



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.

07/16/90

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: BLUE COPPER MINE

ALTERNATE NAMES:

DURHAM HILLS DEPOSIT
EDWARDS PROPERTY
OWL HEAD MINING DISTRICT PROJ.
CRANBERRY GROUP
BUSY BEE CLAIMS
BIG BULL COPPER DEPOSITS
BLUE GLASS PROPERTY

PINAL COUNTY MILS NUMBER: 605A

LOCATION: TOWNSHIP 8 S RANGE 12 E SECTION 17 QUARTER SW
LATITUDE: N 32DEG 43MIN 53SEC LONGITUDE: W 111DEG 07MIN 56SEC
TOPO MAP NAME: TORTOLITA MTS - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

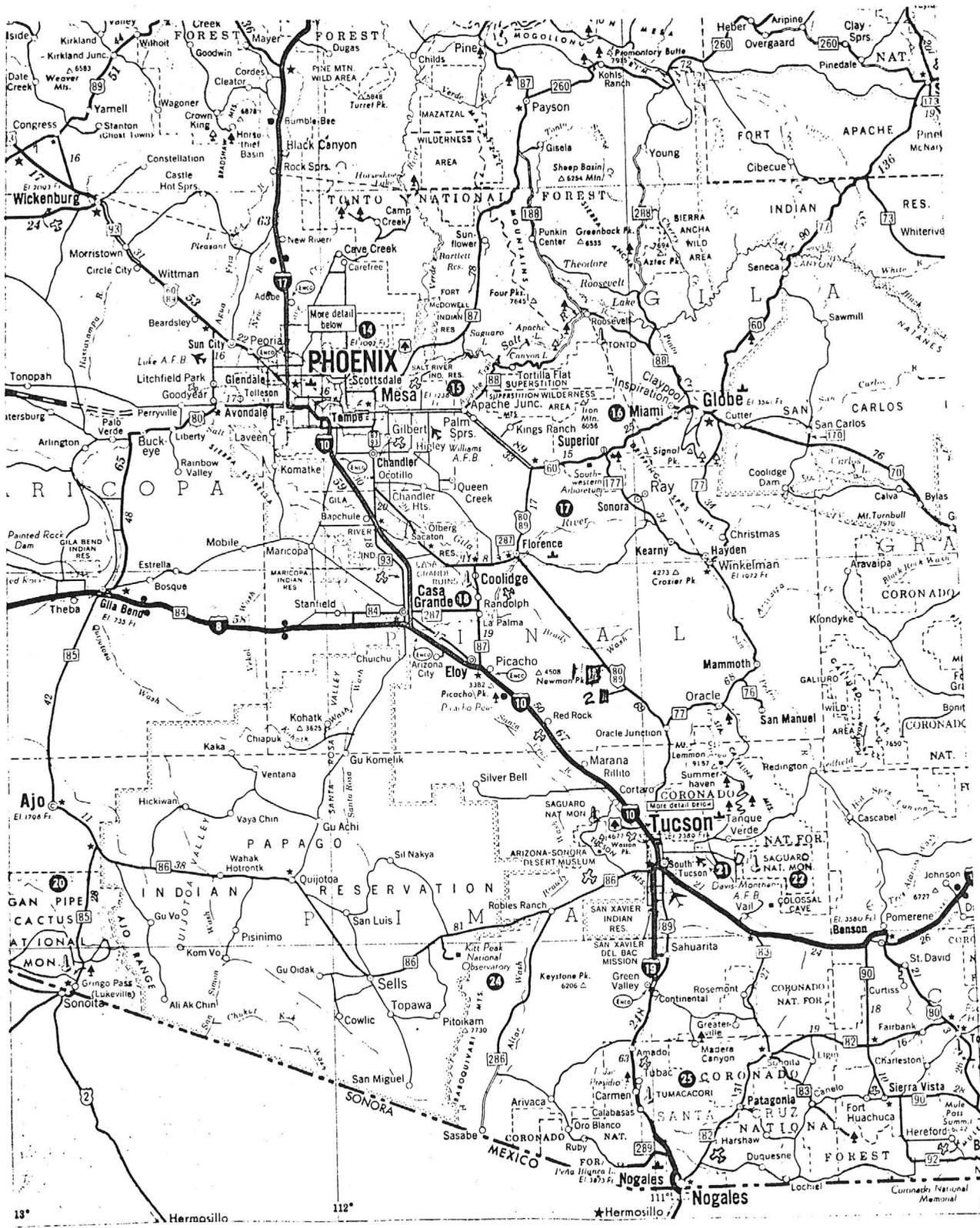
COPPER SULFIDE
COPPER OXIDE
SILICON

BIBLIOGRAPHY:

BARTER, CHARLES F, GEOLOGY OF THE OWL HEAD
MINING DISTRICT PINAL CO. AZ., MS UOFA 1962
ADMMR FERGUSON COPPER PROPERTIES FILE
ADMMR BLUE COPPER MINE FILE
ADMMR U FILE PINAL CU38 (USBM NO 463.2/14114)

BLUE COPPER MINE ✓
OWL HEAD DISTRICT
PINAL COUNTY

- 1 blue print "Sketch Map"
- 1 "Sketch Map"
- 1 N-S Section through Shaft "D" looking west.
- 1 "Proposed Cuts"
- 1 Assay plan



13°

112°

Hermosillo

Nogales

Hermosillo



Atop low hill looking south toward Cross Triangle Ranch which can be seen as white building in middle background. Bulldozed surface is obvious and large blocks of rock in the foreground are of Precambrian granite containing copper oxide minerals.



View of bulldozed trench in Precambrian granite mineralized with copper oxides at Copper Mine Tank, $\frac{1}{2}$ mile NE of Blue Copper Mine.





NAME OF MINE: BLUE COPPER

COUNTY: PINAL
DISTRICT:
METALS: CU

OPERATOR AND ADDRESS:

MINE STATUS

DATE:

DATE:

5/1/44

Phil Hickey, 2241 N. 7th
Street, Phoenix

5/1/44

Developing

12/44

Sold

BLUE COPPER

Cu

Pinal

11 - 3

T 3 S, R 13 E

'43

NAME OF MINE: SIERRA METALS

COUNTY: PINAL
DISTRICT: S
METALS: MN

OPERATOR AND ADDRESS:

MINE STATUS

DATE:

DATE:

5/1/44

Merle Guise, Mgr.
Florence
1420 Lorain Rd.
San Marino, California

5/1/44

Idle

Jason Coggin, Director
Mines and Mineral Resources
1502 W. Washington
Phoenix, Ariz 85007

Dear Mr. Coggin,

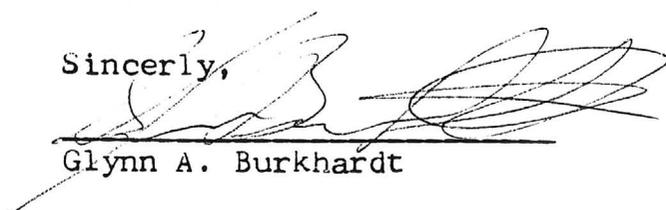
Enclosed are the Magma reports on the Burkhardt property and the S. $\frac{1}{2}$ of Sec. 17. I also included a few old shipping records and assays.

The reports show Magma geologists believe the Blue Copper, Cross Triangle, and Magma Well deposits, plus the Micodiorite Area contain a probable 60 mill. S.T. to 100 mill. S.T. $CuOx$ ore with a grade of .4 percent or better. Magma did not include two other known extensions in these calculations, as a third report was to follow before drilling commenced.

Magma halted exploration on these properties and others due to internal corporate relations. According to several sources, Safford, Florence, Mexico and South America may have drained needed funds.

Please enter the enclosed reports and information into the Mines and Mineral Resources open files for future reference.

Sincerely,


Glynn A. Burkhardt

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine BLUE COPPER MINE
Formerly: Durham Hills Copper
District Owl Head - Pinal County

Date NOVEMBER 19, 1973

Engineer R. E. LEHNER

Subject: Mine visit

Location: Secs. 17, 18, 19, 20 T8S R12E - 41 miles N of Tucson; 16 mi. east of Southern Pacific rr. Paved road to within 1-1/2 miles of deposit; last 1-1/2 mi. good dirt road.

Principal minerals: Copper - chrysocolla, malachite, azurite and some chalcocite.

Type of surrounding terrain: Low hills surrounded by flat desert alleviated plain(pediment?)

Geology and Mineralization: The central part of the Durham Hills contains an elongate north-trending septum of Precambrian Pinal schist in a younger Precambrian granite. These rocks have subsequently been cut by quartz diorite and aplite dikes. The western contact between the schist and granite is highly fractured and broken and represents a fault that strikes N 20° - 30° W. This zone was the major control of the primary copper mineralization which has since been oxidized and leached, and the resulting copper oxides reacted preferentially with the granite and were deposited on fracture surfaces. The copper mineralization consists of chrysocolla, malachite, azurite and some chalcocite. This mineralization is the most concentrated and highest grade developed in the Owl Head area to date.

A tunnel has been driven westward into the hill to encounter the western granite-schist contact (early 1960's) and a shipment of flux ore assayed 3.5% copper from the zone (U of A thesis - Barter, C.F. 1962). It is evident on the surface that the area has been drilled on close spacing.

Mine Workings: 2 shafts, old; tunnel driven westward into hill to intercept granite=schist contact; shallow and deep surface drilling, collar pipes in place; and numerous pits and surface bulldozing, leaving the surface extensively scraped and trenched.

Ore Probable: Copper silicate (carbonate) leach operation.

A number of individuals and mining companies have developed and explored this property. However no information is available. Most recent work consists of quarrying the copper stained rock for building stone.

Reference: See U of A thesis 1962 by C. F. Barter, p.57.

See following page for photographs.

GEOLOGY OF SOME COPPER DEPOSITS
IN THE OWL HEAD DISTRICT, PINAL COUNTY,
ARIZONA

A Preliminary Report

By

John N. Faick, Ph. D.

Registered Geologist

Tucson, Arizona
March 7, 1969

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Location, Accessibility, Power and water	1
History of Ownership, Exploration and Development.	1
General Geology.	2
Description of the Blue Hill Copper Deposit.	3
Description of the Big Bull Copper Deposit	5
Future of the Copper Deposits.	6
Conclusions	7

GEOLOGY OF SOME COPPER DEPOSITS IN THE OWL HEAD DISTRICT,
PINAL COUNTY, ARIZONA

A Preliminary Report

By

John N. Faick, Ph. D.
Registered Geologist

Introduction

In the northern part of the Owl Head mining district of Pinal County, Arizona, about 42 miles northwest of Tucson, is an area of several square miles in which numerous copper deposits are known to occur. These deposits attracted the attention of prospectors and miners as early as the 1870's, and by 1900 serious attempts were being made to explore some of the deposits by means of prospect pits, shafts, tunnels and drill holes. Since that time, by application of constantly improving technology, frequent but sporadic efforts were made to find and develop commercial ore. Most of these efforts were directed toward exploring the two most noteworthy deposits of ore in the district, both of which are now controlled by the Enterprise Copper Corporation. These deposits are known as the Big Bull and Blue Hill deposits, although other names have been assigned to them at different times. About six miles southeast of these deposits is another copper deposit which is presently known as the Burkhardt property. It is also controlled by the Enterprise Mining Company.

Location, Accessibility, Power and Water

The Big Bull copper deposit is located about 42 miles northwest of Tucson and is about one mile southwest of the Florence-Tucson highway, and the Blue Hill deposit is about one-half mile farther to the southwest. Access to these copper deposits is over an unimproved road which leaves the Tucson-Florence highway a few hundred feet east of Bogard Wash, as is shown on the north central part of the Tortolita Mountain quadrangle map published by the U.S. Geological Survey. This map clearly illustrates the nature of the topography, drainage and accessibility of the deposits. The area is drained by Bogard and Durham Washes and several small arroyos. Vegetation consists principally of desert grasses, creosote bush, mesquite trees and several varieties of cacti.

Electrical power is readily available from major transmission lines which pass within about two miles of the copper deposits. Oral reports indicate that sufficient water to operate a mining and ore processing plant is available from nearby wells or from wells that might be drilled in the alluvium of Bogard and Durham Washes. These supplies can be augmented by surface runoff during the rainy season.

History of Ownership, Exploration and Development

History indicates that the first mining claims were staked in the area by Jack Durham about the turn of the century and subsequently the claims were controlled at different times by several individuals or companies. At different times they were owned wholly or in part by a Mr. McGill, a Mr. Dozier, John Migel, James Aspell, R. J. Edwards, C. M. d'Autremont, F. E. Richards, P. J. Hickey, Larry Drake and probably others whose names are no longer associated with the property. Apparently the claims were owned by the Desert Lake Mining Company during the late 1930's, and about 1942-1943 the claims were

controlled by Sierra Metals Co., Inc. In 1960 the American Exploration and Mining Company leased the property and drilled a few exploratory drill holes. During the winter months of 1961-1962 the Guzman & Schwartz Mining Company of Superior, Arizona held a mining lease on the property and a similar lease was held by the Hollinger & McFarland Mining Co., during the winter of 1965-1966. At different times over a period of many years the deposits were examined or explored by engineers and geologists for major mining companies such as Magma Copper Co., Kerr-McGee Corporation, American Smelting and Refining Company and others.

On the Blue Hill Copper deposit shallow shafts and a short tunnel were driven and two churn drill holes were drilled prior to World War I. In 1960, John N. Faick, geologist, supervised drilling and sampling a few Air-Trac percussion drill holes to explore the principal part of the Blue Hill copper deposit, and in 1968 it was intensively explored by Subeo Ltd., a mining firm based in Toronto, Canada.

The most thorough investigation ever made of the Blue Hill and Big Bull deposits was directed by J. R. Glass, geologist, on behalf of Subeo Ltd. The complete results of this investigation have been made available to Enterprise Mining Company through the present owners of the property, Glynn G. and Lois Burkhardt and U-Tex Oil Company. The investigation extended from December 15, 1967 through March 8, 1968, and the exploration program consisted of geological, geophysical, and geochemical surveys and diamond drilling. The work included 8 line-miles of induced potential geophysical surveys, about 18 line-miles of geochemical surveys, drilling 22 diamond drill holes totaling 2,805 linear feet of core hole and bulldozing 4,170 feet of exploration trenches. The field examination included extensive sampling of drill core and cuttings and was followed by comprehensive laboratory studies of the recovery of copper by heap-leaching. The investigation included feasibility studies, analyses of production costs and cash flow. Most of this work, except for the extensive geological, geochemical and geophysical surveys, was done on the south part of the Blue Hill deposit because this is the largest and most impressive of the deposits.

The Big Bull deposit has been explored by two old shafts, the deepest of which is reported to be 100 feet deep. Short exploratory drifts and cross-cuts reportedly were driven from the bottom of the shaft and the deposit is said to have been explored by two short diamond drill holes. It is believed these were drilled in 1939 for John Migel and James Aspell under supervision of C. M. d'Autremont.

General Geology

The area of interest is characterized by low ridges and hills, and small mountains, locally known as Durham Hills, that rise above a broad bedrock pediment or plain that is largely concealed by a thin surficial layer of young or recent sand and gravel, some of which is firmly consolidated. These materials generally range from a few feet to a few tens of feet in thickness but drill holes indicate the gravels are a few hundred feet thick in some places.

The older underlying bedrock is exposed at many places on the pediment and in the hills and ridges that rise above the general level of the gravel-covered plain. The oldest rocks are ancient schists and gneisses which have been intruded by granite-type rocks. These rocks are shown to be of Precambrian age on the geologic map of Pinal County, prepared in 1959 by the Arizona

Bureau of Mines, University of Arizona, Tucson, Arizona. Generally the schists and gneisses occupy the pediment and low ridges and hills, and granites make up the larger hills or small mountains. Locally dike-like or sill-like bodies of diorite or diabase have intruded the older rocks and in some places they are covered by young basalt flows or other types of volcanic rocks. Within the older rocks there are numerous deposits of copper ore of which the largest and best known are the Blue Hill and the Big Bull deposits.

Description of the Blue Hill Copper Deposit

The Blue Hill copper ore deposit is located on a low ridge that trends north-northwest from the main residence on the Cross Triangle ranch, which is shown on the U.S. Geological Survey map of the Tortolita quadrangle. The copper ore is exposed in scattered outcrops and prospect pits and trenches for a couple thousand feet along the ridge; however, a low saddle which bisects the ridge seems to be underlain by barren granite; thus, the mineralized zone is divided into two orebodies, one on either side of the low saddle. Apparently erosion destroyed most of the ore zone in the vicinity of the saddle.

The Blue Hill copper ore zone lies along a contact between schist and granite and apparently dips easterly from 10 to 30 degrees. The mineralized zone does not appear to be strictly a contact phenomenon because copper occurs in both the granite and schist and digresses from the actual contact. There is some evidence to indicate that the copper occurs in a zone that has been shattered or sheared by movement along fault planes and later silicified by the introduction of quartz which resulted in formation of the hard erosion-resistant ridge along which the copper is exposed.

The ore consists of the secondary copper minerals chalcocite, chrysocolla, malachite and azurite. Primary minerals in significant amounts have not been identified with the possible exception of chalcocite, some of which may be primary. Chalcocite is a minor constituent in the ore and occurs as scattered small nodules, narrow veinlets and extremely small particles disseminated in schist and granite. The principal minerals are the secondary chrysocolla, malachite and azurite which form thin films and veinlets along fractures in the granite, schist and gneiss. These minerals occur principally on fracture planes in the granite and schist and generally do not occur within larger blocks of host rock. On clean surfaces these minerals give a distinctive greenish and bluish appearance to the host rocks and this highly colored rock finds a ready market as ornamental building stone. The deposit is unique in that the iron content is exceptionally low, consequently a typical iron gossan has not developed over the orebody. In some places a barren, leached, siliceous cap-rock was exposed over the orebody before the advent of recent mining and exploration activities.

Only the south orebody of the Blue Hill deposit has been extensively explored. It has been explored by a 30-foot deep shaft, a short tunnel, several prospect pits, bulldozer trenches and numerous drill holes. Some ore has been mined from a small stope in the tunnel and also from the surface.

The comprehensive investigation made on behalf of Subeo Ltd., of Toronto, Canada, indicates that the south orebody of the Blue Hill deposit is about 1200 feet long and has a width at the outcrop ranging from about 75 to 150 feet. The

orebody is extremely irregular, but in general terms it is somewhat lenticular and trends in a northerly direction, and it dips from 10 to 30 degrees easterly. The thickness ranges from only a few feet to about 120 feet and the down dip limit of the ore has not been determined. Probably the extent of the orebody will be determined by the economic value of the ore rather than by distribution of the copper. In order to obtain the maximum amount of ore some waste rock will have to be removed during mining operations. Engineers for Subeo, Ltd. estimated about 0.39 tons of waste would be removed for each ton of ore mined. Some of this waste rock may contain recoverable amounts of copper.

