CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Cambior Exploration USA Inc. records

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.

TERRAMAR RESOURCE CORPORATION(TEM-V,T)

TERRAMAR RESOURCE CORPORATION (TEM-V,T)

TERRAMAR RESOURCE CORPORATION

ARK ENERGY LTD.

BULK LEACH TEST SHOWS [redacted]

ARK ENERGY LTD. (ARK-V)

[redacted]

NICOR MINERAL VENTURES

One of the NICOR basic energy companies

2659-G Pan American Freeway, N.E. Albuquerque, New Mexico 87107 Phone 505 344 7803

April 25, 1984

Mr. W. E. Sweet
P.O. Box 1274
Bagdad, Arizona 86321

Dear Mr. Sweet,

I would like to thank you for the opportunity to visit your mine. Based on our sample results and geology it was decided that your property does not meet the minimum size/grade cut-off for a NICOR operation. Our sample results are listed below.

SAMPLE	Au-ppm	Ag-ppm	DESCRIPTION
K-916	1.5	12	3' chip of vein, top of hill
K-917	.58	14	6' chip of vein and wallrock, top of hill
K-918	3.7	81	grab of ore pile
K-919	.25	8.6	8.6' chip of vein and wallrock by adit

Assays by North American Assay Company, Tempe, Arizona.

Good luck with your mine.
Sincerely yours,

Frank Bain

Frank Bain
Geologist

W.E. Sweet & Associates, Ltd.
POST OFFICE BOX 27170 • LAS VEGAS, NEVADA 89126
~~(702) 878-8474~~

2-15-84

Reply To: W.E. Sweet, Jr.
P.O. Box 1274
Bagdad, Az 86321
MSG. PH: 602-442-3420

Nicor Mineral Ventures
2659-G Pan American Fwy, N.E.
Albuquerque, NM 87107

Attn: Manager - Exploration / Development

Sir:

I had the occasion today to talk to Frank Bain, a Geologist on your staff Dewatering the Mammoth-Prospect in Yava, Arizona. As your Company is involved in Precious Metals Exploration and Mine Development, I would like to enquire if you would be interested in a property I own near Bagdad, Arizona. The property is known locally as the Stukey Mine, a Lead-Silver-Gold deposit on a structure that has been traced for 3 miles. The mine has been reopened by myself but sinking stopped at 65 feet due to water in the shaft. Gold values range from 0.10 - 1.00 oz/ton with silver @ 1.0 oz - 17.0 oz/ton. Free gold is associated with the quartz gangue. I feel the mine has potential, but I am currently hampered by lack of capital needed to sink the shaft deeper & drift under potential ore shoots. We would be interested in hearing from you.

Sincerely yours, Wilbur E. Sweet, Jr.

Browning, W. C., and Snow, F. W., Geology and Operations of the Magma Mine, Eng. & Min. Jour., Vol. 119, p. 197, 1925.
Short, M. N., and Ettlinger, I. A., Ore Deposition and Enrichment at the Magma Mine, Superior, Arizona, Am. Inst. Min. Eng., Trans., Vol. 74, pp. 174-222, 1927.
Ettlinger, I. A., Ore Deposits Support Hypothesis of a Central Arizona Batholith, Am. Inst. Min. Eng., Tech. Pub. 63, 1928.
Ettlinger, I. A., and Short, M. N., The Magma Mine, Superior, 16 Int. Geol. Cong., Copper Resources of the World, Vol. 1, pp. 207-13, 1935.
Wilson, Eldred D., Arizona Lode Gold Mines, Univ. of Ariz., Ariz. Bureau of Mines Bull. 137, pp. 168-70, 1934.
Gardner, E. D., Mining Methods and Costs at Herron and Laster Lease, Superior, Arizona, U.S. Bureau of Mines Inf. Circ. 6799, 1934.

