February 13, 1951

Memorandum

To: Operating Committee, Defense Minerals Administration, Washington, D. C.

From: Field Team, DMA, Region IV

Subject: DMA Docket 57, Sunnyside Copper Property, Santa Cruz County, Arizona

We are attaching a report on Sunnyside Copper Property, Santa Cruz County, Arizona, DMA Docket 57. The Field Team, DMA, Region IV recommends that the application for Government assistance be denied.

J. H. East, Jr.

A. H. Koschmann

Attachment.

Copies to -
Operating Committee (3)
Koschmann (1)
Allsman (1)
DMA files

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

REGIONAL DIRECTOR'S OFFICE
REGION IV
FEB 9 - 1951
BUREAU OF MINES
DENVER, COLORADO

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

February 9, 1951

Memorandum

To: Executive Officer, D.M.A. Field Team, Region IV

From: P. T. Allsman and W. D. McMillan

Subject: D.M.A. Docket No. 57, Report on Sunnyside Copper Property, Santa Cruz County, Arizona.

The undersigned agree entirely with the authors of the above report that financial assistance under Section 302 of the Defense Production Act of 1950 is not justified. The application should be denied.

Paul T. Allsman

W. D. McMillan

Enclosures 6

Copy to: WR Storms (2)

Arizona-New Mexico Branch
[redacted]
Box 4097
UNIVERSITY STATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINING DIVISION
REGION IV

TUCSON, ARIZONA

February 2, 1951

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV
and
District Supervisor, Ariz.-New Mexico, Geological Survey

Subject : Defense Minerals Administration Report on Sunnyside Copper Property, Santa Cruz County, Ariz. (DMA Docket 57).

Enclosed are original and five copies of the above report by T. M. Romslo of the Bureau of Mines and S. C. Creasey of the Geological Survey. No loan is recommended.

This report has our approval.

Mining Division
Date Rec'd.
FEB 5 1951
BUREAU OF MINES
Denver, Colorado

Walter R. Storms

Walter R. Storms

Charles A. Anderson

C. A. Anderson

CC P. T. Allsman
C. A. Anderson
DMA Docket 57
DF

All copies of report submitted to East

FOR VICTORY
BUY
UNITED STATES SAVINGS BONDS AND STAMPS

SUNNYSIDE COPPER PROPERTY

SANTA CRUZ COUNTY, ARIZONA

By T. M. Rosario and S. C. Creasey

* * * * * * * * * DEFENSE MINERALS ADMINISTRATION REPORT
DMA Docket No. 57

Approved:

J. H. East, Jr. by W. W. McMillan

J. H. East, Jr.

A. H. Koschmann

A. H. Koschmann

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
JAMES BOND, ADMINISTRATOR

CONFIDENTIAL

SUNTRIBE COPPER PROSPECT

SANTA CRUZ COUNTY, ARIZ.

By T. M. Romalo[1] and S. C. Creasey[2]

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1/ Mining Engineer, Arizona-New Mexico Branch, Region IV, Bureau of Mines, Tucson, Arizona
2/ Geologist, U. S. Geological Survey, Prescott, Ariz.

SUMMARY AND CONCLUSIONS

The Sunnyside Copper property, near Patagonia, Santa Cruz County, Ariz., was examined in connection with a request by the United Minerals Reserve Corp. for Governmental assistance, under the Defense Production Act of 1950, to start limited mining operations and to carry out preliminary explorations designed to determine the possibilities of developing a large tonnage of low-grade copper ore. The request carries docket number DMA 57.

The Sunnyside property was first located in 1897 and at present consists of a group of 17 lode mining claims. It is situated in an area of rough topography of the Patagonia Mountains. It has produced a total of a few hundred tons of direct shipping ore most of which was mined shortly after the property was located. The most recent production was in 1949 when 62 tons of ore containing 4.8 percent copper and 2.23 ounces silver a ton was mined and shipped from a small open-cut. Principal workings consist of 2 shallow shafts, a small open-cut, and an 200-foot adit from which a few crosscuts have been driven.

The Sunnyside property is in an elongated north-trending mass of Mesozoic granite porphyry, which is bounded on the east chiefly by Tertiary rhyolite and on the west by Mesozoic quartz monzonite and quartz diorite.

Alteration is widespread in the granite porphyry and rhyolite in the northern part of the Harshaw and Palmetto mining districts. In

the Sunnyside property, the alteration comprises chiefly formation of pyrite and quartz, and alteration of the silicate minerals. Little evidence of copper sulfide was observed.

Pyrite exposed in numerous places in the bottom of Alum Gulch, which cuts through the Sunnyside property, attests to the shallow depth of the general level of oxidation.

The copper minerals in the Sunnyside deposit consist of soluble copper salts and a trace of chalcocite. Faults and fractures apparently were the dominant control for the descending copper-bearing solutions, which to some extent migrated into the adjacent brecciated rocks depositing secondary copper where conditions were favorable.

