Copper Appears Minor But Lenses And Veinlets In Fissures Are Wide Spread. Suggest Drilling Best Lenses And Intersections At Point Below Water Level. Wolcotts Report Good. Will Work Detail Near At Good Copper Lense Tomorrow.

(signed) L G THOMAS

COMBINED METALS REDUCTION COMPANY

Florence, Arizona
May 16, 1948.

Mr. J.C. Jensen
218 Felt Bldg
Salt Lake City, Utah

Dear Mr. Jensen:

Your Wire requesting a sketch indicating relative locations and distances to copper opertions surrounding the Arizona Copper property was received yesterday evening.

A well marked road map with the mines marked in red pencil, together with the direction and distances from Arizona Copper is enclosed.

Mr. Robertson and I have been mapping detail of the geologic structure. Copper mineralization and fracturing appears most intense along, in, and near a prominent (North 80°East)diorite porphyry intrusive which has served as a zone of weakness for diabase dikes - then mineralized, and later followed by aplite injection into the same fractures.

Early Northeast and Northwest zones are iron stained, contain considerable hemotite with quartz and other spots of copper(carbonates and silicates); these account for the formation of "Red Hills" by being more resistant to erosion than the plutonic granites which form the basal structures of the area.

The East-West fracturing in particular contains many small veinlets of copper oxides - too numerous to plat. The larger cuts and fractures, which have been previously sampled and photographed, contain from one inch to eight inches in one higher grade veinlet with a face showing as many as two or three narrow ones, with greenish stained lower grade materials between.

The fact that there are so many narrow copper veins and veinlets grouped into one area about one-quarter miles in width,

is a most important condition at the Arizona Copper Mine.

Concentration of higher values in the secondary copper sulphide zone should most surely exist at or below the permanent water table, thought to be about 350 to 450 feet below the surface

In otherwords, drilling of the area appears a much - better-than-average bet.

It has been my lot to have the experience of seeing some of the largest copper mines before the surface was dug away, massive copper veins were not prominent features of their surface outcrops, but rather small veinlets comprised the general rule.

Yours very truly,

(signed) Leonard G. Thomas

(Bear in mind the above wire and letter were only two of)
(many written by Mr. Thomas to his employer. They were)
(not for our information, but for the information of)
(Combined Metals of Salt Lake.)

The money to do the diamond drilling as suggested by our Mr. Wolcott, Mr. Johnson, and the visiting engineer Mr. Thomas, was raised and the work proceeded.

Carl Trischka Engaged

The services of Mr. Carl Trischka were engaged for the purpose of consultation on the diamond drill cores and for further geological reconnaissance. Recommendations for the future and a fine geologic map were submitted and taken under advisement on January 3, 1950. Mr. Trischka's report was very favorable.

A.P. THOMPSON Engaged

After the report of engineer and geologist Mr. Trischka had been carefully analized it was deemed in the best interest of the company to secure another geological report to confirm and to further magnify the findings of Mr. Trischka. Thus the

services of Mr. A.P. Thompson, registered mining geologist were engaged.

Mr. Thompson for the past thirty five years has been serving the mining industry as a consulting engineer. He was for many years a member of the American Institute of Mining Engineers; formerly employed by Anaconda Copper Company as a geologist. Mr. Thompson received his Master of Arts degree in Geology from Columbia University. His findings and judgement are highly regarded in the mining industry nationally.

Mr. Thompson completed his geological report on our Red Hills disseminated copper deposit on June 21, 1950. His geological reconnaissance of Red Hills Ridge to gather data useful in planning open pit or sub-surface mining was completed on February 27, 1951. Both reports in their entirety are reproduced herein. On April 9, 1951 he completed a set of sketches depicting verticle section thru Red Hills Ridge and his interpretation of the geological structure from his reconnaissance survey on the property.

ARIZONA CONSOLIDATED GOLD AND COPPER MINES COMPANY ON ADVISE OF ITS PRESIDENT, ENGINEERS, GEOLOGISTS, AND IN COMPLETE ACCORD WITH ITS BOARD OF DIRECTORS IS GOING TO "CHURN DRILL" THE PROPERTY AS DESCRIBED IN THE "THOMPSON REPORT" (which follows). MR. JOHN F. JOHNSON IS IN THE PROCESS OF RAISING THE NECESSARY FUNDS TO CARRY OUT THIS NEXT STEP IN THE DEVELOPMENT PROGRAM. LARGE NUMBERS OF THE STOCKHOLDERS ARE REQUESTING THAT THEY BE PERMITTED TO ASSIST IN PROVIDING THESE FUNDS. THE CORPORATION'S STOCK IS NON-ASSESSABLE. Certified copies of the geological maps and drawings mentioned in this report are available for the inspection of the stockholders.

GEOLOGICAL REPORT ON
RED HILLS DISSEMINATED COPPER DEPOSIT
ON PROPERTY OF
ARIZONA CONSOLIDATED GOLD AND COPPER MINES COMPANY
FLORENCE-PINAL COUNTY-ARIZONA

The low chain of Red Hills buttes, rising out of surrounding Sahuara cactus-studded desert plain, lies about 12 miles east of Florence, Pinal County, Arizona, in the Red Hills Mining District.

The Red Hills mining rights are in possession of Arizona Consolidated Gold and Copper Mines Company by virtue of mining lode claim locations.

