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PRINTED: 06-20-2006

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: BULLARD

ALTERNATE NAMES:
LITTLE GIANT

YAVAPAI COUNTY MILS NUMBER: 109

LOCATION: TOWNSHIP 8 N RANGE 10 W SECTION 11 QUARTER N2
LATITUDE: N 34DEG 03MIN 57SEC LONGITUDE: W 113DEG 16MIN 23SEC
TOPO MAP NAME: SMITH PEAK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER OXIDE
COPPER SULFIDE
SILVER
GOLD
SILICON
CALCIUM CALCITE

BIBLIOGRAPHY:
MAPS - FLAT STORAGE, 2ND DRAWER
ADMMR BULLARD MINE FILE & COLVO FILE
ADMMR INDEPENDENCE FILE
BLM MINING DISTRICT SHEET 341
USBM WAR MINERAL REPORT 1945 REPORT 453
CLAIMS ALSO IN SEC 1, 2, 3, 10 & 12
FOWLER, GEORGE M (EAGLE PITCHER) GEO FILE
TOVOTE, W. 1918 "CUNNINGHAM PASS", GEO FILE
AGSU OFR 92-1, MINERAL DEP. BULLARD MINERAL
DIST. . . ., 1992, SPENCER, J. AND REYNOLDS

VIS6.23

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

NOTE FROM FIELD VISIT

1. Information from: **Field Visit by Nyal Niemuth and Ken Phillips**
2. Phone:
3. Mine: **Bullard**
4. ADMMR Mine File: **Bullard**
5. County: **Yavapai** MILS Number: **109**
6. Summary of information received, comments, etc.:

A stockpile of material measuring 50′ x 50′ x 3.5′ had been built on a flat area to be northeast of the Bullard Mine workings. There was no evidence of the material having been leached, nor was it on a liner.

Date: **Feb. 1990** Engineer: **Ken A. Phillips**

BULLARD MINE YAVAPAI COUNTY

RRB WR 10/1/82: Mr. Kenny Olson, 708 Main St., Superior, AZ was in to look at the Bullard Mine file, Yavapai County. The following information is from him. He bought the Bullard group from the Willis estate, sold them to Contract Mining Corporation of Yuma who sold them to a Canadian group. The Little Giant Group was willed to a church. Olson bought them and now owns them in partnership with Loraine Turbert, 16638 N. Lake Forest Drive, Sun City, Arizona 974-2992. Carol Lowery has no interest in the Little Giant. Raymond Shannon of CEC from Tucson is now evaluating them.

RRB WR 5/27/83: Mike Sansone who owns claims surrounding the Bullard Mine, Yavapai County, reports that he is discussing the possibility of selling his claims to the owner of the Bullard. He reports that the owner is NRG Resources Ltd. K. C. Delise, 9043 Harmony Grove Road, Escondido, CAlifornia 92025, phone 743-8921. John Rud of Yuma is NRG's consultant. Mr. Sansone said that he is still getting lease payments from Unity Mining on his claims.

NJN WR 8/19/85: Mike Sansome (c) called and reported that he has interested St. Joe Minerals in his claims in the Bullard Mine (f) area, Yavapai County and believes they may sign a lease on the property.

RRB WR 7/5/85: Mike Sansone reports that St. Joe Minerals has optioned his ACM group of claims surrounding the Bullard Mine (f) Yavapai County.

NJN WR 8/16/85: Ken Mattison brought in a report on the ACM Group (c) Bullard MIne file, Yavapai County on behalf of Mike Sansome. The mine report indicates that NRG Resources Ltd (c) have a new mill in Sec 2 of the property. The ACM Group is for sale or lease.

RRB WR 8/15/86: Discussed Can-Ex property (El Tigre, etc) south of Aguila with Wayne Fierend and Jim Siebert. Also discussed the Bullard and Sansome's claims north of Aguila. They are trying to put together some deals in the area.

Mrs. Murphy, geologist, said that Messrs. Parr and Moore were living on or near the old Bullard copper property north of Aguila and were gathering chrysocolla for sale to rock shops and jewelry makers. GW WR 10/18/76

Mr. Donnerstag, Division Mines Inc., Denver, came in to discuss activities at the old Bullard mine north of Aguila. Mrs. Murphy, geologist for the BLM, had recently reported that some religious sect had bought the patented claims to recovery gem chrysocolla. She also said John Moore and Gene Parrs had staked claims adjacent to the patents. GW WR 10/22/76

See: Dept. of Interior, Bureau of Mines, War Minerals Report, #453, (Nov. 1942), 5 pages, 5/3/77 ap

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CJH WR 2/13/80: John Rud, Consultant, Contract Mining Corp., 1965 Athens Avenue, Yuma, Arizona 85364, phone 782-9976. With Fred Murphy, mine contractor (Yuma, Arizona) he is operating the Bullard Mine, 11½ miles north of Aguila. Is now shipping silica (with oxide Cu and some precious metals) at the rate of 20 tpd to Hayden, with hopes of increasing to 100 tpd. They are mining a lower vein beneath and parallel to a mined out vein. (See CJH Field Engineer's Report 12-7-78). Vein is reportedly 4' - 20' wide. Equipment includes a compressor, jacklegs, slushers.
Can no custom milling for Pb, Ag and fluorspar.

AWB WR 8/29/80: Mike Sansome called for Mineral Regulations. He has an interest in the Bullard Mine. He would like some help at the mine.

CJH WR 11/13/81: Visitor: Carol Lowery, P.O. Box 3158, Globe, AZ 85501. She reported that the Bullard Mine (Pierce district, Yavapai County) was sold by Orangewood Farms to Arizona Contract Mining Co. in Yuma.

RRB WR 11/13/81: Al Foote was in to look at Bullard Mine for Jerry Walters, Advance Welding and Manufacturing, 4235 W. Clarendon, Phoenix, AZ 85019, 272-9386. He reports that Mr. Walters wants to operate a small mine to satisfy a lifelong dream and that he may be interested in the Bullard Mine north of Aguila.

KAP WR 2/2/82: Alfred Foote has been prospecting in the area of the Bullard Mine. He reported the majority of the nine sections surrounding the Bullard are under claim by a Michael C. Sansome, Box 111 Salome, Arizona. The claims are the ACM Group of 97 claims in Sections 1,3,2,10,12,13,14, and 15, T8N R10W. Assessment work for 1981 was done by David Roe of Aguila for Realty Investment Co. of Missouri.

BULLARD MINE

YAVAPAI COUNTY

Mr. Christofferson stated that Mr. Harold Fenix of Wickenburg recently did some drilling at the above mine but he does not know the results and apparently they have ceased work. Robert F. Playter - 10-10-67

Interviewed Mrs. Matthews re Bullard Mine - Harold Fenix and associates have dropped their option on the property. FTJ WR 10-20-67

Interview with Mrs. Matthews re Bullard Mine - Fenix and associates have dropped their option. Robert Camp of Prescott is now the agent for Mrs. Matthews, et al. FTJ 10-23-67

T. D. Rice, Jr., Baptist Foundation of Arizona, Baptist Building, 316 W. McDowell, Phoenix 85003 - visited office to view the Bullard Mine file. He stated that his church was being given part of the Bullard Mine through trust. 12-1968

Active Mine List - April 1969 - 5 men - Norman Hatcher in charge. PMC, 1805 W. Latham

Mr. Don Anderson thinks favorably of the prospects for the Bullard mine due north of Aguila near the eastern end of the Harcuvar Mountains. FPK WR 6-4-69

PMC are buying the Bullard Mine. FTJ WR 10-17-69

Unice B. Matthews is the principal owner as per article in Parker Pioneer 10-9-69. Article is in the PMC file.

I briefly visited the Bullard property about 9 miles north of Aguila. There were signs that the property had been frequently visited from the many tire tracks, but I saw no exploration nor mining activity while I was there. REL WR 11/8/73

Mr. McDonald for information relating to Little Giant and Bullard mine for possible sale; apparently to settle the estate. Suggested he contact exploration companies; gave him directory. FTJ WR 12/16/74

BULLARD MINE

YAVAPAI COUNTY

Conference with Hans Christofferson - Aguila

Mr. Christofferson had a claim map of the Bullard Mine that showed 70 claims that he said were owned by Mrs. Charles Matthews, Congress. He also stated that Mrs. Matthews had reportedly optioned the claims to J. C. Gallagher and R. M. King. Hans did not have the addresses of the latter. A letter will be written to Mrs. Matthews later. Memo LAS 6-22-65

Mr. Ken Dunham, 2235 W. Minnezona, Phoenix, visited office re Bullard Mine. He is investigating possibilities of a lease. FTJ WR 12-10-65

Conference with Hans Christerofferson who has part of the mine area leased at Aguila

The claim maps include 29 patented and 35 unpatented claims. These cover the south half of Secs. 1-3 and north half of Sec. 10-12, T8N, R9W. Patented claims largely lie along the line between the two tiers of claims. They include: Stonewall, Correction, State, Sweepstake, Democrate, Las Bien, Arizona, Avalanche, Washington, International, Rattle, Homestake, North Star, Emily, Stella, Producer, Blue Jay, New Born, Napoleon, Nevada, Butte, Venice, Hawtence, Chancellor, South Wing, Sulla, Agustus, North Extension, Amezon, according to Hans Christofferson, the property still has the ruins of an old smelter reported to have been worked in the 1870's. Christofferson leased the Newell, Crystal, Asonto, Berry, Emily, Correction and Anaconda and laid out a few.

The ore zone lies in a hill and the ore bed dips southeast through the hill. Developed by several tunnels and short shafts, and two deeper ones.

Mrs. Charles Matthews, Congress Junction, and others hold the claims.
LAS Memo 2-8-66

Visited friend of Mrs. Charles Matthews, Congress, for information re Bullard Mine. The property is held in the estate pending probate action. FTJ WR 2-18-66

Reportedly owned by Mrs. Unice Matthews. LP 3-2-67

Reported operating April 1967. LP

Interview with Mrs. Matthews at Congress re Bullard Mine which has been optioned to Mr. Harold Fenix of Wickenburg. FTJ WR 5-6-67

Conference with Hans Christofferson at Aguila

Christofferson said that Harold Fenix had leased the claims held by Mrs. Charles Matthews of Congress. Fenix shipped one car earlier in the year and is said to be developing. Fenix lives at Western Gardens, Apt. 1, Wickenburg. Memo LAS 6-13-67

RESOURCE EXPLORATION

AND

DEVELOPMENT COMPANY

BULLARD PEAK PROPERTY
Yavapai County, Arizona
November, 1985

RESOURCE EXPLORATION AND DEVELOPMENT COMPANY
1755 E. Plumb Lane • Suite 118 • Reno, NV 89502

REDCO

BULLARD PEAK PROPERTY

Introduction

REDCO optioned the ACM claim group from Mike Sansone in September of 1985. The claim group consists of 166 unpatented lode claims surrounding the patented claims of the Bullard Mine. The claims are in Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, and 16 of T.8N., R.10W., and Sections 7 and 18 of T.8N., R.9W. Yavapai County, Arizona.

General Geology

The ACM claims encompass an area of pediment and small to moderate size hills immediately south of the Harcuvar Mountains. The Harcuvar Mountains and much of the pediment area are composed of a Pre-Cambrian gneiss, granites, and hornfels complex.

The Pre-Cambrian is unconformably overlain by a series of Cretaceous to Tertiary andesites, andesite porphry, andesite agglomerates, and scorriaceous units. The andesites are normally purplish to brownish, with greenish units in the agglomerates. Contained within the andesites sequence are sandy, carbonate, and shaley units. Others have assigned a Paleozoic age to these units, but they appear to be wholey contained within the andesites as lenses and beds. Attitudes within the andesites vary greatly from area to area.

Mineralization on the ACM claims is restsricted to narrow (1" - 30"), shallow dipping (10° - 35°) shears carrying abundant copper carbonates and silicates. Although some shears can be traced for up to 1000 feet, mineralization occurs as lenses and

pods of varying sizes and thicknesses along the structures. The predominant structural direction (shears) is about N 65° - 70° E. A secondary direction of shearing is about N 30° W and is normally almost vertical. The N 30° W structures are normally small, short, and only mineralized near the N 65° - 70° E flatter structures.

An area of carbonate with what appears to be hot springs silica (chert) and calcite deposition was found southeast of the Broken Ladder area. The zone was up to 60' wide and trended about N 60° W.

A large zone of crushing and shearing was found in the Pre-Cambrian rocks in a large draw a mile west of Bullard Peak. The sheared area is several hundred feet wide and shows very weak alteration and iron staining.

Sampling

REDCO personnel spent several days sampling the ACM claims. In total, 49 samples were taken from numerous areas (see attached maps, sample descriptions, and assay results). The samples were twenty to thirty pounds apiece. The entire sample was crushed to -10 mesh before any splitting. The samples were fire assayed for gold at Chemex Labs in Vancouver.

The sampling program was designed to test the gold value of the narrow shear zones, to determine if mineralization disseminated into the hanging wall or footwall, and to determine if any larger structures carried gold values.

Results of Sampling

REDCO sampling verified the presence of gold in the narrow

copper carbonate/silicate rich shears. Gold was not found to disseminate into the hanging wall or footwall. The large sheared areas in the Pre-Cambrian rocks and in the volcanics did not carry gold. The hot springs (?) altered carbonate area was also barren of gold values.

The Broken Ladder, John Moore, and Unity areas were found to carry significant gold grades over very narrow thicknesses (1" - 20"). The sampling also indicates a wide variance of grades along strike of the mineralized structures. Twelve of the 49 samples had values > .1 opt Au; all were from the three areas listed above. Several of the samples had values in excess of .5 opt Au.

Conclusions and Recommendations

The primary interest in the ACM claims was to find an area with gold values spread over a much wider area than the small copper carbonate bearing shears. Although several larger shears were found and a hot springs area was found, they did not carry gold. The other possibility was dissemination of gold values into the volcanics as a halo around the small high grade shears. Dissemination also proved to be non-existent. Although the area has some of the characteristics of a detachment type structure, the large structures with mineralization were not found by REDCO.

Although the small low angle structures are high grade in some areas, the very restricted widths (1" - 30"), pod like nature, and large stripping burdens caused by Bullard Peak at the John Moore and Unity areas preclude any attempt to mine significant tonnage of the better grade material.

Chemex Labs Ltd.