The almost complete absence of relicts after primary copper sulfide minerals in the surface outcrops is unfavorable for the concept of large ore bodies of secondary origin. Sampling of unoxidized pyritic granite porphyry revealed that the pyrite is slightly cupriferous. Considering the wide extent of pyritic mineralization, the cupriferous pyrite offers a more than adequate source for the small amount of copper present.

The examination indicates the mineralized zone at the Volcano shaft contains a very small tonnage of comparatively low grade copper ore that can be mined only at a very high cost. On this basis the DMA would not be justified in granting the applicant a loan to start mining operations on the Sunnyside property.

It is also concluded conditions are not favorable for the presence of large reserves of low grade copper ore and that the DMA would not be

justified in granting a loan for the purpose of carrying out preliminary explorations.

INTRODUCTION

This report covers an examination of the Sunnyside mining property, Harshaw Mining District, Santa Cruz County, Ariz. The examination was made in connection with a request by the United Minerals Reserve Corporation, Salt Lake City, Utah, for Governmental assistance, under the Defense Production Act of 1950, to start limited mining operations and to carry out preliminary explorations designed to determine the possibilities of developing a large tonnage of low-grade copper ore.

The applicant's request, docketed as DMA 57, states two principal objectives exist on the property, namely:

Project 1. Installation of equipment and mining of ore blocked out at the Volcano shaft. Operations to be by surface excavation. It requires suitable equipment for drilling and a small tractor-type mechanical loader, installation of an ore bin and a payroll for 60 days, estimated at $1,600.00, $1,500.00, and $2,700.00, respectively. A total of $6,500.00 requested for this project would include a supply account of $700.00. The applicant states the necessary equipment is obtainable in the district and that a working

force of 4 experienced local men are available.

Project 2. Diamond drilling of perhaps 4 holes for a total of 2,400 feet. This drilling is designed to determine possibilities of developing a large reserve of low-grade copper ore. The cost of this work estimated at $19,200.00 includes the building of a service road to drill sites.

The applicant states, "the ore is very amenable to milling and metallurgical studies are being made to select the most efficient methods. Present results indicate that a rough acid leach on the material ground to 6 mesh will make an extraction of 75-80% of Cu present."

The applicant proposes loan repayment will be made from gross profits on ores sold to smelters on a fixed basis of 10 percent of net returns. Part of the requested loan, is intended for the purchase of mining equipment valued at $3,100.00. This equipment is the only collateral offered as security for repayment of the loan applied for.

The examination was made during the period of Jan. 3 to 9, 1951, by S. C. Creasey and T. M. Donald of the U. S. Geological Survey and the U. S. Bureau of Mines, respectively. The object of the examination was to determine if the Government would be justified in furnishing the applicant financial assistance to carry out work outlined under projects

1 and 2. Field work consisted of a transit-stadia survey to locate mine workings, a brunton and tape survey of pertinent workings, geologic mapping, and obtaining 5 samples for analyses.

ACKNOWLEDGMENTS

The authors wish to thank Robert Lenon, B.S.E.M., Patagonia, Ariz. for furnishing current claim and survey data on the property.