Bagdad Mine, Eureka District[60]

By
B. S. Butler and Eldred D. Wilson

Introduction

The Bagdad Mine is in the Eureka district, western Yavapai County, 27 miles by road from Hillside, a station on the Santa Fe railway. Bagdad camp is on Copper Creek, a few miles upstream from its junction with Burro Creek, at an altitude of about 3,200 feet.

Little has been published regarding the geology of the Bagdad area, though several studies have been made and reports prepared for the Bagdad Copper Corporation and its predecessors.

The following discussion is largely based on these reports and other data furnished by the company. The map (Pl. XXV) was originally prepared by Rogers, Mayer, and Ball in 1918 and modified by H. N. Witt and P. C. Benedict in 1926.

The writers are particularly indebted to J. W. Still, mine manager, for information.

History and Production

Prior to 1907, eight claims in the Bagdad area were patented by John Lawler. Between 1907 and 1910 this group was obtained by the Copper Creek Development Company, Inc., which did additional development work and located additional claims which were later patented. By various successions the property was acquired in turn by the Arizona Nevada Copper Company, by the Bagdad Copper Company, by the Arizona Bagdad Copper Company, and in March, 1927, by the Bagdad Copper Corporation.

[60] Paper prepared for the regional meeting of the A.I.M.&M.E. held at Tucson, Arizona, November 1-5, 1938.

Additional development work was done by each of these companies. In the past considerable underground work has been done for the purposes of checking churn drill assays, to provide ore for metallurgical test work in pilot mills, and to check the caving system of mining proposed for a larger operation. The estimated ore reserves, hereinafter mentioned, are based on information obtained from 123 churn drill holes, approximately 20,000 feet of underground work, and approximately 8,000 feet of underground diamond drilling.

The property now has mill and power plant equipment installed sufficient to handle 250 tons per day.

During 1937 a total of 75,512 tons of ore with an average copper content of 1.37 per cent yielded 1,792.76 tons of concentrates averaging 42.87 per cent copper.

Operating costs of delivering concentrates on cars at Hillside, Arizona, were $2.045 per ton, distributed as follows:

Mining	$0.732 per ton
Milling	1.021 per ton
Camp, etc.	0.292 per ton

Production in 1937 was 1,537,396 pounds of copper at a cost of 0.137 cents per pound.

Rocks

The oldest rocks at Bagdad are amphibolite and mica schists which, because of their lithology and metamorphism, have been correlated with the pre-Cambrian Yavapai schist of the Prescott-Jerome region. Their composition suggests derivation from both igneous and sedimentary rocks. Intrusive into the schists is a granitic rock that resembles the pre-Cambrian Bradshaw granite. The presence of schist suggests that the Bagdad area is near the margin or in the roof of the granite batholith, which is of wide extent. Both the granite and the schist contain abundant pegmatite bodies, also suggestive of the margin or roof of a batholith. The rock in which the Bagdad ore occurs is intrusive into the schist and pre-Cambrian granite.

Dr. C. P. Berkey, in a report to the company, classifies the later intrusive as granite porphyry that ranges widely in composition. Locally it is known as "monzonite." Both orthoclase and plagioclase are present with abundant quartz. Biotite is variable in amount though abundant in much of the rock. The age of this intrusion is not known; it may be Laramide.

Overlying the pre-Cambrian rocks and the later intrusive body is an irregular thickness of sedimentary material laid down on an old land surface. This material is largely conglomerate that fills old valleys. Locally it has some marly lake beds near the top. Capping the surrounding mesas and covering the conglomerate and all but the higher points of the earlier rocks are flows of basaltic lavas. The sedimentary material and the lava are presumably of late Tertiary or Quaternary age.

Plate XXIV.—Bagdad camp, looking up Copper Creek. Granite porphyry in foreground; mesa capped by basalt and underlain by conglomerate in background.

Recent erosion has cut steep-sided canyons into the mesa areas and exposed the prebasaltic rocks. Active dissection is still in progress. The present drainage lines differ from the earlier drainages and in the vicinity of Bagdad have not cut to the depth of the earlier dissection.