Analytical Chemists • Geochemists • Registered Assayers

155 Glendale Ave. No.
Sparks, Nevad
U.S.A. 8943

Telephone:(702) 356-539

CERTIFICATE OF ASSAY

TO : REDCO

P.O. BOX 21088
RENO, NEVADA
89515

ATTN: MARK BEUTNER

** CERT. # : A8517434-001
INVOICE # : I8517434
DATE : 28-OCT-85
P.O. # :
BP

Sample description	Prep code	Au oz/T
PS-4001	207	0.024
PS-4002	207	0.007
PS-4003	207	0.002
PS-4004	207	0.001
PS-4005	207	0.009
PS-4006	207	0.001
PS-4007	207	<0.001
PS-4008	207	<0.001
PS-4009	207	<0.001
PS-4010	207	<0.001
PS-4011	207	0.001
PS-4012	207	0.212
PS-4013	207	0.082
PS-4014	207	0.114
PS-4015	207	0.013
PS-4016	207	0.002
PS-4017	207	<0.001
PS-4018	207	<0.001
PS-4019	207	<0.001
PS-4020	207	0.068
PS-4021	207	<0.001
PS-4022	207	0.040
PS-4023	207	0.708
PS-4024	207	0.010
PS-4025	207	0.776
PS-4026	207	0.272
PS-4027	207	<0.001
PS-4028	207	1.545
PS-4029	207	0.094
PS-4030	207	0.148
PS-4031	207	0.010
PS-4032	207	0.001
PS-4033	207	0.040
PS-4034	207	0.112
PS-4035	207	0.002
PS-4036	207	<0.001
PS-4037	207	<0.001
PS-4038	207	0.102
PS-4039	207	<0.001
PS-4040	207	0.473

CTA

Chemex Labs Ltd.

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155 Glendale Ave. No.
Sparks, Nevad
U.S.A. 8943

Telephone:(702) 356-539

CERTIFICATE OF ASSAY

TO : REDCO

P.O. BOX 21088
RENO, NEVADA
89515

ATTN: MARK BEUTNER

** CERT. # : A8517434-002
INVOICE # : I8517434
DATE : 28-OCT-85
P.O. # :
BP

Sample description	Prep code	Au oz/T
PS-4041	207	0.508
PS-4042	207	0.007
PS-4043	207	0.110
PS-4044	207	0.054
PS-4045	207	0.006
PS-4046	207	0.006
PS-4047	207	<0.001
PS-4048	207	0.001
PS-4049	207	<0.001

CTA

BULLARD PEAK

Sample Description

PS-4001; 12"-15" wide zone of Hematite, CuOx, Carb
moderate to strong SiO_2, cutting dark green fine grained
basic extrusive volcanics with Cal.,
weak to moderate halo surrounds CuOx, Carb area
2"-6" with pyrite casts and Hematite,
incline work slopes 70° reaching 50'-75' depth
some stoping visible from surface
post mineral shearing has imparted small offsets to zone (1'-2').

PS-4002; similar to 4001 in all respects
no access to workings.

PS-4003; 4"-6" up to 12" rapidly pinching with heavy
CuOx and Carb. with moderate Hem. clays
hosted by basic volcanics.

PS-4004; silicified outcrop with CuOx and Carb
and minor Hematite. roughly 5' x 25' with abundant
quartz veining. possible intersection of PS-4003
and N/S vein. N80W 55S hosted as above.

PS-4005; CuOx, Carb; Hem., strong Cal filling with fragments
3'-4' in width N70E-70SE; Qtz veining with open spaces
filling. hosted by volcanics, volcanic sediments.

PS-4006; green, red shattered host volcanics; footwall to PS-4005
abundant Cal, Hematite, Chlor nil SiO_2, Channel 8' long.

PS-4007; dark grey hangingwall to PS-4005 weak to nil
bx or shattering. abundant Cal; mod Hem, Chlor, Channel/grab
4' wide.

PS-4008; Channel/grab through volcanics with irregular
qtz/Cal veining. mod. bx/shattering weak-moderate
Hem, trace CuOx + Carb.
mod. SiO_2, strong Cal, weak/moderate.

PS-4009; 25' of channel/grab of fx'd/bx'd KT volcanics
with abundant Chlor, mod. Hem, moderate-strong Cal veins/veinlet
weak clay alteration, minor SiO_2.

PS-4010; 25' of channel/grab very abundant Chlor
with kink folds - approaching pC basement, weak Hem,
weak-moderate Cal vein/veinlets.

PS-4011; 30'-40' channel/grab very abund.-Chlor locally strong Cal veins/veinlets, well folded and broken, spotty CuOx, Carb. weak-moderate Hem, more Hem with /Cu, next outcrop to North (several 100') is p€ basement, locally fragmented with Chlor cements rare Qtz. pods.

PS-4012; 4013; 2 very similar ≈5' channels across Cal/Hem/CuOx, Carb zone. rocks are argillic altered (clays - variable SiO_2, variable Chlor.), strong FeOx and MnOx, heavily fx'd and poorly healed, ≈ trend N35E - 80NW jointing pervasive + parallel to zones; appears to be fault surface in SE and at shaft face?

PS-4014; channel across cat cut wall of highly bx'd and variable argillic altered volcanics. Abundant limonites with Hem>>goethite moderate MnOx. weak and spotty CuOx, Carbs, sparse pyrite casts.

PS-4015; channel across area of more intense clay, SiO_2 with moderate to strong bleaching, locally vuggy/gossan zone with Hematite clays, spotty CuOx, Carbs particularly in vuggy FeOx areas.

PS-4016; grab from stockpile adjacent to 25' shaft, exposed in shaft is a 2-4' wide zone of fx'd SiO_2 heavy FeOx, MnOx in highly altered volcanics, vesicular volcs - silicified - bx'd then rehealed with FeOx Hem>MnOx>Goe.

PS-4017; Cal/Siderite filled 4"-6" fault zone with surrounding bx'd volcanics, Cal/qtz/coarse quartz filling moderate Hematite staining, host is very broken up, angular weathering green/red rock.

PS-4018; area grab of bx'd filled volcs, at least 3 stages of fluid 1) layered Cal 2) micro crystaline quartz 3) coarse quartz FeOx/Hem strongest in rare CuOx Carbs. Cal/Qtz/Qtz filling accounts for 10-15% of rock.

PS-4019; as in 4018 but less SiO_2, rare CuOx, Carbs.

PS-4020

PS-4021; ftwall of mineralized zone; volc agglomerate mixed rounded clasts; Cal veinlets/veins; moderate Hem staining, rare CuOx, Carbs.

PS-4022; 12"-24" mineralized CuOx, Carbs; Hem, moderate to strong, sheared volcanic hosting.

PS-4023; 12" channel across/along Hem/Cu/Cal/ strong SiO_2 zone cut by several small post mineral faults.

PS-4024; 2' channel across Hem/Cu/Qtz/Cal zone included ≈8" of clay altered ft wll with Cu, Carbs.

PS-4025; 3' channel along Cu/Hem/Qtz zone 8"-12" wide SiO_2 moderate relative to other sample locations, otherwise similar.

PS-4026; channel in hgwall along post mineral shear? ≈5' long, abundant Chlor, Hem, minor Cal, shattered, but not healed.

PS-4027; Hem/clay shear between agglomerate zone no CuOx/Carbs.

PS-4028; channel grab 12" zone of Hem/CuOx, Carbs/Cal/SiO_2 mod-strg mineralization cuts in and out along the shear/fault basic volcs in ftwll/hgwll here.

PS-4029; grab from 1"-12" wide CuOx, Carbs/Hem/SiO_2 fault zone, andesitic ftwll, basaltic hgwll, highly irregular fault surface 40°-80° dip.

PS-4030; again Cu/Hem/SiO_2, ≈12" wide cut by post mineral shears.

PS-4031; 18"-30" channel through ore zone Cu/Hem/SiO_2 N50E, ≈45° SE shear/fault through basic volcanics.

PS-4032; 4' channel through hgwll material above PS-4031 Chlor/Hem, no CuOx, Carbs.

PS-4033; channel along 8"-6" wide ore zone, Cu/Hem/SiO_2 in volcanics, abundant remobilized Cal in rocks.

PS-4034; channel in Hem/Cu/SiO_2 with geothite, FeOx clay altered Chlor, Cal, Epidote in surrounding volcs. Cal veins/fault in blue on map. zone is pinched or cut by subparallel shear N70E 35SE.

PS-4035; volcanic agglomerate with qtz, filled shears, shears are 1"-3" wide highly irregular direction 10°-80° strike NW-NE, no pattern, weak silicification of volcs., particularly strg SiO_2 where shears are adjacent or intersect (2"-4" SiO_2 halo).

PS-4036; channel through pC shattered with slicks, FeOx, Chlor throughout, rare qtz and/or Cal veins/veinlets.

PS-4037; as above.

PS-4038; channel along Cu/Hem/SiO_2 zone 12"-18" wide, as usual rock is shattered and only poorly healed, locally stringers of mineralization (2"-4") extended up into the hgwll, but alteration/mineralization doesn't pervade the rock to any degree, mineralization not disseminated into the surrounding rock.

PS-4039; hgwall grab. local stringers of mineralization and alteration extend up into the hgwll, ftwll is relatively barren, Hem/Chlor dominate with Cal stringers minor Cu, SiO_2.

PS-4040; channel/grab from Cu/Hem/SiO_2 zone, some post mineral shearing and disturbance, ftwll not well exposed hgwll again has abundant Hem/Chlor shattered and unhealed, zone is only poorly healed.

PS-4041; grab/channel in stope, zone of Cu/Hem/SiO_2 ≈4" with 6"-10" of surrounding clay altered host, minor pyrite.

PS-4042; ftwll grab in stope area, minor Cu/Hem/SiO_2 in ftwll, dominantly Hem/Chlor 3-4' channel, shearing extends into ftwll more than mineralization.

PS-4043; grab of hgwll material from root, not a channel so this represents the best/closest to Cu/Hem/SiO_2 zone of hgwll material, stringer of mineralization included here.

PS-4044; grab of Cu/Hem/SiO_2 shear zone 20"-30" thick in this area, continues to be an irregular surface, but generally NW-WNW strike and 25°-35° NE dip in John Moore area.

PS-4045; hgwll grab above zone taken from 0"-3" above shattered unhealed Hem/Chlor altered.

PS-4046; ftwll grab below zone 0"-4" again shearing extends down into ftwll, but mineralization is not as extrusive Chlor/Hem only wk-mod.

PS-4047; high angle fault/vein banded barite/brown calcite with abundant brecciation and open space filling, very strong MnOx, totally different setting from Bullard Peak area.

PS-4048; as above 3'-5' wide bx'd, banded barite/Cal., well developed slickensides, mullions, indicate major dip, slip movement, hosted by volcanic sandstones.

PS-4049; 10'-15' zone of bx'd sandstone in a matrix of brown Cal/MnOx w minor barite about 70' length then terminates out to SE/NW, banding of barite/Cal started early was bx'd then fill was dominated by massive brown Cal.

AREA: BULLARD PEAK PROPERTY
AGUILA, ARIZONA

DATE: November, 1985

Owner: Mike Sansone

D. Strobel

SUBJECT: Gold Production Potential
(in order of descending likelyhood)

1. Mining/Recovery Method: Multiple-small open-pits @ heap leach/carbon recovery system

(Total) Tonnage: 75,000 to 100,000
Grade: (recovered) .10 to .15 OPT
Total Ounces: 7,500 to 15,000
Delineation Costs: $150,000 to $200,000
Capitalization/Pre-production Costs: $600,000 - $800,000
Total Cash Requirement: $750,000 - $1,000,000
Total Production Cost: $1.5m to 3.0m
Total Gross Gold Value: 2.5m to 5.0m (@$325 Au)

2. Mining/Recovery Method: Combination surface pit and underground @ heap leach/carbon recovery system.

(Total) Tonnage: 50,000 to 75,000
Grade: (recovered) .3 to .5 OPT
Total Ounces: 15,000 to 37,500
Delineation Costs: $250,000 to $300,000
Capitalization/Pre-production Costs: $1,000,000 - $1,500,000
Total Cash Requirement: $1.25m to 1.8m
Total Production Cost: $3.0m to $7.5
Total Gross Gold Value: $5.0m to $12.2m (@$325 Au)

3. Detachment-type (hidden) occurrence mined by either/or open-pit/underground.

Tonnage: 5MT - 10MT
Grade: .05 - .15 OPT
Total Ounces: 250,000 to 1,500,000
Total Gross Value: $81.25m to $487.5m (@$325.00 Au)

RESOURCE EXPLORATION

AND

DEVELOPMENT COMPANY

BULLARD PEAK PROPERTY
Yavapai County, Arizona
November, 1985

REDCO

P.O. Box 21088
Reno, Nevada 89515
(702) 329-0666

PAUL S. STROBEL

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RESOURCE EXPLORATION AND DEVELOPMENT COMPANY
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REDCO

4-21-67

To- FPK U.S.B.M.

This stuff is supposed to be classified, but anyone with a serious interest can read the report. It was signed by Harlow Phelps and Charles Kumke.

There was a War Minerals Report 453 published.

During 10 months of 1944, a little more than

5000 tons was shipped to the Hayden Smelter this ran 1.89 Cu and a liitle gold.

The report estimates a little more than 5000 tons of ore left.

GI

Wild Mine ?

Only know of Mame being operated by Calix — Tombstone Mines

GI

Hard

DATE: January 18, 1985

TO: Mr. F. J. Menzer, Chief Geologist

FROM: J. A. Waegli, Geologist

SUBJECT: Arizona Department of Mineral Resources
List of Flux Properties

In early October, 1984, Mr. John Robertson, Ore Buyer for Phelps Dodge Corporation, requested that the Arizona Department of Mineral Resources (ADMR) compile a list of properties in the state that could produce material grading +80% SiO_2 and +1/3 O/T Au. In response, Mr. Nyal Niemuth, Mineral Resources Specialist with the ADMR, compiled a list of 16 properties (attached) that he feels are capable of producing +70% SiO_2 with $100.00 metal credits. (He stated that he did not know of any mines capable of meeting Mr. Robertson's criteria.)

November 19-21 were spent in Phoenix examining ADMR files to obtain information on each of the mines. Mr. J. E. DuHamel of Western Exploration screened their files and compiled the resulting information in a memo dated November 27 (attached). Based on his memo, pertinent reports were copied from the Western Exploration files on December 3 and 4.

The following is a listing of these 16 properties arranged in order by quad number. A brief description of each property is given, with information on current activity and a summary of past work conducted by Phelps Dodge Corporation. Recommendations based on information compiled to date are also given. Table 1 summarizes information compiled in this report.

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1. BULLARD MINE (Figure 1): Yavapai County, T8N., R.10W., Sec. 11, AZ 242

This property apparently has a series of mineralized shear zones since various reports list the strike of mineralization as anywhere from N-S to N70°W. The main Bullard mine workings are on a N45°-75°W shear zone that dips 20°NE. Mineralization includes quartz, chrysocolla, malachite, pyrite, bornite, chalcopyrite, and hematite.