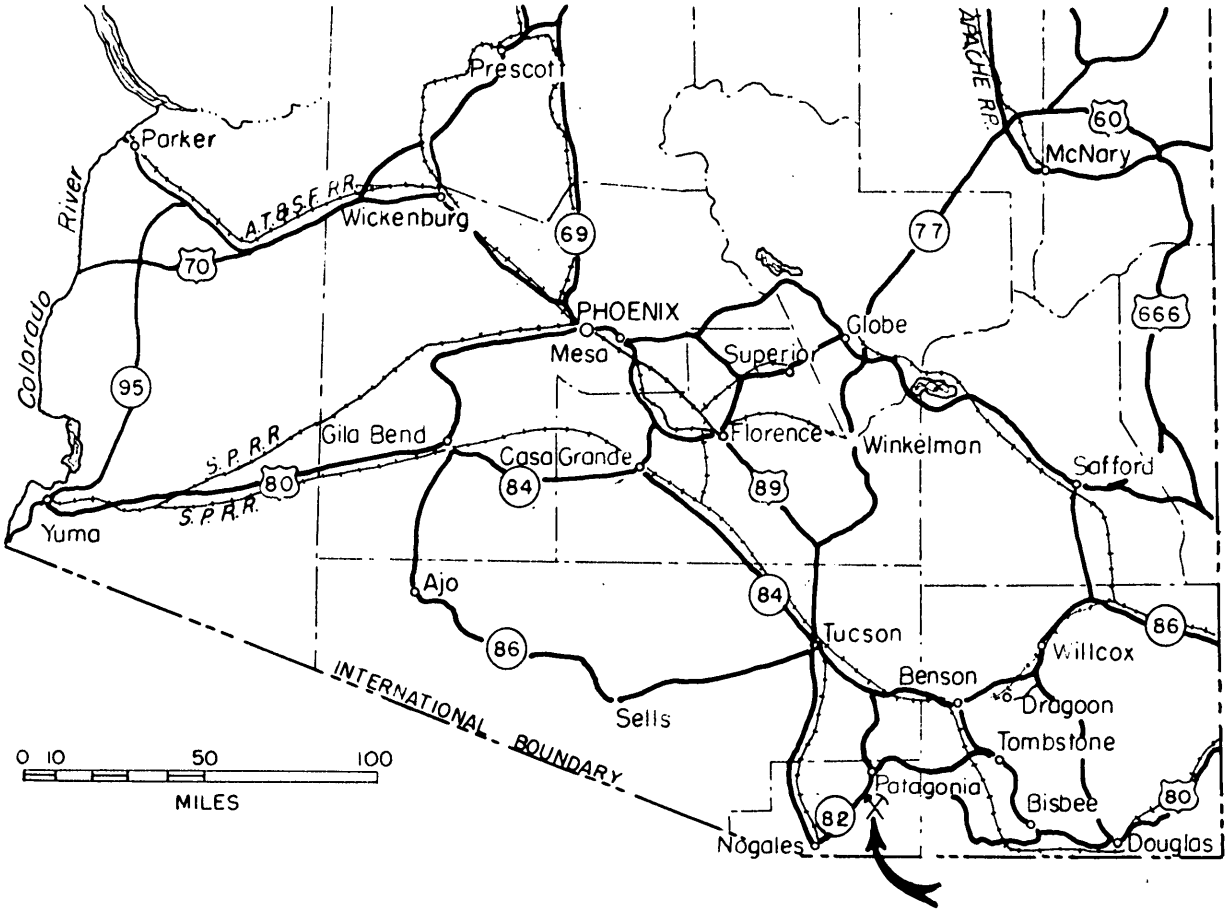
LOCATION AND ACCESSIBILITY

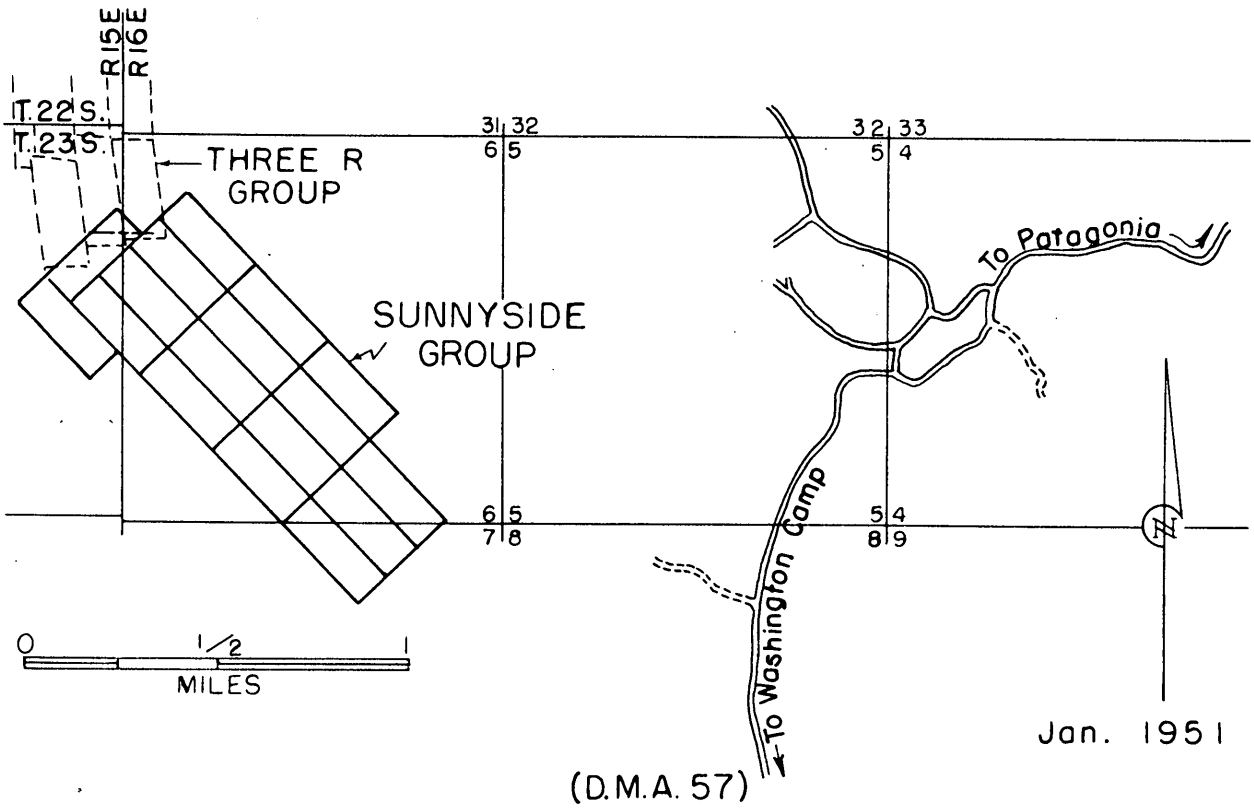
The Sunnyside property is about 5 air-miles south of Patagonia, Ariz., a village on state highway No. 82 and a station on the Patagonia Branch of the Southern Pacific railroad. It may be reached from Patagonia by traveling 9.6 miles toward Washington Camp on a county-maintained dirt road and thence 1.6 miles westerly on a good mine-road that terminates at the open pit (fig. 1). There are no excessive grades on the county-maintained road but much of the road to the mine has uphill grades of 12 percent.