Reserves in the south orebody of the Blue Hill copper deposit were estimated for Subeo, Ltd. to be 517,000 tons of ore having a grade of 0.47 percent total copper. These reserves are classed as indicated or possible ore because the estimate is supported by considerable drill hole information, samples and assay data, and smelter records of ore mined and shipped from the deposit. It seems probable that by selective mining a smaller tonnage of ore could be extracted with a consequent increase in tenor. A grade estimate of 0.5 percent copper is accepted for the purpose of this report. Seven holes drilled in the ore zone with an Air-Trac percussion machine in 1960 yielded an average of 0.57 percent copper in a tabular ore zone averaging about 32 feet thick. When Larry Drake controlled the property during the late 1950's he reported that 13 samples from the outcrop averaged 3.95 percent copper. At a later date John N. Faick cut two select samples which had a total copper content of 3.05 and 7.9 percent, respectively. During the summer of 1961 Mike Guzman cut nine samples which were assayed in the laboratory of Magma Copper Company. The arithmetic average of these nine samples was 1.86 percent copper, 71.2 percent silica and 8.4 percent alumina. It is believed all of these near-surface samples represent exceptionally rich zones and are not representative of the orebody.

In 1962 Larry Drake shipped 518 tons of ore to the ASARCO smelter at Hayden, Arizona. This ore contained from 0.87 to 2.34 percent copper, 67-71 percent silica, 10.6-14.5 percent alumina, 2.7-3.3 percent iron, and from 0.03 to 0.37 ounces of silver per ton. This ore was selectively mined from the richer ore zones, consequently it is not representative of the entire orebody. On the other hand, the copper content in samples from the drill holes appears to be too low, and it is believed some losses were incurred during drilling. Probably the orebody contains somewhat more copper than is indicated by the drill holes and less than indicated by the shipments; therefore, a grade of 0.5 percent copper tentatively is accepted as representative of the south or main orebody of the Blue Hill deposit.

According to unverified reports about 400 tons of ore were shipped from the Blue Hill deposit in 1950 but records of this production are not available. From time to time during the last several years some of the attractive bluish and greenish copper-stained rock was hand sorted and shipped as ornamental building stone but there is no known record of this production.

The north orebody on the Blue Hill ore zone lies within an area about 300 feet long and 150 feet wide. It has been explored by several bulldozer cuts and where exposed it is similar in appearance to the south orebody. Three

vertical holes were drilled into the ore zone by Subeo, Ltd., but gave inconclusive results. Samples of one hole averaged 0.15 percent copper in a drilled distance of 14 feet. Another hole passed through porphyritic granite without evidence of significant amounts of copper. This potential orebody is not considered to be part of the ore reserve because supporting data such as drill hole information and assays of samples are not adequate to prove the existence of ore. It will be explored at some future time.

Description of the Big Bull Copper Deposit

The Big Bull deposit is situated about one-half of a mile northeast of the Blue Hill copper deposit described above. The two deposits are very similar in character; however, the ore of the Big Bull deposit occurs principally in coarse grained granite, some of which is moderately banded or gneissic in character. The Big Bull deposit is exposed on a low hill or knoll which trends east-northeasterly and rises from about 10 to 30 feet above the general land surface. The outcrop of the mineralized zone is about 350 feet long and 150 feet wide. It has been explored by two shafts, the deepest of which is said to be 100 feet. One shaft is open but is inaccessible because there are no ladders in it, and the other shaft was filled during mining operations a few years ago. It is reported that one of the shafts passed through the bottom of the ore zone at a depth of 45 feet and a short crosscut driven easterly at a depth of 100 feet penetrated ore, thus indicating a steep southeasterly dip for the ore zone. A short drift extending southward from the crosscut reportedly was driven in ore containing the same amount of copper as was found in the near-surface ore. Workings driven north and west from the shaft at a depth of 100 feet are reported to have been in barren rock. Two diamond drill holes were drilled many years ago and it is reported that one of them penetrated ore and the other was drilled in unmineralized footwall of the orebody.

In March 1943 the Sierra Metals Co., Inc., applied to the Reconstruction Finance Corporation for a loan to develop the deposits. This application was refused because the ore was not considered to be rich enough to ship directly to smelters. However, the Field Engineer who examined the property recommended that the deposits be explored by diamond drilling by the U.S. Bureau of Mines as part of the Government effort to obtain supplies of copper for World War II.

The Big Bull copper deposit has been mined to a greater extent than any deposit in the district and it has yielded most of the ore shipped to smelters. The ore is higher in copper content than the Blue Hill copper deposit. In April 1937, a former owner of the property, R. J. Edwards, submitted a select sample to ASARCO's smelter at Hayden, Arizona, which reported that the sample contained 5.65 percent copper. In January 1942 a Mr. Church reported assays of 14 samples which had an arithmetic average of 1.85 percent copper. In November 1942 Merle H. Guise, General Superintendent, Sierra Metals Co., Inc., reported assays of four samples which averaged 3.8 percent copper. The preceding assay records were furnished by the Arizona Department of Mineral Resources. Another report, of unknown origin, shows that a hole drilled 65 feet south of the main shaft encountered ore containing from 1.16 to 3.15 percent copper and another hole drilled about 60 feet southwest of the first mentioned hole penetrated only barren rock. It is said that the drift from the shaft workings at a depth of 100 feet contained from 5.0 to 5.9 percent copper.

In May 1943 the deposit was carefully examined by A. L. Flagg, Consulting Mining Engineer and a former engineer for the Arizona Department of Mineral Resources. Mr. Flagg reported analyses of 19 surface or near surface samples which had an arithmetic average of 2.5 percent copper. He also reported three carload shipments of ore made in March and April 1929. The results of these three shipments are as follows:

<u>Dry Wt.</u> <u>in tons</u>	<u>Percent</u> <u>copper</u>	<u>Percent</u> <u>silica</u>	<u>Percent</u> <u>alumina</u>	<u>Ounces of</u> <u>silver/ton</u>
39.95	4.10	77.6	3.8	0.4
45.95	1.50	66.0	11.6	0.5
39.69	1.66	67.0	13.2	0.2

The weighted average copper content of these three carload shipments of ore is 2.40 percent. This apparently was crude, unprocessed ore, as Mr. Flagg stated that by removing waste rock by hand sorting the copper content could easily be increased so that shipments would contain from three to five percent copper. It is said that some small shipments of ore contained as much as 10 percent copper but records of such shipments are unknown.

During the fall and winter months of 1961-1962 Mike Guzman of the Guzman and Schwartz Mining Company mined and shipped from the Big Bull deposit a total of 2505.6 tons of ore which had a weighted average grade of 1.55 percent copper, 0.25 ounces of silver and 0.009 ounces of gold per ton. In 1966 the McFarland and Hollinger Mining Company mined and shipped from the same deposit about 2,146 tons of ore which averaged 1.4 percent copper, 68.2 percent silica and 11.3 percent alumina. The 4,777 tons of ore shipped from the Big Bull deposit, for which records are available, has a weighted average grade of 1.51 percent copper. Both the Blue Hill and the Big Bull deposits contain trace amounts of gold, a little silver and small amounts of molybdenum, but these metals are present in such small amounts that they probably can not be recovered commercially.

It is believed that the total production from the Blue Hill and Big Bull copper deposits amounts to about 10,000 tons, most of which was produced from the Big Bull deposit. One of the main reasons why more ore was not produced was because of the high content of alumina, Al_2O_3 , which is undesirable in the smelting process; therefore, it hindered production and sales of ore. The available analyses indicate an average alumina content of 10.4 percent for the Big Bull deposit and 8.4 percent for the Blue Hill deposit. The alumina will not be a detriment when the ore is treated by the leaching process.

Ore reserves at the Big Bull deposit were estimated for Subeo Ltd. to be about 50,000 tons of ore containing about 1.2 percent copper. For the purposes of this report the grade is reduced to 1.0 percent to allow for depletion of the deposit by selective mining of the richer ore previously extracted, and to allow for dilution by waste rock in future mining operations. This estimated reserve must be classed as geologically inferred or possible ore because drill hole information and assays of samples are inadequate for a higher classification.

Future of the Copper Deposits

Until the last few years it has not been economically feasible to produce copper from the Blue Copper and Big Bull deposits. The value of the crude ore was too low to yield a profit after payment of freight and smelting charges. These charges are estimated to range from \$8.00 to \$10.00 per ton of ore, most of which can be saved by processing the ore near the mine.

At the present time a new mine going into production will benefit from modern mining methods and recently improved low-cost methods of recovery of copper by heap leaching of the ore and precipitating relatively pure copper concentrate from solution. There is a good market for copper at relatively high prices and

the demand is especially great for the type of copper concentrate that is to be produced by Enterprise Copper Corporation; often such concentrate can be sold at premium prices. For these reasons it now appears economically feasible to mine the Blue Hill and Big Bull copper orebodies.

It is planned that additional exploration will be done on the Blue Hill and Big Bull deposits and on other deposits in the district in an effort to increase the known reserves of ore and to bring new copper mines into production. After the Big Bull and Blue Hill deposits are prepared for production another exploration program will be undertaken on a property which lies along Suizo Wash about six miles southeast of the Blue Hill deposit. This property consists of a large group of claims known as the Burkhardt claims, all of which are controlled by the Enterprise Copper Corporation. On this property copper minerals similar to those found in the Big Bull and Blue Hill deposits are exposed in outcrops scattered over a relatively large area. The copper content of 36 samples cut at random from outcrops of the mineralized zone averaged 0.96 percent. It seems probable that exploration might result in the discovery of considerable copper ore; possibly on the order of a couple million tons or more. This is classed as a potential future source of ore as interpreted from favorable geological conditions.

Conclusions

The Blue Hill and Big Bull copper deposits contain a moderate reserve of copper ore that can be mined and treated economically by modern processes to recover a high-grade copper concentrate. There is a good market for this high-grade copper concentrate at firm prices; therefore, it appears feasible to develop and mine both the Big Bull and Blue Hill copper deposits at the present time. In addition to mining copper ore it will be possible to produce considerable architectural stone for the construction trade if market studies indicate sufficient need for this type of material. Other potential sources of ore exist in the Owl Head district and the ore reserves should be increased significantly by future exploration.

Respectfully submitted,

John N. Faick
John N. Faick, Ph. D.
Registered Geologist

Tucson, Arizona
March 7, 1969



A PRELIMINARY STUDY OF THE METALLURGICAL FEASIBILITY OF
LEACHING THE OXIDE COPPER AT THE BLUE GLASS AND
ADJACENT PROPERTIES, PINAL COUNTY, ARIZONA



Report No. 69-2

Prepared by Dr. Walter W. Walker, Ph.D., P.E.
Professional Metallurgical Engineer

February 11, 1969

SUMMARY

The purpose of this report is to summarize the results of a preliminary engineering evaluation of the feasibility of leaching certain oxide copper deposits located in Pinal County, Arizona.

Ore Reserves

The writer examined several properties controlled by Mr. Glynn Burkhardt in Pinal County, Arizona on February 9, 1969. The writer was accompanied on this examination by Mr. Burkhardt, Mr. Ben Knorr and Mr. Bob Knorr. As a result of this cursory examination, it is the writer's professional opinion that sufficient ore reserves are in sight to warrant establishment of a leaching plant.

Metallurgical Feasibility

Metallurgical laboratory tests have shown that up to 82% of the available copper in the ore can be recovered by leaching. The copper is contained in the form of chrysocolla ($\text{CuSiO}_3 \cdot 2\text{H}_2\text{O}$). At present, two other chrysocolla deposits are being treated satisfactorily by leaching. It is the writer's professional opinion, therefore, that leaching appears to be economically feasible for the properties examined.



Closure

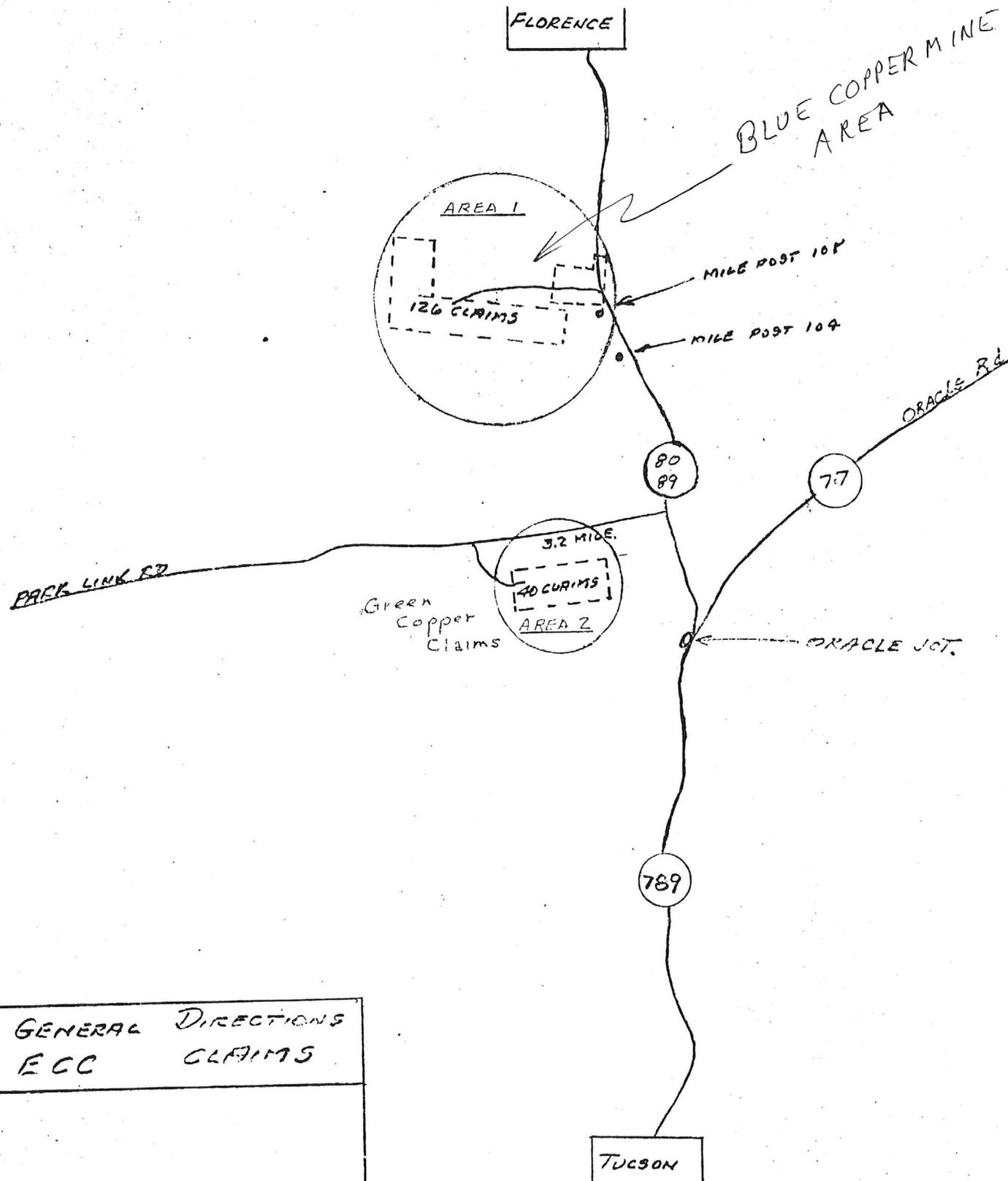
On the basis of an admittedly cursory examination, it appears that the properties examined may be economically mined and the copper recovered by leaching. The writer, however, strongly recommends that further testing be done on a pilot plant basis either prior to or coincidentally with establishment of the ore processing plant.

Respectfully submitted

Walter W. Walker

Dr. Walter W. Walker, Ph.D., P.E.
Professional Metallurgical Engineer





GENERAL DIRECTIONS
ECC CLAIMS

ZONA DEPARTMENT OF MINES & RESOURCES

Mineral Building, Fairgrounds

Phoenix, Arizona

- 1. Information from: Various sources -
Address: _____
- 2. Mine: Blue Copper 3. No. of Claims - Patented _____
Unpatented 62
- 4. Location: _____
19-20-21-28-29 & 32
- 5. Sec _____ Tp 8S Range 12E 6. Mining District _____
- 7. Owner: Glynn Burkhardt (see report at 1-27-65)
- 8. Address: 5701 E. Calle Aurora, Tucson
- 9. Operating Co.: Subco Ltd -
- 10. Address: ?
John Glass - Geologist
- 11. President: 3 others 12. Gen. Mgr.: _____
- 13. Principal Metals: _____ 14. No. Employed: _____
- 15. Mill, Type & Capacity: _____
- 16. Present Operations: (a) Down (b) Assessment work (c) Exploration
(d) Production (e) Rate _____ tpd.
- 17. New Work Planned: _____
- 18. Misc. Notes: Note - This is probably the same Group that
has the Cranberry Mine.
'Boyles had a deep hole drill operating
'Metler " " Shallow 100' small rig operating
in addition someone was doing geophysics L.P. but
could not find them.

Date: 1-24-68

Glynn Burkhardt
(Signature)

(Field Engineer)

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine

Date Feb. 13, 1964

District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Glynn G. Burkhardt.

References: Reports of Jan. 2, 1964, and April 15, 1963

Owners: (1) U-Tex Oil Co., 1112 Walker Bank Bldg., Salt Lake City, Utah --- owns 20 to 25 unpatented claims on Federal land.
(2) Dave Owen, rancher --- owner of 1 1/2 to 2 sections of patented land.
(3) Glynn G. Burkhardt, 5701 E. Calle Aurora, Tucson ---- owns 15 unpatented claims on the south side of the property.

Lessee: Glynn G. Burkhardt, Tucson ---- leasing (1) and (2) of above.

Proposed Plans: Mr. Burkhardt plans to sell or sublease the above described property to some operating company.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Blue Copper Mine

Date January 2, 1964

District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Glynn G. Burkhardt.

References: Report of April 15, 1963.
Corrections and additions to April 15, 1963 report.

Owners: U-Tex Oil Co.
1112 Walker Bank Building,
Salt Lake City, Utah
R.E. Hawks, Supt.

Lessee: Glynn G. Burkhardt, 5701 E. Calle Aurora, Tucson, et al.

Number of Claims: 40 unpatented claims.

Principal Minerals: Copper with high silica content - mixed oxides and sulphides.

Present Activities: Mr. Burkhardt has been mining some blue rock and selling it to the building industry. He operates a stone yard called 'Arizona Beauty Stone at 5961 E. Speedway, Tucson.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine

Date April 15, 1963

District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Glynn G. Burkhardt.