Eighty miles west by paved highway is the large supply center of Phoenix, capital of Arizona and Gile River is 7 miles north of the property. A good graded dirt highway from Florence passes through Red Hills. An electric power line from Coolidge Dam passes within 300 feet of Red Hills camp on the property.

Attention of miners was early attracted to the Red Hills area where red oxides of iron color the hills an attractive hue. An area 3600 feet long, from north to south, and averaging about 1800 feet wide has been highly fractured, faulted and soaked with mineral solutions. Today these processes are revealed in the gently rounded Red Hills, ribbed with parallel and closely repeated dikes; outcrops of silicified fracture zones, iron oxides and the copper silicate chrysocolla.

Water has been encountered in several shafts sunk in the Red Hills area at depths of 60 to 120 feet below the surface. Operating conditions for mining throughout the year are ideal.

A minimum of timber for support of mine workings is indicated by preservation of old workings without much support. Desert flora consists of a profuse growth of several varieties of cactus, a healthy carpet of desert grass and brush together with trees which furnish fodder for range cattle.

A small comfortable camp has been erected at the southern end of Red Hills. Elevation at the mine is about 2600 feet. Supplies are obtained from Florence and Phoenix.

During field examination of six days, investigations were confined to determination of geological conditions affecting deposition of copper ore bodies at Red Hills. Data on title, history, value and production of copper ores were not examined during field work, other than through statements of those associated with former operations. This information shows that the property consists of a compact, contiguous group of 90 mining lode claims, outlined on the accompanying map; 73 of which claims are held by right of location and 17 of which are partly owned or are in the process of acquisition. The entire Red Hills area is held under mining location rights by the Arizona Consolidated Gold and Copper Mines company.

Fifteen miles northeast of Red Hills Copper deposit, across Gila River, is the major disseminated copper mine of Kennecott Copper, at Ray, Arizona, at about the same elevation as Red Hills. Thirty four miles across the desert to the southeast is a newly developed disseminated copper mine of the first magnitude. It is the great copper ore deposit of the San Manuel mine. References in literature describe San Manuel ranking with the leading Utah

Copper and Morenci, Arizona, disseminated copper deposits in tonnage of copper ore developed. So pronounced is the similarity of the Red Hills geological picture with that of San Manuel, that a comparison of the two properties will be outlined herein.

In this examination only 12 claims of the Arizona Consolidated Gold and Copper Mines Company were investigated. Copper ore deposits are indicated at other points on the property.

GEOLOGY

ROCKS:

Relatively few rock formations are exposed in the Red Hills. The oldest rock, forming the basement here and of a large area in this sector of Arizona, is pre-Cambrian quartz monzonite. It is a part of a granitic mass which is found fully 50 miles to the southeast as the oldest formation in the San Manuel copper mine and nearby Catalina Mountains.

The unaltered quartz monzonite is a light-pink coarse-grained porphyritic rock, characterized by coarseness of feldspar phenocrysts which often reach an inch or more in maximum measurement.

The quartz monzonite in the Red Hills area has been intensely affected by shattering, fracturing and hydrothermal alteration connected with ore deposition. It has been impregnated by solutions carrying iron and copper and silica, which were an aftermath of intrusion of monzonite porphyry dikes. These dikes form a ribbed, east-west grid of parallel low ridges, repeated every 10 to 50 feet or more from north to south, as minor projections above the altered quartz monzonite basal pediment.

Monzonite porphyry, of Tertiary age, occurs chieftly as narrow parallel dikes which penetrated the older quartz monzonite along parallel fissures to form the east-west striking structural dike pattern. The porphyry is much finer-grained than the quartz monzonite and is easily distinguished from it in outcrops. Little difference in mineral or chemical composition exists between these two granitic rocks, although the porphyry has less quartz. Hydrothermal alteration and mineralization by iron and copper solutions and deformation by closely spaced east-west fractures in monzonite porphyry is similar to that in the quartz monzonite host rock.

Irregular fine-grained diabase dikes cut the quartz monzonite and monzonite porphyry. They are small and numerous and contain no ore minerals, although it is probable they have had in places some relation to localization of ore deposition.

A persistent fine-grained east-west striking aplite dike, up to 100 feet in width, with near-vertical dip, cuts through the Red Hills copper area and also clear across the Arizona Consolidated Gold and Copper mines estate for more than one mile. Along the north side of the aplite dike, in places, heavy deposition of vein quartz, iron oxides and copper ore minerals can be seen. This mineralization is pronounced in a fissure parallel to and about 10 to 20 feet north of the dike and can be detected in a fractured zone as much as 100 feet wide along the north side of the dike.

Because the aplite dike fills a persistent major crustal fracture in the quartz monzonite, deposition of copper minerals

along its course indicated connection with deep-seated fissuring and sources of ore depositing solutions. Other smaller aplite dikes are present in Red Hills but pale in comparison to the giant heretofore described.

Felsite dikes are frequent throughout Red Hills and conform to the east-west grid pattern for dikes and fractures. They are generally narrow and appear to have a close connection with formation of vein quartz, iron and copper minerals.

The felsite dikes cut the preceding rocks and present a cream-colored very fine-grained rock seamed often with fractures saturated with iron oxide solutions. Often oxidation of pyrite in the felsite dikes gives the outcrop a light pink color.