The property has had intermittent production. A 1942 War Production Board report states that the ore graded 3% Cu, 72% SiO_2, 0.065 O/T Au and 0.34 O/T Ag. No tonnage is given. A 1980 ADMR report states that the owners were shipping 20 tons of copper and precious metal-bearing silica flux per day to Hayden, but no grade is given.

The property was examined by A. E. Nevin of Western Exploration in 1967. No precious metal grades are given in his report.

Taking a composite of various reports, it appears that siliceous material from the mine can be expected to run less than 0.1 O/T Au, less than 1.0 O/T Ag, and +1.0% Cu. These grades, combined with an average vein width of 5 feet, and shallow dip, make the property unattractive at current metal prices. Further work does not appear warranted.

2. ALVARADO MINE (Figure 1): Yavapai County, T.10N., R.5W., Sec. 21, AZ 244N

This shallow-dipping, gold-quartz vein was sampled by M. R. Pawlowski, Morenci Branch geologist, in July, 1984. Because of low precious metal values, he concluded that the property is not of interest to the Small Mines Division.

3. CONGRESS MINE (Figure 1): Yavapai County, T.10N., R.6W., Sec. 23, AZ 244

The Congress Mine has exploited several shallow-dipping, gold-quartz veins that are typical of structures in the Congress and Octave districts.

The mine was examined by M. R. Pawlowski, Morenci Branch Geologist, in September, 1983 (see memo dated September 14, 1983). After reviewing drilling data generated by Magic Circle Energy Corporation (property owner), Mr. Pawlowski concluded that probable reserves in the New Niagra ore shoot are 210,000 tons grading 0.416 O/T Au. An exploration/mine development proposal was also formulated (see report dated December 5, 1983), which estimated that $1.7 million would be required for mine development by a 15% decline and 325-foot ventilation borehole.

Negotiations with Magic Circle proceeded into 1984, but the venture was deemed to be marginal on the basis of known reserves. Meanwhile, Magic Circle was negotiating with other companies and signed a joint venture agreement with Echo Bay Mines of Alberta, Canada in June, 1984. According to Engineering and Mining Journal (August, 1984), Echo Bay planned to spend $250,000 on drilling by the end of 1984. Additional expenditures of up to $7.2 million may be made by 1988 for Echo Bay to earn a 51% interest in the property.

Because of the current joint venture agreement between Magic Circle and Echo Bay, the property is not currently available for acquisition.

4. BISHOP (Figure 2): Yavapai County, T.9N., R.4W., Sec. 4, AZ 245

The Bishop is thought to be an eastern extension of the Octave vein. It strikes approximately east-west and dips 25°-35°N. The property has produced a small amount of gold ore.

11 GH
news

Director
Mineral Resource Department
Phoenix, Arizona

Dear Director:

Thank you for your help in researching Bullard Mine. Your files and staff gave me plenty of information to work with, and were very helpful. I have enclosed a copy of the article I wrote that was published in The Copper News on September 18. It should provide information to you and future researchers on Bullard Mine. It should also make their job easier.

Again, I thank you.

Samuel Collett
Public Information Specialist
Young Adult Conservation Corps

ROCKS TO RICHES , Dunning, 1959

BULLARD MINE, Wm. Allison and R. B. Van Buskirk, lessees, Aguila, Arizona.

This property is located 12 miles from the railroad over desert roads. Trucking costs $1.75 per ton.

The ore shipped has averaged 3% copper, 72% silica, .065 ozs. gold, and 0.34 ozs. silver. The smelter treatment rate is below normal, $1.75 per ton, due to the fluxing quality and the low grade of the ore.

The operation is marginal as costs are high. The vein averages 4 feet wide and is on a 25 degree dip. There were some 40,000 tons of probable ore developed as of October 1942. The operation is valuable for both the copper content and the fluxing properties of the ore. With price and priority help a 50 ton per day production rate could be maintained.

from COPPER REPORT NO. 2, DECEMBER 23, 1942, by Earl F. Hastings, for COPPER BRANCH, WAR PRODUCTION BOARD.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine: Bullard

Date: December 7, 1978

District: Pierce, Secs. 1, 2, 10, 11 T8N R10W
Yavapai County, Arizona

Engineer: Clifford J. Hicks

Subject: Current status and field visit

Note: Mine location is noted on Smith Peak 7.5' U.S.G.S. quadrangle.

Ownership: Mr. Ally Hing, P.O. Box A, Superior, Arizona 85273, phones: 689-2265 and 689-5563 (business), 689-5598 (home) is committed to purchase the 30 patented claims for $72,500, one-half down and placed in escrow, the remainder to be paid within one year. The present owners are the heirs of the Bullard estate who had the property returned to them when Orangewood Farms LTD. defaulted on their payments. The heirs are Messrs. John C. Willis, College Park, Maryland, Warren Willis of New Smyrna, Florida and a female heir, residing in Pennsylvania who is under a court order to sell her 6% holdings for 6% of the sale price. The heirs also settled with the Baptist Foundation.

Note: This information was derived from a conversation with Mr. Ken Olson, 708 Main Street, Superior, Arizona, phone: 689-2601. Mr. Olson is now working for Mr. Hing at a salary of $1200/month and 10% of the mining profits when realized. He is currently living in a house trailer on the New Born claim of the Bullard group. He owns the following equipment which is now being used on the property: Compressor-LeRoi 125; Slusher-Ingersoll Rand 7hp; Tractor (small, make unknown); Jackleg J-40 or 42 and ancillary hoses, etc.

Observations: In the company of Mr. Olson, drove twelve miles northwest from Aguila, Arizona to the Bullard Mine. The property is located in Yavapai County just north of the Maricopa County line and in the eastern foothills of the Harcovar Mountains. The unpaved road is probably intermittently passable by passenger car depending on weather as a number of washes must be crossed. We drove to Mr. Olson's house trailer which is on the New Born claim close to an old well which, according to Mr. Olson could offer considerable water. He said he had pumped it down some ten feet and it refilled in two hours.

We examined some claim maps and an ASARCO assay plan and cross-section which was brought to the office, reproduced and included in the Bullard Mine file. The original was returned.

Drove to a point on the north slope of the east flank of Bullard Peak about 80' below an entrance to old mine workings. (See attached topog-map copy - Point A). At this point Mr. Olson had two men slushing out a round blasted in a mineralized fracture zone striking roughly N-S and dipping 65° to the east. Mineralization is largely malachite and chrysocolla. Then proceeded

up slope to the entry to extensive tunneling and stoping in the southeast dipping bed (20° - 25°). Crawled through these workings which were 4' to 6' from foot to hanging wall. The mineralogy of this orebody is adequately described in other reports in the Bullard Mine file and the War Minerals report. Noted that the footwall was covered by a thick, dry layer of bat guano which may be marketable. Emerged on the south slope where an old ore bin and a dump were observed.

At a point 500' east on the south slope of the outcrop of the mineralized bed another stope broke through to surface and was entered. Approximately 25'x30'x6' (and, again, carpeted with bat guano) this working had been drilled (by jackleg) by Mr. Olson.

Fifteen to twenty holes fifteen feet deep were driven into the mineralized bed and the cuttings saved and sent to Inspiration Copper for assay. Mr. Hing reported that a composite assay of these holes contained the following: 0.36 oz. Ag, 0.01 oz. Au, 1.68% Cu, 79.0% SiO_2, 0.50% CaO and 5.0%Fe. It is debatable whether or not 0.50% CaO would be seriously detrimental to an acid leach. Mr. Hing stated that Inspiration Copper would purchase this rock as a flux for $12.00/ton if it maintained 1.5% Cu, was crushed to ½" and delivered to Miami, Arizona. He didn't think that was economic.

Mr. Olson left for Lake Havasu City in the afternoon, (December 7, 1978) to talk to a landscaping contractor who indicated interest in buying some of the rock as ornamental stone.

Mr. Olson has stated that if production was started, he would ship to ASARCO (El Paso). The highgrade would go by truck at $20-$25/ton. The lowgrade would be shipped by rail since the railroads rates are based on a sliding scale according to ore value.

The following operational optinns were offered to both Mr. Hing and Mr.Olson.

(1) Try to develop a market for the bat guano.

(2) Develop a market for the ornamental stone in place and in the dumps.

(3) Retain an engineer to explore acid leaching possibilities.

(4) "Chloride" or "poor boy" mine the mineralized areas in a selective manner.

(5) Consider harvesting the extensive stand of saguaros for sale to nurseries.

AL 4-0546

REG. ARIZONA

F. C. RAMSING, E.M.
CONSULTING GEOLOGIST and MINING ENGINEER
325 WEST CYPRESS STREET
PHOENIX, ARIZONA

April 27, 1967

BULLARD ?

A MINING REPORT OF A GROUP OF CLAIMS HELD BY POWDERED METALS CORPORATION

This mine is the property of the Powdered Metals Corporation of Phoenix, Arizona. It is located from about eight to fourteen miles north of Aguila, Arizona, in Townships 8&9 north, and Ranges 8 & 9 west, in a mountain range that is detached from the main Harcuvar Mountains and at an elevation of about 3,000 feet. The trend of this range is northwesterly to the Almo road, and lies wholly within the Harcuvar or Ellsworth Mining District.

My purpose was to examine geologically this extensive area of copper bearing minerals. Powdered Metals Corporation has discovered copper in many places that was hidden beneath the surface by erosion. Feeling they had a large open pit project they proceeded to locate many load claims for that purpose.

The geologic structure is as follows: This small range appears as an up-turned fault block from its southern flank, but to the left of the center of the range there is a late granitic intrusive rock that shows a definite arching effect of the formation on the north and the formations to the south which extends for the full length of the range, The rocks on the north are of the old pre-Cambrian granite-gneiss-schist complex. The schist occurs only in the western end of the range while the

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granite is easterly of it. The southern flank is composed of sedimentary and flows, originally superimposed on the complex, of sandstone and shales, then two flows of andesite, then a bed of limestone, and on which is another very cellular flow of andesite. The limestone was dated by the U.S.G.S. as Carboniferous in age, and the late intrusive by me as Laramide of the Tertiary age, from which most copper ores of the southwestern copper province originate.

At the point where the granitic cupola is exposed, the formations are upturned 75 degrees or close to vertical. This slope diminishes going eastward and westward but extends for the entire length of the range of eight miles. It is presumed that this socalled granitic chonolith, which furnished the solutions for this range, is at least 8 miles long and 1 mile wide. This would be the size of this ore-body if the drilling records indicate sufficient copper ore for that area.

A search was now made for veins. At least five or more old prospects are evident in this range, and there are two small but rich veins near the cupola, and the hanging wall of sandstone, referred to, is also mineralized definitely for a mile or more and perhaps for the entire eight miles. But the cupola itself is extensively mineralized with copper ore. I

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myself saw a good size area that was sampled and assayed which showed 1.8%, 23.50%, 29.85% copper and 1.3%, 3.9%, 26.9% iron. The ratio is about 1 to 1, or that obtained in Chalcopyrite, and means there is no extra pyrite to make sulfuric acid for leaching of copper downward. This is confirmed by stereoscopic analysis, that show no pyrite casts. In short, downward enrichment in this area is doubtful.

However, this does not detract from this property, for if the values continue for only 0.7 % copper average, then these values would start from the surface at 1.8 % and require no removal of overburden, such as is needed for leached ore bodies. Without leaching the values remain as disseminated originally. This process is promoted by the crackled appearance of this granitic rock, which allowed the solutions to rise upward through these cracks and eventually fill them, as is evident to anyone seeing the mineralized rock.

This intrusive is light in color but contains other light and dark colored dikes and wide areas, which is usual in mineralized areas. A 30 foot wide coarse porpyry dike also lies in this area. The main intrusive rock is medium grained and no flesh colored feldspar is present, therefore the latter is presumed to be plagioclase. The dark mineral if present has

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been replaced by ore and secondary silica. Some apparent sericite occurs but little if any kaolin. The latter indicates a lack of free sulfuric acid that breaks down the feldspar.

In conclusion:

1. This property contains an area about 8 X 1 miles that has the potential of a large open pit copper mine.

2. It is a prospect that has never been drilled for copper. And very little exploratory work has been done in this general area.

3. A preliminary drilling program requires at least three exploratory core holes, or captured dust from a rotary, reaching a depth of about 400 feet.

4. No large mining company would fail to drill this Laramide intrusive which shows copper over such a wide area, since the greatest distance between prospects is about eight miles; Or when it is so crackled and carries 1.8 % copper at the surface, and the actual chonolith is often wider than indicated by surface reconnaissance.

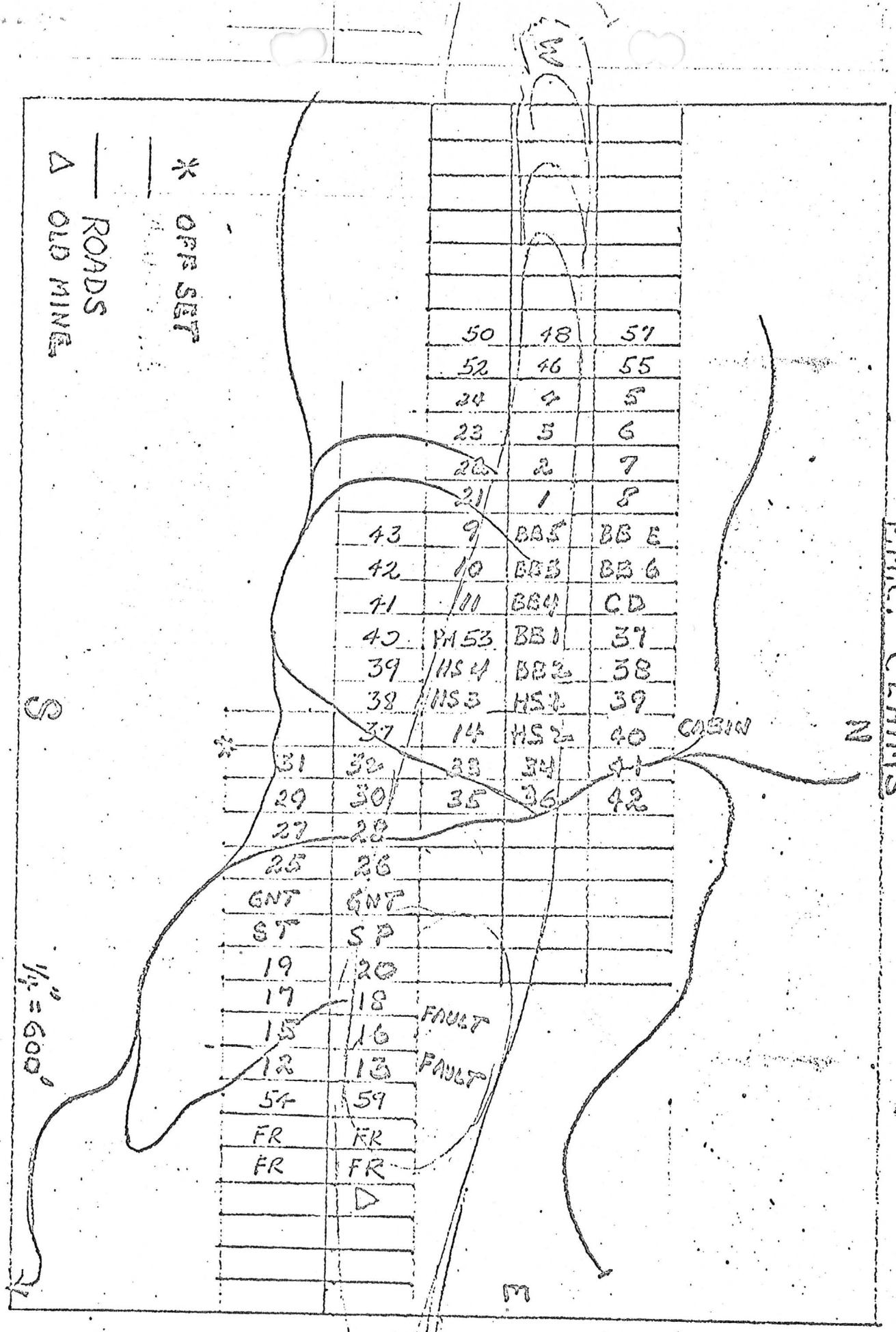
5. Random suface samples were taken and assays made. The assays are attached and evidenced by encirclement.