References: - Report of June 13, 1962, Feb. 14, 1962 and Dec. 19, 1961.

Owners: Utex Oil Co., Salt Lake City, Utah (subsidiary of Tintic Standard).

Lessee: Glynn G. Burkhardt, 5701 E. Calle Aurora, Tucson. Lease provides for \$2.00 per ton royalty on ore mined.

Principal Minerals: Copper with high silica content - mixed oxides and sulphides.

Present Mining Activity: None, as yet.

Proposed Plans: Mr. Burkhardt expects to mine blue rock which can be sold for decorative purposes in the building industry. Mr. & Mrs. Burkhardt operate Arizona Beauty Stone at 5961 E. Speedway, Tucson and sell decorative stone to the building trade.

The blue rock will be mined by open cut operations, the work being done part time, as the demands require it.

6-24-63 - Mine visit - worked intermittently for building stone. The blue oxidized copper ore is used for ornamental purposes. - WR - ALJ - 6-24-63

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine Date June 13, 1962
District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson
Subject: Field Engineers Report. Information from Larry Drake & Personal visit.

References: Report of Feb. 14, 1962.

Lessee: Same as report of Feb. 14, 1962.

Principal Minerals: Same as report of Feb. 14, 1962.

Present Mining Activity: The property is now being operated by open pit operations. This work is done on a knoll about 1/4 mile north of the previous underground operations. 2 men working - Larry Drake and his father.

Ore Values: The ore values are very spotty running from 0.2% to 2.0% copper. By selective mining, it should average about 1.5% copper, with from 70 to 75% in silica content.

Marketing: Operator expects to resume shipments to the A.S. & R. smelter at Hayden. At present he has about 50 tons of ore stockpiled.

Old and New Mine Workings: See report of Dec. 19, 1961.

Review of Recent Operations: Underground mining operations were discontinued some time in April and open pit operations were started soon afterwards. However, work has been carried on only part of the time since then on account of illness of Mr. Drake.

2 truck shipments were made to the A.S. & R. smelter since open pit operations were started, but the returns did not come up to expectations. Also, some rock has been sold for decorative building stone. At present, there are two stockpiles, one about 30 tons and one about 20 tons, ready for shipment.

Mr. Drake states that he hopes to be able to operate full time from now on and that he can keep the grade to above 1.65% copper and 70% silica.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine

Date Feb. 14, 1962

District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Larry Drake & Personal visit.

References Report of Dec. 19, 1961

Lessee Larry Drake, 1902 Irene Vista, Tucson.

Mr. Drake reports that he has leased the property back from the Utex Oil Co., Salt Lake City, Utah, who has an option to purchase the property.

Principal Minerals Copper with high silica content--- mixed oxides and sulphides.

Present Mining Activity Combination raising and stoping from cross cut on main level.
4 men working.

Review of Recent Operations Since last report of Dec. 19, the 2 cross cuts were extended to a length of 60 ft. each, and raising and stoping was started above one of the cross cuts. This is in progress now. The ore is trammed in ore cars out ~~to the~~ through the adit or haulage level, and dumped in an ore stockpile, from where it is loaded into trucks by means of a loader. The ore is trucked to the A. S. & R. smelter at Hayden, with a contractor doing the hauling. Mr. Drake reports that production, at present, is about 30 tons per day, and hopes that, in another week or two, he will be able to step it up to 40 tons per day.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine

Date Dec. 19, 1961

District Black Mountain (Owl Head) Dist., Pinal Co. Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Larry Drake and personal visit.

Location Approx. Sec. 13 - T 8 S - R 11 E. About 45 miles NW of Tucson. Starting from Tucson, drive NW on Hwy. 80-89 for a distance of 43 miles to a point 0.2 miles NW of mile post 108 or 1.2 miles SE of SW Iron & Steel turnout. Turn left (SW) and drive about 1.7 miles on dirt road to the mine, passing the Blue Copper Patented Group operation.

Number of Claims 28 unpatented claims.

Owners R. J. Edwards, Coolidge, Ariz. owns 16 unpatented claims.
Larry Drake, 1902 Irene Vista, Tucson, Ariz. owns 12 unpatented claims.

Lessees Larry Drake has a lease on the 16 claims owned by R. J. Edwards, with purchase option.

Option to Purchase Utex Oil Co., Salt Lake City, Utah (subsidiary of Tintic Standard) has option to purchase from Larry Drake the 12 claims owned by him, and also the 16 claims owned by R. J. Edwards.

Development contract A contract for the development was given to Larry Drake by the Utex Oil Co. at a fixed price per foot of drift or cross cut.

Principal Minerals Copper with high silica content, with mixed oxides and sulphides.

Present Mining Activity Driving cross cuts on both sides of an old adit, on contract from Utex Oil Co. 3 men working. No shipments, but some ore stockpiling.

Geology Ore fissures and ore lenses in quartzite rock, overlaying a granite formation. The ore is a mixture of oxides of chrysocolla, malachite and cuprite, and some sulphides, notably chalcocite.

Ore Values Mr. Drake reports an average of about 3 % of copper, with a high silica content.

Ore in Sight Not reported. Requires additional exploration and development to determine.

Milling & Marketing Ore can be shipped directly to smelter as high silica flux. Possibly enough ore can be developed to justify the construction of a mill.

Old Mine Workings 1 old adit, about 270 ft. long, driven several years ago. Mr. Drake reports that about 4,000 ft. of wagon drilling was done in 1960.

New Mine Workings 1 cross cut, 45 ft. long, and 1 cross cut, 30 ft. long.

Review of Recent Operations Larry Drake reports starting work on his development contract from Utex Oil Co. about one month ago. Since that time, he has driven two cross cuts, one 45 ft. and one 30 ft. respectively. Mr. Drake reports that Utex Oil Co. limits him as to the amount of development he can do. However, he is given the privilege of mining and shipping ore from the mine on his own account, when his is not on contract from Utex Oil. He has not made any ore shipments as yet.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Blue Copper Mine (PATER, Inc. 5-111)

Date 9-21-61

District Owl's Head Dist., Pinal Co.

Engineer Lewis A. Smith

Subject: Interview with Mike Guzman

Location: On Bogart Wash, (approx. Sec. 12T8S R11E and Sec. 7T8S R12E)
(The property is 1 mile west of Hwy 90 and 1 mile north from a point
28 miles Southeast of Florence) It adjoins Omega.

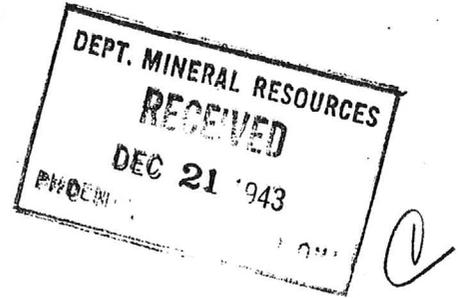
Property: 3 Groups of Claims, Azurite (4) Desert Lake (11) Jack Durham Gr (6) *Unpatented Cu*

Operators: Guzman & Schwartz Mining Co., Superior.
H. C. Smith, Foreman (Globe)

Work and Geology is described in the Files by Arthur Flagg and McFarlane in } *Unpatented Claims*
reports in the files.

Present Work: Open pitting of copper ore is being done by H. C. Smith for Guzman and Schwartz. They are shipping 1 car a day to Magma Copper Company for flux. Thus far the ore has ranged from 1.5 percent to 4 percent copper and 70-75 percent Silica. The haul to Superior, by truck, is about 60 miles. Equipment consists of a front loader, R.D.8 cat and trucks. Mr. Guzman states that the granite and quartzite country rock has been variable silicified out, ^{from} fractures. The fractures carry, narrow, but good grade ore, furnishing sweetness for the intervening areas. In places, however, the stringers are too far apart to make commercial ore.

Phoenix Arizona
December 18th 1943



Mr Andrew MacFarlane
P.O. Box 506
Globe Arizona

My Dear Mr McaFarlane;-

I have the application for the Loan on the Blue Copper Group of Mining Claims in the Owl,s Head Mining District Pinal County.

We are submitting the Report you made ,also the Map you made of the property, in addition to your reportand Maps, we would like to have the Maps, and Report of Mr Flagg, which I sent you, we especially wish the assay map to submit with our application.

Please send these papers at your very earliest conveniece , I thought the Maps and Report was at Mr Coupal,s office , otherwise I would have written you sooner.

Wishing you a MERRY CHRISTMAS & A HAPPY NEW YEAR.

I am very truly

Frank M Pool
Frank M. Pool
608 Title & Trust Building
Phoenix Arizona

Mr Coupal:
Please hand to Mr Pool.

DIST. GENERAL RES.

RECEIVED
NOV 11 1947

Blue Copper

November 24th, 1947

Owl Head.

Box 506 Globe, Arizona

Mr Frank Pool
608 Title & Trust Bldg.
Phoenix, Arizona.

Dear Mr Pool;

I have received two letters from you pertaining to former work made on the Blue Copper, also the very clear maps and report of Mr A.L. Flagg.

My report I made before, by several days, reading Flagg's report, and I note that these two reports are essentially a confirmation one of the other.

You should file your application at once, if you are still of the mind, to try and obtain an R.F.C. loan, and attach my report and also Flagg's as and in support of your application.

You Gentlemen should start a little work on the ground, and at once obtain your zero quota, with the A premium; and apply for the special premium, my report will help in a fair consideration of your application.

Trusting you will be successful in all your applications, and I am sure our Phoenix Office will assist you, in so far as their scope will permit.

Yours very truly.



Field Engr. Eastern Div.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine BLUE COPPER Date October 29, 1943
District Owl-Head, Pinal County, Arizona Engineer A. Macfarlane
Subject: Examination

Property & Location: The unpatented mining claims forming the Blue Copper group are situated on the southwest side of Highway #89 at a point nearly 30 miles south-east of Florence, the County Seat of Pinal County.

A local hill called Owl-head is distant about 4 miles southeasterly from the Blue Copper claims and at this point about 4 miles west of Owl-head service station, a good local road is followed thru a gate taking a westerly direction from the highway keeping this direction for about 1 mile, thence turns abruptly north for nearly a mile, to reach the Blue Copper claims.

A Mr. Robert Edwards and his wife, Mrs. Edwards, are stated to be the owners of the property, but have not given an option and working agreement to Mr. P. J. Hickey of 2241 N. Seventh St., Phoenix, and at Mr. Hickey's request this examination was made.

Nature of Mineralization: A copper carbonate and silicate deposition is found in a partly altered granitic knoll, there being a distinct fracturing of the rock mass, generally along a northwesterly course.

Along these fracture lines both much alteration and copper mineralization has occurred, giving the surface appearance of a series of veins or bands of copper bearing quartzite and feldspathic gangue, in bands of several feet in thickness.

Forming the immediate casing of these mineralized bands are other bands or ribs of Grano-dioritic material, which is thinner in copper impregnations and less well defined structurally.

For a mineralized width of about 100' from hanging wall on the east to the footwall on the west limits of the surface deposit, this whole mass is a series of copper impregnated bands and ribs of Granitic gangue of very low copper content.

The surface mineralization is plainly in view for about 450 feet in length along its northerly course. The deposit faults the low granitic hill near its south end of the visible mineralization, thence forming the low hill extending only about 30' above the level of the surrounding valley, the northerly limits are reached in about 450', as here the alluvial deposit of the broad plain covers any extension of the copper bearing rock, in all directions, except the south end, which as stated is faulted by the Archean granite.

The Feldspathic rocks of the little hill have undergone distinct alteration forming two discernable bands of Kaolin, which are host to the copper minerals, as noted in three small surface stopes.

These alterations have not taken place along conformable fracture planes, nor with much continuity, the same band or vein of Kaolin differentiates into Syenite and may continue to be the course of copper deposition.

Mine Workings: Consist of a number of small open cuts made principally on the formation lenses showing attractive copper content at the surface. Two vertical shafts have been sunk at some past time to a depth of 80 and 100' and at present are not equipped with ladders or timbering, the hard nature of the rock does not allow caving, these shafts are open.

These shafts were collared on bands of copper bearing material, and yet visible for a depth of 20' the same material is noted in the shaft ends, but the muck on the shaft dumps, coming from below the 20' level is almost barren of the copper carbonate, indicating either that the mineralization dipped out of the shafts, or that a lean zone was entered, at say, 20' to 30' below the croppings.

Available Ore: At present the surface mineralization to a depth of 25' provides an ore zone of commercial tonnage; this body about 450' long by 100' laterly and mined to a depth of 25' gives about 70,000 tons.

I estimate that only about 1/10 of this tonnage of copper mineralized gangue, will be 3% copper ore and that the mining of same will have to follow along the most enriched bands apparent on the surface.

The 9/10 of the surface body will be composed of about 1/2 barren material and the other 1/2 will contain over 1% copper; therefore, I will only consider 7,000 tons, selectively mined by following along the best copper bearing lenses, as now available ore of a 3% copper content.

Mining Costs: The economic features attendant are excellent, covering the mining and marketing these low grade ores. A standard highway from mine to rail station, a distance of 30 miles, will cost trucking per ton \$2.00

Mining in elongated surface cuts and glory holes allowing the trucks to enter the stopes and be loaded direct after the blasting, should provide a cost of mining and tramming of	2.50
Rail freight to Hayden smelter from Florence	.80
Smelting, say at	<u>3.00</u>
Total mining and marketing costs ton	\$8.30

Assuming a price for copper as follows:

3% ore net smelter on 50# at .092 per lb. is	\$4.60
A premium plus a special premium of 7¢, or 97% of 60# at 12¢, is	<u>6.98</u>
	11.58

Royalty per ton	.28
Operating margin	<u>3.00</u>

\$11.58

The operating margin will be further reduced by insurance taxes, accounting and other obligations attending the proposed operation.

This project may approach the above estimate, but requires a special premium of at least 7¢ a pound of copper, or a total price Connecticut Valley of 24¢ per pound.

Possibilities of Deposit: The proposed mining of the higher grade surface lenses, serves to immediately produce about 400,000 pounds of copper, also to further prospect the ground.

Information gained by doing the surface mining will be of service in determining if drilling and extended exploration may find larger and commercial grade ores; certainly the broad surface mineralization and the structural forces forming the long axis of the deposit are present evidence that a mine may be made by continuance of the explorations.

Approximately 4 miles southerly from the Blue Copper are the Owlhead veins occurring in a similar general formation of granite and alterations thereof. Several carlots of these carbonate copper ores with a content of about 6% cu. were mined and shipped during 1936 from the Owlhead group.

The extent of the open cuts made on the Blue Copper croppings are evidence of the shipment of three or four carlots from the property at some past period.

In conclusion I will state that if an adequate mining plant for drilling hard rock is provided, and a competent truck of about 10 ton capacity, a smelter charge of not over \$3 on these silicious copper ores, together with a special premium as above stated are all obtained, that this project should fully produce enough copper from the surface stopes to more than meet the costs attendant to this venture.

MEMORANDUM

To: A. Macfarlane

October 21, 1943

From: J. S. Coupal

Subject: P. J. Hickey
Blue Copper Mine, Florence, Arizona

In reply to your memo of October 20, I have just talked with Mr. Hickey and Mr. Frank Poole. It would be most agreeable with them if you could meet them at the Florence Hotel at 10 A. M., Monday, October 25. It will probably not take more than three or four hours to do the work.

In view of your letter, I have made a definite appointment for you with them at that time to go with them to the mine. This will make it possible for you to make the Winkelman meeting on Monday night, and, if necessary to spend other time in the district, you could do so the following day.

J. S. Coupal
Director

JSC:JES

c.c. Frank Poole
Title and Trust Building
Phoenix, Arizona

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

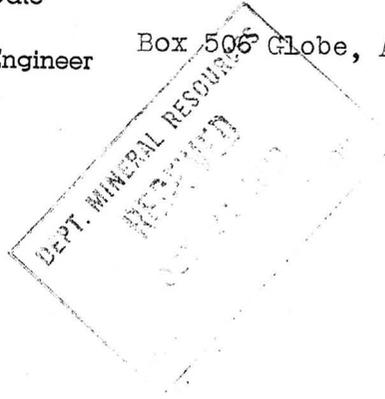
Mine ✓ Blue Copper Mine

Date Oct. 20th, 1943

District ✓
Subject: P.J. Hickey

Engineer Box 506⁵ Globe, Arizona.

Mr Sam Coupal Director
Department Of Mineral Resources
Phoenix, Arizona.



Dear Mr Coupal;

I can meet Mr Hickey early monday Oct. 25th, say at Florence Junction, about 9 A.M. and perhaps I could leave my car there and go in his to his mine.

I have a Council meeting in Winkleman Monday night and will have to get back to my car by 3 P.M. at latest, but if his mine is not far from Florence or Florence Junction, it should be feasible.

However if there is any amount of walking or underground workings, or other delays, we had better make our meeting in Florence Junction, say wednesday the 27th, at 9 A.M. to 10 A.M.

Please let me know which date is most suitable to Mr Hickey, ~~am~~ and oblige.

Yours very truly.

A. Macfarlane
A. Macfarlane

*Trying to save mileage by first
suggested date.*

*Sam Coupal
4-3/21*

*10:00 - all
Monday
Oct 25th*

MEMORANDUM

TOP ANDREW MACFARLANE

FROM: J. S. COUPAL

SUBJECT: BLUE COPPER MINE
✓ P. J. Hickey
2241 N. Seventh Street Phoenix

I would like to have you plan to examine the Blue Copper Mine in company with Mr. Hickey sometime during the week of October 25 when you are in Winkelman, Ray, Florence Area. During that week you have only definitely one council on hand, namely, at Winkelman, so if you will advise me when and where you could meet Mr. Hickey to make this examination, I will advise him and I know he will arrange to meet you. My suggestion would be that you arrange for this meeting at, say, Florence on Tuesday, October 26, but I am leaving the exact date to your convenience. Please advise.

J. S. Coupal

e
po
P
y

BLUE COPPER GROUP.

The Blue Copper Group, consisting of nine unpatented claims, is located in the Owl Head mining district, Pinal County, Arizona.

The property is approximately twenty-eight miles south of Florence, via Highway 80, and west of the highway about one-half mile. About ten miles of this distance is paved. A short connecting road from the highway to the claims is over nearly level ground.

The greater part of the property covers nearly level ground with two conspicuous knolls. The lower and easterly of these knolls is the area which has been most extensively prospected and produced practically all the shipping ore. These knolls are composed essentially of a coarse grained granite. The granite is intruded by a dense, fine grained, highly acidic material in which most of the highest grade copper ore occurs. The larger, or most westerly knoll shows some gneissic structure but in the main the country rock is a coarse grained granitic nature showing evidence of crushing. The interstices around the crushed component have been filled with copper minerals. Those identified are copper silicate, malachite, sparse azurite, chalcocite and, in the denser material, a very few minute particles of chalcopyrite. Concentrations of chalcocite occur in the denser material as nodules up to three inches in diameter and as small lenses as much as four inches thick.

