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02/12/92

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: CEDAR SPRINGS

ALTERNATE NAMES:

GRAHAM COUNTY MILS NUMBER: 296

LOCATION: TOWNSHIP 8 S RANGE 21 E SECTION 25 QUARTER C
LATITUDE: N 32DEG 42MIN 33SEC LONGITUDE: W 110DEG 09MIN 10SEC
TOPO MAP NAME: EUREKA RANCH - 7.5 MIN

CURRENT STATUS: PRODUCER

COMMODITY:
COPPER

BIBLIOGRAPHY:
ADMMR CEDAR SPRINGS FILE

CEDAR SPRINGS

5/85

GRAHAM COUNTY
T7-9S R21-22E

MILS Index # 296

BEAR CREEK MINING COMPANY
1714 West Grant Road
Tucson, Arizona 85705

M E M O R A N D U M

TO: D.M. Snyder June 4, 1973
FROM: M.M. Swan and J.D. Chakarun
SUBJECT: THE CEDAR SPRINGS-LINDSEY CANYON AREA (006-21-0820)
GRAHAM COUNTY, ARIZONA

INTRODUCTION

The Cedar Springs-Lindsey Canyon area is located on the northwest flank of the Pinaleno Mountains, Graham County, Arizona. It is a porphyry target area that was generated by the Southwest Structural Study and further defined by a reconnaissance of the area made from May 16-19, 1973.

CONCLUSIONS AND RECOMMENDATIONS

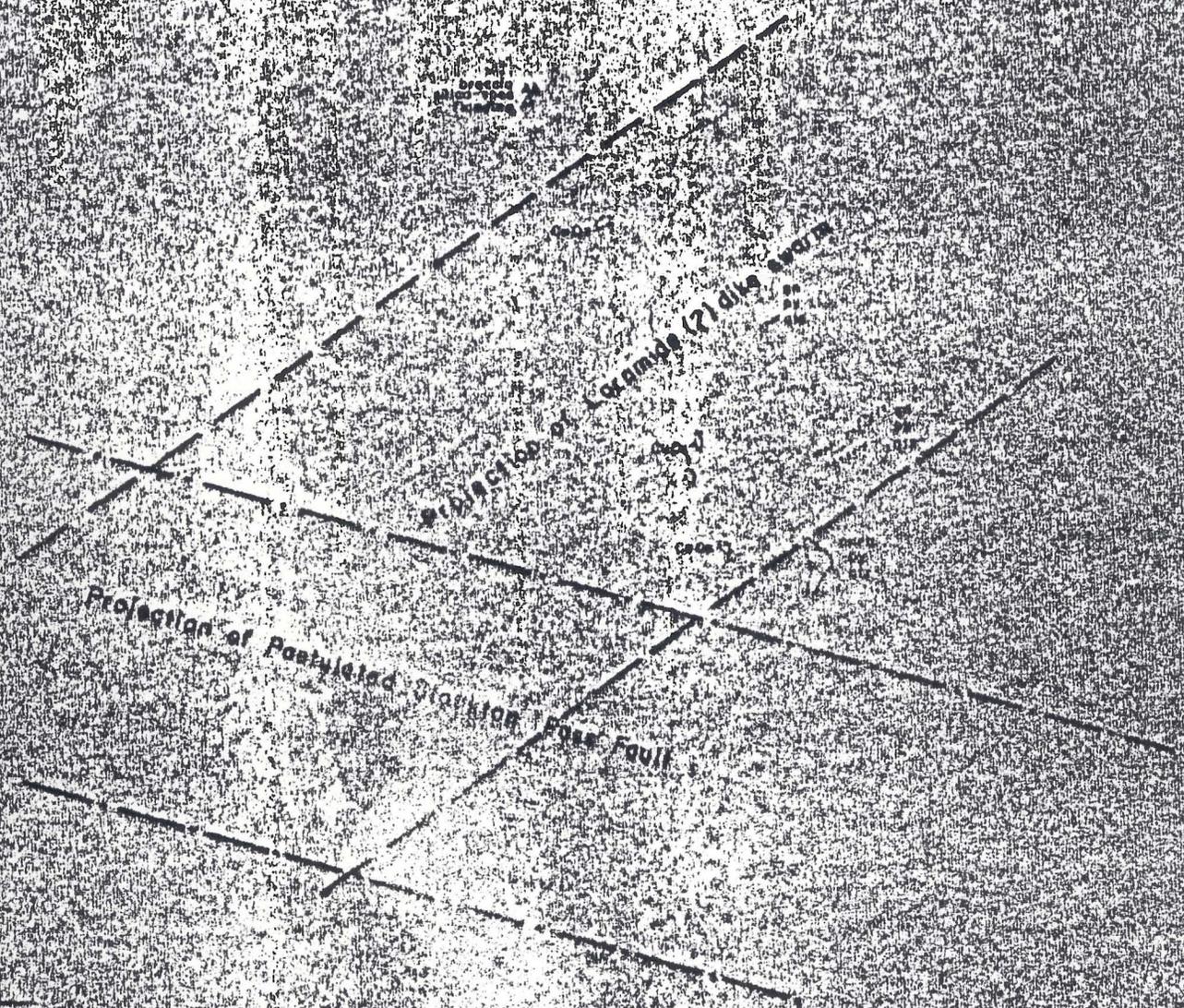
A favorable porphyry-type target area exists in the Cedar Springs-Lindsey Canyon area. The target lies under an estimated 500 to 2,000 feet of thrust-faulted Tertiary volcanic and on-lapping Quaternary gravel cover.