6. I would be very foolish not to recommend the prospective drilling of this property. Drilling has the answer, no one else.

F.C. Ramsing

April 27, 1967

REGISTERED MINING ENGINEER
CERTIFICATE EXPIRES
F. C.
RAMSING
DEC. 31, 1969
ARIZONA, U.S.A.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38 HS3 HS1 39
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AUXILIARY REPORT RE BULLARD'S MINE

YAVAPAI COUNTY, ARIZONA

This property is located about thirty miles west of Congress Junction, and is situated in a low range of hills which are more or less isolated from the main mass of mountains further west. The hills rise abruptly from the general base level of the surrounding desert plains and are rather bold in outline, with sharp upstanding out crops of rock. The general color is red to reddish black as against a rather white color predominating over the greater part of the desert wash.

The main mountain range to the west which culminated in Bullard's Peak is geologically of great age, and consists of the eroded remains of a complex of Archean schists with later Cambrian intrusives. I have not examined the main range personally, but take this data from the published geological data regarding Arizona. I did, however, examine the gravel in the various gulches which deploy from the main mountain range, and found fragments of granite, schists, hornblendeschist, gneiss, porphyry, and some metamorphic rocks difficult to identify.

The main motiff of the small group of hills in which the veins of the Bullard Mine occur, appear to be made up mainly of a very ancient series of clastics ranging from coarse well water-worn conglomerates, to fine grained red and white sandstones, deep red, red-brown to almost black being the

predominating colors of the outcrops. I found no fossils, and no means of correlating or identifying the age of those beds, but some of the fine grained sandstones were very similar to the red beds of Permian sandstones that I have seen in other localities.

Besides the rocks which could easily be identified in the field as conglomerates and sandstones, there are a number of zones which are difficult of identification,--these may be fine volcanic breccias, or superinduced clastics from crushing and movement; there are also some fine grained and well bedded rather massive rocks which from a field examination I might classify as quartzites, they are at any rate a highly silicious clastic that may be an altered indurated tuff or that may be sandstones altered by metamorphism to a fine grained, silicious rock practically a quartzite, I have termed this whole group meta-sandstones.

There are large areas of lava in many cases having amygdaloidal structure, and I noticed at or near the contacts that what appeared to be a sandstone also contained amygdaloids. This may be due to a contact metamorphic phenomena due to escaping steam and solutions impregnating the shattered zone in the sandstones. I have found direct evidence of this, in several cases in Central America, and would not be surprised if it proved to be the case here. Some of the lavas are very fine grained, and difficult to identify megascopically, and the blending and local contact metamorphism between the lavas and the clastics makes determination very difficult, but judging by the physical appearance and the structural

relationship and position of such clastic beds as could be identified, I should judge that the lava had come up as a sheeting between the beds of clastics, in some cases the lava has almost laccolithic proportions, in some places lifting and faulting the beds of clastics and making cross lines of effusion. It seems probable that the volcanic rocks were both intrusive and at some points extrusive so that phenomena common to both types are in evidence.

There is evidence on the northerly range of hills of bedded sandstones of a much later period lying uncomfortably on the earlier and partly eroded red beds. These later sandstones cannot be mistaken and they include pebbles of granite, gneiss, and other rock washed down from the high hills from the west and also well water-worn pebbles of the old red sandstones and fragments of the various extrusive lavas showing that they were laid down from relatively local material, in apparent recent periods. They are not as homogenous or compact as the earlier type of sandstones, neither are they as dark in color, but some of the veins cut through both the earlier and these later sandstones, showing that at least one late phase of mineralization was a great deal later than that of the intrusive and extrusive volcanic period referred to, and I am inclined to think that this later period was during the great volcanic outburst corresponding to the Tertiary epoch.

Since this last mineralizing period there has been profound erosion and pene-planation with a great accumulation of

local wash which has become cemented in the deeper gullies into a reddish colored agglomerate which completely obscures the continuity and relationship of the veins whenever their outcrops have a lower horizon than the level of this agglomerate.

During recent Quarternary times a considerable amount of desert wash has been brought down from the high mountains to the west, and has built out a fan blanket of light colored gravel and sub-angular material typical of the desert wash of Arizona; at the present period erosion is cutting gullies through both of these deposits, and at some points has exposed the remains of the underlying strata, at two of these points outcrops of veins have been noted and prospect shafts have been sunk, proving that there is continuity of the vein system under the blankets of desert wash. At one point marked "B" on my photographs a shaft which I judged to be over one hundred feet deep has been sunk, and from a small dump alongside of this shaft I took some samples, No. 10 and No. 11, - 10 being an average chippings taken from this dump and 11 being type samples. It is to be noted that some of these samples show very nice specimens of chalcocite.

It is to be noted that this point is nearly 1-½ miles south from a similar shaft sunk on an outcrop in a gulch and I have named this outcrop the north vein.

I understand a drilled well was put down to obtain water only a few hundred yards from where sample No. 10 was taken, and I am told (?) that they reached a depth of nearly 500 feet

and obtained water from 300 feet down; if this is true, that would place the water table of this district at about 300 feet below the base level of the desert wash. It is to be noted that besides the main vein known as the Bullar vein which outcrops in the central mass of hills (see photo No. 2) that there are a number of other veins and the possibility of many more which are obscured by the desert wash. It is further to be noted that quite a number of these veins have approximately the same general strike and direction of dip, although the angle of the dip varies. It is also to be noted that eight miles to the northeast there is a similar range of mountains of a greater extent. I have not visited these mountains but am told that similar sandstones and conglomerates are to be found there and their structural appearance shows evidence of well marked bedding planes having a general dip to the south and a sharp escarpment to the north. These mountains can be seen in the distance to the east in photo No. 2; they are also shown in photos which I sent in with my original report, and I understand that there are good ore prospects in these mountains.

I judge from the structure of the hills that many of the intrusive masses of volcanic rocks are later than some of the veins and that they have faulted and cut out whole sections, but some of the veins are later than the extrusive period and it is quite possible that the veins will be continuous as planket veins to a considerable depth, and that therefore there is the possibility of finding fairly extensive zones of secondary enrichment, probably chalcocite, at or about the water table, and that the possible value of this property should be based

upon the probability of finding such ores and not upon the amount of the present visible outcrop.

In view of the data given above I think it appears evident that the ores at present in evidence at the vein outcrops, do not represent an enrichment of copper, but may rather be classed as residual and leached remains of carbonate ores, a product of original massive suphides. In view of the relatively high copper content remaining, it would seem probable that the veins at depth within the sulphide zone would be quite high and although relatively small will be worth working in view of this fact.

It is also to be noted that the gold content is very general and the owners tell me that they have had individual assays as high as $1,000. and many assays as high as $80. to $100. in gold. I understand that the smelter returns of such ores as were shipped show an average of over $5.00 in gold, but as these ores were taken with a view of obtaining the highest copper content and not gold content, they eliminated the most silicious portions and those portions showing gossan or iron oxides, and that it is from those portions of the veins showing more iron oxides that the highest gold content was obtained.

Mr. Dick Bullard told me that they took a number of tons from all parts of the vein and attempted to make a test run with an arrastra and they obtained an average of $18. in gold. I believe this included the losses computed from assays of their tailings. However, I was given sufficient evidence to convince me that the average gold content is considerable and will form an important part of the total value of the property.

I would suggest that development should consist of sinking a vertical shaft out on the flat desert wash at some point where the main vein can be intersected at depth and to make exploration by drifting from this shaft. This, together with further development on those shafts which already exist should soon prove the existence or non-existence of a zone of secondary enrichment at or about the water table.

In making the last inspection of the mine I took note of the old smelter camp, as I consider this would be the logical point on which to develop a camp for exploration purposes. There is a good stone house which measures 27 feet inside each way. This is divided into four rooms; the interior wooden framing of the roof is in good condition; it was covered with an old shingle roof and above this (with an air space in between) a new galvanized iron roof has been put on, which makes it quite a good building. With some minor repairs and new doors and windows and the construction of a camp kitchen, this should make an excellent staff house for all purposes during preliminary investigation. The deep well near by could be cleaned out and would have to be equipped with a deep well pump and pumping head so as to develop the water supply for camp and lavatory purposes. The roads are almost impassable and would require an expenditure of probably $3,000. to $5,000. before regular traffic could be maintained for camp supplies. There is no equipment of any real value on the property and all machinery would have to be brought in, and in view of the general condition as outlined above, I do not see that it would be possible to undertake development of this

property on a sufficient scale to prove its merits for less than $50,000. and it would probably cost nearer $100,000. before final appraisement could be made; even this would only be sufficient to justify the purchase price which the owner puts at $500,000.

The total area within which these veins occur is roughly within a zone of two miles from east to west and one and one-half miles from north to south. How far the mineralized zone may extend beyond this is undetermined, as all surface indications are completely obliterated by desert wash.

Submitted:

(Signed) John M. Nicol,

Consulting Engineer.

San Francisco, California,

October 7, 1926.

N. B. This report is submitted for the purpose of mkaing it easier to interpret the samples sent.

R E P O R T

OF THE

B U L L A R D M I N E S

.....

PIERCE MINING DISTRICT

YAVAPAI COUNTY

ARIZONA

BY

E. M. DURFEE, E. M.,

Congress Junction

Arizona

T H E BULLARD MINES

Congress Junction, Arizona

LOCATION: The Bullard Mines are situated in the Pierce Mining District in the southwestern part of Yavapai County, Arizona, about 29 miles from Congress Junction, a station on the Santa Fe, Phoenix & Prescott Railway and about 9 miles from Aguila Station on the Arizona & California Railway. Aguila is about 80 miles from Phoenix, Arizona and about 400 miles from Los Angeles, California. There is a very good road from Congress Junction over nearly level country to the mines. No road has been made from the property to Aguila, but the conditions for one are ideal, there being an easy grade down hill all of the way to the station, with no gulches or sandy places to cross and but little brush to clear; the ground could be very easily driven over in its present condition.

The altitude at the mines is about 3000 ft. above sea level.

PROPERTY: The property comprises ten patented claims, located as shown by the blue print accompanying this report and named as follows:

Homestake
Sweepstake
Washington
Avalanche
International
Producer
Steller
Emily
North Star

covering 196 acres. Besides these patented claims there are ten locations adjoining them and water rights located on Date Creek, 18 miles distant from the mines. I am unable to show any of these locations by map but was told, however, that they cover all of the ground to and including the old smelter as well as some on the other side of the patented claims. The land, where the water rights are held was located by the owners of this property and sold, reserving the water rights for use in connection with this mining property. It is claimed that there is ample water for all purposes, and it can be conveyed to the mines by gravitation under a head of 270 ft. Some of the ground was located by the Bullards something like 30 years ago, and the patents secured in September 1907. Some of these claims were jumped, others were located and a smelter built about '87 or '88, which ran but a very short time. At that time the nearest railway station from which to haul coke and supplies was Maricopa, about 100 miles distant. There has been some litigation over the

claims that were jumped but the present owners won out in the suits.

GEOLOGY:

The mines are situated in the foothills of the Harcurar Mountains. The rocks are sedimentary, composed principally from highly metamorphosed limestone; some beds in the gulch near the north end of the property are conglomerate. The formation all has a fairly uniform dip of about 20 degrees from the horizontal, S 43 degrees 10' E and strike of about N 46 degrees 50' E. The source of mineralization is apparently from a series of parallel fissures, cutting across the formation north 5 degrees 30' E and dipping easterly about 65 degrees from the horizontal. I have indicated some of these fissures on the map, but have not attempted to locate all of them. There has been some movement along the plane of bedding which has opened channels through which the mineral bearing solutions could spread, and it is along this "plane faulting" or bedded vein where most of the ore is found. Besides the metaliferous minerals, the fissures seem to have been the source of a large amount of silica, and owing to the silification of these limestone beds, they have withstood the erosion to a much greater extent than the surrounding country, leaving a prominent butte in which the ore outcrops. As may be seen from the jagged peaks on either side of the mountain, the fissuring extends some distance bother easterly and westerly from the ore developments. In most places the limestone has been changed until very little semblance of the original remains, some of it appearing much like quartzite. Where sufficient development has been done to show it, the mineralization has extended along this bedded vein the entire distance between the fissues. Ore also occurs along some of the fissures where shafts have been sunk on them through strata lying underneath the bedded vein. This vein dips into the mountain from the north side, near the top, and has been exposed by erosion along the apex about 1875 feet; about 400 ft. across the west end and between 400 and 500 feet along the south side. At the westerly end of the mountain on both sides, for a distance of between 400 and 500 ft. and across the west end about 400 ft., the work and erosion show the ore to be continuous along this vein. Easterly from this, on the south side, the vein is not exposed and over 450 feet from the west end on the north side the copper stain is not much in evidence, except at points where work has been done, and it is still to be determined whether it is continuous; although were fresh surface to be exposed it would very likely show the copper to have been leached near the surface and that ore exists below. This "plane faulting" seems to be more pronounced as you follow it westerly.