PHYSICAL FEATURES AND CLIMATE

The Sunnyside property is in the Patagonia Mountains that in general trend north-south and extend from Sonoita Creek near the village of Patagonia to the International border. The topography of the property is rough. Near the workings the hillsides slope at about 35 degrees. Here the relief ranges from an elevation of 5,543 feet at the portal of the Farrell tunnel to about 5,900 feet at the Sunnyside shaft.

The main drainage of the property is through Alum Gulch. It is reported water runs in the Gulch only during the rainy period, from July to September.





(D.M.A. 57)

Fig. 1 - Location map, Sunnyside Copper property, Santa Cruz Co., Ariz.

Vegetation, of light growth, consists mainly of pine, scrub oak and manzanita.

The annual temperatures range from near 20 to 100 degrees and precipitation of about 15 inches annually includes a few light snowfalls.

PROPERTY AND OWNERSHIP

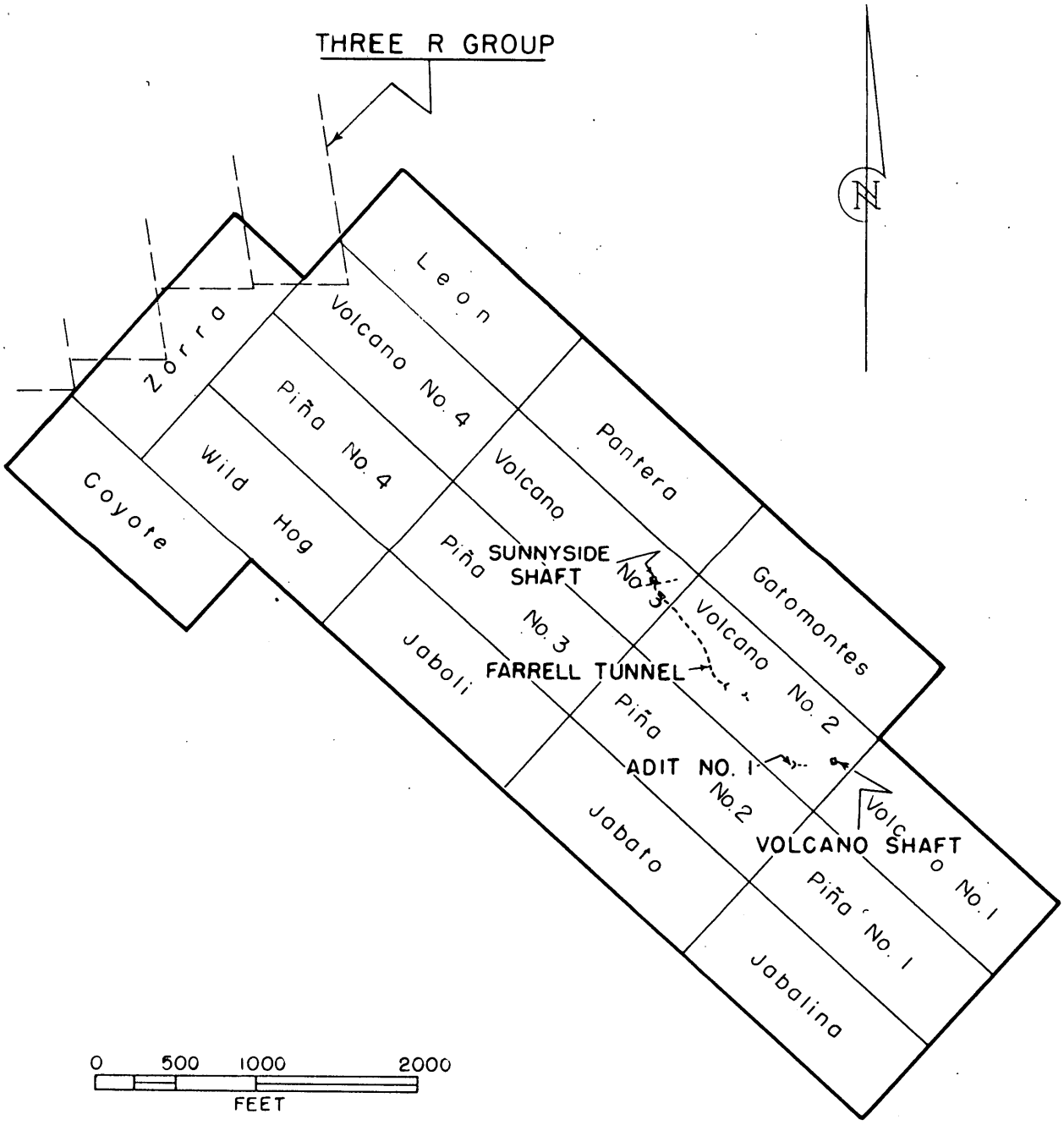
The Sunnyside copper property consists of a group of 17 lode mining claims located in Sec. 1, T. 23 S., R. 15 E., and secs. 6 and 7, T. 23 S., R. 16 E., Harshaw mining district, Santa Cruz County, Ariz. (figs. 1 and 2).