The work done on the property consists principally of shallow pits, very irregularly distributed over certain more favorable areas. The deepest shafts are one hundred feet and eighty feet respectively. Neither of these are timbered and except for a minor obstruction in one they appear to be open to the bottom. It is claimed that there is a drift forty feet to the south from the bottom of the one hundred foot shaft. Water stands at ninety feet. The owners report that at a short distance from the top in this shaft ore was encountered which was forty-two feet thick in the shaft. This ore is thought to have been cut again in the drift. The ore cut in the drift assays 0.20 oz gold, 7.0 oz silver and 5.0% copper. About fifteen hundred feet northeast of the knoll on which this work is done is another shaft, rather shallow and without timber, which similarly passes through ore, which is four feet thick here. The ore is very hard and is said to assay 5.0% copper. A grab sample from the dump assayed 2.06% copper.

Out of these and other workings, but principally from the very shallowest, several shipments have been made. The total quantity shipped is not known but shipments ranged from a single truck load of four or five tons to lots of more than forty tons. Some of the ore was roughly sorted but much of it was shipped just as it was broken.

The following records of shipments are the only ones known to be available at the present time. These shipments were made by truck to the Magna Copper Company, at Superior, Arizona.

Date	Dry Wt	Cu	Ag	Au	Al	Si1.
3/24/29	79,900	4.10	0.40	0.01	3.8	77.6
4/3/29	91,900	1.50	0.50	0.01	11.6	66.00
4/5/29	79,380	1.66	0.20	0.10	13.2	67.0

Other cars are known to have been shipped but there is no record available

c
o
P
Y

covering this material. It is known that the ore was sorted after a fashion and that the cepper content was above 5%, some of it above 10 per cent.

In the foregoing tabulation the first lot came from the "Glory Hole" which is marked "C" in the accompanying assay map. This is an irregular funnel shaped opening about 10 feet in diameter but about eight feet deep. There is at least one two to four inch streak of high grade ore in this opening. The shipment from this hold was not sorted material.

Lot No. 2 came from the locality marked "F" on the assay map. This was shoveled from the pit directly into the truck without any regard for the kind or quality of material being loaded. The same may be said for the material in the third lot, which came from the opening marked "F" on the assay map. These pits are not over three feet deep, consequently everything shipped was surface material. From the history of other shipments, it is believed that this ore can be sorted easily to carry more than 5% copper. The silica content will be above 60% in any of the ore.

The total number of openings on the property, including any shafts deeper than fifty feet, is almost fifty. Some of these are very limited in extent and could have been dug in half a shift. Others are a little more extensive and have yielded some very good copper ore. The attached sketch shows the relative position of the most important but not all of the openings around the lower knoll principally on the Busy Bee No. 2 claim. Some samples were taken in this area by the writer. The copper content of these samples is entered on the map together with the results of other samples on which data was supplied by the owner. The results of this sampling warrant additional exploration.

The initial work recommended may be divided into three classes: (1) The two shafts B and G on the sketch, 80 to 100-feet deep respectively should be examined in detail. Only elementary timbering is recommended at the beginning, just enough to permit safe entry and complete investigation and sampling. The program with respect to the future of these shafts would depend entirely upon the findings when the shafts are opened for inspection. (2) A trench should be run from approximately point marked "F" on the sketch west to and probably beyond the crest of the knoll. Similar trenches might be made east and west at a point just south of "B" and through "A". (3) Finally, while this work is in the progress any/ of the shallow openings on the sketch might be enlarged for the purpose of producing shipping ore. It would seem that with a very little effort the copper content can be kept up to at least 3%. Since the mining cost would be very low for such an operation three percent copper ore should yield a small profit. To effect a temporary rehabilitation of the two shafts and make a complete examination, as well as commente shipping some ore, a fund of not less than five thousand dollars should be available. In all probability this much net can be recovered from existing shallow surface workings.

Phoenix, Arizona
May 31st, 1943.

Respectfully submitted,

W. L. Flagg
Consulting Engineer.

Part of application for U.S. Pat. Grant

Exhibit A, Paragraph 6,

LEGAL DESCRIPTION.

(a) Property in Owls Head mining district, Pinal county, Arizona. Section 19, Tp 8 South, Range 12 East.

(b) There are no patented claims.

(c) The date of location and the book and page at which they are recorded in Florence, Arizona are given below.

Claim	Located	Book	Page
Blue Copper No.1	7-1-41	52	171
Blue Copper No.2	7 -1-41	52	172
Blue Copper No.3	8-28-41	52	237
Blue Copper No.4	8-28-41	52	242
Blue Copper No.5	8-28-41	52	241
Blue Copper No.6	8-28-41	52	240
Buisy Bee No.1	7-1-41	52	168
Buisy Bee No.2	7-1-41	52	169
Buisy Bee No.3	7-1-41	52	170

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine SIERRA METALS CO., INC., Cu.
(Formerly known as the Edwards Mine)

Date April 6, 1943

District Owl Head

Engineer Earl F. Hastings

Subject: Reconstruction Finance Corporation
Mining Loan.

Docket No.

Phoenix C-172

Date Application Received

March 31, 1943

Date of Report

April 6, 1943

1. Name and address of applicant (correspondent):

Merle H. Guise, Gen. Supt., Sierra Metals Co., Box 202, Florence, Arizona.

2. Character of project and estimated cost thereof:

Cu. Reopen two 100 foot and one 60 foot shaft, and miscellaneous pits for inspection. \$5,000.00.

3. Location of property:

Owl Head Mining District, Pinal County, Arizona.

4. Applicant's interest in or ownership of property:

The applicant, a corporation, holds a 10 year lease on sliding royalties; date of lease is November 15, 1942.

5. Loan requested:

\$5,000.00.

6. Loan recommended:

None.

7. Comments:

(A) There is a wide area of mineralization though continuity is not proven between the various points of exposure. Exposures are from 5 to 20 feet in width and several local points of production appear possible.

(B) The general average of ore values, as closely as an average can be determined by the limited and widespread sampling, is below a commercial shipping grade. A large amount of development would be required before local beneficiation could be considered.

There do not appear prospects for any considerable quantity of shipping ore by selective mining, particularly since the ore is not of good fluxing quality; even if a price stimulant were administered it is doubtful if profitable operations could be attained.

At best this appears to be a long term project. The relation of value of ore to indicated width and depth of ore is such that neither a large low-grade nor small moderate grade operation appears probable.

April 6, 1943

(C) A better approach toward the exploration of possibilities of such a project would be through the utilization of the facilities of the U. S. Bureau of Mines. It should be recommended to the applicant that he request exploration by diamond drilling from that bureau.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

Earl F. Hastings,
Projects Engineer.

Blue Copper Group

1-10-1910

NAME OF CLAIM	DOCKET	PAGE
ANGUS #11	454	579
ANGUS #12	454	578
LOIS #1	388	557
LOIS #2	"	558
LOIS #3	"	559
LOIS #4	"	560
LOIS #5	"	561
LOIS #6	"	562
LOIS #7	"	563
LOIS #8	"	564
LOIS #14	389	518
LOIS #15	389	519
LOIS #17	392	521
LOIS #18	392	522
LOIS #19	"	523
LOIS #20	"	524
LOIS #21	"	525
LOIS #22	"	526
LOIS #23	"	527
LOIS #24	"	528
LOIS #25	"	529
LOIS #26	"	530
LOIS #27 thru & incl. of---	394	422 thru &
LOIS ---- #71 -----	394	incl. of 466
LOIS #15A	453	213
Buffalo #3	276	517
Buffalo #4	276	518
Buffalo #7	276	521
Buffalo #8	276	519
Buffalo #13	276	520
Buffalo #11	276	522
Buffalo #12	276	523
Buffalo #14	276	524
Buffalo #15	276	525
Buffalo #16	276	526
Angus Extension 4	276	527
Angus Extension 8	276	528
Blue Copper 1	52	171
Blue Copper 2	52	172
Blue Copper 3	52	237
Blue Copper 4	52	242
Blue Copper 5	52	241
Blue Copper 6	52	240
Big Bull 1	57	106
Big Bull 2	57	106
Big Bull 3	57	107
Big Bull 4	57	108
Big Bull 5	57	109
Big Bull 6	57	110
Big Bull 7	57	111
Big Bull 8	57	112
Big Bull 9	57	113
Big Bull 10	57	114
Buffalo #17	340	530
Buffalo #18	340	531
Buffalo #19	340	532
Buffalo #20	340	533
Buffalo #21	340	534
Buffalo #22	340	535
Buffalo #23	340	536
Buffalo #24	340	537
Angus Extension #10	276	529
Angus Extension #12	276	530

INTERNATIONAL SMELTING & REFINING COMPANY

MIAMI PLANT
MIAMI, ARIZONA

GENERAL ORE SCHEDULE

Date Issued August 23, 1939

Shipper Mr. R. J. Edwards Address P. O. Box "0" Eloy, Arizona

Mine _____ Location Tubac, Arizona

Character of Ore _____ Shipping Point Tubac, Arizona

Remarks _____

PAYMENTS:

COPPER: Pay for 90% of the copper content with a minimum deduction of 10 lbs. and a maximum deduction of 20 lbs. per ton at the daily net refinery quotation for electrolytic copper as published in the Engineering and Mining Journal on the date of arrival of last car of each lot at the Plant of the Buyer, less a deduction of 2.5 cents per pound of copper paid for. No payment or deduction will be made for copper when the copper content is less than 0.8% as determined by wet assay.

SILVER: If the silver content is one ounce per ton or over, pay for 95% of the silver content at the U. S. Mint price, less the usual mint handling charge of approximately 5/8c per ounce, providing affidavits are furnished by the shipper, showing such silver to be of domestic origin and eligible for sale to the U. S. Mint, otherwise the Handy & Harman New York silver quotation for date of receipt of last car lot, shall be used as a basis for settlement. No payment is made for silver in ores assaying less than one oz. per ton.

GOLD: If the gold runs 0.03 ozs. per ton or over, pay for all of the gold at 92% of the average weekly U. S. Treasury price for gold, i.e. at \$35 x .92 or \$32.20 per ounce. No payment is made for gold in ores assaying less than 0.03 ounces per ton.

TREATMENT CHARGE

The base treatment charge shall be \$3.50 per dry ton on ores having metal values paid for up to \$15.00 per ton. If the metal values paid for are over \$15.00 per ton, the treatment charge will be increased 10% of the first \$25.00 in excess of \$15.00 paid for, to a total of \$6.00 per dry ton, for ores having values paid for between \$40 and \$100 per dry ton.

With ores, having values paid for in excess of \$100 per ton, the treatment charge will be further increased to the extent of 5% of the values over \$100, or at the rate of \$1.00 for each \$20.00 increase in values paid for over \$100 to a maximum treatment charge of \$8.00 per dry ton.

DELIVERY

Delivery in the case of truckload shipments shall be f. o. b. cars at the Buyer's works and in the case of carload shipments, f. o. b. Inspiration Transfer, Miami, Arizona.

FREIGHT

All freight and delivery charges are for the account of the shipper. Any advance made by the Buyer shall be deducted from the settlement.

NOTE: The foregoing settlement terms are subject to the General Clauses as shown on the back of this sheet. Terms quoted are subject to immediate acceptance and unless shipments are begun within thirty days, this quotation is automatically cancelled.

GENERAL CLAUSES COVERING SCHEDULES

I. Weighing, Moisture and Ore sampling as done by the Buyer according to standard practice promptly after receipt of the product will be accepted as final.

The Seller or his representative has the right to be present to witness these operations but the absence of said Seller or his representative shall be deemed a waiver of the right in each instance. After sampling, the product may be placed in process or disposed of as the Buyer sees fit.

In case of disagreement on assays such assays shall be sent to Umpire. Umpire assays shall be final if within the limits of the assays of the two parties, and if not, the assay of the party nearer to the Umpire shall prevail. The losing party shall pay the cost of Umpire. In the case the Seller fails to make or submit assays to the Buyer, the Buyer's assays shall govern.

II. Except by special arrangement, rates quoted are for carload shipment, minimum 60,000 lbs.

III. Where small shipments are accepted a sampling and handling charge will be made. This charge will amount to \$10.00 for shipments of one ton or less and will be decreased one dollar for each ton in excess of the first ton in the shipment.

IV. Schedules on ore not under contract for a definite period of time are subject to change without notice.

V. In this schedule where the word "ton" is used, it is understood to be a ton of 2,000 pounds avoirdupois; where the word "ounce" is used, in connection with gold and silver, it is understood to mean the troy ounce; where the word "unit" is used it is understood to mean a unit of one percent or twenty pounds avoirdupois.

MIAMI, ARIZONA.

INTERNATIONAL SMELTING & REFINING CO.
MIAMI PLANT

AMERICAN SMELTING & REFINING CO.

HAYDEN PLANT

HAYDEN, ARIZONA

Mr. R. J. Edwards
Box 553
Coolidge, Arizona

April 27, 1937
70.141

Dear Sir:

I am enclosing Assay Certificate on the sample of copper ore from the Desert Lake Mining Company which you left here to be assayed. The analysis is as follows:

<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>SiO₂</u>	<u>Fe</u>	<u>Al₂O₃</u>
Tr.	0.50	5.65	66.2	6.0	12.8

With the present price of cathode copper of 14.15¢ less 2.5¢, your outcome on this ore would be as follows:

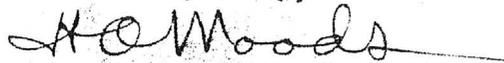
Total Metal Value	\$11.60 per ton
Base Charge	\$3.50
Alumina penalty 6.2 units @ 25¢	1.55
Total Treatment	5.05
Net Value FOB Hayden	\$ 6.55 per ton

After paying freight from Florence to Hayden of \$1.00 per ton you would have \$5.55 left out of which to pay mining and trucking costs.

I would like to call your attention to the high alumina content of this ore and to the penalty shown above which is the excess alumina over 10% of the silica content, charged for at 25¢ per unit. This high alumina is very undesirable from a smelting standpoint, and even though we provide penalty for it we are not anxious to smelt this type of ore. However, if you would care to load a car as a trial shipment we could handle one car and at the same time have an opportunity to see if the alumina content is going to hold up to the hand sample. If your first car turns out to be as high alumina as this sample then I am afraid that we would be unable to handle any more.

I therefore suggest that if you care to do so you load up a car and send it in and we will advise you promptly if we can handle any more.

Yours very truly,



H. O. WOODS, Asst. Supt.

HOW:ERS

cc - Mr. Brent N. Rickard
Mr. H. F. Easter

covering this material. It is known that the ore was sorted after a fashion and that the copper content was above 5%, some of it above 10 per cent.

In the foregoing tabulation the first lot came from the "Glory Hole" which is marked "C" in the accompanying assay map. This is an irregular funnel shaped opening about 10 feet in diameter but about eight feet deep. There is at least one two to four inch streak of high grade ore in this opening. The shipment from this hold was not sorted material.

Lot No. 2 came from the locality marked "F" on the assay map. This was shoveled from the pit directly into the truck without any regard for the kind or quality of material being loaded. The same may be said for the material in the third lot, which came from the opening marked "F" on the assay map. These pits are not over three feet deep, consequently everything shipped was surface material. From the history of other shipments, it is believed that this ore can be sorted easily to carry more than 5% copper. The silica content will be above 60% in any of the ore.

The total number of openings on the property, including any shafts deeper than fifty feet, is almost fifty. Some of these are very limited in extent and could have been dug in half a shift. Others are a little more extensive and have yielded some very good copper ore. The attached sketch shows the relative position of the most important but not all of the openings around the lower knoll principally on the Busy Bee No. 2 claim. Some samples were taken in this area by the writer. The copper content of these samples is entered on the map together with the results of other samples on which data was supplied by the owner. The results of this sampling warrant additional exploration.

The initial work recommended may be divided into three classes: (1) The two shafts B and G on the sketch, 80 to 100-feet deep respectively should be examined in detail. Only elementary timbering is recommended at the beginning, just enough to permit safe entry and complete investigation and sampling. The program with respect to the future of these shafts would depend entirely upon the findings when the shafts are opened for inspection. (2) A trench should be run from approximately point marked "F" on the sketch west to and probably beyond the crest of the knoll. Similar trenches might be made east and west at a point just south of "B" and through "A". (3) Finally, while this work is in the progress any of the shallow openings on the sketch might be enlarged for the purpose of producing shipping ore. It would seem that with a very little effort the copper content can be kept up to at least 3%. Since the mining cost would be very low for such an operation three percent copper ore should yield a small profit. To effect a temporary rehabilitation of the two shafts and make a complete examination, as well as commence shipping some ore, a fund of not less than five thousand dollars should be available. In all probability this much net can be recovered from existing shallow surface workings.

Phoenix, Arizona
May 31st, 1943.

Respectfully submitted,

Consulting Engineer.

BLUE COPPER CLAIMS

PINAL

Glynn Burkhardt is trying to interest a company in his Blue Copper claims. GWI QR 4/1/71

Telephone call from Mr. Glenn Burkhardt regarding a letter that he had received from the State Land Department regarding his lowering of the ripper on his dozer for approximately 900' on his mineral lease. The holder of the grazing rights complained of the damage to the forage. GWI WR 10/18/72

The Durham Hills prospect (T8S R12E, Sec. 19) was examined. Here, extensive bulldozer cuts have explored along a strong shear zone striking in a N.N.W. direction in the contact zone between the Precambrian Oracle granite and the Pinal schist. Copper oxide mineralization coats the fracture surfaces. There is evidence that many drill holes tested for mineralization at depth along this zone. REL WR 8/20/73

Glynn Burkhardt called to say that he had a deal with Amax and that they were drilling on his Blue Copper property. GWI WR 8/30/73

RH

BLUE COPPER MINE

PINAL COUNTY

Glynn G. Burkhardt, Tucson, reported diamond drilling EX core, 120 feet deep on his Blue Copper Claims. ALJ WR 3-27-65

Called Mrs. Robert Edwards of Coolidge, who has sold her Blue Copper Claims (16) to U-Tex Oil Co., of Salt Lake City. No work is being done on claims at present although Glynn Burkhardt of Tucson, has lease and mines the oxide ore for building stone when the market demands. FTJ WR 6-11-65

Called on Dave Owens of Owens Ranch who purchased the Glory Hole claims from Edwards. He has optioned the claims to Kerr-McGee, who have drilled several holes (deepest reportedly +550 feet) They still hold option and have subleased to Burkhardt for the building stone. FTJ WR 6-11-65

Glynn Burkhardt called and gave the following information: Duval has optioned his Blue Copper Claims in secs. 20, 21, 28, 29, 33, T8S, R12E (114 claims) GWI WR 8-27-66

PRELIMINARY REPORT AND RECOMMENDATIONS
ON BURKHARDT COPPER SUBMITTAL,
SECS. 18 - 21, T. 8 S., R. 12 E.
PINAL COUNTY, ARIZONA.