At the surface therefore, over the designated Red Hills area, mineralization is indicated by oxidation products; iron oxides, principally hematite and limonite resulting from oxidation of pyrite; chrysocolla, resulting from oxidation of chalcocite and chalcopyrite; and by quartz veins and jasper, colored red by hematite, by quartz stringers and seams dispersed in all directions where fracturing and mineralization has been intense. The prevailing red color of Red Hills is due to hematite released by oxidation of pyrite.

STRUCTURE:

The most prominent structural feature of Red Hills copper area is the north-south-striking West fault cutting clear through the center of the 3600-foot-long ridge of red buttes.

Parallel to the West fault and 600 feet easterly is the similar major East fault which forms an eastern boundary to Red

Hills ridge and to the area under investigation. These two faults, the West and East faults, include within their walls the eastern pediment of Red Hills ridge.

It is apparent on the surface that the 600-foot wide fault zone formed by these two major lines of movement in Red Hills ridge has had a pronounced influence on deposition of ore minerals. Reference to the accompanying map will illustrate the wide swath cut through the eastern half of Red Hills ridge by these two major fault planes. It is apparent in the field too, that minor parallel fault planes on the west side of the West fault have extended influence of this structure up the red eastern slopes of Red Hills ridge and exert a similar beneficial influence on concentration of mineral deposition.

The major structural feature of this 600 to 1000-foot wide north-south fault zone is an anticlinal flexure developed at about the center, north to south, of Red Hills ridge. Interpretation of this fault anticline in the quartz monzonite and monzonite porphyry mass of Red Hills ridge suggests the structural influence that has concentrated intrusion of dikes and deposition of disseminated copper and iron minerals in Red Hills.

In spite of large areas of disseminated copper and iron mineralization in east-west fracture zones from the south to the north tip of Red Hills, a distinct increase in surface indications of ore deposition is evident along the strike of the West and East faults. This influence for richer ore deposition appears strongest in a 600-foot wide zone along the west side of the West

fault and between the West and East faults. It appears as though these eastward dipping faults have acted as walls directing circulation of mineralizing solutions which formed the quartz, iron and copper deposits.

Like the great tabular ore zones of the San Manuel mine, where the ore lies upon the eastward dipping pyritic zone of Red Hill, this structure on the claims of Arizona Consolidated Gold and Copper Mines Company appears to concentrate the best copper mineral zone of Red Hills on the red core of the ridge as a footwall.

Dips of the West and East faults are hard to obtain for nowhere has surface digging unearthed a satisfactory exposure of the fault plane. Its course and dip have been estimated from surface indications and occasional contacts of quartz monzonite and monzonite porphyry along its course. Dips estimated for the West fault vary from 65 degrees to 85 degrees east. Dips of the East fault are estimated at 35 degrees east to vertical.

It is thus apparent that Red Hills ridge is a core of pyritic quartz monzonite, sliced into thin vertical layers by east-west striking monzonite porphyry dikes and vertical east-west fracturing. And into this mass of fractured rock, with a hood of impervious fault clay entered the mineralizing solutions that formed the disseminated copper deposits indicated by widespread chrysocolla outcrops which extend from the south limit of Red Hills ridge to the northern limit, 3600 feet distant.

MINERALIZATION:

A significant exhibit of copper ore deposition is present at

the south end of the Red Hills as this mineralized area is approached. Opencut and tunnel workings for 200 feet west of the West fault have been dug on an east-west-striking fracture zone from which chrysocolla ore has been mined and shipped. A 100-foot deep shaft, now filled, is reported dug right at the west contact of this mineralized zone and the West fault. It appears that, in this initially considered working alone, as much evidence of copper mineralization is present as can be found in the entire outcrop visible at the San Manuel mine, 34 miles southeast.

Chrysocolla, hydrous silicate of copper, and vein quartz and hematite, red oxide of iron, are the chief minerals in these workings. Still further west along this same zone, outcrops indicate a continuation of mineralization.

Going further north on the west side of the West fault, outcrops of east-west-striking silicified fracture zones, soaked with iron oxide and containing chrysocolla films along fracture planes and permeating the monzonite in places, continue for 3600 feet through the Red Hills ridge.

The basal and ancient quartz monzonite foundation of the region is here ribbed with small and large east-west striking monzonite porphyry dikes; some a few feet wide, others more than 100 feet wide. In both of these monzonite formations, east-west striking, vertical fracture zones have sheeted the entire ridge into a permeable mass that has been favorable for entrance of mineralizing solutions believed to be genetically connected with the Tertiary monzonite porphyry intrusion.

Silicification of the dikes and host rock along the vertical east-west fracture planes has formed indurated zones of most intense silicification and these project, several feet high, as ridges above the surrounding rock, repeated one after another, every few feet to every 100 feet or so, along the entire ridge, from south to north. They cut the north-south Red Hills ridge into vertical east-west standing slices from the south end to the northern extremity.

At the north end of Red Hills ridge singularly enough, another 120-foot deep shaft was sunk on an iron-copper zone of vertical sheeting and fault movement, thus completing a picture of Red Hills with deepest shafts sunk at southern and northern extremities.

At about the center of the ridge, from south to north, where an anticlinal arch is apparent in the West fault, surface diggings have exposed chrysocolla concentrations along many east-west fracture zones. A concentration both of silica and chrysocolla outcrops also occurs along the west side of the West fault zone.