The property is owned by the Santa Cruz Copper Company, an Illinois corporation, having a capitalization of $1,000,000.00. The United Minerals Reserve Corporation, Felt Building, Salt Lake City 1, Utah, has an arrangement to operate the property and lists as part of its fixed assets the ownership of 100,000 shares common stock of the Santa Cruz Copper Company. Mr. George W. Snyder, Jr., Director and President of the Corporation, has been active in mining, oil, and airline activities. Some of the other officers as given in the Corporation's application include: Harold M. Covey, an experienced mining engineer; Mason W. Rankin, an experienced mining geologist; George W. Snyder, engaged in the mining industry of the Intermountain Territory for 35 years; and Harvey G. Orton, an experienced corporation executive. All these men are both Directors and Vice-Presidents of the Corporation.

HISTORY AND PRODUCTION[3/]

The Sunnyside property was first located in 1897 by R. Farrell. During the first half year of the original ownership 5 carloads of

3/ Mainly from Schrader, Frank C., Mineral Deposits of the Santa Rita and the Patagonia Mountains, Ariz., U.S.G.S. Bull. 582, pp. 254-256, 1915



Jan. 1951

(D.M.A. 57)

Figure 2.- Property map, Sunnyside Copper property

copper carbonate ore containing a little silver yielded $5,000. During this period several shafts were sunk. Probably all of the production came from the Valesmo and the Sunnyside shafts. Two carloads of the ore from the Valesmo shaft were reported to have assayed 9 percent in copper and 2 ounces silver a ton. Two shipments of 22 and 15 tons of ore from workings at the Sunnyside shaft were reported to have yielded 30 percent copper and 14 percent copper and 5 ounces of silver, respectively. Other small shipments were probably made during this period.

Early in 1912 the property was reported to be bonded to A. B. Ricketts, of Genesee. During 1949 R. Lemon and S. Vasquez, of Pedagonia, Ariz. leased and operated the property for a short time. They produced about 62 tons of ore from an open pit at the Valesmo shaft that assayed approximately 4.8 percent copper, and 2.25 ounces and 0.004 ounces of silver and gold, respectively. Total production from the property probably amounts to between 2 and 3 hundred tons of ore.

MINE WORKINGS

The principal workings are the Valesmo and Sunnyside shafts, the Farrell tunnel, and 2 small open cuts near the Valesmo shafts. The Valesmo and Sunnyside shafts are both inaccessible and said to be 30 to 90 feet deep, respectively. The Farrell tunnel and its 3 crosscuts have an aggregate length of approximately 1,130 feet.