Other systems of fissuring exist on the property which should be studied closely in connection with the mining as they may have an important bearing on the rich ore shoots.

DEVELOPMENT:
ORE:

The development consists of tunnels, shafts, inclines, and open cuts, amounting to 2000 feet or more, nearly all of which has been done in ore, but the natural erosion has done most to develop the ore bodies.

The letters in quotation marks in the following paragraphs refer to maps accompanying this report.

At "F" is an incline about twelve feet deep, sunk on one of these mineralizing fissures showing about two feet of ore and at "G" an incline 150 ft. deep was started at the crossing of the bedded vein with one of these fissures but is too steep to follow the bedding, being at an angle of about 45 degrees. Some drifts and cross cuts have been driven from this shaft, but the cross cut in the bottom, about 40 feet into the hanging wall, has not been driven far enough to reach the vein.

About 300 ft. westerly from "G" a twelve foot incline on the vein shows no ore of consequence. This is the only work done between "G" and "H" so that this ground is not proven.

There are no workings between "L" and "I", but I have very little doubt that ore could be developed along that section.

At "C" there is an incline about 100 ft. deep to water with a drift at the 50 foot level something over 230 ft. long, reaching the surface in a small gulch at the southerly end. The vein is faulted at the shaft on the level, throwing it into the hanging wall, but farther down above the water, it can be seen coming in again in the back, but could not be reached fro sampling. Most of the ore has been s topped out above the level, and was probably taken to the smelter as there was very little left on the dump.

At "D" is an incline, said to be 107 feet deep which was sunk on the edge of a large wash, but has been completely filled with sand, washed in at times by heavy rains. A sample taken from a pile of several tons of ore on the dump gave 8.26% copper and $14.40 gold per tone. It is claimed that ore extends all of the way to the bottom of the shaft.

The workings at "E" are on an entirely different vein that dips much steeper, about 50 degrees. The collar of the shaft was badly caved and most of the workings were filled with water so that it was impossible to get into them, but from the size of the dump, many feet of openings must

have been at this point. Some ore left in the old bin showed some sulphides (chalcopyrite), the only place where I saw any, and a sample taken from this bin gave 7.87% copper and 80¢ gold per ton.

A few hundred feet southwesterly from the old smelter, some very nice looking ore has been taken from a shallow incline and both easterly and northeasterly from the main workings several shallow shafts have been sunk, mostly on cross fissures for title work and all show more or less copper ore. This shows the mineralization to be very extensive in the district. From the most easterly cropping of the bedded vein on the north side of the mountain to "D" shaft is something like 5000 ft. and from all appearances it is on the same "plane faulting".

In all probability other shoots of good ore could be developed along the strike of the vein, between the main workings and "D" or beyond this; and that the main shoot will continue to considerable depth in the direction of the dip and fissuring, beyond where erosion has cut through the vein. It is claimed that in sinking a well which was bored to a depth of 900 feet, at the smelter site, a stratum of ore seven feet thick was penetrated. I could get no reliable data regarding the depth at which it was encountered nor the character of the ore. The possibilities for ore in this direction are most promising, and I have no doubt future developments will show that the amount at present in sight is but a very small part of what the property contains.

The ore is highly silicious and generally very much iron stained, the values being principally in gold and copper with an average of one half ounce silver per ton. The copper is entirely oxidized and is mostly in the form of malachite with some oxides and silicates.

An amalgamation test on a sample made up from portions taken from each of my samples and crushed to pass a 40 mesh screen, gave an extraction of 91.3% of the gold, which shows it to be very free milling. To make this test I amalgamated the bottom of a copper-bottomed gold pan and agitated the pulp in this for a short time, assaying samples of the pulp taken before and after amalgamation, with the above results.

An average sample leached for twenty-four hours in a 7% sulphuric acid solution gave an extraction of 97% of the copper contents.

MINING:
MILLING:

The conditions for cheap mining of the ore developed in this property are very apparent. Advantage can be taken of gravity for delivering ore to the surface where in most places expensive hoisting plants and tower are necessary. In this case it is something like delivering ore to the lowest level of the mine without having to hoist it.

The ore is quite hard to drill but is friable and should break well. With a compressor plant and small machine drills, the total cost of the mining and delivering the ore to the surface ought not to exceed $2.00 per ton, and, considering that there is something like 8000 tons on the south side stripped and on the surface it ought to be done for less. In future developments, where the ore would have to be hoisted, it would cost more.

Milling costs for the simple amalgamating process could be done for fifty cents per ton, to which no doubt fifty cents more should be added if the copper were to be leached besides 11 cents per lb. more for precipitating the copper.

LABOR:

Labor at this point should cost about the same as at Congress District where miners (machine men) are paid $3.50, muckers $2.50, timber men $3.50, and timber men helpers $2.50, all for eight hour shifts; and ordinary laborers on the surface $2.00 to $2.25 for nine hours.

POWER:

By the use of oil engines something like the De La Vergne, with California crude oil, power ought not to cost over $50.00 per H.P. year.

ORE TREATMENT:

The oxidized condition of the copper in the ore makes it unsuitable for concentration, and its highly silicious charaeter(about 80% insoluble), makes a hard smelting proposition unless it could be sold to some smelter for converter linings.

From my amalgamation tests on the gold and leaching test on the copper, it would seem that it might be profitably treated by first crushing with stamps and amalgamating the gold followed by leaching the copper. Mr. Austin's article "Leaching Applied to Copper Ores" in the December number of "Mines & Methods", where he describes the "Laszczynski" process, would indicate that this ore would be particularly adaptable for treatment in this way.

IMPROVEMENTS:

The surface improvements consist of a cooking cabin, a two room bunk house, stable and wagon sheds, located near the north end of the property, a blacksmith shop near the north end of the apex of the vein; and at the smelter site a good sized stone cabin and the frame of the old smelter in which the smelting stack and blower still stand.

ORE ESTIMATES:

The assay map, which accompanies this report, is a longitudinal section on the vein and shows the locations, widths, percentage of copper and values in dollars in gold per ton for each of the seventy odd samples taken. These samples were taken across the full width of the vein and measurements made at right angles to the dip and noted in each case.

I have divided the ore developed into two blocks (Block "L" and block "M") called "Positive" ore and Block "N", "Probable" ore.

The average values for each block of ground, as indicated on the map, have been computed, as is customary among engineers, as follows:

By multiplying the assay values in dollars or percentages by the width of ore sampled and dividing the sum of these products by the sum of the widths to get the average value, and the sum of the widths by the number of samples taken to get the average width of samples. In estimating the tonnage I have assumed that it would require twelve cubic feet of ore to yield one ton.

In the Block "L" forty-nine samples give an average width of 3.04 feet, assaying 2.95% copper and $7.34 per ton gold. This block gives 42,100 tons.

In Block "M" nine samples give an average width of 1.92 feet assaying 2.84% copper and $12.47 gold per ton, figuring 1,600 tons.

For Block "N" I assume the average width to be 2.5 feet which would give 34,100 tons that should average as good as the "Positive" ore.

This gives a total of 43,700 tons averaging 2.94% copper and $7.52 gold per ton for "Positive" ore and 34,100 tons of the same grade for "Probable" ore.

Figuring on saving 90% of the gold values on ore averaging $7.53 per ton gives a net recovery of $8.72 per ton, or for 43,700 tons, of $296,286.00. At a cost of $2.50 per ton for mining and milling, the expense would be $109,250.00, leaving a net value of $187,036.00 for the gold alone in the "Positive" ore. The net value of the "Probable" ore on the same basis would be 34,100 tons, $145,948.00, or a total net value of $332,984.00 for the gold in the "Positive" and "Probable" ore.

Net value of gold "Positive" ore,	43,700 ($7.53 x 90%-$2.50--	$187,036.00
" " " " "Probable"	" 34,100 ($7.53 x 90%-$2.50--	$145,948.00
" " of gold in"Positive" and "Probable"		$332,984.00

If 90% of the copper values can be saved, figuring copper at 14 cents less 1 cent for precipitating, 2.94%= 58.8 lbs. per ton @ 13 cents = $7.64. $7.64 x 90% = $6.88 per ton recovered. If this can be done at an additional cost of 50 cents per ton for milling the returns would be as follows:

Copper in "Positive" ore	$43,700	($7.64 x 90% - 50¢)	=	$278,806.00
Copper in "Probable" ore	$34,100	($7.64 x 90% - 50¢)	=	$217,558.00
Total net value copper in "Positive and "Probable" ore				$496,364.00

Cu and Au in "Positive" ore	$187,036.00	$278,806.00	=	$465,842.00
" " " " "Probable" "	$145,948.00	$217,558.00	=	$363,306.00
Total net value of ore.....				$829,348.00

Besides the ore figured in these blocks there are several hundred tons piled up in different places around the property. This ore has been sorted over to some extent so there is no doubt it would average better grade than the blocks.

My samples were taken at fifteen foot intervals, along the vein wherever it was possible. Many of the samples were taken where no work has been done to expose fresh surface, in which case the copper is pretty much leached out so that I have no doubt shows lower results than mining would give.

There seems to be no relation, whatever, between the gold and copper values, and I am unable to account for the much higher gold values along the northwesterly portion of the vein, as the ore all looks very much alike.

Ten samples taken along the drift at "C" gave an average width of 2.37 feet assaying 2.31% copper and $3.77 gold per ton.

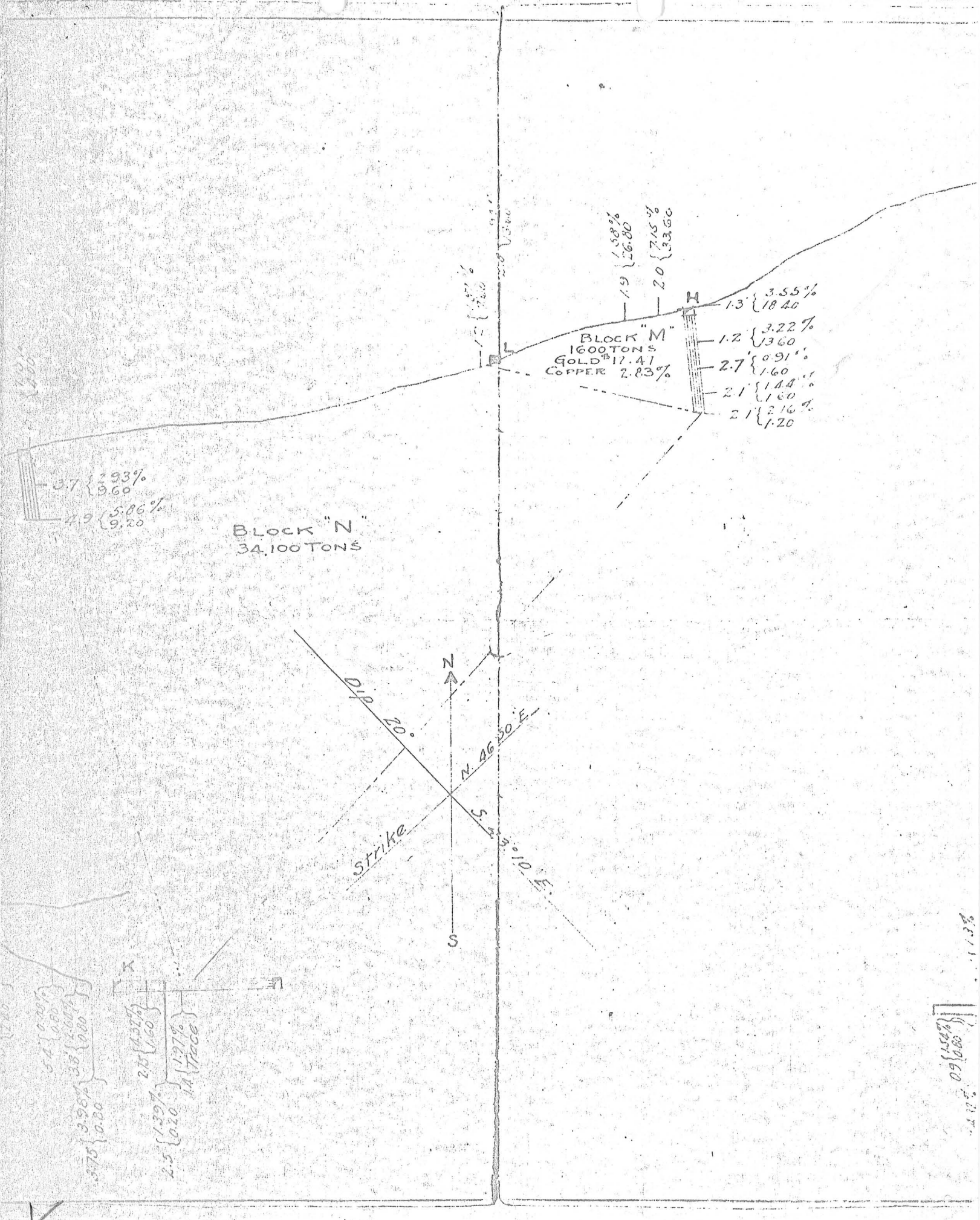
CONCLUSION:

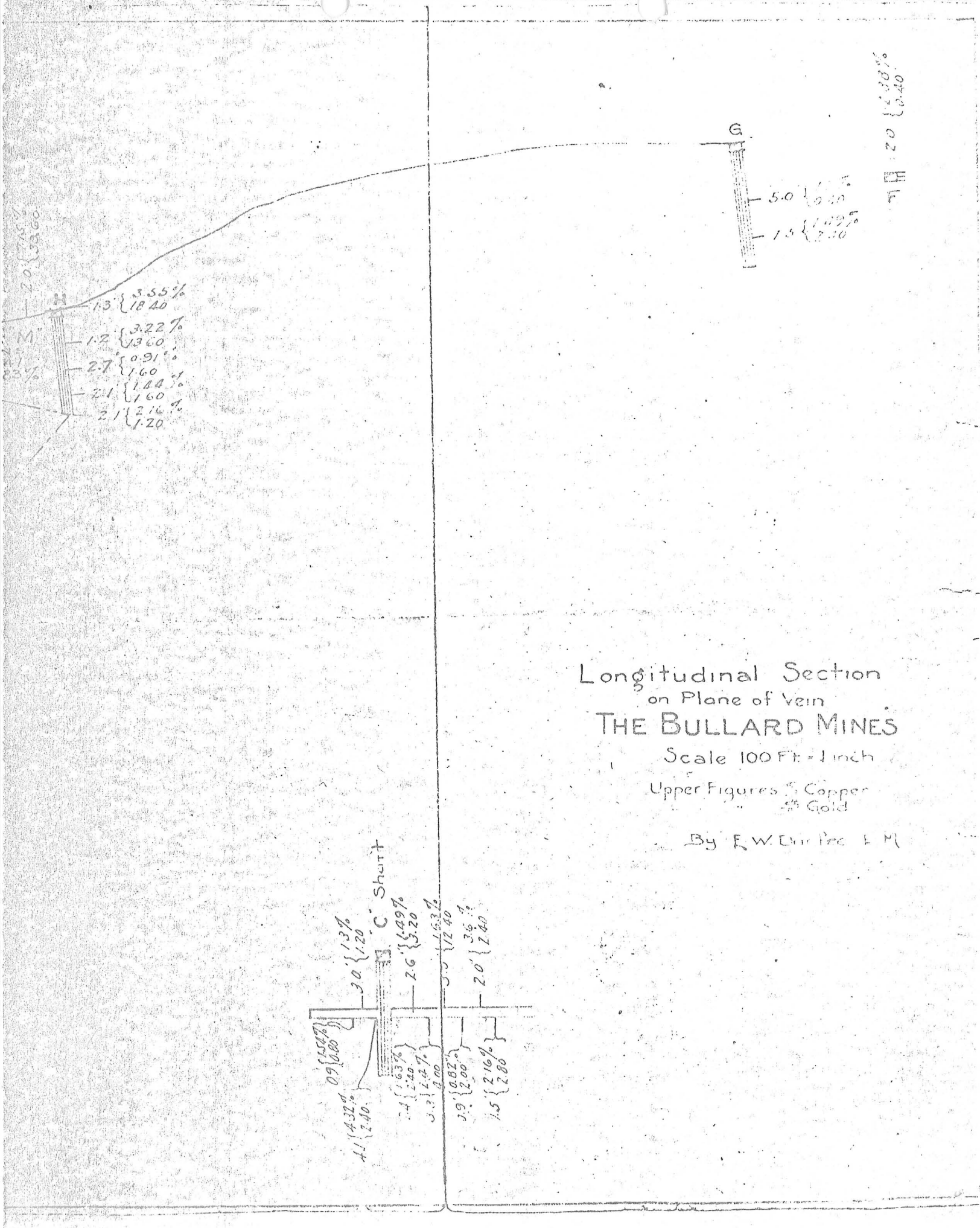
With the amount and grade of ore developed in this property, the probabilities and possibilities of much larger amounts there to be developed, the question of treatment of the copper contents at a reasonable figure, is about the only uncertain factor in the proposition. Judging from the successful operations of the plants described in the article referred to above, it would seem that there is little doubt that the "Laszozynski" process would be applicable to this ore and that a considerably better saving than the 90% estimated might be made. There is no question about being able to save the gold values by the simple amalgamation process.

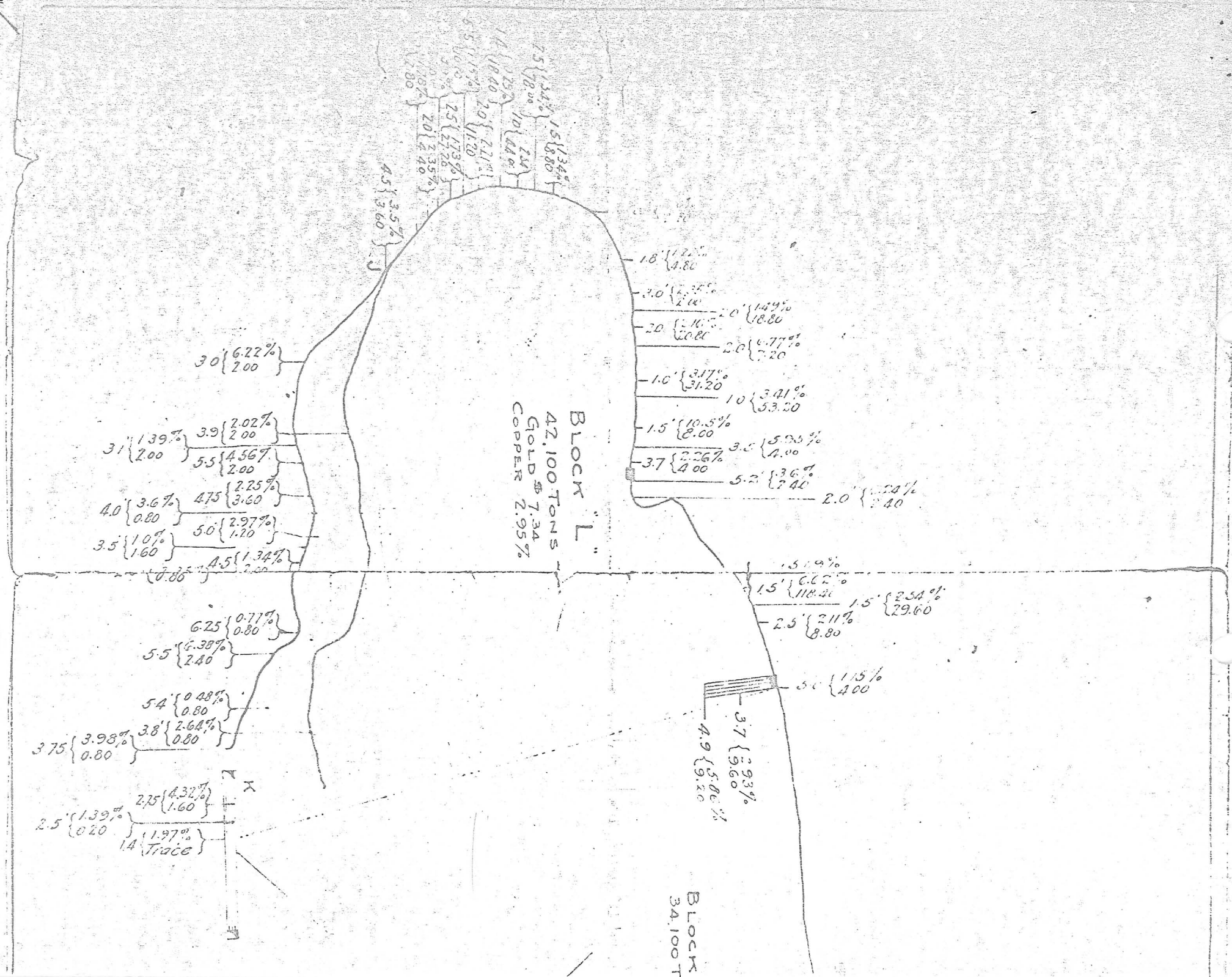
Respectfully submitted,

(Signed) E. W. Durfee, E. M.

Date?


BLOCK "M"
1600 TONS
GOLD 17.41
COPPER 2.83%
BLOCK "N"
34,100 TONS
Dip 20°
N. 46 50 E.
S. 43° 10 E.
Strike
N
S
H
L
K
1.9 {1.58% 26.80
2.0 {7.15% 33.60
1.3 {3.55% 18.40
1.2 {3.22% 3.60
2.7 {0.91% 1.60
2.1 {1.44% 1.60
2.1 {2.16% 1.20
3.7 {1.93% 9.60
4.9 {5.86% 9.20
2.5 {1.39% 0.20
2.8 {1.35% 1.60
1.4 {1.97% Trace


Longitudinal Section
on Plane of Vein
THE BULLARD MINES
Scale 100 Ft = 1 inch
Upper Figures % Copper
" " Gold
By F.W. Durfee E.M.
C Shaft
G
H
M


BLOCK L
42,100 TONS
GOLD $ 7.34
COPPER 2.95%
BLOCK
34,100 T
J
K
L
M

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine BULLARD Date OCT6_TH 1942

District AGUILA Engineer A. C.NEBEKER

Subject: PRODUCTION POSSIBILITIES

The Bullard mine is being worked by Bill Allison and R. B. Van Buskirk, Lessee.

The mine is 12 miles north of the railroad station of Aguila and is in Yavapai County just over the county line.

4 men plus the bosses being worked.

Ore a copper carbonate carrying on average of 3% copper, 72% silica, .065 gold, silver .34 Ozs.

Work so far has been development and from development 2 cars of ore has been shipped to the Hayden Smelter and a third car is near loaded.

The vein is flat, dipping 25 degrees to the South East with an average thickness of 4 feet

The development now going on is driving a connecting raise to a upper level and when this raise is completed it is estimated that 42,000 tons will be blocked out on the north side and 3400 tons on the south, and in the block further south 1600 tons more tons is estimated.

The Lessees are trying to get an adjustment on their contract and when this is had will increase their production to 50 tons per day, if available men can be had. They figure they will need ten men.

The property is equiped with a 250 cu. ft. I. R. Portable compressor, jackhammers and stopers.

They are operating on order P. D. 100

Transportation is reasonable. They pay for trucking to Railroad $1.25 per ton, freight to Smelter $2.00 per ton. Treatment rate for low grade $1.75 per ton.

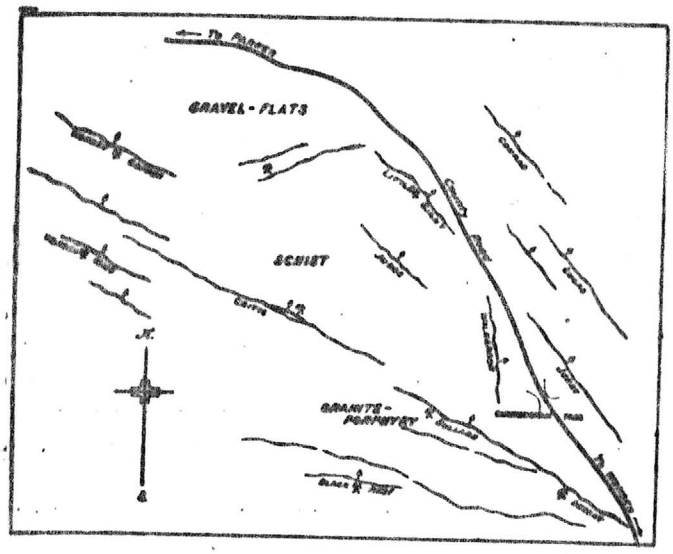
The operators think they can find enough older men, whom the larger companies reject so they can carry on with little labor trouble.

A C Nebeker

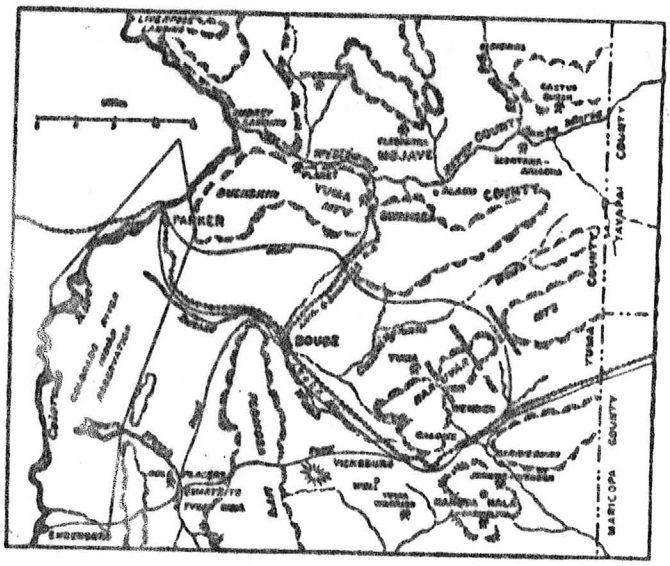
Cunningham Pass District, Arizona

By W. TOVOTE

The Cunningham pass country, in northern Yuma county, Arizona, recently has been attracting considerable attention. This is less because of the amount of ore being mined than for the fact that the ore is high-grade and of excellent character for smelting. Three mines are now producing steadily, others are in process of development, and small shipments are being made by lessees from undeveloped properties. The district is about 10 miles north of Wenden on the Arizona & California branch of the Santa Fe system. It is part of the Ellsworth mining district.



SKETCH SHOWING PART OF VEIN-SYSTEM NEAR CUNNINGHAM PASS



SKETCH OF THE PARKER CUT-OFF DISTRICT IN YUMA COUNTY

Cunningham pass is a low saddle in the Harcuvar mountains. The main traveled road from points in central Arizona to Parker used to lead through this pass, but in recent years a new highway has been constructed along the railroad, which now takes most of the through-traffic. The country is a typical semi-desert. Water is scarce and wells supply most of the drinking water. Small towns and settlements have grown wherever water has been found in sufficient quantity. Vegetation is scanty, the mesquite and palo verde being the principal shrubs, and some ironwood is found along the arroyos.

Mining near Cunningham pass dates back at least 20 years. The Critic and the Bullard mines were started on rich surface-ores, and both produced for awhile. The Critic is credited with an output of $500,000 and the Bullard with $150,000. The Bullard was opened by four short tunnels, the longest being 320 ft., with a maximum depth of about 225 ft. vertically. Ore was also developed in two shafts. The ore-shoot in the tunnels was partly stoped and the mine closed because the owner did not care to operate it, while prospective buyers were reluctant to meet his price and terms. The mine has been worked intermittently since by lessees. The Critic is a shaft-mine. It was opened to the 400-ft. level and partly stoped, some good orebodies being overlooked. Lessees have operated it since with indifferent success, until J. Nohlecheck, about two years ago, opened several good ore-shoots, increasing the reserves steadily, while making regular shipments.

Two years ago H. Barkdoll, superintendent of the Old Dominion Copper Mining & Smelting Co., at Globe, and his associates, acquired the Wenden Copper mine, sank a shaft 200 ft. deep, shipped ore and then closed. Adjoining the Wenden are the Conrad claims, which were purchased by El Paso people who organized the Wenden King Mining Co. Considerable money was expended without much to show for the expenditure, and the enterprise came to grief. Activity lagged again, until recently a rather remarkable showing was made in the Little Giant mine. Here two lessees had stoped out a small surface-shoot of high-grade copper ore, ranging from 2 to 15 in. wide. At 35 ft. this gave out, but the new owners acquired a lease and option and continued sinking. At 75 ft. the vein suddenly widened to about two feet, and was followed for about 70 ft., yielding ore assaying from 15 to 20% copper. Sinking was resumed and the ore improved in value. A new level at 125 ft., driven for over 100 ft., revealed excellent ore, in some places being 40 in. wide. About 200 tons of ore was shipped from development work alone, which returned more than $50 per ton net. This new development has

been widely advertised and number of new companies and lessees are entering the district.