The evidence is unmistakable that throughout Red Hills ridge, iron and copper sulphide minerals were deposited in the quartz monzonite and monzonite porphyry east-west fracture zones which shatter the entire red ridge. Red and brown iron oxides and chrysocolla outcrops seen today are remnants of oxidized sulphides, the surface trace of sulphide mineralization to be expected in these rocks at depths where oxygen has not attacked and destroyed the sulphide minerals.

Another distinctive channel for uprising mineralizing solutions is found on the north side of the mile long 70-100-foot wide, east-west aplite dike which paints a white path clear across the northern third of Red Hills at right angles to its strike. A prominent quartz-iron-copper cropping, standing 10 feet above the surface can be seen marking a mineral zone solution channel about 15 feet north of and parallel to the dike on the Copper #20 claim.

Where the northerly striking West fault cuts through the east-west striking aplite dike and moves the east side of the fault about 165 feet north, a concentration of mineralization has occurred on the west side of the fault, resulting in the prominent outcrop is reminiscent of quartz croppings over some of the best copper deposits of the state. It appears advisable to explore this bold quartz cropping at depth, for it is highly saturated with iron oxides and shows chrysocolla films.

The above description of mineralization on the west side of the West fault applies also to the east side, where a 600-foot wide north-south strip of mineralized Red Hills lies between the West and East faults. Because of greater east-west shattering between these faults, an increase in the number of silicified ridges is apparent in this inter-fault zone. These are concentrated particularly in the northern half of the zone where anticlinal structure creates an arch.

For this reason it appears best to start preliminary exploration at seemingly favorable points in this anticlinal structure.

Between the West and East faults, in the northern half of Red Hills, four hills stand out, ribbed with silicified mineralized dikes and fractures. They represent the ultimate in mineral deposition in the ridge. Chrysocolla is evident as films in the fractures and rocks exposed by opencuts, shallow shafts and outcrops.

Visible mineralization of Red Hills therefore consists of an oxide zone of unknown depth containing the copper silicate chrysocolla. It is undoubtedly certain that chrysocolla results from oxidation of either Chalcophyrite of Chalcocite, primary and secondary sulphides of copper, which are thus indicated at some unknown depth beneath the surface.

Alteration of the quartz monzonite and monzonite porphyry has resulted in decomposition of the feldspar of the rock in zones of intense fracturing and mineralization, and in silicification along fractures. Near the West and East fault zones alteration of the rocks has proceded further, and a bleached mass of kaolinite and various alteration products outcrop in the most intensely mineralized fracture zones intersecting the faults.

Surface evidence therefore indicates a disseminated copper sulphide zone beneath the chrysocolla and hematite-limonite deposits on Red Hills eastern flank.

COMPARISON WITH OTHER DISSEMINATED COPPER DEPOSITS

Red Hills copper area lies in the Basin and Range province of southern Arizona. Geologic history similar to that of proven major copper mines nearby, can reasonably be expected from similarity of rocks, structure and mineralization. Within a

radius of 120 miles lie such rich and well known Arizona mining districts as San Manuel, Globe, Morenci, Bisbee, Miami, Superior, Jerome, Bagdad, Ajo and Ray.

So near are the Ray and San Manuel copper deposits, with a patently identical geologic history, that comparison of these deposits with Red Hills will serve to portray what may be expected in exploration at Red Hills.

Since San Manuel rock occurrences and associations are identical with those of Red Hills, it is interesting to note that chrysocolla and iron oxide surface evidence of the immense copper ore body developed by churn drilling at San Manuel, is similar to the chrysocolla and iron oxide outcrops at Red Hills.

One hundred and twenty two churn drill holes were drilled to outline San Manuel ore deposit, and the mineralized rock was found to be remarkably uniform in copper content. A comparatively regular tabular zone of enriched copper sulphide ore was found dipping from 50 degrees to 60 degrees southeast. The ore zone averages about 400 feet in thickness. The footwall of this zone is highly pyritic monzonite and is represented at the surface by the red iron-stained rocks of Red Hill. The ore zone, on its dip, extends to depths of over 3000 feet.

The hangingwall of the copper ore body is gradational and indefinite, due to its determination by means of copper content. Oxidation of the hangingwall rock, from the sulphide ore body to the surface has resulted in a great mass of low-grade chrysocolla-bearing monzonite that varies in depth from 300 to 1600 feet. Many holes drilled through this hangingwall of the main copper

sulphide zone show an horizon of very lean oxidized rock.

No relation between sulphide enrichment and the underground water table at San Manuel is apparent. Deep oxidation is no doubt due to tilting of the copper deposit formations to the southeast after leaching of the overlying oxide zone by surface waters and enrichment of the sulphide zone below.

The greater part of the copper in the secondarily enriched sulphide zone, lying just beneath the oxide zone is in the form of the secondary copper sulphide chalcocite, which is usually a replacement, by downward percolating copper-bearing waters, of chalcopyrite, primary copper-iron sulphide, and secondarily of pyrite.

One drill hole at San Manuel showed 390 feet of oxide zone averaging 1.1% copper. The secondarily enriched sulphide zone, just beneath the oxide zone, had a thickness of 40 feet and averaged 1.793% copper. The primary sulphide zone, below the secondary zone, averaged 1.877% copper.

The first 17 churn drill holes drilled by the United States Bureau of Mines in the San Manuel Copper deposit are described in Report of Investigations 4108, where assay returns from samples taken every five feet down the holes are recorded, along with notations on the character of rock and of copper mineralization present. Four more holes drilled by Magma Copper Co. are similarly described.