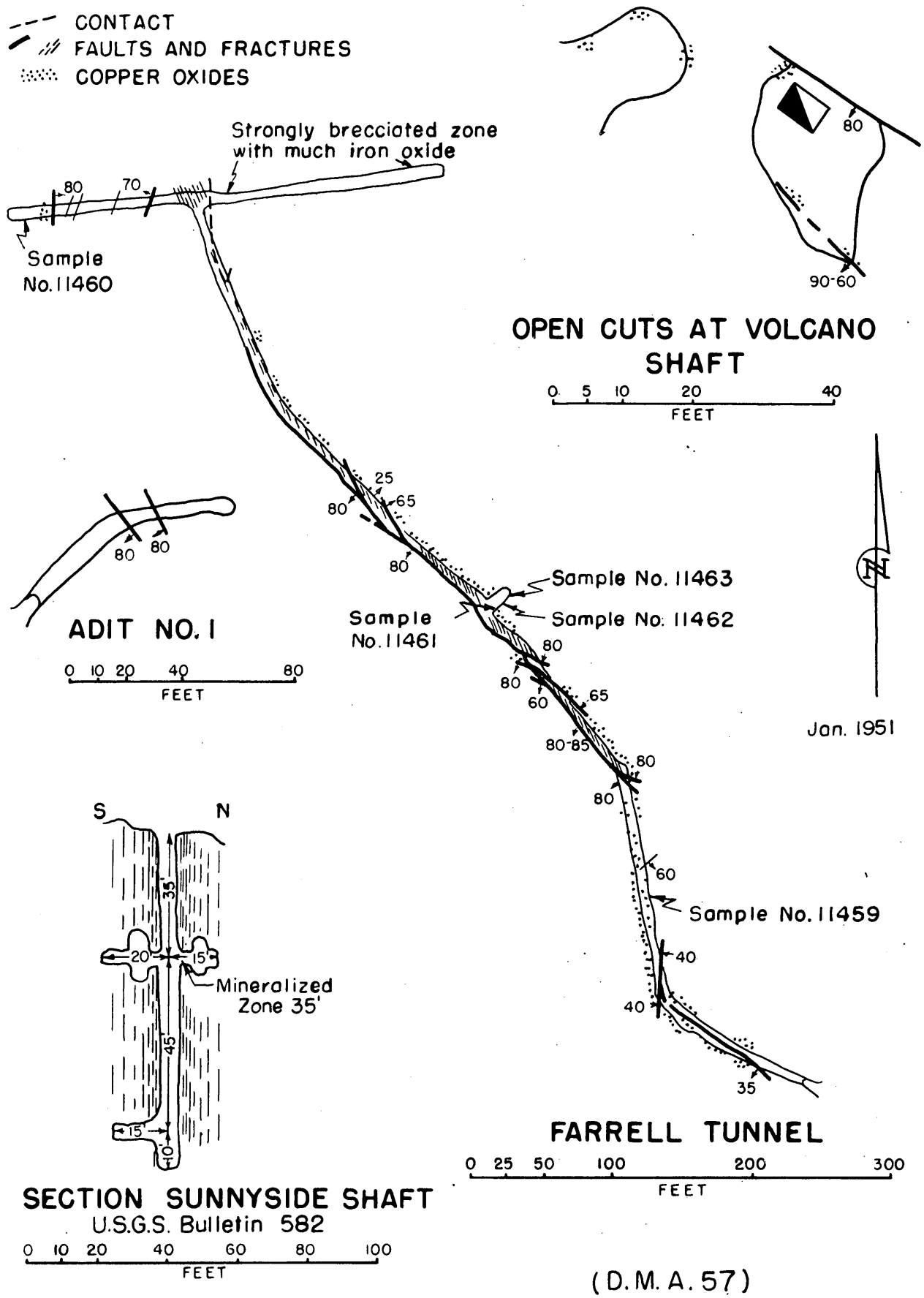
Other workings consist of several short adits, 2 of which are shown on figure 2.

There is no equipment on the property and the only structure consists of a metal 2,000-gallon water tank located near the Valeano shaft.

SAMPLING AND ASSAYS

Robert W. Michael, mining engineer and consultant, in his report to the present owners of the property stated the Farrell tunnel had been sampled prior to his examination and was reported to have showed an average of 1.35 percent copper and 1 ounce silver a ton over its length of about 800 feet. He stated visible high-grade spots were not included in the sampling and in his opinion the results obtained were probably acceptable.

As a check against the above reported assays the writers channel-sampled a portion of 2 sections of the tunnel that a close visual examination indicated to be of higher than average copper content. Figure 3 shows the location from where each of 5 samples were taken and samples 11,459 and 11,461, each taken over a 6-foot section, are the 2 check samples. The channel of sample 11,461 was continued to the end of the crosscut to obtain samples 11,462 and 11,463, each 7 feet in length. Sample 11,460, a 6-foot channel sample weighing about 10 pounds, was taken from near the end of the west crosscut from the Farrell tunnel.



(D.M.A. 57)

Figure 3. - Geologic map of workings, Sunnyside Copper property, Santa Cruz Co., Arizona.

The assays of the five samples are as follows:

Sample No.	Percent copper: Total	Percent copper: H_2SO_4 Soluble	Percent copper: Sulfide (by difference)	Ounces a ton: Gold	Ounces a ton: Silver
11459	0.56	0.43	0.15	Nil	Tr
11460	0.033	0.002	0.031	Tr	0.07
11461	0.87	0.83	0.04	Nil	Tr
11462	0.30	0.28	0.02	Nil	Tr
11463	0.58	0.58	Nil	Nil	Tr

Note: No visible dore' beads were obtained from 1/2-assay-ton charges on Nos. 11,459, 11,461, 11,462, and 11,463. Assays from sample No. 11,460 were obtained from a 2-assay-ton charge.

