



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

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INTER-OFFICE MEMORANDUM

To John Sandy
Tucson, Arizona

DATE June 26, 1972

FROM John E. Kinnison JK
AT Tucson, Arizona

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SUBJECT Copper Butte, Northern Tortilla
Mountains, Pinal County, Arizona

The Copper Butte property consists of copper oxides in the Tertiary Whitetail conglomerate, about three miles southwest of the porphyry copper deposit at Ray, Arizona. The source of the copper in this conglomerate has long been the subject of speculation. Various theories have been proposed--but very little has been published on the deposit.

I hold no opinion with regard to the deposit, and I fear that previous opinions--verbally expressed to me at different times in the past--are based perhaps on somewhat hasty observations. My first-hand knowledge is negligible--amounting to at most an hour or so in 1951. I would like for you to undertake a study of the deposit to determine if a previously unrecognized porphyry copper source can be interpreted for this deposit at Copper Butte, and the possible location of such an undiscovered deposit.

Attached is a Xerox of an old Bureau of Mines report on drilling done during World War II on Copper Butte. This was one of many such projects which the government sponsored hoping to locate additional copper resources for the War effort. A man by the name of Mitchell at that time held the property, and had been shipping from open pits to the smelter owned by Asarco at Hayden, for which he was paid a silica-flux bonus in addition to the copper values. Mitchell has operated the property off and on and may still be shipping flux. The deposit, and the vicinity have, at various times, been held by other companies for the purpose of exploration. I do not know whether legal access can be had to Copper Butte and the surrounding territory at this time. The land position will of course influence whether or not you can make a study of the deposit.

Several theories have been advanced:

1. The deposit is entirely an alluvial placer. I have seen rounded boulders which were mineralized with vuggy quartz and manganese, and have seen what appeared to be rounded boulders of essentially pure chalcocite. Most of the copper, as oxides, occur in rock fragments. Presumably, the oxide copper could also exist as small placer grains. If the source is entirely placer, a study of the white-tail conglomerate to determine its point of origin in the area would be the proper way to go. I feel certain that I recall copper stringers, and other suggestions of copper oxides absorbed in the clay, which suggests that at those particular points, the copper has been transported. The question which must be raised is--was it transported and redistributed entirely from placer-derived sources within the deposit itself?

2. Assuming that the deposit is in part placer-derived, it may in addition to having suffered some redistribution since deposition, also

be the site of exotic copper transported by surface or ground water.

3. The deposit could be almost entirely derived from exotic copper transported by ground or surface water, and I suppose I tend to slightly favor this possibility simply on the statistical basis that elsewhere porphyry copper deposits have frequently provided copper solutions which deposited their load in gravel or other rock near the source. Probably a maximum working distance from the original deposit is about four miles. The distance is limited on theoretical grounds, as well as observed occurrences.

If my memory regarding the chalcocite boulders is shown to be correct, certainly some placer-derived material must probably be admitted. The conditions required for precipitation of chalcocite does not seem to be met in the ordinary down-slope acid-water drainage from porphyry copper deposits. All of the observed occurrences are as chrysocolla, malachite, or other green copper minerals absorbed onto clay. Black chrysocolla is a common constituent of such deposits, as well as manganese and iron oxides.

DISCUSSION

If the deposit is principally placer derived, and should the conglomerate show derivation from the northeast, the Ray deposit which is about three miles to the northeast may be the obvious source. If the deposit is found to be exotic, the Ray deposit may still be the obvious source. However, a rather thorough study on the situation might indicate a possible derivation--by whatever mechanism from some other source which is now concealed either beneath Whitetail conglomerate or volcanics.

At least two old churn drill holes were sunk on a group of claims known as the Jim group west of Copper Butte. At least one of these penetrated highly iron-stained leached capping overlying disseminated pyrite in schist. These churn drill holes were sunk in the middle fifties, and since that time there may have been other drilling programs of which I am not aware.

The actual conduct of this study will revolve around two points: 1. the origin of the copper at Copper Butte--whether placer or exotic, and if exotic whether syngenetic or epigenetic; 2. the source of the copper, and whether or not the Ray deposit is in fact the most likely source.

Recent 7½ minute topographic quadrangles are available, and the immediate area is covered by the teapot mountain quad. Access is probably up Walnut Creek from the highway north of Ray.

John E. Kinnison
Tucson, Arizona

August 3, 1972

John Sandy
Tucson, Arizona

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Copper Butte, Northern Tortilla
Mountains, Pinal County, Recon-
naissance

Following your instructions regarding Copper Butte (memo June 26, 1972), I visited this area on two occasions between July 10 and July 18, 1972. Both visits were made under difficult circumstances since Copper Butte itself and the surrounding area are being actively explored by Kennecott and Quintana. There were survey and drill crews using the only road into the area and there are "no-trespassing" signs, and chained and locked roads leading to Copper Butte. However, I did manage to see the Copper Butte prospect late one afternoon after the work crews had left for the day.

The deposit occurs in a fault block of grey-brown conglomerate bounded on the east and west by a heavily iron-stained conglomerate. Most of the large fragments in the conglomerate are grey shale which are frequently copper-stained. Other fragments are schist and light-colored porphyry. The conglomerate is fairly well cemented with a fine clay-sand. Eastward-dipping stratification appears to have channeled the mineralization to some degree. Abundant copper oxides occur near the top and up-dip segments of the conglomerate suggesting supergene deposition. Except for copper mineralization along shears, copper becomes rather scarce below the upper portions of the conglomerate which is exposed in small open pits.

The source of the copper is unknown, but it was probably transported in alluvium to a position overlying the conglomerate and then leached to form a supergene deposit. Some fragments look like they were cupriferous before transport, however, and may be pieces that formed the conglomerate. It has been suggested that the conglomerate which is part of the Whitetail conglomerate, is normally too tight (little porosity and permeability) for leaching processes. This does not seem to be the case at Copper Butte.

Since the Copper Butte area (including the possible source areas of the copper within a few miles' distance) appears to be under claim at the present time, it is recommended that no further work be done on the area.

JS/bl