The projected intersection of a northeast-trending Laramide(?) dike swarm and a strong west-northwest-trending basement break defines the target. Base metal sulfide veining is associated with the dikes. Pervasive copper oxide mineralization is spatially related to the thrust fault suggesting remobilization of the copper from a source area to the southwest.

Although BCMC has filed applications for prospecting permits in much of the related area, the direct area of interest is now being investigated by Cities Service. It is suggested that RIP be carried out when this property becomes available.

ROCK TYPES

Precambrian basement rocks, Laramide(?) porphyry dikes, and Tertiary(?) volcanic rocks crop out in the area. The Precambrian basement is made up of a coarse grained granite which is locally gradational into a coarse grained granite gneiss. Medium grained granite gneiss and schist occur in



EXPLANATION

- Pervasively mineralized zone
- Vein
- Outline of dike swarm
- Outline of fault zone

BONE TUCOON OFFICE
 STRUCTURAL AND MINERALIZATION
 OVERLAY MAP
 CEDAR SPRINGS -
 LINSEY CANYON AREA
 GRAHAM COUNTY, ARIZONA
 608 - 21 - 0870

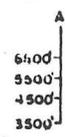
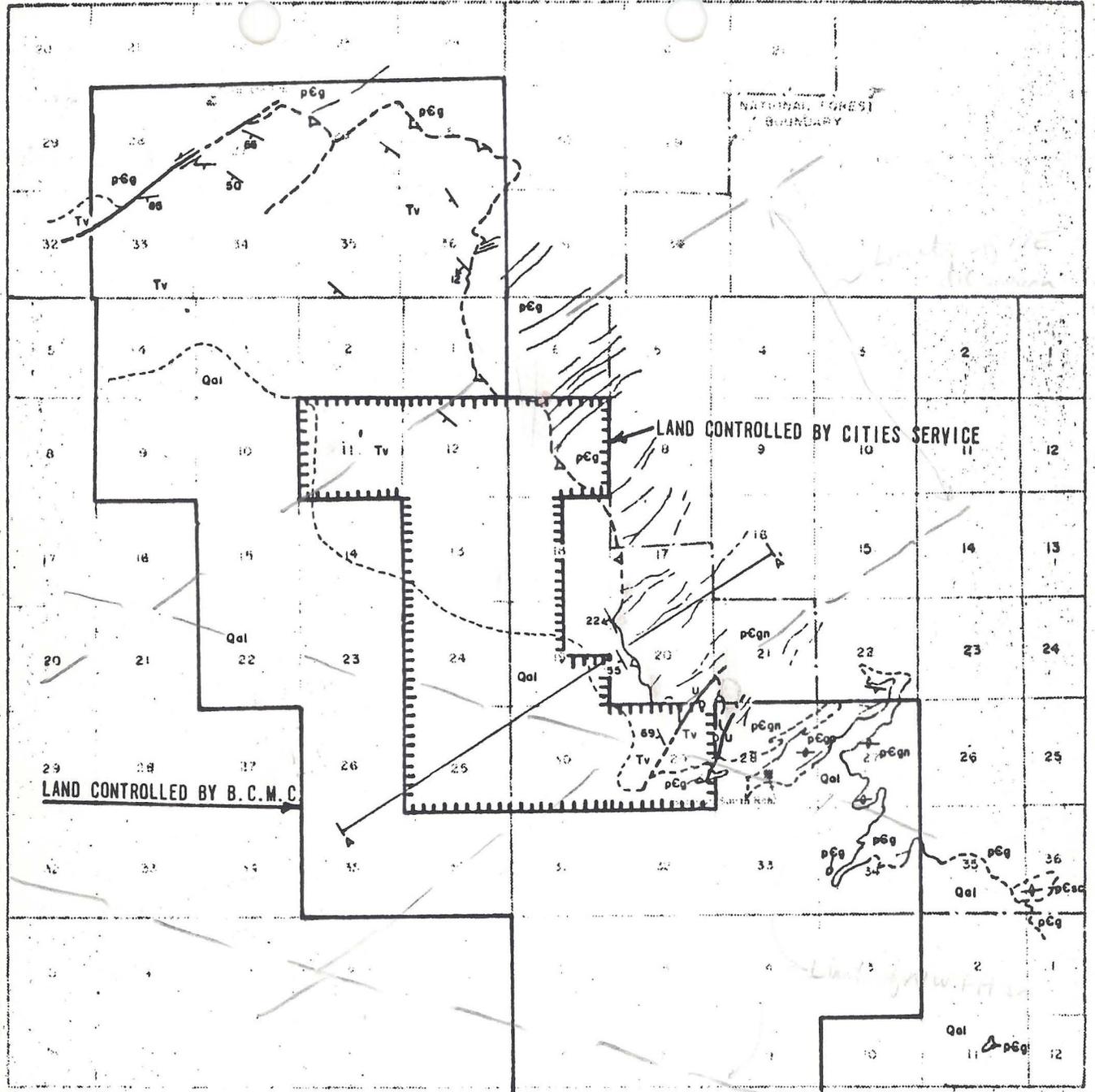
R21 E

R22 E

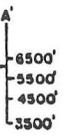
T 7 S

T 8 S

T 9 S



LOOKING N.W.



EXPLANATION

- Qal Recent alluvium
- Tv Tertiary (?) volcanics
- TKd Laramide (?), rhyolite porphyry, qtz. latite porphyry, and andesite porphyry dikes