The assays were made by Ray Stiles under the supervision of J. Bruce Clemmer, Chief, Arizona-New Mexico Branch, Metallurgical Division, U. S. Bureau of Mines, Tucson, Arizona.

GEOLOGY

The short period spent by the writers in the examination of the Sunnyside property prohibited unraveling of the greater geologic features and relationships. For these, they are dependent on the report on the Santa Rita and Patagonia Mountains by Schrader.[1]

1/ Schrader, F. C., op. cit.

According to Schrader, deposition of Paleozoic sedimentary rocks, uplift, and intrusion of Mesozoic granitic and porphyritic rocks was followed by the most significant mineralization period in the Santa Rita and Patagonia Mountains. Subsequently, subsidence and deposition of upper Cretaceous sedimentary rocks was followed by uplift and Tertiary volcanism. A second period of mineralization was associated with the Tertiary volcanic rocks, as shown by the ore deposits found in them.

The Sunnyside property is in a mass of Mesozoic granite porphyry that is about 5 miles in length and ranges in width from about 1000 feet to slightly under 2 miles. The mass trends north, and the Sunnyside is near the eastern margin about midway between the northern and southern limits of the mass.

Tertiary volcanics, chiefly rhyolite, underlie most of the area north and east of the granite porphyry. In addition, Devonian limestone and late Cretaceous sedimentary rocks underlie sizable areas east of the southern part of the granite porphyry and southeast of the Sunnyside property. Mesozoic quartz monzonite and quartz diorite bound the granite porphyry on the west.

Despite the fact that the Sunnyside deposit is in Mesozoic rocks, it is believed that it belongs to the Tertiary period of mineralization. Many of the deposits in the Harshaw district, including the Trench, Flux, and Hardshell, all of which produced substantial amounts of ore, are post-rhyolite. Apparently, the same type of mineralization that

characterizes the Sunnyside continues uninterrupted north and northwestward into the rhyolite. Tertiary mineralization was widespread in the Harshaw district, but whether Mescalito deposits are present is questionable.

ORE DEPOSITS

Alteration is widespread in the northern part of the Harshaw and adjacent Palmetto mining districts. It appears to be limited chiefly to the Mescalito granite porphyry and to the Tertiary rhyolite. In the Harshaw district and adjacent parts of the Palmetto district, granite porphyry crops out over about 9 square miles, and rhyolite crops out over about 7 square miles in the Harshaw district.

The alteration in the granite porphyry comprises development of sulfides and quartz, and alteration of the silicate minerals, chiefly the feldspar. Concerning the granite porphyry, Schrader says, "The rock contains widely disseminated pyrite and chalcopyrite, mostly in silicified shear zones or silica bands, some of which are 200 feet or more in width." ....."The feldspars are of a dull whitish color and in general highly altered to muscovite, but in some of the rock, as at the Three-R mine, in the Palmetto district, they are almost completely replaced by a secondary pink uniaxial positive mineral which was determined to be alunite."

Apparently the entire mass of rhyolite in the Harshaw district is altered, for Schrader states that it is profusely impregnated with crystals and grains of pyrite, chalcopyrite, and chalcocite.

3/ Schrader, F.C., op. cit., pp. 63 and 64.

All of the rocks observed on the Sunnyside property were altered similarly to that just described, but with one exception. Little evidence of copper sulfides was observed. In all of the outcrops in the vicinity of the Farrell Tunnel, Sunnyside shaft, and Paloma shaft abundant cracks after pyrite were disseminated in the rock and to a lesser extent concentrated along small veinlets. The iron oxide derived from the pyrite commonly gives the rock a speckled appearance, or where more abundant, a pervasive reddish hue marks the rocks.

In the Farrell Tunnel unoxidized pyrite occurs within 10 feet of the portal, and it is abundant throughout the rest of the tunnel except adjacent to the more pronounced faults and fractures where apparently oxidation extends to greater depths. Pyrite exposed in numerous places in the bottom of Alum Gulch, which passes by the portal to the Farrell Tunnel, attests to the shallow depth of the general level of oxidation on the Sunnyside property.

Locally the rocks were slightly to intensely silicified. In some specimens, quartz was the only recognizable mineral. Sizeable areas on the surface are characterized by fine-grained dense siliceous rocks that might have been rhyolite or intensely silicified granite porphyry in which the original porphyritic texture has been destroyed entirely. In most of the areas where the porphyritic texture of the granite porphyry was still visible, the phenocrysts were altered to a soft white mass. Presumably this is the muscovite- and albite-type of alteration referred to by Schrader.