A Report Prepared for
Magma Copper Company
7400 North Oracle Road
Suite 200
Tucson, Arizona 85704.

by

Syver W. More
-Consulting Geologist-
11321 East Calle Vaqueros
Tucson, Arizona 85749 - U.S.A.

December 22, 1992.



TABLE OF CONTENTS

Recommedations.....	1
Introduction.....	2
Location.....	2
Claim Status.....	4
Geology.....	4
"Conceptual" Exploration Resource Potential.....	9
Conclusions.....	10
References.....	12
Appendix.....	13

LIST OF ILLUSTRATIONS

Fig. 1. Burkhardt Property Location Map.....	3
Fig. 2. Burkhardt Submittal - Land Staus Map.....	5
Fig. 3. Burkhardt Claim Map (reconstruction).....	6
Fig. 4. Reconnaissance Geologic Map.....	in pocket
Fig. 5. Conceptual Resource Blocks of the Blue Copper Claim Group.....	in pocket

Recommendations

The Burkhardt copper submittal represents an unnoticed class of structurally-confined copper oxide bodies readily amenable to standard bulk mining and heap-leach processing methods. On the Burkhardt claim block, a 2500'-long x 500'-wide block of fracture-controlled copper-oxide mineralization is distributed in a north-south belt of schist/phyllonite. A second block of copper oxide mineralization to the northeast consists of a 900' long x 270'-wide exposure of multi-stranded northwesterly shears localized in Tertiary Catalina quartz monzonite. A rough estimate of exposed copper mineralization immediately available for extraction is approximately 5MMt and 2MMt respectively, grading 0.4 % Cu or better.

The Blue Copper property is sited several miles west of Highway 89 in an area of prior mining activity and free from subdivision encroachments.

Both belts of copper mineralization appear spatially related to a series of northwesterly dilational shears of regional extent that are tied to the plutonic and metamorphic evolution of the Tortolita-Santa Catalina-Rincon metamorphic core complex. The depth extent of mineralization in the two zones is conservatively estimated at 100'. Accepting a metamorphic hydrothermal model for the copper oxide mineralizations, the shears represent conduits for hydrothermal copper oxide mineralization tapped from a lower source. The potential thus exists for substantially increasing reserves by depth extension to several hundred feet, and in the immediate vicinity out along strike under pediment cover. Simple projections of major structures allows for conceptual exploration play along strike for 2 miles to the southeast and 0.5 - 2 miles to the northwest. A third possible buried structural regime is suggested in the south central Durham Hills in secs.30, 31 by fringing microdiorite swarms.

In the author's opinion, the probability of discovery of three to seven or more copper oxide zones of similar magnitude in tonnage and grade is reasonably good. The economics of a 40MM - 60 MMt @ .4% Cu near-surface oxide body are attractive, and it is in Magma's interests to test the property. I recommend Magma approach Burkhardt and negotiate an exploration agreement with him, with the provisos of a "quick-look" exploration program (i.e., early-exit clause if property proves unfavourable), and a negotiated NSR restricted to production derived within the confines of the Burkhardt claims.

Introduction

The Blue Copper property is a submittal of Glynn Burkhardt, 9100 Indian Hills Road, Tucson, Arizona 85749, to Magma Copper Company, Tucson, Arizona. The author was engaged by Mr. Charles Gaston, Chief Engineer, to accompany him and Burkhardt on a visit to the property on November 24, 1992. The author has since conducted additional stepout reconnaissance in the Tortolita, Ninety Six, and Picacho Mountains, and Durham Hills, and undertaken additional research at the Arizona Geological Survey.

The purpose of the author's additional field activities have been to ascertain the structural localization of copper mineralization, to examine the potential for expansion of reserves along strike, and to check prospect clusters elsewhere in the district for similar mineral occurrences. The Burkhardt property has NOT been mapped in detail by the author, as emphasis has been correctly directed towards overall appraisal of the style of mineral deposition and formulation of genetic models that can be used as predictors for step-out exploration. Further work will begin with integration of detailed mapping, structural analysis, and subsurface geophysical data.

All estimates of copper resources are strictly rough estimates +/- 50%; grade estimates are based off of Burkhardt's oral presentation and mine and Mr. Gaston's informal hand-sample evaluations. The third dimension used for tonnages (depth extent) is an estimate based off the depth of the shaft at Magma Well.

Location

The Burkhardt Blue Copper property is located in Pinal County at the north end of the Durham Hills, and 10 miles north of the main mass of the Tortolita Mountains, in secs. 18 - 21, T. 8 S., R. 12 E. in the Owl Head mining district. Mining activities in the region date to early Territorial days. The prospective ground is free from subdivision encroachments, as seen around the Tortolitas, and is on flat-lying non-obstrusive ground (figure 1). Large expanses of flat land suitable for siting of a heap-leach operation lie to the northwest, behind the Durham Hills. Figure 2 is a land status map of the district.

Access into the property is via state Highway 89 (Pinal Pioneer Highway): proceed north of Oracle Junction past Park link Drive; proceed further north 7.5 miles, turn west (left) through gate, proceed on trail to workings. (Refs: Durham Hills and Chief Butte 7 1/2' quads; Casa Grande 1:100,000 BLM series:Tucson AMS).

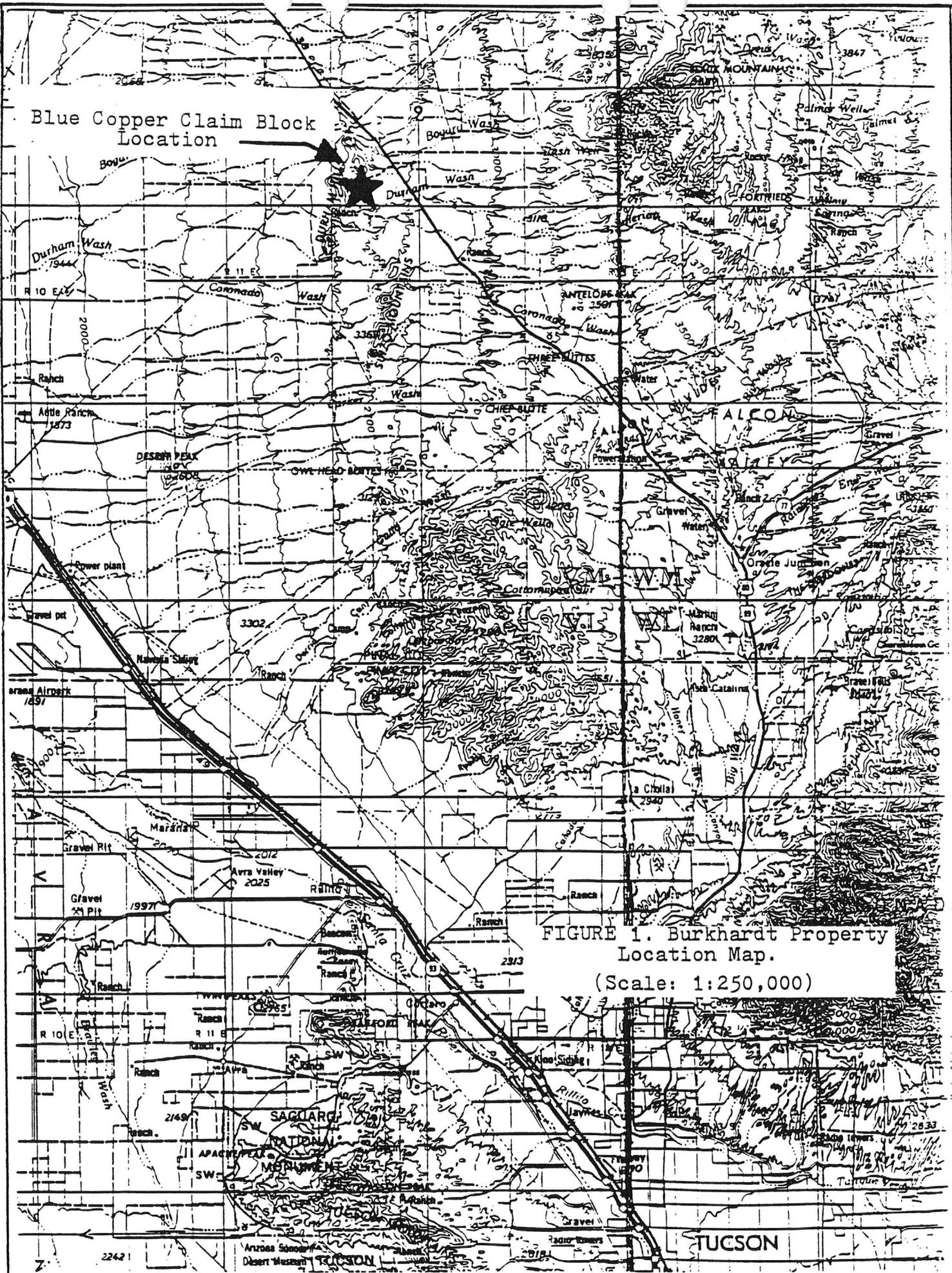


FIGURE 1. Burkhardt Property Location Map.
 (Scale: 1:250,000)

TUCSON

2242 1

Claim Status

Burkhardt has not yet provided Magma with a claim map for the property, forcing a reconstruction of property status from BLM files (see Appendix).

The Burkhardt property consists of 53 unpatented lode claims sited on open (locatable) patent, Federal and state lands (figure 3). The claim group consists of two non-adjointing blocks of claims with valid assessment current through December 30, 1991: a northern contiguous group consisting of lode claims L-100 to L-117, and a southern contiguous lode claim group consisting of L-1 through L-35 (BLM lead file no. 161019; figure 3). The claims date to 1982, and are successors to older Burkhardt claims dating to the early '60's.

Burkhardt and his various partners over the years have picked at the copper showings in the southern block with numerous dozer excavations, pits, roads and shallow (?) air-track drillholes. An attempt was made to ship some of the mineralization as decorative or construction stone, according to Burkhardt. The major exploration groups looked at it in the late '60's and early '70's as a porphyry copper play. The Tucson office of Kerr-McGee staked the property in the mid 1960's, and drilled 12 +/- rotary drillholes. The property was dropped in 1969, according to an ex-Kerr-McGee geologist. The KM drill data has either been shredded or "buried" in KM headquarters in Tulsa.

The northern copper shows, near the Magma Well, are on a half-section of patented ground held by the estate of the late rancher who lived nearby. Burkhardt is in touch with the lawyer handling the estate, and states the ground can be acquired with no problems.

Geology

The geology of the Blue Copper property is tied into the involved and complex evolutionary history of the Santa Catalina-Tortolita-Rincon Mountains metamorphic core complex. It is beyond the scope of this summary paper to delve into this subject in detail, as it is still the centre of an ongoing debate in academic circles as to the root causes and mechanism for the phenomenon. What is important is the interplay of magmatism, metamorphism, and regional fracturing has led to high heat flow and hydrothermal circulation, resulting in deposition of copper oxide minerals.

The Blue Copper/Burkhardt property is located in the central Durham Hills, which form a gently- arching NNW -> NS elongate ridge. The hills consist of a complex of Laramide-age (73 ma) granodiorite/quartz diorite (correlative with early-phase Chirreon Wash granodiorite in the central Tortolitas), located at

BUREAU OF LAND MANAGEMENT

LAND STATUS LEGEND

Public Lands (Administered By Bureau of Land Management)	
Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR)	
National Forest	
National Grasslands	
National Parks and Monuments	
Indian Lands or Reservations	
Military Reservations and Withdrawals Corps of Engineers	
Wildlife Refuges	
Bankhead-Jones Land Use Lands (L.U. Lands)	
Tennessee Valley Authority	
Patented Lands	
State Lands	
Water and Power Resources Service	
Power Withdrawals and Classifications	
Federal Agency Protective Withdrawals	
Public Water Reserves	
Department of Energy (DOE)	
Oregon & California Lands (O&C Lands) Administered By US Forest Service	
Radio & Air Facilities	
Miscellaneous	
State, County, City, Wildlife, Park and Outdoor Recreation Areas	
Acquired Lands (By Administering Agency)	

MINERALS OWNED BY THE FEDERAL GOVERNMENT

<i>Mineral Rights</i>	<i>Symbol</i>
All minerals	
Coal only	
Oil and Gas only	
Oil, Gas, and Coal only	
Other	
No symbol indicates no Federal minerals	

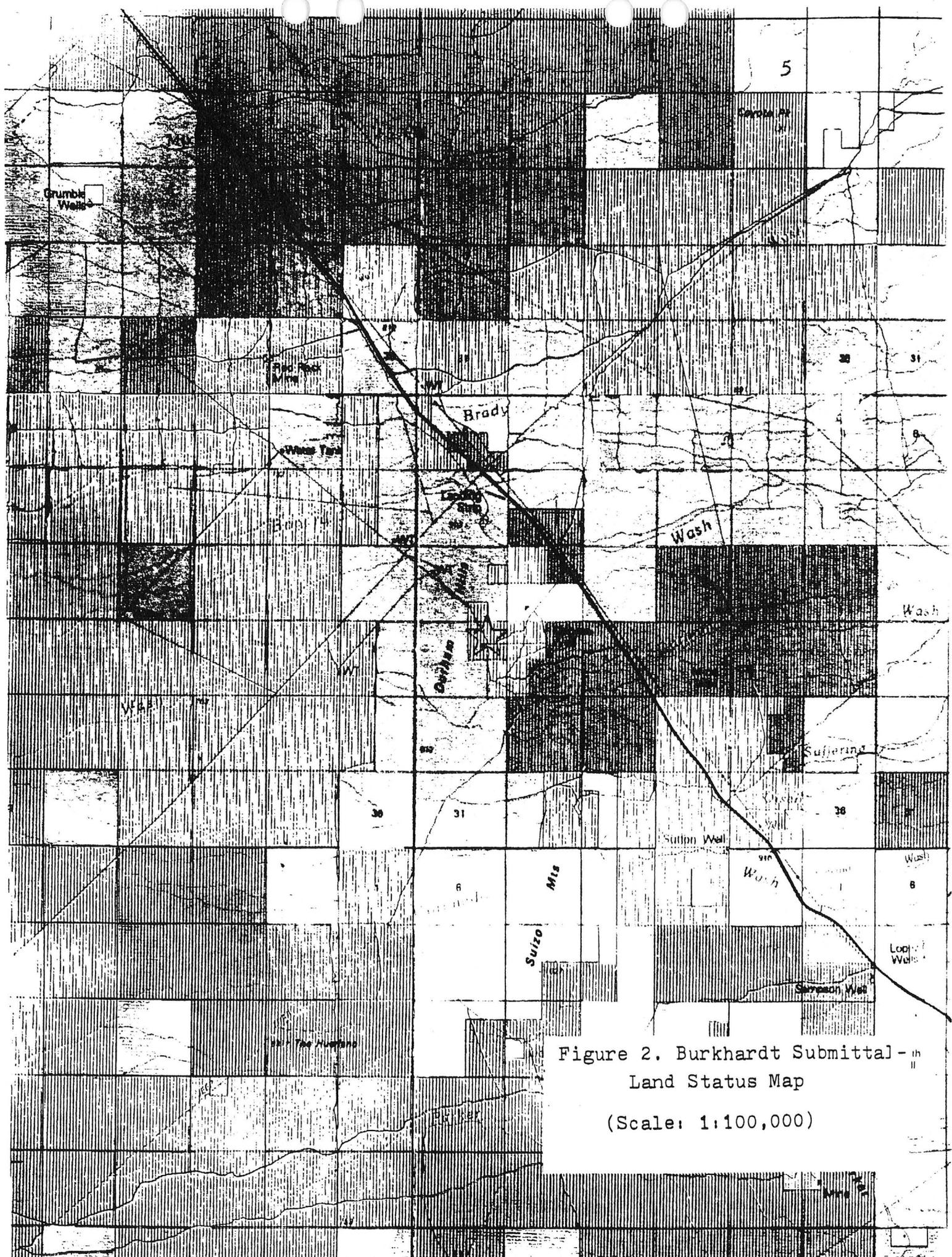


Figure 2. Burkhardt Submittal - II
 Land Status Map
 (Scale: 1:100,000)

DURHAM HILLS QUADRANGLE UNITED STATES
 ARIZONA COUNTY DEPARTMENT OF THE INTERIOR
 7.5 MINUTE SERIES (TOPOGRAPHIC) GEOLOGICAL SURVEY

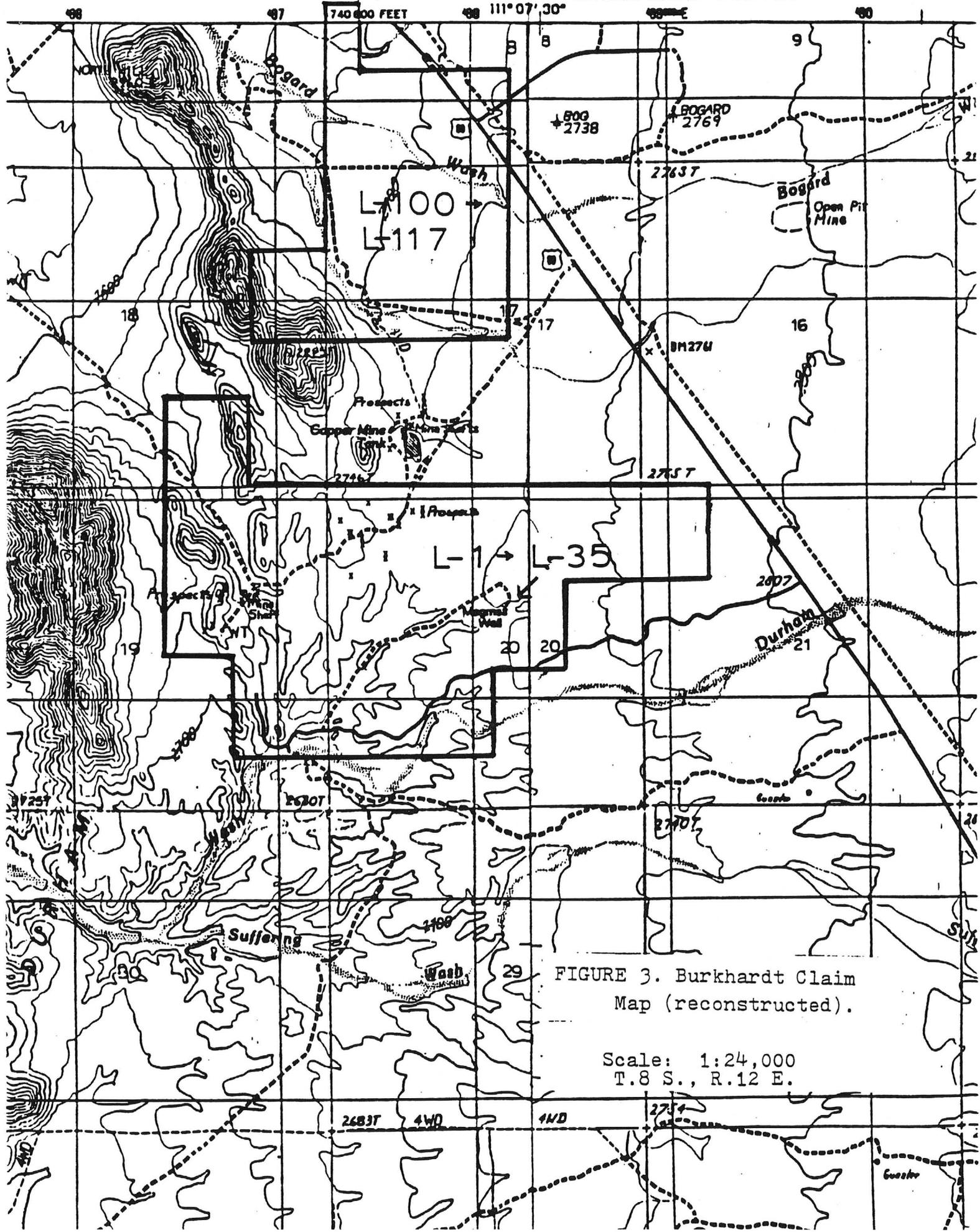


FIGURE 3. Burkhardt Claim Map (reconstructed).