Structure

Little is known of the pre-Cambrian structure of the Bagdad area. Since a large part of the area and also part of the outcrop of the later intrusive rock is covered by basalt, it is not evident what structures may have controlled the location of the later intrusive body.

Following the later intrusive activity the rock was highly fractured, with some movement on the stronger breaks.

In most exposures the fractures show many directions and attitudes that are not readily reduced to definite systems. Some of the fractures, however, are strong and persistent and have been followed for long distances by mine workings. The general strike of these stronger mineralized fractures is northwest. The Black Mesa breccia area has an elongation in an east-northeast direction but without obvious strong fractures. Later than the mineralized fissures and apparently later than the gravels and the basalt are northeasterly striking faults of small displacement that offset the mineralized fissures. One of the strongest faults recognized is the Hawkeye which trends northwestward with the general direction of the mineralized fissures. As indicated on Plate XXV, it is west of the main developed area.

Plate XXVI.—Near view of shattered granite porphyry.

Mineralization

A conspicuous feature around Bagdad is the red and brown iron stain on the rocks, particularly all exposures of the granite porphyry. Much of it is highly colored. This extensive staining indicates a rather widespread mineralization.

Prospecting in the mineralized granite porphyry has been mainly of two types, first, of the more prominent fissures, and, second, of disseminated deposits.

Development has been largely in the porphyry east of the junction of Copper and Marooney creeks, between the streams and the basalt-covered mesa, though a few drill holes have been sunk through the basalt and conglomerates of the mesa. The prospected area is also largely east of the Hawkeye fault.

Recent operations have been in the eastern part of the Bagdad area on both sides of Copper Creek where it flows southward. Here, the granite porphyry is broken into fragments of different

sizes by fissures that strike and dip in various directions. As already noted, two directions are prominent—northwesterly mineralized fissures and northeasterly faults that offset the mineralized fissures. The spacing of premineral fissures in the developed area shows considerable irregularity. In some parts a hand specimen contains several fissures, whereas in other parts the rock is distinctly blocky with its prominent fractures spaced several inches or more apart.

The stronger fissures contain well-defined veins that range from a fraction of an inch to more than a foot in width. In general, they have not proved large and rich enough to mine as simple veins.

The smaller fractures are also mineralized. Some sulphide grains seem to be disseminated in unfractured rock, but they are probably connected with inconspicuous fissures.

The degree of mineralization appears to be related to the closeness of fractures. Coarse, blocky ground appears less mineralized than the more closely fractured areas.

The alteration of the rock is less intense than in most disseminated deposits. Much of the feldspar is clouded with sericite, and the biotite is in part altered to chlorite or bleached to muscovite, but there has been no complete working over of the minerals, and the rock generally looks fresh. Along the strongly mineralized fissures, however, the rock is more strongly sericitized. Like most of the copper deposits of the Southwest, the Bagdad deposit can be separated into three zones—namely, the oxidized zone, the zone of sulphide enrichment, and the primary lean sulphide zone.

The alteration of the deposit occurred in large part during the period in which the preconglomerate topography developed, though it probably continued during the accumulation of the conglomerate. It has certainly been active in the present cycle of erosion, which has produced the steep-sided valleys.

The present surface, especially on the higher slopes, is rather free from copper stains and appears to be rather completely leached of any copper that may have been present.

The cross sections of the ore body (Pl. XXVII) give a rather representative picture of the distribution of copper. Probably the near-surface cappings were not assayed where low in copper. Generally the amount of copper in the oxidized zone increases with depth, and in places just above the secondary sulphide zone it may approach the copper content of the sulphide zone. Ordinarily, however, it is distinctly of lower grade than the sulphide zone, and probably no large bodies of it would exceed 0.5 per cent copper. In total, however, a very considerable amount of the copper is in the oxidized zone.

The secondary sulphide zone consists of veinlets of pyrite and chalcopyrite partially replaced by chalcocite. The copper content of the enriched sulphide zone in general is highest just below the oxide zone and decreases gradually towards the primary zone. In the upper, richer portion of the secondary sulphide zone the average copper content is probably three to four times that in the primary zone, indicating a very considerable movement and enrichment of copper.