In all the surface examination, the writers did not observe one specimen that contained recognizable gossan or boxwork after chalcopyrite or chalcocite. The absence of relicts after chalcopyrite and chalcocite in outcrops was one of the most discouraging aspects of the Sunnyside deposit.

All of the rocks on the Sunnyside property are brecciated or crackled, but the degree of brecciation varies from one place to another. Within this generally brecciated terrane, fractures and small faults that appear to have preferred orientation, mark restricted zones of most intense brecciation. The dominant set of fractures and faults trends northeast, and a minor set trends north or slightly west of north. Two northeast-trending small discontinuous faults are exposed in the Farrell tunnel, and they appear to be the dominant control for the secondary copper mineralization. Schrader speaks of a sheared, silicified, and mineralized belt 200 feet in width trending N. 50° W. across the claims of the Sunnyside property, but this feature was not recognized by the writers. The northeast-trending faults and fractures, such as those in the Farrell tunnel, apparently are discontinuous; nevertheless they do etch out and form the dominant grain of the terrane.

The copper minerals consist of blue and green secondary copper salts and a minor amount of chalcocite. They occur chiefly in the Farrell tunnel and to a lesser extent in the open cuts around the Velasco shaft, the short adit across the gulch for the Farrell tunnel, and in a short adit between the Sunnyside shaft and the Farrell tunnel. Some copper

carbonate was shipped from stopes located on the 35-foot level of the Sunnyside shaft, but inaccessibility of the shaft prevented examination of this occurrence.

All or nearly all of the copper minerals bear a spatial relationship to fractures or small faults (figure 3). In the Farrell tunnel the northwest-trending faults were the "plumbing system" that controlled the descending copper bearing solutions. To some extent the solutions migrated outward into the adjacent brecciated rock depositing soluble copper salts where conditions were favorable. The primary control of the oxide copper in the largest open cut at the Volcano shaft is a northwest-trending fault and the adjacent brecciated rock, which reaches a maximum width of 4 feet.

The widespread brecciation and other northwest-trending fractured and sheared zones offers numerous other sites for deposition of small amounts of soluble copper salts, but the location of those that might contain copper minerals and the places along these structures where copper might have been deposited is unpredictable.

ORE RESERVES

Project No. 1

At the Volcano shaft where the applicant proposes to initiate open-cut mining the ore occurs as small pods and lenses associated with fractures and weak faults. Field evidence indicates the zone of mineralization does not extend beyond the boundary of the open-cuts. Furthermore production records from a zone overlying the present floor of the open-cuts

indicate the ratio of ore to waste is decreasing rapidly with depth.

It is estimated ore exposures constitute less than one-half of one percent of the areal extent of the mineralized zone. Thus inferred ore reserves of the deposit amount to only a few tens of tons, containing approximately 5 percent copper per foot of depth.

From a deposit of this type production of over a ton or two of ore daily could not be expected and economic operation would be dependent upon a market price for copper of over $2.00 a pound.

Project No. 2

The following factors were considered in arriving at conclusions as to the possibility of developing a large reserve of copper ore on the Sunnyside property.

1. The complete or almost complete absence of relicts (bonanza) after primary copper minerals in the surface outcrops. The writers have no assurance that chalcopyrite or chalcocite ever occurred in amounts greater than traces. Sample no. 11460, taken from the unoxidized pyritic granite porphyry, revealed that the pyrite is slightly cupriferous. It assayed 0.033 percent copper. Considering the wide extent of pyrite mineralization, the cupriferous pyrite offers a more than adequate source of the small amount of copper present.
2. The shallow depth of oxidization. All drilling below the level of Alum gulch would be in primary

mineralization where little else but auriferous pyrite could be expected.

3. The results of sampling a zone (Farrell tunnel) of higher than average copper content of the deposit. The sampling showed the higher grade sections of the zone contained an average of about 0.73 percent copper. Samples taken over a 14-foot length into the footwall of the zone contained an average of 0.44 percent copper. A visual examination showed other sections of the tunnel to be barren of copper mineralization. On this basis it is probably reasonable to assume the average copper content in the oxide zone will be under one percent, a grade too low to be considered as a possible source of copper under existing conditions.

4. The concept of a widespread blanket of secondary copper at the water table is vitiated by the evidence of very small amounts of copper in the primary mineralization and by the relatively shallow depth of oxidation.

CONCLUSIONS

Project No. 1

It would be unreasonable to expect that over a few tons of comparatively low-grade copper ore could be produced daily from the mineralized zone at the Volcano shaft. Furthermore any production would be made at a prohibitively high cost. Therefore the SBA would not be justified in approving a loan to the applicant for this phase of proposed operations on the Sunnyside property.

Project No. 2

Conditions are unfavorable for the presence of a large reserve of copper ore on the Sunnyside property. It is therefore concluded the SBA would not be justified in granting a loan to the applicant for the purpose of carrying out preliminary explorations.