Scale: 1:24,000
 T.8 S., R.12 E.

the northern and southern ends of the hills. The foliated quartz diorite is a medium-grained, equigranular to weakly porphyritic, sphene-bearing hornblende-biotite composite rock, that forms a continuum in the Tortolita's from diorite -> granodiorite -> quartz monzonite and possibly is co-magmatic with the Leatherwood diorite complex in the northern Catalinas (a calc-alkalic pluton affiliated with skarn/carbonate replacement mineralization at the Marble Peak and Korn Kob Mines). In the Durham Hills alteration in the quartz diorite is limited to tectonically-induced chloritization and minor Fe-oxide release in mafics.

Along the northern end of the Durham Hills the remnant of quartz diorite is intruded by Tertiary porphyritic quartz monzonite correlative with Catalina granite (cf: granite of Samaniego Ridge, 25.1 ma) along a NS -> NNW trend. The Catalina granite is a coarse-grained, sphene-bearing, porphyritic biotite-hornblende quartz monzonite closely resembling pC Oracle granite. On the ridge at North Peak (S. 1/2 sec. 7), K-feldspar megacrysts of the Catalina granite show remarkable near-vertical alignment and shear lineation along knife-sharp contacts with quartz diorite. This remnant -north-south shear/ trend arcs and reappears in the south as a wedge of preCambrian Oracle granite (now converted to a schist, or phyllonite), separating the main mass of Catalina granite on the west from a wedge of mid-Tertiary volcanics and clastics to the east. The phyllonite is strongly foliated and lineated, with foliation predominantly trending northwesterly. Small-scale open- to rootless- and isoclinal folding is present. The phyllonite is the host rock for the larger body of copper-oxide mineralization (Cross Triangle block).

Numerous northwest-to east-west-striking sills of microdiorite (diorite -> andesite, with variable degrees of carbonatic alteration) cut Catalina granite and phyllonite. (Microdiorites tend to occur in low-angle extensional systems, and are thought to represent upper-mantle mafic-streaming material, hence, can be an indirect indicator of base- and precious-metal mineralization). In the wash below North Peak a small NS dike of microdiorite, dipping 45 degrees west, intrudes a silicified breccia zone in Catalina granite. The arc-like NS shear, the geomorphic disposition of gently west-dipping hillslopes, and abundant microdiorite dikes are suggestive to the author of a west-dipping low-angle extensional system. This concept is important, as in such a setting substantial tonnages can be developed downdip.

The Magma Well (northern copper occurrence) and Cross Triangle (southern or schist/phyllonite copper occurrence) are separated by a prominent N. 40-50 W. fault (Wash Fault). The Wash Fault exposes remnant patches or slivers of Laramide quartz diorite

along it. The Wash Fault may thus be the trace of a southwest-dipping low-angle structure, as opposed to a normal high-angle fault.

In Mojave and central and western Arizona extensional terrains the unusual interplay of high crustal heat flow, regional extension, and magmatism can result in deposition of hydrothermal chrysocolla, copper carbonates, and a host of base- and precious metals: copper oxides, hematite, gold, trace sulphides (<1%), and gangue assemblages of quartz/silica, calcite, siderite, sericite, chlorite, adularia, and manganese oxides.

At Magma Well, copper-oxide mineralization (chrysocolla, cuprite, azurite-malachite) is localized in a N. 25 W. multi-strand near-vertical shear zone. The dimensions of the main exposure are ~900' x 270'. Narrow sympathetic shears persist out under shallow alluvial cover ~ 250' east and 300' north, as exposed in shallow prospect pits. The host rock is Catalina quartz monzonite that locally in the central shear is pervasively sericitized (plagioclase + mafics -> 20%-60% sericite) and showing weak -> moderate pervasive silicification. Wallrock alteration away from the 130'-wide central shear shows weak pervasive chloritization of mafics. Slickensides on outcrops demonstrate multiple episodic movement, with both normal dip-slip and oblique slip (20-40 degrees SE). Vein fabrics show pronounced cataclasis or brecciation textures of granulated quartz and feldspar fragments set in a chloritic matrix and with pervasive hematite, chrysocolla and malachite staining ubiquitous along foliation.

Copper oxide mineralization is impressive. Chrysocolla is the dominant copper mineral and is distributed along near-vertical fractures. Pyrite and chalcopyrite are present in trace amounts as very-fine-grained discrete granules in silicification and sericite masses (<= 1/2%). Most hematite present along fractures is transported and developed predominantly from mafic sources. Chrysocolla shows no apparent relation to trace sulphides and is considered to be hydrothermal in origin, similar to mineralization documented in the Northern Picacho, Whipple (Copper Basin), and Sacramentos Mountains (latter two occurrences in the Mojave Block of southeastern California). Shallow alluvium covers the structure along strike to the northwest and southeast. Grade estimates are 0.4 - 0.6 % Cu for the zone, with narrow high-grade copper runs in individual veins.

At the Cross Triangle block to the south, chrysocolla is also fracture hosted in schist/phyllonite. Prospect pits and dozer trenches demonstrate northwesterly-trending mineralization consistent with the overall grain of the central and southern Durham Hills. Copper grades appear to be better at the north end of the phyllonite wedge with increasing proximity to the Wash Fault. Copper oxide staining is also present in Tertiary volcanics near the phyllonite wedge. Mineralization is distributed over a 3000' - 4000' x 500' wedge of phyllonite and Catalina quartz monzonite, discussed earlier.

A limited metallurgical bulk-sample test was made on Blue Copper mineralization by Metcon Labs, Tucson, for Burkhardt in 1968. The results from the two samples showed 62% recovery in column leach tests and 80% recovery in bottle tests (21 days percolation).

"Conceptual" Exploration Resource Potential

It is impossible to predict the tonnages and grade of copper oxide mineralization in the Blue Copper claims, since strike length, width, depth, and surface grades can only be rough-estimated at best. As an exploration play, however, the magnitude of the resource potential can be judiciously calculated using some basic geologic assumptions:

1. The depth extent is at least twice that of the vertical extent seen at the surface (at Magma Well, 30' cuts + minimum 70'+ depth in shafts = 100' minimum depth).
2. Width is constant, although the pinch-and-swell braided nature of shears, both vertically and along strike, is a distinct possibility and leads to the assumption that economic mineralization will occur as discrete elongated pods.
3. Mineralization can occur along strike as deflections in the major structure, leading to more than one mineralized body along each shear.

Siting of mineralized pods would be within one to three miles from the Cross Triangle copper oxide body.

Magma Well Body : Immediate resource potential available solely on
----- exposed mineralization @ 0.4 % Cu.

900'x 270'x 100'depth extent =	1.9 MMt

(900'x 270'x 200 'depth extent=	3.7 MMt)

Speculative : 1200'x 270'x 200' depth extent=	5.0 MMt

Strike extensions: Add two 900' x 270' x 200 pods	
to NW and SE =	3.7 MMt

Cross Triangle Body: Immediate resource potential available solely on exposed mineralization @ 0.4 % Cu.

2500' x 250' x 100' depth extent = 4.8 MMt

 (2500' x 250' x 200' depth extent = 9.6 MMt)

Speculative: 3000' x 250' x 200' depth extent = 11.5 MMt

Strike Extensions: Add two pods along Wash Fault
 1500' x 250' x 200' x 2 = 11.5 MMt

Add one pod in low valley
 parallel to schist belt
 2500' x 250' x 200' = 9.6 MMt

Microdiorite Area (South Durham Hills):

Speculative: Northwesternly shears under pediment cover - structure of similar magnitude to Wash Fault - 0.4 % Cu.

 Add two pods -
 2000' x 200' x 200' x 2 = 20.8 MMt

Summary

	Surface-Indicated Tonnage		w/ Moderate Strike Length Increase		Additional Pods Along Strike
Magma Well-	1.9 - 3.7 MMt	-->	5.0 MMt		3.7 MMt
Cross Triangle-	4.8 - 9.6 MMt	-->	11.5 MMt		11.5 MMt 9.6 MMt
Microdiorite-	--		--		20.8 MMt
	<u>6.7 - 13.4 MMt</u>	-->	<u>16.5 MMt</u>	+	<u>45.6 MMt</u>

A graphical presentation of known mineralization blocks is presented in figure 5, along with examples of the above blocks.

Conclusions

The origin of the Blue Copper claims mineralization is intriguing and thought-provoking. If the shears are the product of an orthomag-

matic sulphide system (i.e., a porphyry copper system). then further potential exists somewhere for the roots of the system. Such a model must be reconciled with the absence of middle-Tertiary-age PCD's in southern and central Arizona. On the other hand, if the veins are indeed products of the Tortolita-Santa Catalina metamorphic core complex magmatic/metamorphic evolution at 21-25 ma, or further regional extension at 17-21 ma, then the property represents a class of deposits which have not received serious attention from the exploration community. Magma will thus be in an enviable position in regards to competitors.

Regardless of the origin, the Burkhardt claims represent a very attractive copper oxide target, as the mineralization in the structures can aggregate sufficient tonnages to fuel a viable mining venture. Exploration is a straightforward proposition, utilizing angled reverse-circulation drills to probe the depth and strike length of both major northwest structures, and investigating whether Cross Triangle mineralization exposures are actually part of a west- or southwest-dipping low-angle structure

I recommend Magma give serious attention to the Burkhardt property, and if the parameters of the copper oxide body meet Magma's IRR guidelines, approach him for an exploration lease. I further recommend that MCC negotiate a 9 -12 month lease with option, with an escape clause if early drilling fails to develop sufficient grade and tonnages. Secondly, confine NSR to production from his central claim block, and not from outside or acquired property. Thirdly, offer a moderate up-front payment to Burkhardt, with emphasis given to in-ground expenditures. The upcoming claim payments to the Federal government in August 1993 will cost Burkhardt \$ 10,600 (if he retains all present claims), and is a good bargaining tool if MCC elects to pay part or whole of the fees.

Competitor activity for secondary chalcocite and copper oxide properties has been on the increase in the last two years, and it will not be long before another forward-thinking group makes the same connections as regards the Durham Hills-Tortolita copper system. The cost of testing the Burkhardt claims is relatively modest, and can easily be handled out of Tucson.



Respectfully submitted,

Syver W. More, R.G., C.P.G.
Consulting Geologist

References

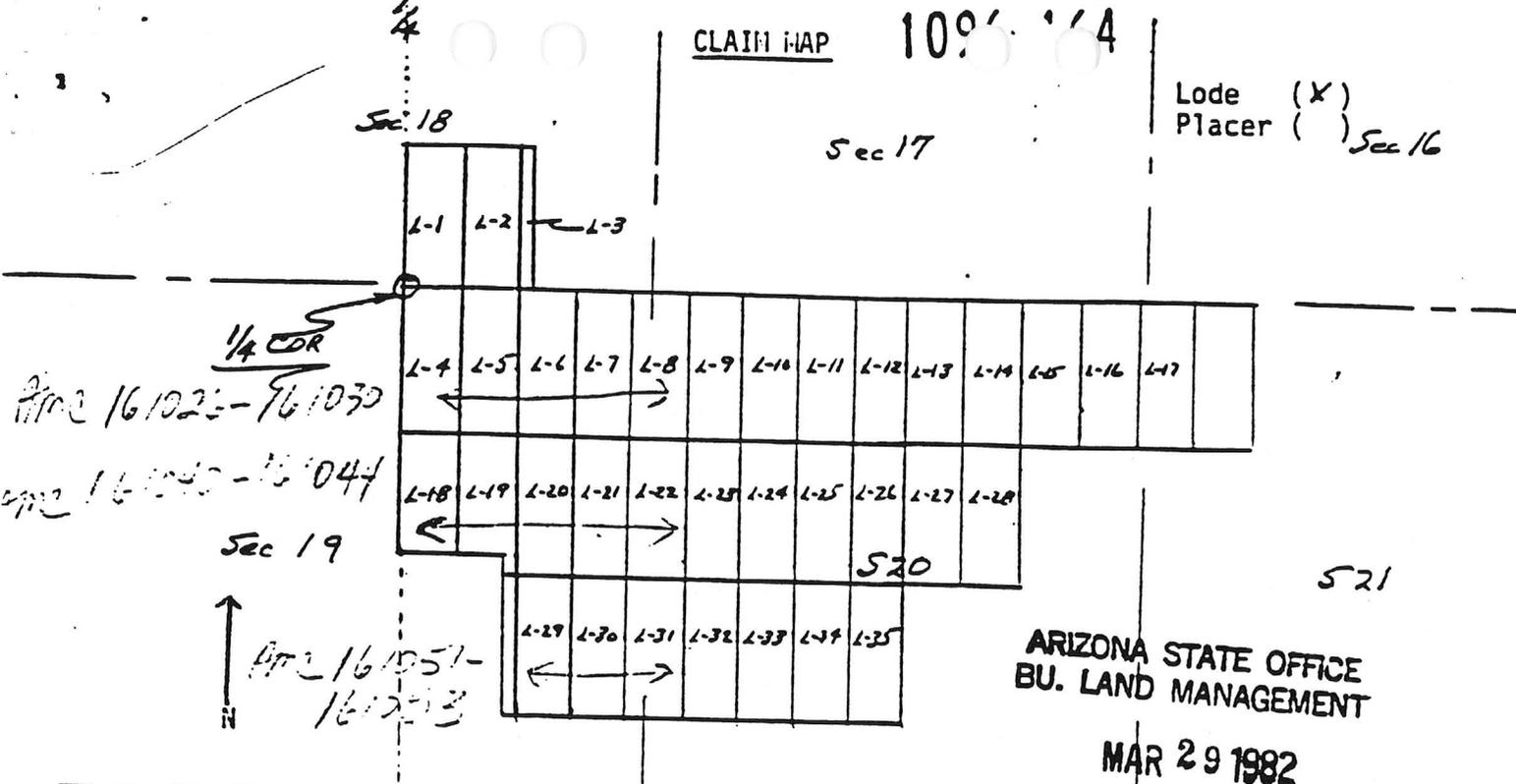
- Applebaum, S., 1975, Geology of the Palo Verde Ranch area, Owl Head mining district, Pinal County, Arizona: unpub. M.S. thesis, Univ. of Arizona, 89 p.
- Banks, N.G., et al, 1977, Map of mines, mineralization, and alteration in the Tortolita Mountains quadrangle, Arizona: U.S. Geol. Survey Open File Maps 76-764, 3 sheets. scale 1: 62,500.
- Banks, N.G., et al, 1977, Reconnaissance geologic map of the Tortolita Mountains quadrangle, Arizona: U.S. Geol. Survey Misc. Field Studies Map MF-864. scale 1: 62,500.
- Banks, N.,G., et al, 1980, Geology of a zone of metamorphic core complexes in southeastern Arizona: in, Crittenden, M.D., and others, eds., Cordilleran Metamorphic Core Complexes, Geol. Soc. Amer. Memoir 153, pp.177-215.
- Barter, C.F., 1962, Geology of the Owl Head Mining district, Pinal County, Arizona: unpub. M.S. thesis, Univ. of Arizona, Tucson, 73 p.
- Budden, R.T., 1975, the Tortolita-Santa Catalina Mountains complex: unpub. M.S. thesis, Univ. of Arizona, Tucson, 133 p.
- Iles, C.D., 1967, Mineralization of a portion of the Owl Head mining district, Pinal County, Arizona: unpub. M.S. thesis, Univ. of Arizona, Tucson, 114 p.
- Keith, S.B., et al, 1980, Evidence for multiple intrusion and deformation within the Santa Catalina-Rinson-Tortolita crystalline complex, southeastern Arizona: in, Crittenden, M.D., Jr., and others, eds., Cordilleran Metamorphic Core Complexes, Geol. Soc. America Memoir 153, pp.217-267.
- Pickard, B.O., 1912, The Apache Mines of the Owl Head District, Arizona: Min. Sci., vol.65, pp.473-475.
- Yeend, W., 1976, Reconnaissance geologic map of the Picacho Mountains, Arizona: U.S. Geol. Survey Misc. Field Studies Map MF-778. scale 1:62,500.
- Yeend, W., et al, 1977, Reconnaissance geologic map of the Ninety Six Hills NW, NE, SE, and SW quadrangles, Pinal County, Arizona: U.S. Geol. Survey Misc. Field Studies Map MF-909. scale 1:62,500.

Appendix

Photocopies of Burkhardt Blue Copper claim group Maps
as filed with BLM (through 08-13-92) plus
representative copies of location notices (L-1->
L-4).

Copies of Metcon Labs metallurgical report on Blue Copper
bulk samples.

Lode (X)
Placer () Sec 16



Scale: 1" = 2000'

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
MAR 29 1982
7:45 A.M.
PHOENIX, ARIZONA

1. The above map depicts the L-1 thru L-35 mining claims which is located in Section(s) 18, 19, 20 Township(s) 8S, Range(s) 12E, G&SP's, Placer County, Arizona.
2. Type of corner and location monuments used are as follows: 2" x 2" x 4" monuments (wood)
3. The bearings and distances between claim corners are as depicted on the above map.