GEOLOGY. The Cunningham pass country is worn down to the old gneiss or schist basement of pre-Paleozoic age. The schist is apparently derived mostly, if not exclusively, from intrusive rocks. Acid and semi-acid rocks, like biotite-gneiss and granite, prevail. The schist strikes N.60°E. and dips 25 to 30° to the north-west. Contorted and folded areas interrupt the uniformity. Paleozoic strata do not appear within five miles of Cunningham pass. The schistose complex has been invaded by intrusives. Two of these are prominent in the mineralized area and have probably influenced the ore deposition. They are: A granitic intrusion of the quartz-monzonite type, sending out numerous pegmatitic and aplitic dikes; and a semi-basic to basic intrusive, ranging from coarse hornblende-diorite to dense porphyritic dikes, resembling diabase. The latter strike generally north-west, while the pegmatite dikes lie in all directions and are irregular in outline, forming a network of dikes, sills, and penetrations in the schist. Both systems of intrusives are cut by the veins and sometimes are distinctly displaced.

The most important veins strike about 60 to 70° north-west and dip to the north-east. Flat and steep dips alternate, varying from 30 to 90°. Even reversals of dip have been found at places. Cross-veins striking N. 30°W. are similar to the main-veins in character and mineralization. Others with a course from north to N. 10°W. seem to carry more gold and less copper. Bedded veins with a strike about N.60°E. are ore-bearing, but likely to prove irregular. The chief importance of all the smaller veins is their enriching influence upon the main veins at intersection-points. Enrichment occurs as well in strike-intersections as in dip-crossings.

Composite stringer-veins predominate, usually with one fissure that is likely to persist over considerable distances. From the evidence available the veins must have been re-opened several times, and the principal fissure appears frequently in several displaced sections, joined by a network of stringers, giving the impression that the main mineralization shifted from one branch of an intricate fracture-system to another abruptly. The dislocating fractures had a course about N.30°E.

The mineralization indicates two distinct periods. The principal gangue of one period of mineralization is quartz, while the other period is characterized by iron, principally as hematite. Both are associated with copper and gold. The strong influence exerted upon the veins by the pegmatite dikes leads me to consider the pegmatite as responsible for the acid mineralization. The iron mineralization I attribute to the semi-basic intrusives. Seams and veinlets of hematite are frequent in the pegmatite dikes, from which it appears that the pegmatite antedates the basic mineralization in the veins, and that considerable replacement of quartz by hematite must have taken place. The hematite has been altered to limonite superficially, but not to any large extent. It occurs massive and in its micaceous variety. The latter is considered a more favorable sign of ore. It is probably due to stress and pressure and is coincident with areas of folding and contortion along the veins. These frequently have produced a false secondary schistosity, and often make the veins appear to conform to the schistosity, where they actually do not. Other gangue-minerals found are siderite, dolomite, and ankerite. Of these siderite is the most important and is closely associated with chalcopyrite. Possibly the hematite has been derived from siderite by metamorphism. Apparently post-mineral barite is common; less frequent is calcite, which is probably secondary. The metallization introduced chalcopyrite and pyrite with accessory gold. Silver is found, but seldom exceeds two ounces per ton, while the gold ranges from $2 to over $50 per ton. The copper has undergone considerable secondary concentration. Chalcocite, cuprite, and malachite are the principal products, while native copper, azurite, and chrysocolla are rarer. The ore generally assays higher than would be judged by its appearance, owing to a penetration of the hematite gangue by cuprite. Exceptional cuprite is found in perfect transparent crystals, accompanied by velvety malachite. The primary chalcopyrite is very pure and usually greatly in excess of the accompanying pyrite.

The orebodies are roughly lenticular, and vary from stringers to about four feet in width. A series of lenses, joined by narrow stringers, has produced a maximum stoping-length of 450 ft., and about the same proven depth in the Critic mine, the most extensively explored property in the district. The Bullard has an ore-zone about 150 ft. long. Favorable places for ore are folded areas, pegmatite-contacts, and the vicinity of basic intrusives. Intersection-zones increase the grade as well as the quantity of the ore.

The average grade of ore shipped from the district in the past was about 18 to 20% copper with about $10 gold per ton. Chalcocite-stringers only a few inches wide are mined, and on being followed they will widen suddenly to several feet of solid ore and then contract again. While careful sorting is required where the vein is narrow, the ore breaks remarkably clean in the bigger shoots. The number of men employed is small. A mine employing 10 men and shipping 200 tons per month should make a good profit, as the net smelter returns are from $50 to $70 per ton. The haul to Wenden costs about $4.50 per ton by team, but is now being done for less by trucks. The roads are fairly good and the grades not heavy. The Jerome scale of wages prevails, but labor is not very satisfactory, because many people dislike the hardships of the desert. The Bullard has shipped over 100 tons per month, working only two to three men, and the same ratio would be possible in most mines, if they were properly opened and employed power drills. The ore commands a ready market on account of its self-fluxing quality. The Clarkdale, Humboldt, Hayden, Sasco, and Douglas smelters have been receiving ore from the district. Cunningham pass is one of the few 'poor man's' copper districts in Arizona.

CREOSOTE has advanced to $2.10 per pound. The demand is active.

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: BULLARD MINE
2. Mine name if different from above: Same
3. County:
4. Information from: George Foster

   Company:

   Address: P.O. Box 5840, Yuma, Arizona 85366

   Phone:

5. Summary of information received, comments, etc.:

Mr. Foster requested information on the typical analysis of direct shipping ore or flux required by a copper smelter.

He hopes to ba able to ship from the Bullard to ASARCO at Hayden.

Date: Oct. 4, 1989 Ken A. Phillips, Chief Engineer

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Bullard | Date April 20, 1976

District Bullard (Pierce) Yavapai County | Engineer Ken A. Phillips

Subject: Current status and field visit.

Present Owner: Orangewood Farms Limited Partnership % Neal Roberts, Managing Partner 90 W. Virginia Avenue, Phoenix, Arizona 85033

Previous Ownership: Information from Neal Roberts and John L. Moore. PMC (Powdered Metals Corporation), the last owner by our records, went bankrupt a few years ago and the taxes on the patented property became delinquient. For a couple of years Mr. John L. Moore, a local area prospector paid the taxes on the mine. The Baptist Foundation, some type of Baptist Church organization, held a vested interest in the property and paid up the back taxes. Orangewood Farms purchased the property for an accounting advantage and now reportedly is sole owner.

Lessees: Burt Balonick, 6533 N. Seventh Avenue, Phoenix, Az. 85013, 246-9544. Burt Balonick is one of the limited partners in Orangewood Farms and holds a six-month exclusive right on the Bullard to develop the property as either a gemstone, decorative stone, or copper-gold producer.

Future Plans: Orangewood Farms has no particular plans for the property. Their present use is at least partly as a hideaway for some of the partners. Neal Roberts stated that his only real interest is removal of the cactus from the property. Arlene Lyons, secretary to Neal Roberts is enthused about what she thought was turquoise scattered all over the property (I believe it is nearly all chrysocolla) and hopes to collect the stones and sell them.

Burt Balonick is working in partnership with a Phoenix plastics firm who is investigating the manufacture of table tops and similar products with the copper embedded in the plastic. Balonick appears to be well endowed with sales ability and has a number of promised orders. He is also considering the sale of decorative stone.

John L. Moore and a partner, two prospectors in the country north of Aguila, have told Balonick that they could be in production on the Bullard in a few months. They would sulfuric acid leach for copper, then cyanide for the gold, silver, platinum and osmium, running 800 tons per day. (see separate note re: John L. Moore and partner, KAP weekly report April 20, 1976).

References: Property is described in three reports and one summary contained in the Bullard Mine file.

1. Summary, May 4, 1957, "Bullard Mines Property", by Louis F. Bombarclieri for Shattuck Denn Mining Corporation, 2p.

2. Durfee, E. M., "Report of the Bullard Mines", date unknown, 9p, includes estimates of reserves.

3. 1926, Nicol, John M, "Auxillary report Re: Bullard's Mine", October 7, 1926, 8p, a report originally written to accompany a collection of ore samples sent for evaluation to a potential investor.

4. 1936, Flagg, Arthur L., "Report on the Bullard Mine", July 20, 1936, 11p, probably the best of the reports available with greatest detail.

Observations: The author accompanied Burt Balonick to the property April 20, 1976, where considerable time was spent identifying hand specimens of various copper oxide zone minerals, most thought by Balonick to be turquoise. The majority of specimens were chrysocolla with some malachite, azurite, cuprite, tenorite and very small amounts of chalcocite. Chalcopyrite occured as small crystals in a couple of specimens from outcrops at the northeast end of property, (north side of Bullard Peak). Gangue minerals include calcite, siderite, and quartz. There is sufficient quantity of colorful copper minerals in the dumps and surface cuts to supply material for use in encapsolated plastic products for many years. Little material suitable for use in cutting gemstones was found. Approximately 500 tons of decorative stone could be recovered from the dumps. Numerous churn drill holes, reportedly drilled by PMC (J. L. Moore, verbal comm.) - are located on the property, many of which were drilled south west of the outcrop, apparently to intersect the vein down dip. Samples were collected in five foot intervals, bagged and stored on a flat SW of the old workings. The bags have totally deteoriated, but each sample is isolatable, but not identifiable as to either hole or depth (ie. of little value). The samples were too fine to identify any copper minerals.

From surface examination of outcrops and dumps and from comments in previous literature the property should be analyzed as to its potential for a small copper leaching operation. Copies of drill logs from previous drilling should be analyzed for clues as to any extension of the vein down dip as previous workings have not extended below 150 feet.

EQUIPMENT

Mine equipment consists of:

1- 320 cu. ft. compressor

1- 160 cu. ft. compressor

2- Slusher hoists with scrapers

1- Air "Tugger" hoist

2- Hoists

3- Jackhammer rock drills

1- Stoper drill

1- Truck

Some steel, tram cars and miscellaneous equipment.

WORK BY BUREAU OF MINES

Four vertical diamond drill holes were drilled by the Bureau as follows:

Hole No. 1 (Fig.4) located east of the fault zone, showed a trace of gold and copper at a depth of 37.2 feet which continued to 54.4 feet. From 54.4 to 60.0 feet, a vein width of 5.2 feet assuming the dip of the vein to be 20°, the weighted average is 0.196 ounce gold and 0.20 ounce silver per ton and 1.27 percent copper. The hole was continued to 75.4 feet with no further mineral showing.

Hole No. 2 (fig. 4), located about 60 feet north and east of the areas stoped, showed a trace of gold and copper for 4.4 feet (46.0 to 50.4 feet). From 50.4 to 51.5 feet (1.1 feet) the average is 1.50 percent copper but only a trace of gold. The ore in the

vein occurs at a depth of 51.5 to 54.5 feet, representing a vein width of 2.8 feet. It has a weighted average of 0.016 ounce gold per ton, 0.05 ounce silver per ton, and 3.84 percent copper. The next 2.7 feet showed a trace of gold and copper. This hole was continued to a depth of 77.2 feet but showed no additional values.

Hole No. 3, located halfway between holes 1 and 2 on the same east-west line and just west of the fault zone, was drilled to a depth of 97.0 feet but showed no ore. A sample from 65.0 to 68.5 feet showed some quartz, which assayed a trace in gold and 0.12 percent copper.

Hole 4 (Fig. 5), located about 30 feet west of a face in the main stope, showed ore from 37.2 to 40.2 feet, 2.8 feet wide. The weighted average is 0.07 ounce gold, 0.10 ounce silver per ton, and 2.88 percent copper. The interval from 40.2 to 42.0 feet assayed a trace in gold and 0.35 percent copper. The hole was bottomed at 63.2 feet.

Drilling by the Bureau of Mines indicated ore at a distance of 30 to 75 feet in three different directions from the present workings.