Some of the prominent fissures locally have the primary sulphide largely replaced by chalcocite, resulting in high-grade specimen ore.

The thickness of the enriched sulphide zone ranges considerably (Pl. XXVII). The lower boundary is, of course, drawn at what is regarded as the limit of profitable ore and not necessarily or likely at the boundary between secondary and primary ore.

As in many deposits, the primary sulphide zone beneath the enriched zone has not been extensively prospected or developed. Pyrite and chalcopyrite are the sulphides present, and the copper content in general does not appear to exceed 0.5 per cent.

Notable amounts of molybdenite occur in thin, widely scattered quartz veins that generally dip at low angles southeastward. These occurrences seem to account for the small amount of molybdenum in the concentrates. Molybdenite was not noted in the copper veins, though it is possibly present.

Some prospecting has been carried on west of the main developed area of disseminated copper (Pl. XXV).

The Black Mesa deposit consists of a brecciated area with elongation in a general east-northeast direction (Pl. XXV). This breccia is probably due to faulting. On the surface it is cemented with quartz and limonite. A tunnel driven into the breccia has encountered sulphides. So far as shown by this limited development, the sulphides are most abundant on the margins of the breccia.

The Giroux and Paul tunnels have prospected an area between the Black Mesa and the main Bagdad areas.

Quantity and Grade of Ore

The following figures of quantity and grade of ore have been taken from the prospectus of the Bagdad Copper Corporation, May 11, 1938.

Ore estimates, made in various reports to the company and its predecessors, range from 5,000,000 to 35,000,000 tons, of which the estimated copper content ranges from 1 per cent to 1.93 per cent.

The latest report on the property, by Whitaker and Schlereth, of Denver, Colorado, dated June, 1937, estimated 6,000,000 tons with an average of 1.47 per cent copper. No estimate was made of oxidized ore.

The main deposit was developed by churn drill, and a part of the area has been opened for mining by the undercut caving system.

The capacity of the mill in 1937 was approximately 250 tons per day. The Whitaker and Schlereth report recommended a 1,000-ton mill as the most efficient for the property.

SOCIETY OF MINING ENGINEERS of AIME

540 ARAPEEN DRIVE — SALT LAKE CITY, UTAH 84108

PREPRINT NUMBER

78-I-49

THE BRUCE MINE - A CASE FOR METAMORPHIC REMOBILIZATION OF PRECAMBRIAN MASSIVE SULFIDES

R. L. Clayton

Cyprus Mines Corporation
Tucson, Arizona

For presentation at the 1978 AIME Annual Meeting
Denver, Colorado - February 28 - March 2, 1978

The Bruce Mine - A Case For Metamorphic Remobilization of Precambrian Massive Sulfides

by

R. L. Clayton
Cyprus Mines Corporation

Introduction

The Bagdad district is 67 kilometers west of Prescott, Arizona, (Figure 1). The area north of the Old Dick and Bruce Mines was originally mapped by Anderson, Scholz and Strobell between 1943 and 1945, (1). The region is perhaps better known for the Bagdad porphyry copper deposit of tertiary age. However, 2 to 5 kilometers south of this deposit are several small massive sulfide occurrences in a eugeosynclinal Precambrian greenschist environment. More specifically, in the Bridle formation of the Yavapai schist series.

Three of these mines - Old Dick, Bruce and Copper Queen - were mined by Cyprus Mines Corporation between 1957 and 1977, and produced nearly 2mm tons of 3.6% copper and 12% zinc. These deposits occur at the interface between andesite and rhyolite and are stratiform in character. Certain structural and textural properties of the Bruce orebody suggest that remobilization of the massive sulfides occurred at some period during the metamorphic history of the area.

Regional Geology

Figure 2 is a generalized geologic map of the Bagdad greenstone belt. It shows an 8 kilometer exposure of Dick rhyolite with adjacent extrusive, intrusive and sedimentary lithology which become progressively younger in an easterly direction. The Dick rhyolite is used to break the Bridle formation into a younger eastern unit and an older western unit. The strike of the lines which graphically depict the Bridle formation is approximately parallel to the regional schistosity, which is mimetic.