Instructions:

- (i) If the land is surveyed, a corner of the claim or group of contiguous claims must be tied by course and distance to a monument of the public land survey; if the land is unsurveyed, a corner must be tied by course and distance to an established survey monument of a United States Government agency or a United States Mineral Monument; if no such monuments are available, a corner must be tied by course and distance to some prominent natural object or other permanent monument as shown on the map.
- (ii) A north arrow, the scale and the bearings and distances between corners must be shown on the map.
- (iii) The map must be no larger than 8 1/2" by 14" and the scale must be no more than 1 inch equals 2,000 feet.
- (iv) If the claim is a placer with exterior limits conforming to legal subdivisions of the public lands survey, the legal description may be used in place of the information required by item (i) and the bearings and distances between corners need not be provided.

AMC 161011

LOCATION NOTICE
(Lode)

1090-163

695654

FILE 161023

NOTICE IS HEREBY GIVEN that the L-1 lode mining claim has been located by Glynn Burkhardt, whose address is 9100 Indian Hills Rd, Tucson, Ariz. 85715. The general course of this claim is North to South and it is situated in the Outland Mining District, Pinal County, Arizona.

This claim is 1500 feet in length and 600 feet in width. The claim runs from the location monument on which this notice is posted 0 feet in a Northward direction to the North end line and 1500 feet in a Southward direction to the South end line. The claim boundaries are marked by six monuments, one at each corner and one at the center of each end line of the claim. The location monument on which this notice is posted is situated within Section 18, T. 8S, R. 12E, G&SR11, Arizona, and this claim encompasses portions of the following quarter section(s),

Section(s), Township(s), and Range(s):

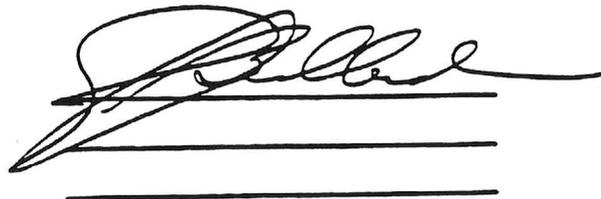
SE 1/4, Sec 18, T8S, R12E G&SRBYM, Pinal Co., Ariz.
G&SR11, Arizona.

The locality of this claim with reference to some natural object or permanent monument and additional information (if any) concerning its locality are as follows:

The S.W. corner of L-1 parallels N/S 1/2 line (abuts) + parallels + abuts E/W section line

DATED AND POSTED on the ground this 15th day of January, 19 82

LOCATOR:



ARIZONA STATE OFFICE
BUL LAND MANAGEMENT
MAR 29 1982
7:45 A.M.
PHOENIX, ARIZONA

LOCATION NOTICE
(Lode)

99-165

695655

A MC 161024

NOTICE IS HEREBY GIVEN that the L-2 lode mining claim has been located by Glynn Bradford, whose address is 9100 Indian Hills Rd, Tucson, Ariz.

The general course of this claim is North to South and it is situated in the Outback Mining District, Pinal County, Arizona.

This claim is 1500 feet in length and 600 feet in width. The claim runs from the location monument on which this notice is posted

0 feet in a Northward direction to the NORTH end line and 1500 feet in a Southward direction to the South end line. The claim boundaries are marked by six

monuments, one at each corner and one at the center of each end line of the claim. The location monument on which this notice is posted is situated within Section 18, T. 85, R. 12E, G&SR11, Arizona, and this claim encompasses portions of the following quarter section(s), Section(s), Township(s), and Range(s):

SE 1/4, Sec 18, T85, R12E, Pinal Co.

G&SR11, Arizona.

The locality of this claim with reference to some natural object or permanent monument and additional information (if any) concerning its locality are as follows:

The south line parallels + Abts E/W Section line, the west side of L-2 is 600 feet east of 1/4 line (N/S)

DATED AND POSTED on the ground this 15th day of January, 19 82.

LOCATOR:

[Signature]

ARIZONA STATE OFFICE
BLM. LAND MANAGEMENT
MAR 29 1982
7:45 A.M.
PHOENIX, ARIZONA

LOCATION NOTICE
(Lode)

10.6-167

A M E 161025

NOTICE IS HEREBY GIVEN that the 1-3 lode mining claim has been located by Alyan Blackart, whose address is 9100 Indian Hill Rd, Tucson, Ariz. 85715. The general course of this claim is North & South and it is situated in the Oulhead Mining District, Pinal County, Arizona.

This claim is 1500 feet in length and 600 feet in width. The claim runs from the location monument on which this notice is posted 0 feet in a North direction to the North end line and 1500 feet in a South direction to the South end line. The claim boundaries are marked by six monuments, one at each corner and one at the center of each end line of the claim. The location monument on which this notice is posted is situated within Section 18, T. 8S, R. 12E, G&SR11, Arizona, and this claim encompasses portions of the following quarter section(s), Section(s), Township(s), and Range(s):

SE 1/4, Sec 18, T8S, R12E, Pinal Co.

G&SR11, Arizona.

The locality of this claim with reference to some natural object or permanent monument and additional information (if any) concerning its locality are as follows:

The south line parallel to Abets E/W Section line, The West side is 1200 feet East of 1/4 line, The claim abets 1-2 on 1-2 East side & West side 1-3

DATED AND POSTED on the ground this 1st day of January, 19 82.

LOCATOR:

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT

MAR 29 1982

7:45 A.M.
PHOENIX, ARIZONA

[Signature]

LOCATION NOTICE
(Lode)

10669

000007

A MC 161026

NOTICE IS HEREBY GIVEN that the L-7 lode mining claim has been located by Flynn & Buckland, whose address is 9100 Indian Hills Rd, Tucson, Ariz, 85715. The general course of this claim is North to South and it is situated in the Outhead Mining District, Pinal County, Arizona.

This claim is 1500 feet in length and 600 feet in width. The claim runs from the location monument on which this notice is posted 0 feet in a North direction to the North end line and 1500 feet in a South direction to the South end line. The claim boundaries are marked by six monuments, one at each corner and one at the center of each end line of the claim. The location monument on which this notice is posted is situated within Section 19, T. 8S, R. 12E, G&SR11, Arizona, and this claim encompasses portions of the following quarter section(s), Section(s), Township(s), and Range(s):

NE 1/4, Sec 19, T8S, R12E,

G&SR11, Arizona.

The locality of this claim with reference to some natural object or permanent monument and additional information (if any) concerning its locality are as follows:

The NW corner abuts & parallels E/W sec 42,
abuts & parallels N/S 1/4 line

DATED AND POSTED on the ground this 15th day of January, 19 82.

LOCATOR:

[Signature]

ARIZONA STATE OFFICE
BLM LAND MANAGEMENT
MAR 29 1982
7:45 A.M.
PHOENIX, ARIZONA

BLUE COPPER MINE

Richard Hull, 1918 Irene Vista, Tucson (has been working for Larry Drake at Blue Copper Mine). Engineer received information on operations at the Blue Copper. Mr. Hull stated that they have been closed down for two to three weeks, and also that they have sold some copper ore for building stone at \$15 per ton. Mr. Hull stated that they had to quit shipping to A. S. & R., Hayden as the returns showed only 1.37% copper, and they are questioning the A.S.& R. sampling. Engineer suggested umpire samples.

AXEL L. JOHNSON - Weekly Report - June 1, 1962

SHIPPING RECORDS, BLUE COPPER CLAIMS

ENTERPRISE COPPER CORPORATION
 Route 2 Box 701-A
 Tucson, Arizona 85715

BIG BULL CLAIMS, GULF HEAD DISTRICT, ARIZONA (records aquired from ASARCO Feb. 26 1969 R+W)

BLUE HILL PIT, GREEN HILL DRIFTS AND CUTS

Tons	Ag	Cu	SiO ₂	Fe	Al ₂ O ₃
1962 518	.03-.37	.37-2.34	67-71	2.7-3.3	4.6-10.5

GREEN HILL, OPEN CUTS

1961 161.8	.03	2.10	68.0	-----	7.8
---------------	-----	------	------	-------	-----

These shipments made by Larry Drake, to Inspiration Copper Co., Miami, Arizona

MAGMA PIT, SOUTH HALF SEC.17

1961 499.5	.32	1.6	69.2	4.0	7.7	TO MAGMA COPPER CO.
---------------	-----	-----	------	-----	-----	---------------------

BLUE HILL PIT, CUTS

1961 1334.0	.22	1.5	68.6	3.3	10.6	TO HAYDEN
----------------	-----	-----	------	-----	------	-----------

BLUE HILL, GREEN HILL, CUTS, DRIFTS AND PITS

1966 2146.0	.09	1.4	68.2	3.2	11.3	MCFARLAND: HULLINGER TO HAYDEN
----------------	-----	-----	------	-----	------	-----------------------------------

<u>DATE</u>	<u>TONS</u>	<u>Cu</u> (%)	<u>Ag</u> oz/ton	<u>Au</u> oz/ton	
10/26/61	94.2	1.55	0.21	0.015	Mayma Copper, Superior
10/26/61	98.7	1.55	0.37	0.015	
10/28/61	104.2	1.45	0.19	0.015	
10/30/61	103.6	1.60	0.33	0.010	
10/31/61	92.6	1.95	0.29	0.012	
10/31/61	93.6	1.80	0.19	0.008	
11/9/61	90.3	1.20	0.23	0.005	
11/8/61	96.2	1.25	0.16	0.015	
11/9/61	97.9	1.20	0.12	0.007	
11/13/61	86.1	1.35	0.22	0.005	
11/15/61	89.5	1.10	0.14	0.005	
11/16/61	94.1	1.55	0.34	0.008	
11/21/61	101.0	1.65	0.13	0.008	
11/21/61	97.2	1.25	0.11	0.008	
11/25/61	99.1	1.55	0.26	0.010	
11/30/61	102.1	1.60	0.26	0.012	
11/30/61	90.0	2.00	0.37	0.008	
12/13/61	105.4	1.75	0.38	0.008	
12/15/61	62.1	1.50	0.24	0.005	
12/18/61	87.5	1.80	0.43	0.018	
3/16/62	86.5	1.34	0.10	0.005	ASARCO, Hayden
3/22/62	320.0	1.25	0.15	-----	" "
4/20/62	96.5	1.20	0.21	0.007	Mayma Copper, Superior
4/26/62	117.2	3.10	0.68	0.012	" " "
Weighted Average	2505.6	1.55	0.25	0.009	

Table 2. Assays of Mine-run Ore From Open Pit in Section 17, Durham Hills Area.

<u>SAMPLE</u>	<u>Cu</u> (%)	<u>Mo</u> (%)	<u>Au</u> oz/ton	<u>Ag</u> oz/ton	<u>DESCRIPTION</u>
2242	3.81	0.0007	tr.	tr.	Grab sample of good-grade material.
2243	0.92	0.014	tr.	tr.	Grab sample of average-grade material.
2244	0.59	0.008	tr.	tr.	Grab sample of low-grade material.
2247	0.12	nil			Rocks piled near cut; not believed to be from cut.
2248	1.14	0.009			Chip sample across 11.5 feet.
2249	0.56				Chip sample across 3 feet.
2250	1.19	0.016			Small chips taken every 4-6 inches across 19 feet of dump (pit inaccessible).
2251	0.83	0.004			Chips taken every 6 inches across 15 feet
2252	0.62	0.003			Random chips taken along 12 feet on south side of cut. Attempted to take considerable amount of poorer-appearing material
2253	0.89	0.132			Chips taken every 3-6 inches across 12 feet of outcrop.
2254	0.79	0.016			Chips taken every 3-6 inches across 22 feet of pit face.
2255	1.07	0.076			Chips taken every 3-6 inches across 35 feet of pit face.
2256	1.38	0.041			Chips taken every 3-6 inches across 22 feet of pit face.
2257	0.63	0.003			Chips taken every 3-6 inches across 35 feet of pit face.
2258	0.36	0.002			Chips taken every 3-6 inches across 33 feet of pit face.
2259	0.98	0.022			Chips taken every 3-6 inches across 40 feet of pit face.
2260	1.07	0.017			Chips taken every 3-6 inches across 11 feet of outcrop.

Total 16.95
17 samples
Ave 110 % Cu

Table 1. Samples of Exposed Mineralization in Section 17, Durham Hills Area.

EXPLORATORY WORK PERFORMED

BY

ENTERPRISE COPPER CORPORATION

1971-1972

BLUE COPPER CLAIMS

FINAL COUNTY, ARIZ.

OWL HEAD DIST.

BLUE COPPER CLAIMS

D-8 CAT. TRENCHING

Trench No.	Depth	Length & Width	Strength of Mineralization	Minerals Present
1.	1' to 5'	200'x 12'	Strong-EE Exceptional	Chrys., Az., Mala. Chalcocite, Turq.
2.	1' to 10'	250'x 12'	Strong-EE Exceptional	Chrys., Az., Mala. Bornite, Chalco.
3.	1' To 3'	100'x 12'	Strong	Chrys., Mala., Chalcocite
4.	1'to 4'	100'x 12'	Strong	Chrys., Mala., Chalcocite
5.	1' to 2'	100'x 12'	Moderate	Chrys., Mala.
6.	1' to 3'	75'x 30'	Strong	Chrys., Mala., Chalcocite
7.	1' to 3'	100'x 75'	Moderate	Chrys., Mala., Chalcocite-pyrite
8.	1' to 5'	350'x 12'	Moderate-NW 175' Slight-SE 175'	Chrys., Chal., Mala Chrys., Mala.
9.	1' to 4'	200'x 12'	Moderate to Strong	Chrys., Mala., Az. Chalcocite
10.	1' to 3'	150'x 12'	Center 75' Strong Ends Slight	Chrys., Mala., Az. Chalcocite
11.	1' to 3'	200'x 12'	Moderate 4 1'-5' zones, many string- ers	Chrys., Mala., Chalcocite-pyrite
12.	1' to 2'	100'x 30'	Strong-Moderate	Chrys., Mala., Chalcocite

GUIDE OF MINERALIZATION

DETERMINED BY FACTICAL COUNT

Strong -.50% or more copper

Moderate -.49% to .20% copper

Slight - less than .20% copper

Upon completion of tests 1 to 4, above data will be available, and non-suction work.

Test No. 1, 15' from 17' (1 & 2) to 16' vein, further sampling.
 Test No. 2, 20' from 17' (1 & 2) to 16' vein.
 Test No. 3, 20' from 17' (1 & 2) to 16' vein, for leaching.
 Test No. 4, 20' from 17' (1 & 2) to 16' vein, for leaching.
 6'6" and 3'6" ()

The purpose of this report is to collect all necessary data to date. Further sections will be collected with the above and under today, and a full report of the results will be submitted with the report of Nov. 2, and 13, 1942.

Section 10' of a 16' vertical zone, vein widening to 4' at end.

Section	10' of a 16' vertical zone	vein widening to 4' at end
10' - 11'	1.2	1.8
11' - 12'	1.0	1.9
12' - 13'	1.0	1.9
13' - 14'	1.0	1.9
14' - 15'	1.0	1.9
15' - 16'	1.0	1.9
16' - 17'	1.0	1.9
17' - 18'	1.0	1.9
18' - 19'	1.0	1.9
19' - 20'	1.0	1.9
20' - 21'	1.0	1.9
21' - 22'	1.0	1.9
22' - 23'	1.0	1.9
23' - 24'	1.0	1.9
24' - 25'	1.0	1.9
25' - 26'	1.0	1.9
26' - 27'	1.0	1.9
27' - 28'	1.0	1.9
28' - 29'	1.0	1.9
29' - 30'	1.0	1.9
30' - 31'	1.0	1.9
31' - 32'	1.0	1.9
32' - 33'	1.0	1.9
33' - 34'	1.0	1.9
34' - 35'	1.0	1.9
35' - 36'	1.0	1.9
36' - 37'	1.0	1.9
37' - 38'	1.0	1.9
38' - 39'	1.0	1.9
39' - 40'	1.0	1.9
40' - 41'	1.0	1.9
41' - 42'	1.0	1.9
42' - 43'	1.0	1.9
43' - 44'	1.0	1.9
44' - 45'	1.0	1.9
45' - 46'	1.0	1.9
46' - 47'	1.0	1.9
47' - 48'	1.0	1.9
48' - 49'	1.0	1.9
49' - 50'	1.0	1.9
50' - 51'	1.0	1.9
51' - 52'	1.0	1.9
52' - 53'	1.0	1.9
53' - 54'	1.0	1.9
54' - 55'	1.0	1.9
55' - 56'	1.0	1.9
56' - 57'	1.0	1.9
57' - 58'	1.0	1.9
58' - 59'	1.0	1.9
59' - 60'	1.0	1.9
60' - 61'	1.0	1.9
61' - 62'	1.0	1.9
62' - 63'	1.0	1.9
63' - 64'	1.0	1.9
64' - 65'	1.0	1.9
65' - 66'	1.0	1.9
66' - 67'	1.0	1.9
67' - 68'	1.0	1.9
68' - 69'	1.0	1.9
69' - 70'	1.0	1.9
70' - 71'	1.0	1.9
71' - 72'	1.0	1.9
72' - 73'	1.0	1.9
73' - 74'	1.0	1.9
74' - 75'	1.0	1.9
75' - 76'	1.0	1.9
76' - 77'	1.0	1.9
77' - 78'	1.0	1.9
78' - 79'	1.0	1.9
79' - 80'	1.0	1.9
80' - 81'	1.0	1.9
81' - 82'	1.0	1.9
82' - 83'	1.0	1.9
83' - 84'	1.0	1.9
84' - 85'	1.0	1.9
85' - 86'	1.0	1.9
86' - 87'	1.0	1.9
87' - 88'	1.0	1.9
88' - 89'	1.0	1.9
89' - 90'	1.0	1.9
90' - 91'	1.0	1.9
91' - 92'	1.0	1.9
92' - 93'	1.0	1.9
93' - 94'	1.0	1.9
94' - 95'	1.0	1.9
95' - 96'	1.0	1.9
96' - 97'	1.0	1.9
97' - 98'	1.0	1.9
98' - 99'	1.0	1.9
99' - 100'	1.0	1.9

Section 10' of a 16' vertical zone, vein widening to 4' at end.

The purpose of this report is to collect all necessary data to date. Further sections will be collected with the above and under today, and a full report of the results will be submitted with the report of Nov. 2, and 13, 1942.

Section 10' of a 16' vertical zone, vein widening to 4' at end.

The purpose of this report is to collect all necessary data to date. Further sections will be collected with the above and under today, and a full report of the results will be submitted with the report of Nov. 2, and 13, 1942.