It is apparent that, for the first 400 to 700 feet on the average, the drills passed through an oxidized zone in quartz monzonite and monzonite porphyry which contained around 0.25% to

1% copper in the form of chrysocolla.

Below this oxide zone, an enriched sulphide zone was entered by the drills, where chalcocite and chalcopyrite were the main copper sulphide minerals. Copper content of the formation increased in this sulphide ore zone to around 1% copper or more; sometimes however only 0.75% copper was found. This was the copper ore body of the San Manuel mine. A thickness of 400 feet of this ore might be used as an illustration of the magnitude of the deposit which has a length, in one ore body of 3800 feet.

Below the enriched chalcocite-chalcopyrite zone lies the primary sulphide zone which may have any width until the underlying pyritic zone of Red Hill is reached. Some rock, containing primary metallization is as rich in copper as the secondary chalcocite zone-showing that little enrichment of copper is sometimes present in the San Manuel disseminated copper deposit. This is illustrated by one drill hole wherein primary ore extended from 705 to 2,160 feet. The average copper content for the 1,455 feet was just over 0.9% copper, most assays returned between 0.75% and 1.1% copper.

Altho Magma Copper Co., in its annual report for 1946 states that there are 66,000,000 tons of oxide ore averaging 0.7% copper in the deposit, this oxide mineralization is not relied upon for copper production. The slightly enriched secondary sulphide and primary sulphide ore zones below the oxide zone are relied on to furnish profitable copper ore.

This story has great import for Red Hills exploration on property of the Arizona Consolidated Gold and Copper Mines Company, with identical geological setting among quartz monzo-

1% copper in the form of chrysocolla.

Below this oxide zone, an enriched sulphide zone was entered by the drills, where chalcocite and chalcopyrite were the main copper sulphide minerals. Copper content of the formation increased in this sulphide ore zone to around 1% copper or more; sometimes however only 0.75% copper was found. This was the copper ore body of the San Manuel mine. A thickness of 400 feet of this ore might be used as an illustration of the magnitude of the deposit which has a length, in one ore body of 3800 feet.

Below the enriched chalcocite-chalcopyrite zone lies the primary sulphide zone which may have any width until the underlying pyritic zone of Red Hill is reached. Some rock, containing primary metallization is as rich in copper as the secondary chalcocite zone-showing that little enrichment of copper is sometimes present in the San Manuel disseminated copper deposit. This is illustrated by one drill hole wherein primary ore extended from 705 to 2,160 feet. The average copper content for the 1,455 feet was just over 0.9% copper, most assays returned between 0.75% and 1.1% copper.

Altho Magma Copper Co., in its annual report for 1946 states that there are 66,000,000 tons of oxide ore averaging 0.7% copper in the deposit, this oxide mineralization is not relied upon for copper production. The slightly enriched secondary sulphide and primary sulphide ore zones below the oxide zone are relied on to furnish profitable copper ore.

This story has great import for Red Hills exploration on property of the Arizona Consolidated Gold and Copper Mines Company, with identical geological setting among quartz monzo-

nite basement and monzonite porphyry dike rocks; with a pyritic footwall in evidence and fracturing and widespread chrysocolla outcrops, Red Hills exploration should disclose a somewhat similar arrangement of oxide, secondary sulphide and primary sulphide copper ore zones as San Manuel. It is quite probable that copper deposition of both ore deposits dame from the same deep regional source of mineralization, that is, the parent magma of the intrusive monzonite porphyry.

A somewhat less complicated picture of copper ore enrichment is presented by the disseminated copper deposit at Ray, 15 miles northeast of Red Hills. Here the deposit is a secondary enrichment of disseminated chalcocite associated with and partly replacing primary pyrite in the pre-Cambrian Pinal schist, and to a slight extent in the monzonite porphyry responsible for the mineralization. The ore body is a flat-lying mass, irregular in outline and of variable thickness. The long axis of this copper deposit extends roughly east and west for about 7000 feet. It ranges in width from about 200 feet in the center to over 2000 feet at the ends. The thickness of the ore ranges from 15 to 400 feet and averages around 150 feet. An average depth of 225 feet of oxide zone overlies the ore body; chrysocolla is the main copper mineral of the oxide zone. The concentration of secondary copper was greatly influenced by fault barriers which confined the descending enriching solutions to well defined areas. Value of copper produced in the Ray district to date approach the grand total of $400,000,000.00.

EXPLORATION AT RED HILLS

It can readily be seen, my comparing Red Hills mineralized outcrops and rock varieties and structural pattern, that great resemblance exists with the San Manuel copper deposit. The formation of disseminated copper deposits at Ray also sheds light on expectations of copper enrichment at Red Hills.

Apparently the churn drill program followed at the San Manuel copper mine in exploring for the copper ore body at depth, should be emulated at Red Hills. As shown heretofore, the anticlinal structure formed by the West and East faults along the eastern half of Red Hills ridge may be the guide to copper ore deposits at Red Hills. It therefore seems best to churn drill Red Hills eastern flank at selected spots to determine the presence of secondary copper sulphide ore bodies beneath outcrops which indicate copper enrichments below.

With this exploration in view, it is interesting to note that color of outcrop at San Manuel distinguished the zone in which the copper deposit lay. This shade is a dark brownish red, from a sericitized rock commonly seamed with chrysocolla, indicating copper and iron sulphides at depth.