If the Dick rhyolite is extrusive, it is an intrinsic part of the Bridle formation, if intrusive it is a separate unit.

Regionally the Bridle formation (2200 m. thick) is postulated by Anderson, et al (1) to be the westerly dipping (70° to 90°) overturned west limb of a geosyncline, the east limb of which is 10 kilometers to the east. The Mountain Spring fault separates the Bridle formation and Dick rhyolite from the younger Butte Falls Tuff (760 m. thick), Hillside mica schist (900 to 1200 m. thick), and Lawler Peak granite, all to the east.

The Bridle formation consists of andesite to basaltic flows, tuffs and volcanogenic sediments. It appears to be gradational with the younger overlying Butte Falls Tuff.

Trondjhemite (albite rich Alaska) which intrudes the Bridle formation to the west is believed to be the plutonic equivalent of the Dick rhyolite and probably the King Peak rhyolite.

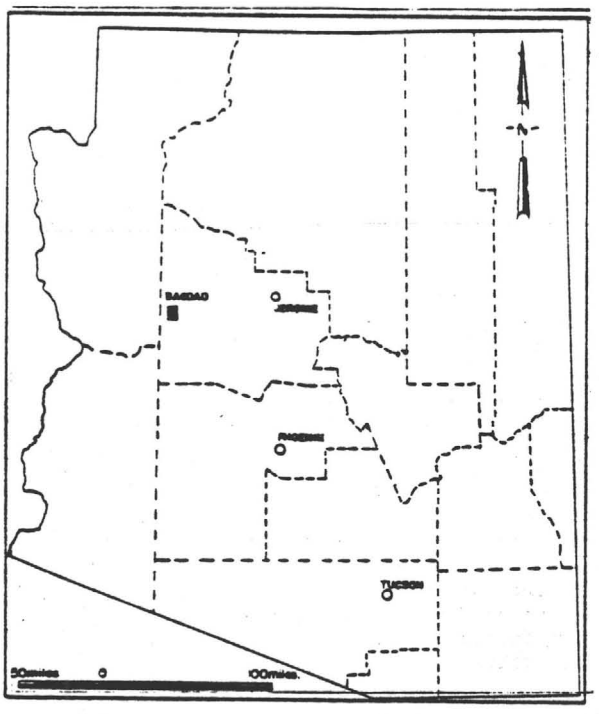

Figure 1.

Regional Metallogeny

Figure 2 indicates five massive sulfide deposits and their spacial distribution within the framework of the regional geology. The geological setting and field association of these orebodies are in many respects identical to those deposits currently classified as stratiform. They occur in a low grade metamorphic environment at the top of a volcanic succession - at a break in the volcanism - in a banded sedimentary unit separating mafic and felsic volcanics. The Old Dick and Bruce orebodies have well developed chlorite pipes and are referred to as proximal deposits (2). They occur within a quartz-sericite-schist horizon separating andesite from the overlying younger Dick rhyolite. The Copper Queen is a distal deposit (2) occurring on the east side of the rhyolite and overlain by an andesite flow.

According to Anderson, et al (1), the Copper King orebody is within a meta-tuff which separates andesite from the overlying King rhyolite.

Little is known about the Pinafore, except that it is also on the west side of the Dick rhyolite within a quartz-sericite-schist horizon separating andesite of the Bridle formation from the overlying younger rhyolite. Production from the Pinafore was limited to a few thousand tons at most.

Economically these deposits are not particularly impressive. The Old Dick produced about 700,000 tons of 3.6% copper and 10.6% zinc; the Copper Queen produced about 200,000 tons of 3.7% copper and 14.4% zinc; the Bruce produced 823,000 tons of 3.65% copper and 12.7% zinc, as of July 3, 1977, when the mine was closed because of depressed metal prices; the Copper