<u>SAMPLE</u>	<u>Cu</u> (%)	<u>Mo</u> (%)	<u>Au</u> oz/ton	<u>Ag</u> oz/ton	<u>DESCRIPTION</u>
2242	3.81	0.0007	tr.	tr.	Grab sample of good-grade material.
2243	0.92	0.014	tr.	tr.	Grab sample of average-grade material.
2244	0.59	0.008	tr.	tr.	Grab sample of low-grade material.
2247	0.12	nil			Rocks piled near cut; not believed to be from cut.
2248	1.14	0.009			Chip sample across 11.5 feet.
2249	0.56				Chip sample across 3 feet.
2250	1.19	0.016			Small chips taken every 4-6 inches across 19 feet of dump (pit inaccessible).
2251	0.83	0.004			Chips taken every 6 inches across 15 feet.
2252	0.62	0.003			Random chips taken along 12 feet on south side of cut. Attempted to take considerable amount of poorer-appearing material
2253	0.89	0.132			Chips taken every 3-6 inches across 12 feet of outcrop.
2254	0.79	0.016			Chips taken every 3-6 inches across 22 feet of pit face.
2255	1.07	0.076			Chips taken every 3-6 inches across 35 feet of pit face.
2256	1.38	0.041			Chips taken every 3-6 inches across 22 feet of pit face.
2257	0.63	0.003			Chips taken every 3-6 inches across 35 feet of pit face.
2258	0.36	0.002			Chips taken every 3-6 inches across 33 feet of pit face.
2259	0.98	0.022			Chips taken every 3-6 inches across 40 feet of pit face.
2260	1.07	0.017			Chips taken every 3-6 inches across 11 feet of outcrop.

Total 16.95
 17 samples
 Ave 110 % Cu

Wagon Drill Holes

Hole No.	From	To	O/O Cu.	Hole No.	From	To	O/O Cu.
1A	0	5	.60	4A	0	10	.00
	10	15	.41		10	20	.29
	15	25	.22		20	30	.74
	25	35	.06		30	40	.43
	35	100	---		40	50	.21
2A	0	10	.10	5A	0	10	.00
	10	20	.28		10	20	.00
	20	30	.14		20	30	.00
	30	40	.51		30	40	.10
	40	50	.36		40	50	.32
	50	60	.31		50	60	.69
	60	70	.19		60	70	.59
3A				70	80	.56	
	0	10	---	80	90	.17	
	10	20	---	90	100	---	
	20	30	.04				
	30	40	.13				
	40	50	.38				
	50	60	.98				
	60	70	.50				
	70	80	1.04				
	80	90	.18				
90	100	.12					

AIR-TRAC HOLES

West side of Blue Copper Hill

See attached sheet:

BLUE COPPER MINE
OWL HEAD MINE

Rte. 2, Box 701A,
Tucson, Arizona.
April 27, 1972

85715

Mr. Omer Humble,
Humble Oil & Refining Co.,
P. O. Box 120,
Denver, Colorado.

Dear Mr. Humble:

In response to Mr. Moore's telephone call, I am enclosing maps showing the general location of the approximately 166 copper claims owned by my associates and myself. In Area 1, about 100 claims had a title search in 1968 and 26 claims have been added since that time. In Area 2, there are 30 state mineral leases and 4 federal claims.

Mineralization in both areas is basically copper oxide with minor amounts of copper sulphide in granite and schist. The oxides are readily leachable. There has been a minor amount of drilling in Area 1 to an average depth of 100 feet which revealed copper content averaging .50% or greater.

For our assessment work for Area 1, in 1971, 5 wagon drill holes were drilled to about 100 feet which averaged .36% copper. These were approximately 600 feet north of existing drill holes.

Data taken from drill holes, trenching, etc., indicate firm reserves of in excess of 500,000 tons. These reserves were blocked out by Subio, Ltd., a Canadian company, in 1968. We understand they had financial difficulties and were unable to pursue the project further.

Area 2 has had only wagon drilling and dozer work for assessment purposes and no assays were taken. However, mineralization shows over a large area, with about three-fourths of a mile of almost continuous exposure.

We welcome your examination of the properties and also all of the geological data we have accumulated pertaining to the claims.

Yours very truly,

(602) 298-8938

Glynn G. Burkhardt

X - Section Tonnage

	<u>Sq. Ft.</u>	<u>Factor</u>	<u>Tons</u>
0+00	= 31,744	Sq. Ft. x 15.38	= 488,222.7
2+00S	= 21,866	" " " "	= 336,299.0
4+00S	= 10,174	" " " "	= 156,476.1
6+00S	= 9,650	" " " "	= 148,417.0
8+00S	= 6,027	" " " "	= 92,695.3
10+00N	= 12,640	" " " "	= 194,403.2
8+00N	= 975.0	" " " "	= 149,955.0

1,566,460.3

1,566,460.3

APPENDIX IV

BLUE GLASS COPPER PROJECT

DIAMOND DRILL HOLE ASSAY RECORD

February 3, 1968

Hole No	Sample No.	From - To		Cu	OxCu	February 3, 1968	
						%Cu Wtd.	% OxCu Aver.
1	007	2	7	0.21	0.17		
1	008	7	10	0.36	0.33		
1	009	10	15	0.27	0.24		
1	010	15	20	0.39	0.36		
1	011	20	23	0.50	0.49		
1	095	23	28	0.26	0.25		
1	096	28	31	0.21	0.18		
1	012	31	36	0.52	0.51		
1	1334	36	41	0.13	0.08		
1	1335	41	46	0.11	0.07		
1	1336	46	51	0.07	0.05		
1	1337	51	56	0.07	0.05		
1	1338	56	60	0.12	0.08	0.31	0.28
1	1339	60	62	0.15	0.10		
1	013	62	65.5	0.61	0.60		
1	1340	65.5	70	0.04	0.02		
1	1341	70	75	0.03	0.01		
1	1342	75	80	0.03	0.02		
1	1343	80	85	0.23	0.28		
1	1344	85	90	0.47	0.42		
1	1345	90	96	0.94	0.88		
1	014	96	101	0.29	0.30		
1	015	101	105	0.54	0.52		
1	016	105	110	0.70	0.63		
2	414-12	10	15	0.11	0.11		
2	414-13	15	20	0.23	0.21		
2	414-14	27	34	0.03	0.01		
2	414-15	34	39	0.03	0.01		
2	414-16	39	45	0.06	0.03	0.23	0.20
2	414-17	45	50	0.17	0.13		
2	414-18	50	55	0.10	0.08		
2	047	55	60	0.62	0.61		
2	048	60	65	0.69	0.64		
2	049	65	68	0.43	0.43		
2	414-19	68	73	0.21	0.16		
3	017	0	9	0.37	0.33		
3	018	9	13	0.35	0.32		
3	019	13	15	0.34	0.33		
3	020	15	20	0.09	0.04		
3	021	20	24	0.65	0.62		
3	022	24	29	0.73	0.71		
3	023	29	33	0.45	0.40		
3	024	33	38	0.44	0.41		

2.

Hole No	Sample No.	From	To	Cu	OxCu	%Cu Wtd. Aver.	% OxCu
3	025	38	40	0.50	0.45		
3	026	40	45	0.50	0.50		
3	027	45	50	0.51	0.50		
3	028	50	52	0.67	0.60		
3	029	52	56	0.70	0.62		
3	030	56	60	0.25	0.21		
3	031	60	65	0.02	0.01		
3	032	65	70	0.01	0.01		
3	033	70	75	0.67	0.59		
3	034	75	80	0.76	0.70	0.52	0.47
3	035	80	82	1.12	1.09		
3	036	82	86	1.14	1.14		
3	037	86	90	1.53	1.29		
3	038	90	95	0.42	0.39		
3	039	95	100	1.35	1.29		
3	040	100	105	0.87	0.83		
3	041	105	110	0.16	0.13		
3	042	110	115	0.53	0.50		
3	043	115	120	0.78	0.55		
3	044	120	125	0.38	0.36		
3	045	125	130	0.09	0.08		
3	046	130	133	0.21	0.20		
5	091	10	15	0.08	0.05		
5	068	15	19	0.30	0.15	0.14	0.07
5	092	19	24	0.06	0.03		
6	061	20	22	0.07	0.03		
6	062	22	26	0.63	0.55		
6	063	26	29	0.59	0.47		
6	064	29	31	0.18	0.07		
6	414-20	31	35	0.25	0.22		
6	065	35	36	0.19	0.02		
6	1346	36	42	0.11	0.06		
6	066	42	45	0.24	0.22		
6	067	45	48	0.13	0.01		
6	1347	48	53	0.21	0.16		
6	1348	53	58	0.62	0.55	0.48	0.41
6	1349	58	60	0.13	0.08		
6	075	60	64	0.36	0.32		
6	1350	64	70	0.33	0.28		
6	2121	70	75	0.11	0.06		
6	2122	75	80	0.13	0.07		
6	076	80	85	1.57	1.47		
6	093	85	90	0.39	0.38		
6	077	90	95	2.29	1.96		
6	078	95	98.5	0.43	0.42		
6	094	98.5	101.5	0.18	0.14		
6	079	101.5	106	0.66	0.63		
6	414-21	106	111	0.11	0.08		

Hole No.	Sample No.	From	To	Cu	OxCu	%Cu	% OxCu
						Wtd.	Aver.
8	069	6	11	0.85	0.79		
8	070	11	16	0.94	0.85		
8	071	16	20	0.83	0.81		
8	072	20	25	0.90	0.84	0.77	0.73
8	073	25	31	0.93	0.91		
8	074	31	33	0.92	0.90		
8	3213	33	38	0.09	0.09		
9	414-26	13	18	0.05	0.03		
9	414-27	18	23	0.04	0.01		
9	414-28	23	28	0.03	0.03		
9	414-29	28	33	0.05	0.05		
9	080	33	38	0.43	0.40		
9	081	38	40	0.42	0.39	0.27	0.24
9	082	40	45	0.53	0.48		
9	083	45	50	0.34	0.28		
9	084	50	52	0.37	0.31		
9	085	52	57	0.58	0.54		
9	086	57	58	0.23	0.18		
9	087	58	60.5	0.27	0.25		
10	088	98.5	102.5	0.49	0.46		
10	097	102.5	103	0.35	0.32		
10	098	103	108	0.10	0.07		
10	089	108	114	0.39	0.37	0.32	0.30
10	090	114	119	0.46	0.40		
10	414-30	119	126	0.40	0.40		
10	414-31	126	131	0.21	0.20		
10	414-32	131	135	0.38	0.37		
10	414-33	135	141	0.13	0.12		
11	099	28	32	0.15	0.13		
11	100	32	35	0.18	0.13		
11	3201	35	40	0.19	0.20	0.28	0.28
11	3202	40	45	0.39	0.39		
11	3203	45	50	0.60	0.61		
11	3204	50	54	0.09	0.07		
12	3205	10	14	0.29	0.29		
12	3206	14	18	0.27	0.26		
12	3207	19	24	0.91	0.51		
12	3208	24	28	0.63	0.60	0.39	0.32
12	3209	28	33	0.41	0.36		
12	3210	33	37	0.14	0.14		
12	3211	37	41	0.09	0.09		
12	3212	41	46	0.24	0.24		
13	3213	33	35	0.03	0.08		
13	3214	35	40	0.56	0.53		
13	3215	40	45	0.19	0.17		
13	3216	45	47	0.18	0.18		

Hole No	Sample No.	From	To	Cu	OxCu	%Cu	
						Wtd.	Aver.
13	3217	47	50	0.46	0.43		
13	3218	50	52	0.49	0.46		
13	3219	52	57	1.18	1.14		
13	3220	57	61	2.16	2.14		
13	3221	61	66	1.37	1.33		
13	3222	66	70	2.89	2.87		
13	3223	70	74	0.28	0.24	0.66	0.63
13	3224	74	79	0.26	0.22		
13	3225	79	83	0.24	0.20		
13	3226	83	86	0.44	0.42		
13	3227	86	89	0.34	0.33		
13	3238	89	93	0.81	0.73		
13	3239	93	95	0.67	0.65		
13		95	98				
13	3240	98	103	0.19	0.17		
13	3241	103	107	0.48	0.43		
13	414-22	107	112	0.05	0.04		
13	414-23	112	117	0.09	0.08		
14	3228	37	41	0.26	0.20		
14	3229	41	45.5	0.24	0.21		
14	414-24	45.5	50	0.18	0.16		
14	414-25	50	55	0.22	0.20		
14	3230	55	58	0.57	0.49		
14	3231	58	63	0.93	0.87		
14	3232	63	68	0.42	0.40		
14	3233	68	72	0.66	0.63	0.37	0.34
14	3234	72	75	0.57	0.54		
14	212-11	75	80	0.07	0.04		
14	212-12	80	84	0.20	0.16		
14	3235	84	89	0.25	0.22		
14	3236	89	91	0.22	0.18		
14	212-13	91	96	0.57	0.49		
14	3237	96	98	0.17	0.14		
15	1323	29	34	0.16	0.13		
15	3242	34	39	0.33	0.28		
15	212-3	39	44	0.24	0.15		
15	212-4	44	48	0.07	0.05		
15	212-5	48	50	0.18	0.14		
15	212-6	50	55	0.14	0.12		
15	212-7	55	60	0.08	0.02		
15	3244	60	65	0.47	0.42		
15	3245	65	70	0.94	0.88	0.32	0.27
15	3246	70	75	0.89	0.86		
15	3247	75	80	0.92	0.83		
15	3248	80	85	0.57	0.55		
15	3249	85	88	0.51	0.46		
15	3250	88	92	0.21	0.16		
15	1324	92	97	0.08	0.05		
15	1325	97	100	0.09	0.06		

Hole No	Sample No.	From	To	Cu	OxCu	%Cu Wtd. Aver.	% OxCu
13	3217	47	50	0.46	0.43		
13	3218	50	52	0.49	0.46		
13	3219	52	57	1.18	1.14		
13	3220	57	61	2.16	2.14		
13	3221	61	66	1.37	1.33		
13	3222	66	70	2.89	2.87		
13	3223	70	74	0.28	0.24	0.66	0.63
13	3224	74	79	0.26	0.22		
13	3225	79	83	0.24	0.20		
13	3226	83	86	0.44	0.42		
13	3227	86	89	0.34	0.33		
13	3238	89	93	0.81	0.73		
13	3239	93	95	0.67	0.65		
13		95	98				
13	3240	98	103	0.19	0.17		
13	3241	103	107	0.48	0.43		
13	414-22	107	112	0.05	0.04		
13	414-23	112	117	0.09	0.08		
14	3228	37	41	0.26	0.20		
14	3229	41	45.5	0.24	0.21		
14	414-24	45.5	50	0.18	0.16		
14	414-25	50	55	0.22	0.20		
14	3230	55	58	0.57	0.49		
14	3231	58	63	0.93	0.87		
14	3232	63	68	0.42	0.40		
14	3233	68	72	0.66	0.63	0.37	0.34
14	3234	72	75	0.57	0.54		
14	212-11	75	80	0.07	0.04		
14	212-12	80	84	0.20	0.16		
14	3235	84	89	0.25	0.22		
14	3236	89	91	0.22	0.18		
14	212-13	91	96	0.57	0.49		
14	3237	96	98	0.17	0.14		
15	1323	29	34	0.16	0.13		
15	3242	34	39	0.33	0.28		
15	212-3	39	44	0.24	0.15		
15	212-4	44	48	0.07	0.05		
15	212-5	48	50	0.18	0.14		
15	212-6	50	55	0.14	0.12		
15	212-7	55	60	0.08	0.02		
15	3244	60	65	0.47	0.42		
15	3245	65	70	0.94	0.88	0.32	0.27
15	3246	70	75	0.89	0.86		
15	3247	75	80	0.92	0.83		
15	3248	80	85	0.57	0.55		
15	3249	85	88	0.51	0.46		
15	3250	88	92	0.21	0.16		
15	1324	92	97	0.08	0.05		
15	1325	97	100	0.09	0.06		

Hole No	Sample No.	From	To	Cu	OxCu	%Cu Wtd. Aver.	% OxCu
15	1326	100	104	0.21	0.15		
15	212-8	104	109	0.02	0.01		
15	212-9	109	114	0.03	0.01		
15	212-10	114	119	0.07	0.04		
15	1327	119	121	0.12	0.08		
16	1328	66	68	0.11	0.04		
16	1329	68	73	0.78	0.46		
16	1330	73	78	0.29	0.25		
16	1331	78	83	0.37	0.33	0.35	0.28
16	1332	83	88	0.49	0.47		
16	1333	88	93	0.47	0.42		
16	414-10	93	98	0.03	0.03		
16	414-11	98	103	0.09	0.09		
18	212-14	132	134	0.14	0.12		
18	212-15	134	139	0.04	0.01		
18	212-16	139	144	0.10	0.04		
18	212-17	144	149	0.21	0.14		
18	212-18	149	153.5	0.35	0.34		
18	212-19	153.5	156	0.31	0.26	0.24	0.20
18	212-20	156	161	0.53	0.48		
18	212-21	161	166	0.26	0.23		
18	212-23	171	176	0.13	0.09		
18	212-24	176	180	0.12	0.11		
18	212-31	203	205	0.36	0.34		
18	212-22	166	171	0.36	0.28		
20	212-32	8	13	0.80	0.78		
20	33	13	18	0.39	0.37		
20	34	18	23	0.90	0.87		
20	35	23	28	0.69	0.68		
20	36	28	34	0.70	0.70		
20	37	34	37	0.55	0.55		
20	414-6	37	42	0.15	0.14		
20	7	42	47	0.16	0.16		
20	8	47	52	0.04	0.04	0.32	0.31
20	9	52	58	0.08	0.08		
20	212-38	58	63	0.33	0.31		
20	39	63	68	0.14	0.12		
20	40	68	73	0.11	0.10		
20	41	73	78	0.20	0.19		
20	42	78	83	0.23	0.21		
20	43	83	89	0.14	0.13		
20	44	90	96	0.03	0.03		
21	45	47	50	0.20	0.19		
21	46	50	55	0.07	0.06		
21	47	55	60	0.05	0.05	0.16	0.15
21	48	60	65	0.03	0.02		

6.

<u>Hole No</u>	<u>Sample No.</u>	<u>From</u>	<u>-</u>	<u>To</u>	<u>Cu</u>	<u>OxCu</u>	<u>%Cu Wtd.</u>	<u>% OxCu Aver.</u>
21	212-49	65		70	0.47	0.44		
21	50	104		110	0.55	0.51		
21	414-1	127		132	0.09	0.09		
21	2	132		134.5	0.91	0.50	0.37	0.31
21	3	134.5		140	0.21	0.21		
21	4	154		156	0.25	0.25		