RECOMMENDATIONS:

Five proposed churn drill holes have been spotted on croppings of dark brownish red monzonite near the footwalls of the West and East faults. It is recommended that eight-inch churn drill holes be drilled at these points to explore for secondary copper sulphide ore bodies at depth in Red Hills ridge.

It is probable that the depth of secondary sulphide ore at San Manuel is the most likely information applicable to Red Hills.

It is unlikely that present water level is related to depth of oxidized zone or secondary sulphide enrichment. Using San Manuel as a guide therefore, sulphide enrichment at Red Hills should be encountered above the 600-foot depth in drill holes. It is possible that a much shallower depth will obtain. In advance of drilling however, certain forecast is impossible and drill holes should continue to greater depth if necessary to pass through the oxidized zone; pass through the secondarily enriched sulphide zone and into the primary ore zone.

PROPOSED CHURN DRILL HOLES:

#1 Hole: proposed to be drilled in the footwall of the West fault near the southwest corner of the copper #1 claim, will penetrate a brownish-red highly fractured outcrop, containing brown iron oxides and seams of chrysocolla, which appears to indicate deposition of copper sulphides at depth.

#2 Hole: near the Mexican shaft, on Copper #1 claim, likewise is located on croppings of brown oxides of iron and chrysocolla-seamed monzonite. The hole also will descend in the footwall of the West fault near the center of the anticlinal arch in the strong structural zone of movement. The brownish iron-stained appearance of rock on the dump of the nearby Mexican shaft furnishes strong support to expectation of good results from this hole.

#3 Hole: is located on the east side of the Red Hills, in the footwall of the East fault and at about the center of Chango #7 claim, 480 feet east of its westerly endline. Here, the hole will penetrate a ridge characterized by brownish red outcrops of

sericitized monzonite porphyry seamed with chrysocolla. The ridge lies at the top of the east-west anticlinal arch exhibited by the East fault and appears to contain the most attractive outcrop of any ridge east of the West fault.

#4 Hole: is a deviation from the policy followed in locating the first three holes. It is located near the center of Copper #20 claim, 360 feet west of the east endline. It is also about 30 feet north of the large east-west aplite dike which cuts clear across Red Hills ridge. The hole will go down in the vicinity of a quartz specular hematite-chrysocolla outcrop that could well be part of the United Verde ore body outcrop at Jerome. There may be a copper ore shoot along the aplite dike at this point. Only exploration can settle that question.

#5 Hole: is located near the north end of Red Hills, where strong outcrops of quartz, iron oxides and chrysocolla filling fracture zones project to a position in the footwall of the West fault.

These five holes all lie in the north half of Red Hills. They are all predicated on the hypothesis that a combination of favorable outcrops, structural anticline due to faulting and apparent position overlying the red core of Red Hills will bring to them the optimum of good results.

Depth to which these holes should be drilled can only be determined when the drills penetrate the oxide, secondary sulphide and primary sulphide zones of copper deposition. Possibly more than 1000 feet depth will be advisable, as at San Manuel. Possibly less than 1,000 feet depth will tell the story, as at Ray.

CONCLUSIONS

The Red Hills mineralized outcrops and rock formations resembling so closely those of the noted, major San Manuel copper deposit 34 miles southeast of Red Hills, warrant exploration by churn drilling to determine the presence of disseminated copper ore bodies at depth.

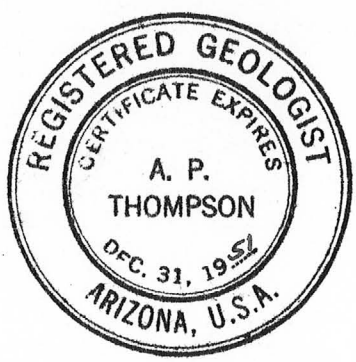
The anticlinal fault structures of the West and East faults in Red Hills indicate a concentration of copper mineralization beneath the 3600-foot long ridge.

It is therefore a sound exploration endeavor to churn drill as recommended above in a search for copper ore bodies. Red Hill ridge certainly contains mineral indications at the surface of a magnitude comparable to those of the closely related San Manuel mine, and should be carefully explored with the expectation of major copper ore discoveries.

Respectfully submitted,

A. P. Thompson, B.Sc.; A.M.
Mining Geologist
Oakland, California

June 21, 1950



GEOLOGICAL RECONNAISSANCE OF
RED HILLS RIDGE
TO GATHER DATA USEFUL IN PLANNING
OPEN PIT OR SUB-SURFACE MINING

Recent geological reconnaissance to determin the position of probable sub-surface disseminated copper deposits in the Red Hills sector of Arizona Consolidated Gold and Copper Mines Company's 73-claim estate, disclosed important favorable indications

Over an 80-acre area of highly fractured quartz monzonito, with quartz, iron oxide and copper silicate outcrops, the presence of the following major indications of mineralization were noted. Principal attention during the five-day examination was concentrated on a 50-acre inner area where mineral deposition appeared to have been most active.

1. Granite Porphyry Dike

A major granite porphyry dike, about 100 feet wide strikes through the property from east to west. On the north side of the dike, deposits of vein quartz, iron oxides and copper silicate can be observed at points 3500 feet apart where mineral zones project above the valley fill.