- pCgn Precambrian gneiss
- pCg Precambrian granite
- pEsc Precambrian schist

SYMBOLS

- Fault plane strike and dip
- Bedding strike and dip
- Foliation
- High angle fault
- Low angle fault



BCMC TUCSON OFFICE
GEOLOGIC MAP
 CEDAR SPRING -
 LINDSEY CANYON AREA
 GRAHAM COUNTY, ARIZONA

006 - 21 - 0820

Data by M.M. Swan, J.D. CHAKRUN May 1973

lesser amounts. In order of abundance Laramide(?) rhyolite porphyry, quartz latite porphyry, and andesite porphyry dikes intrude the Precambrian rocks. Tertiary(?) volcanic rocks which crop out in the area include purple andesitic flow breccia, agglomerate and volcanic sediments. Large blocks of lower Paleozoic(?) quartzite are abundant in the agglomerate. The base of the volcanic section appears to be toward the northeast where the andesite flow breccia is dominant.

STRUCTURE

The structure of the area is characterized by a northeast Precambrian foliation trend, a northeast Laramide(?) dike swarm, and a Tertiary(?) low angle fault.

The northeast foliation trend is the predominant trend in the area and is probably the regional trend as well. An anomalous west-northwest foliation trend occurs in the southern part of the area along the projected strike of the postulated west-northwest Stockton Pass strike-slip fault zone. A Laramide(?) dike swarm is intruded parallel to the northeast-trend and widens toward the southwest to three to four miles where it disappears under the Tv.