Most prominent croppings of this evidence of mineralization along the dike, project eight feet above the surface, and vein quartz float covers the downhill surface with large boulders. In places, deflection of the Brunton Compass needle above these cropings indicates extensive sub-surface deposits of magnetic specularite or magnetite

The significance of the major porphyry dike with accompanying mineralization, lies in its evidence of an underlying intrusive magma, from the roof of which it is an offshoot. Copper-iron-silica mineralization accompanying the dikesindicates its connection with sources of copper mineralization emanating from the underlying magma.

2. Fracturing

The trend of all channels of formation of copper ore lies nearly east-west across the Red Hills sector. Copper, iron and quartz deposition occured along these channels where the greatest zones of nearly vertical fracturing formed.

At the locus of the Mexican Shaft occurs a vein structure, with quartz, iron oxide and copper silicate croppings, which appears to be the Master fissure zone of the immediate area. It is possible that a similar copper-bearing fissure which shipments of oxidized copper ore have been made, at a point about 7000 feet east of Red Hills, it is the eastward extension of the Master fissure of the Mexican Shaft.

For 1100 feet north and 2400 feet south of the Master fissure, parallel fissures similarly mineralized with quartz, copper silicate and iron oxides are visible in Red Hills.

3. Monzonite Porphyry Dikes

Through this nearly east-west zone of highly fractured mineralized quartz monzonite run numerous nearly east-west srtiking monzonite porphyry dikes, similar to those of other copper deposits of the region where monzonite porphyry is regarded as the parent magma responsible for the formation of the copper ore bodies.

In this historical picture, the greatest fractured older quartz monzonite is known to be the ancient pre-Cambrian basement rock of the region. It is the basal formation of the earth's crust for many miles to the southeast; through the great copper ore deposits of the San Manuel mine 35 miles south-east, and beyond to the north of the Santa Catalina Mountains. It is called the oracle granite.

Monzonite porphyry dikes occur at San Manuel's copper deposits and contain copper ore bodies as does the ancient quartz monzonite.

On the Red Hills ridge monzonite porphyry dikes are regarded as favorable factors for the formation of copper ore, which occurs not only within the fracture zones in the dikes, but also most frequently along the dike contacts with the invaded quartz monzonite. It is expected that exploration will establish the occurence of solution channels for ore-bearing mineralizers extending downward along the monzonite porphyry dikes to the roof of an expected monzonite porphyry intrusive at shallow depth.

4. Faulting

Through the Red Hills sector from south to north run two major zones of faulting that have had an important effect on concentration of ore deposition in their vicinity. The two most important faults described herewith, are the East and the West faults, as shown on the accompanying map, with easterly dip, estimated from rare indistinct evidence, as 65 degrees.

There seems to be little doubt that both the East and West faults were major structural features at the time of intrusion of the underlying monzonitic magma which furnished mineral-bearing solutions to form copper deposits in Red Hills area. While copper-bearing solutions apparently rose from the roof of this monzonite intrusive along the nearly verticle east-west fractures seen today, there is little doubt that they were confined on the east side of the Red Hills by the East fault. And along the east base of Red Hills peaks the north-south West fault concentrated deposition of copper, quartz and iron within the immediate vicinity of its clay walls.

There was thus formed a pattern for ore deposition with strong east-west and north-south control, parallel branches of both the East and West faults spreading their major influence from a general aura of 300 feet west of the West fault to the walls of the East fault.

A central area is thus outlined in Red Hills, 1000 feet wide and 2700 feet long, where exploration by churn drilling should proceed to determine in a preliminary prospecting the position and extent of copper mineralization.

At about the center of the West fault zone, in a north-south direction, an apparent major anticlinal flexure in the fault walls coincides with the area of the best copper outcrops. It appears that the eastward-pitching trough of this anticlinal fault structure concentrated mineralsolutions along its ridge-like control.

Paralell branches of the West fault occur on both the east and west sides of the major fracture plane, having a beneficial influence on ore deposition over a zone about 500 feet wide along the strike of the fault.

5. MASTER VEIN FISSURE ZONE

This concentration of solutions by the East and the West faults has naturally produced a greater deposition of ore minerals along the crest of the downward-pitching anticlinal flexure. Probably the most extensive fracturing of the rocks occured on this anticline.

What appears to be the Master channel, or zone of fissuring mineral deposition occurs at the locus of the Mexican shaft, near the West center end of the Copper #1 claim. Here, vein quartz with iron oxides and copper silicate occurs in several parallel veins.

Where the nearby West fault cuts through the Master fissure zone, the eastward continuations of the veins are displaced about 400feet to the north and their outcrops form the crest of a ridge which descends abruptly to the arroyo at the East fault base of Red Hills. Churn drill hole #3 is located on the bank of the arroyo. Drill hole #1 near the Mexican Shaft. Thus in this Master fissure zone both churn drill holes #1 and #3 are located 750 feet apart.

6000 feet easterly from the Mexican shaft on a course similar to that of the Master fissure zone occurs the copper silicate ore shoot of the Vernes Santo Claim.

Further geological investigation may well prove this copper mineralization to be in the easterly projection of the Master fissure zone of the Mexican shaft--an evidence of widespread copper ore deposition that indicates the possibility of major mineralization at depth.

6. CAMPTONITE INTRUSIVE

The anticlinal apex of the West fault plane is also noted for an intrusion of the Camptonite and a minor granite porphyry dike. Occurrence of these two rocks in such a relation to the structure is regarded as favorable and important factor influencing richer ore deposition in the vicinity.

7. CHURN DRILLING

To prove the presence of valuable copper ore bodies beneath the chrysocolla, iron oxide and quartz croppings of Red Hills, it is a dvisable to initiate a churn drilling campaign in an exploration guided at the start by surface evidence alone.

Data from evidence gathered from the first drill hole should be used to guide location of the second drill hole and so forth. In this perspective, it seems best to locate three churn drill holes as noted on the map, reserving the location of holes #4 and #5 of the drilling program for selection when results from drill holes #1 to #3 are available.

Both holes # 1 and #2 are laid out near the West fault. Both holes #1 and #3 are located in the Master fissure zone, at the West and East faults respectively, 750 feet apart.

If preliminary holes are drilled where chances of finding ore bodies beneath the leached outcrops of Red Hills seem best, the optimum in favorable results should be achieved for the welfare of the enterprise.

Respectfully submitted,

A. P. Thompson B.Sc.; A.M.
Consulting Geologist

February 27, 1951.

REGISTERED GEOLOGIST
CERTIFICATE EXPIRES
A. P.
THOMPSON
DEC. 31, 19 51
ARIZONA, U.S.A.

AUXILIARY PROPERTY OF

ARIZONA CONSOLIDATED GOLD AND COPPER MINES CO.

CAMERON MINES

Arizona Consolidated Gold And Copper Mines Company has in a ddition to its hugh copper property at the Red Hills several other auxiliary properties that in time we will develop and which will prove to be very good mines.

The latest of these auxiliary properties was aquired in 1950 and is located in the Republic of Mexico and known as the CAMERON MINES. The mines contain Tungsten, Manganese, Lead, Silver, and Gold. The mines were in a process of rapid development during World War II with the initiative being taken by the United States Government for their development.

Today the major supply of world tungsten is cut off from the U.S. by virtue of Red China controlling the supply and making it necessary for our government to seek other sources of supply. We are in a process of developing the property further and plan to install an appropriate mill to handle the ores.

Following is a report on the location, description, and brief history of the Cameron Mines as written by Mr. John Gallagher, internationally known mining engineer and with whom we are interested in the Cameron Mines.

Report of Mr. John J. Gallagher

The Cameron Mines are located in the Municipality of Trincheres, District of Altar, in the State of Sonora, Republic of Mexico. The property is south-west of Santa Ana, approximately forty

miles from the Nogales, Hermosillo paved highway. The original grant of land is known as Rancho Porvinear.

The claims (exploitations) are known as CAMERON, CAMARONCITA, and NAVIDAD, and cover and area of eighty acres.

The metals for exploitation are Tungsten, Manganese, Lead, Silver, and Gold. There are twenty-three well defined veins on these properties, all showing Scheelite (high grade tungsten) under the lamp.

During the last war (1943) the U.S. Geological Survey, headed by Dr. Carl Friese made an examination of these claims and the surrounding region to check the advisability of placing a mill to concentrate the tungsten. Their report was satisfactory They were followed by Engineers of the Board of Economic Warfare, who made the examinations and at that time under their supervision there were nine test holes sunk on the main vein of the "Cameron" and six holes on the main vein of the "Navidad". A new vein on the Cameron was opened and the over-all test proved up at seven-tenths of one percent tungsten. There were no tests made at that time for gold, as the Board of Economic Warfare had no interest in Gold. The tungsten ore we were shipping to the agent of the United States at Nogales was penalty free. At that time we were receiving twenty-five ($25.) dollars per ton (2000 pounds) from the agent on all rock that showed indications of tungsten under the lamp. In other words rough hand sorted ore.

The Wah Chung Trading Company had the concession to process all the scheelite into concentrate at that time, and through

the R.F.C. had erected a small concentration plant at Nogales, Sonora. This went on up till the end of 1944, but the supply was not sufficient for the demand. The Board of Econimic Warfare again stepped in and sent their chief concentration engineer T.E. Dickel to the Cameron Mine to check the feasibility of establishing a 300 ton-a-day concentration mill at the property. Dickel made all the tests and not only approved the property and outlying districts as sufficient to keep the mill in operation but completed the drawings to send to Washington to set the plan in operation. The writer was to operate the mill and buy and encourage the other mine owners in the area to mine and sell the ore to the central mill. At the completion of Dickel's survey, Washington announced that through arrangements with China the U.S.A. had more than sufficient WO_3 for our war needs and the plan was shelved.

At this time we struck the first gold-bearing quartz at 41 feet in the main shaft of the NAVIDAD. Cross cutting proved up the assays at 78 grams a ton and the vein has been constantly increasing as the shaft gets deeper. The Camaron was then assayed at 22 feet and the gold-bearing quartz averaged out at 101 grams a ton. The majority of the veins run north and south. On the North side of the Cameron is a magnatite formation carrying 2 ounces of Silver with gold indicated, but the test holes are not deep enough to justify an opinion at this writting as to the worth. All the properties are heavily lime ca ped; the native rock is granite. The veins are quartzite bearing Scheelite and gold. The dyke and ladder formations have a natural tendency to pocket and the

largest pocket to date was the first level at 28 feet which ran 11 tons in the NAVUDAD. At the second level the gold became definate and has held steadily to the assays that were originally made.

There are 1000 tons of ore above the ground ready for milling at this time or 20 days at 50 tons per day. There is blocked-out and in sight 24,000 tons equivalent to 480 days. These estimates were rechecked by Dickel.

(signed) JOHN J. GALLAGHER