The Tertiary(?) low angle fault forms the contact between the Tv and the underlying Precambrian basement. The fault zone varies from a silica--specularite flooded breccia to a mylonite-gouge zone, strikes northwest, dips 10-20° to the west, and displays poorly developed N60E trending - southwest plunging mullion. N60E trending high angle tear (?) faults apparently displace this contact laterally, and just south of Ferguson Ranch drag the Tv in a position parallel to the fault. Vertical movement along northeast-trending faults also occurred and can be seen just north of Shotgun Smith's Ranch where a well developed graben is present. Both Tv and Precambrian rocks are cut by the faults.

The first Basin and Range fault to significantly drop the pediment occurs about two miles west of the Tv-Precambrian basement contact.

MINERALIZATION TYPES

Nearly all of the mineralization is located along the Tv/p6g contact. Specularite and quartz-specularite veining is confined to the Precambrian granite and extends discontinuously along the entire length of the contact. Where the northeast-trending felsite dike swarm meets the Tv/p6g contact chrysocolla

and malachite have permeated and replaced the Precambrian granite. Exposures of mineralized rock as large as 300 x 400 feet were found (Figure 1). The Precambrian granite is kaolinized and locally serpentized, but carries only trace amounts of pyrite. Mn oxides have mottled the rock to a color index of about 20. Fracture coatings of hematite are rare and probably originated as specularite. The rock is highly magnetic.

Abundant small prospects are located on quartz veins that parallel the dikes in the southern part of the dike swarm. The veins are generally less than two feet wide and are not lengthy in comparison to the dikes (Figure 1). The most abundant sulfide minerals are pyrite and galena, but trace amounts of chalcopyrite are also present.

Late barite veins are prominent in both the T_v and Precambrian granite. They trend northwest, perpendicular to the trend of the quartz-sulfide veins.

A bleached zone of Precambrian granite 500 x 1,500 feet is present at the northeast end of the graben near Shotgun Smith's Ranch. Disseminated pyrite comprises about 0.5% by volume, and ferruginous calcite and jasperoid veining is prominent cutting both basement and volcanic rocks.

STRUCTURAL INTERPRETATION

The Southwest Structural Study has shown us that Laramide stock emplacement was tectonically controlled and that generally the porphyries in the southwest have similar structural settings. Based on this concept the Cedar Springs-Lindsey Canyon area is structurally favorable for porphyry type mineralization.

The postulated Stockton Pass fault which projects into the area and the northeast-trending dike swarm which "tails off" to the northeast are both characteristic structures of the porphyries. The stocks at Bagdad and Morenci both "tail off" to the northeast into a dike swarm and were probably emplaced as a result of movement along the large west-northwest fault zones which cut through both areas. The target generated from this model would lie under the volcanic cover which is faulted over the basement rocks. This low angle fault is best interpreted at this time as a thrust fault with a N60E direction of movement. Porphyry mineralization, if it does exist, would be located greater than one-half mile southwest of the volcanic-basement

contact, on trend with the dike swarm. Post mineral cover in the target area would vary in thickness from 500 - 2,000 feet.

MINERALIZATION INTERPRETATION

Similar copper oxide mineralization is present in many places in Arizona where hot ground water has apparently migrated under volcanic cover and scavenged copper from the basement rocks. In the Cedar Springs-Lindsey Canyon area, however, Tertiary volcanic rocks and the Precambrian granite are in fault contact, not flow contact, and the fault lies nowhere near the old flow surface (Figure 1).

The close spatial relationship of quartz-specularite and copper oxides at the Tv/p6g fault contact is suggestive that the fault zone was the avenue of migration for mineralizing solutions. The additional close association of the dike swarm and the copper mineralization suggests that the copper migrated preferentially along the dikes -- the brittle dikes may have been better mineralization channels than the Precambrian granite. Also, the exposed quartz-galena-pyrite veins that parallel the dikes may give way to copper-quartz veining or even to a porphyry sulfide system to the southwest under the Tv.


M. M. Swan


J. D. Chakarun