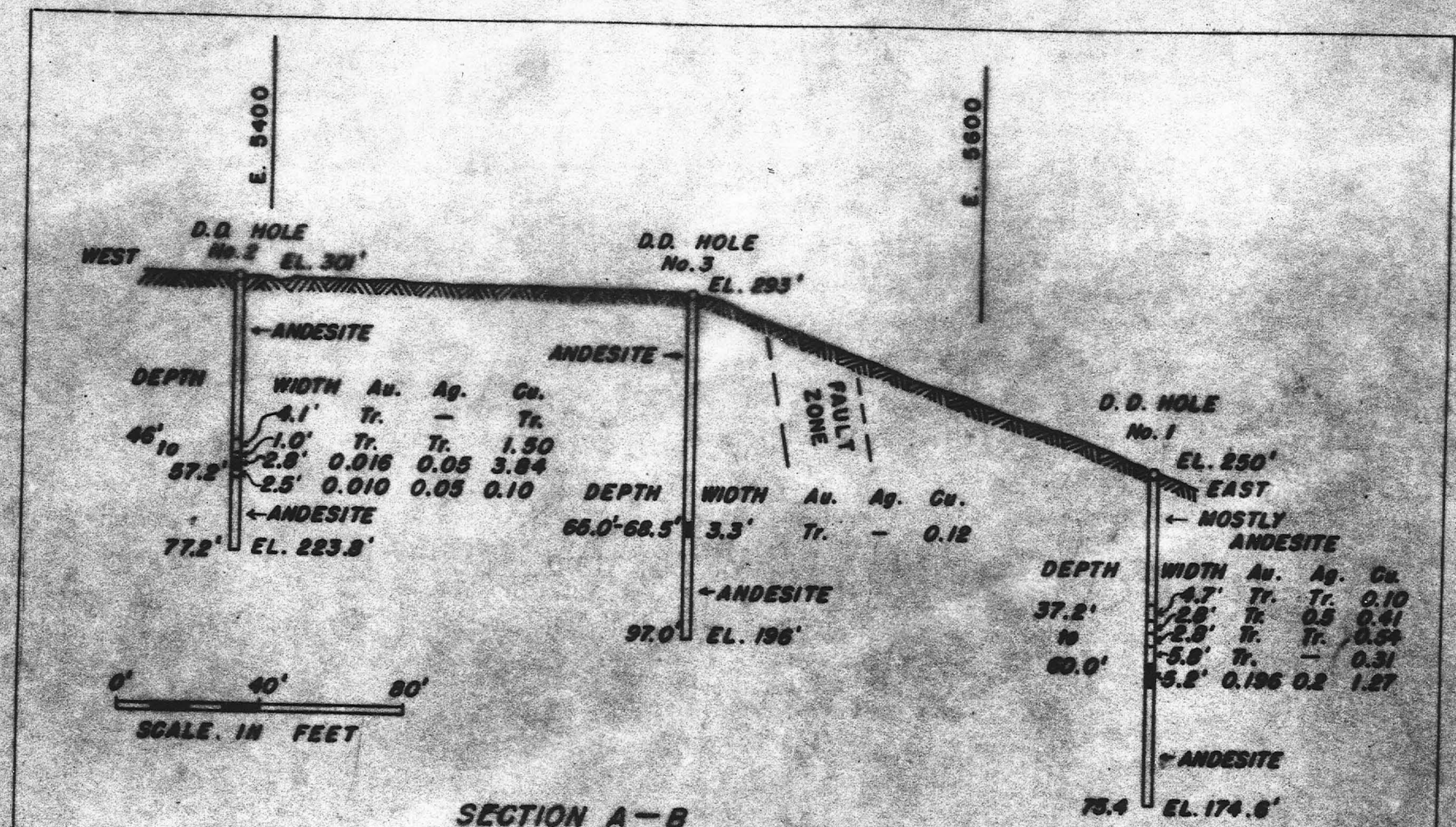
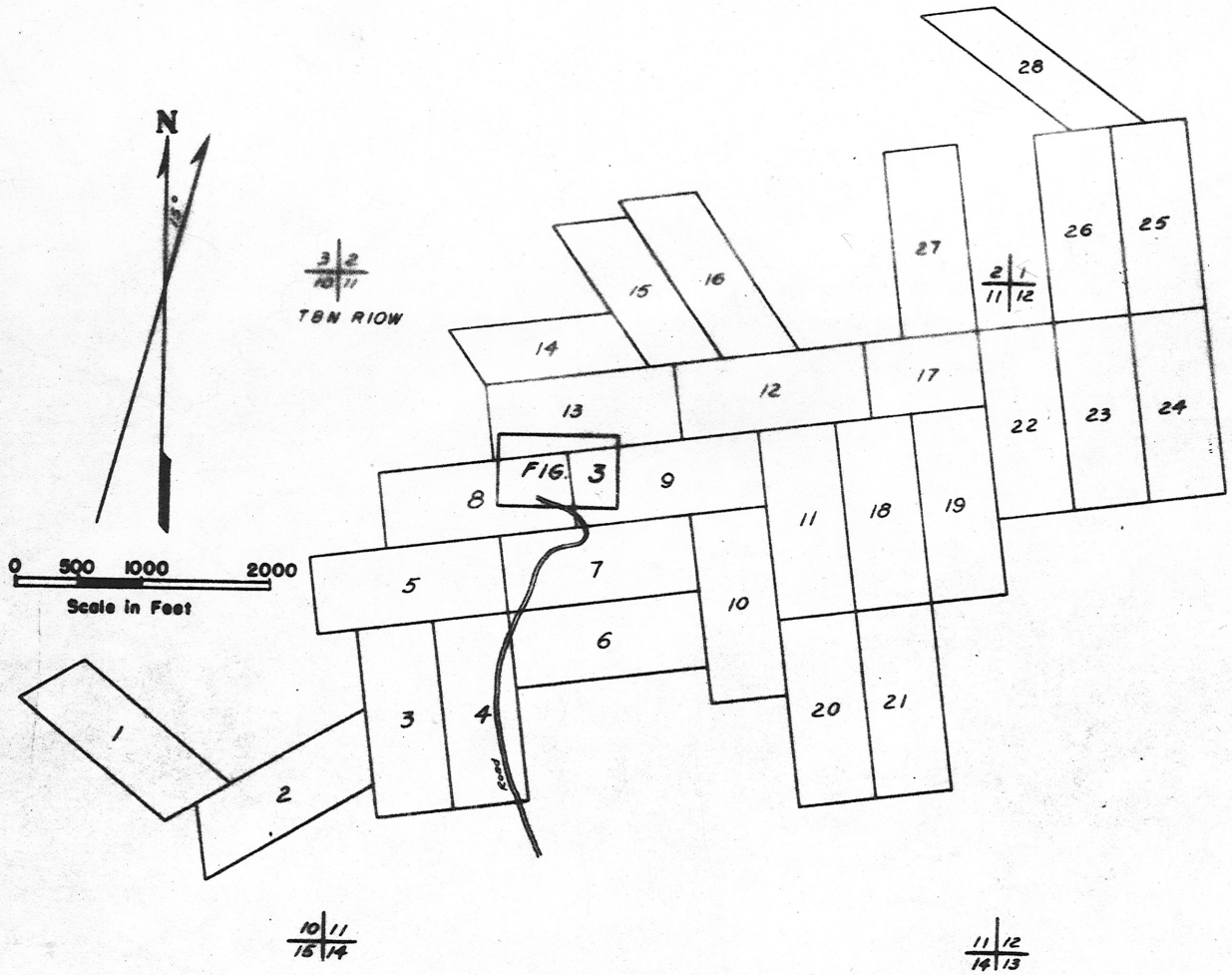


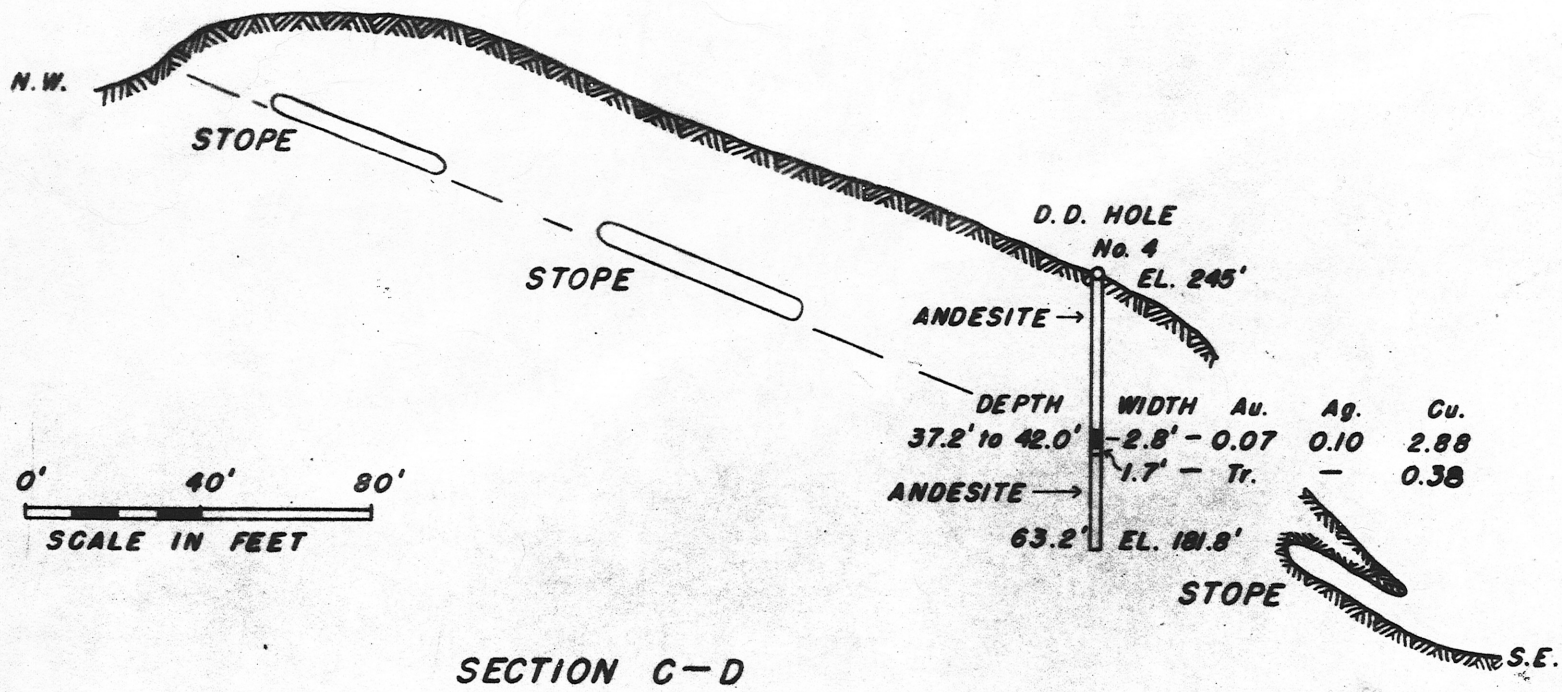
FIG. 4 — BU Figure 4 - Section through drill holes 1, 2, and 3 ARIZONA



PATENTED LODE CLAIMS

No.	Name	Mineral Survey
1 -	Stonewall	3402
2 -	Conection	"
3 -	Last Bean	"
4 -	Democrat	"
5 -	State	"
6 -	Arizona	"
7 -	Avalanche	2467
8 -	Sweep Stake	"
9 -	Washington	"
10 -	International	"
11 -	Producer	"
12 -	Rattler	"
13 -	Home Stake	"
14 -	North Star	"
15 -	Emily	"
16 -	Steller	"
17 -	Napoleon	3403
18 -	Jay Bird	"
19 -	Venice	"
20 -	Butte	"
21 -	Nevada	"
22 -	Amazon	"
23 -	Chancellor	"
24 -	South Wing	"
25 -	Augustus	"
26 -	Sulla	"
27 -	Newborn	"
28 -	North Extension	"

Figure 2.- Claim map, Bullard mine.



SECTION C—D
S 35° E
ON DIP OF VEIN — APPROXIMATELY 21° S.E.

FIG. 5 — BULLSEYE MINE YAVAPAI COUNTY, ARIZONA

Figure 5 - Section through main stope and drill hole 4

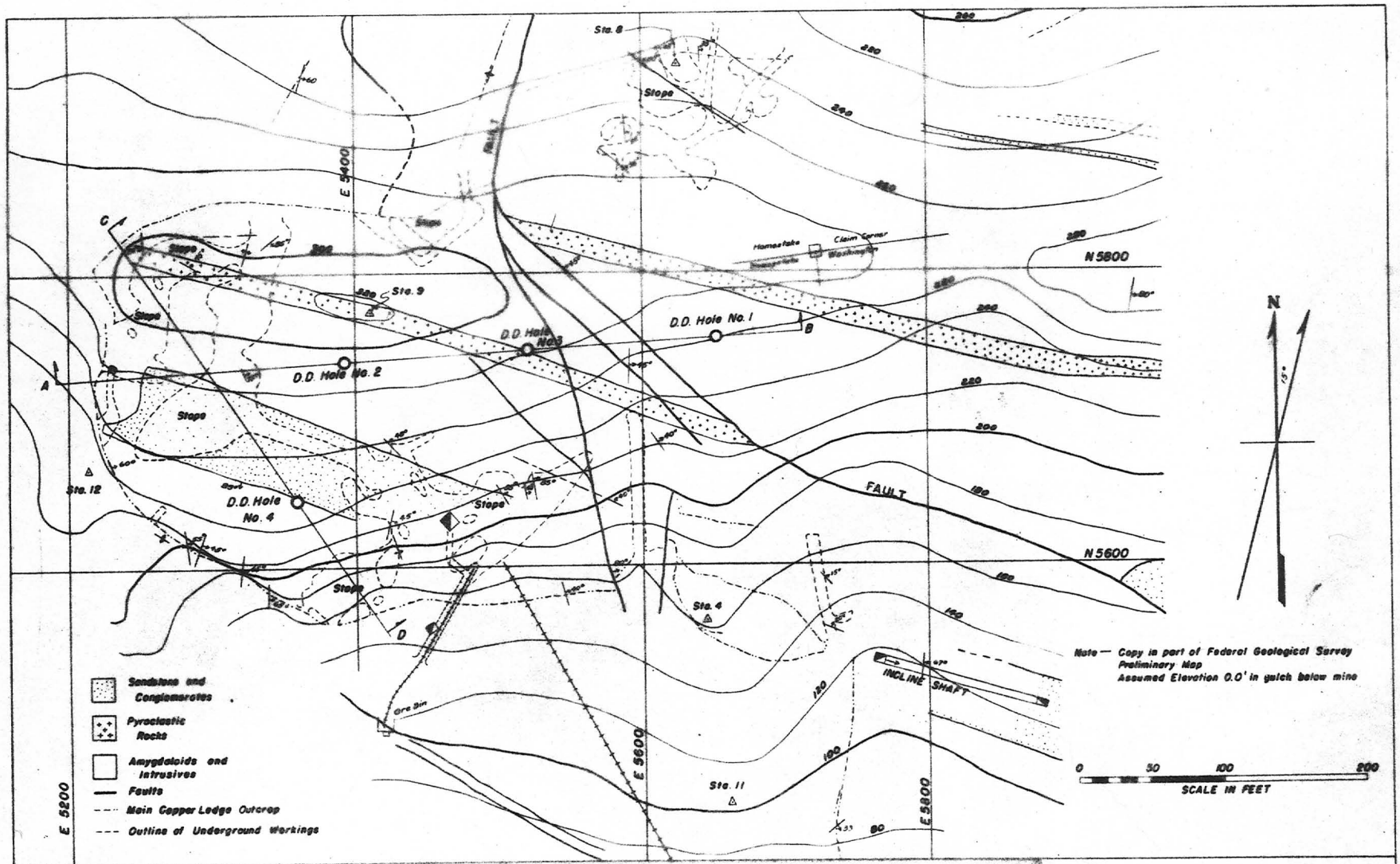


Figure 3 - Geologic map of Bullard mine area

Intra-Company Corresponde

SHATTUCK DENN MINING CORPORATION

and

SUBSIDIARIES

Engineering Office

Date May 4, 1957

TO: Mr. D. M. Kentro
Assistant Vice-President

SUBJECT: Bullard Mines Property

On April 16th I visited the Bullard Mine Property owned by Charles O. Mathews. I was accompanied on this examination by Mr. Mathews and Mr. Herb White.

This property consists of 28 patented claims and a like number unpatented. It is located in the Pierce Mining District in the southwestern part of Yavapai County, Arizona about 9 miles north of Aguila, Arizona.

The rocks are sedimentary, composed principally from highly metamorphosed limestone. The formation has a fairly uniform dip of about 20 degrees, S 40° E and a strike off about N 50° E. Mineralization is apparently from a series of parallel fissures cutting across the formation. There has been some movement along the plane of bedding and it is along this "plane faulting" where most of the ore is found. In most places the l mestone has been changed until very little semblance of the original remains, some of it appearing much like quartzite.

The development consists of tunnels, shafts, inclines, and open cuts, nearly all of which has been done in ore, but the natural erosion has done most to develop and expose the ore bodies. Most of the outcropping of the ore shows up in a prominent butte where most of the mining has taken place. The vein dips into the mountain from the north side, near the top, and as evidenced by erosion, outcrops on the west end and south side for a considerable distance.

On the north side of the butte I climbed down approximately 70 feet to the bottom of the "Wooten Shaft", which follows the dip of the vein and cut a sample of 40 inches of the face which assayed .05 oz. Au, 0.60 oz. Ag, and 2.50% Cu.

I was told that sulfides were contacted at a lower depth in another shaft west of the Butte. This shaft is full of water and was inaccessible.

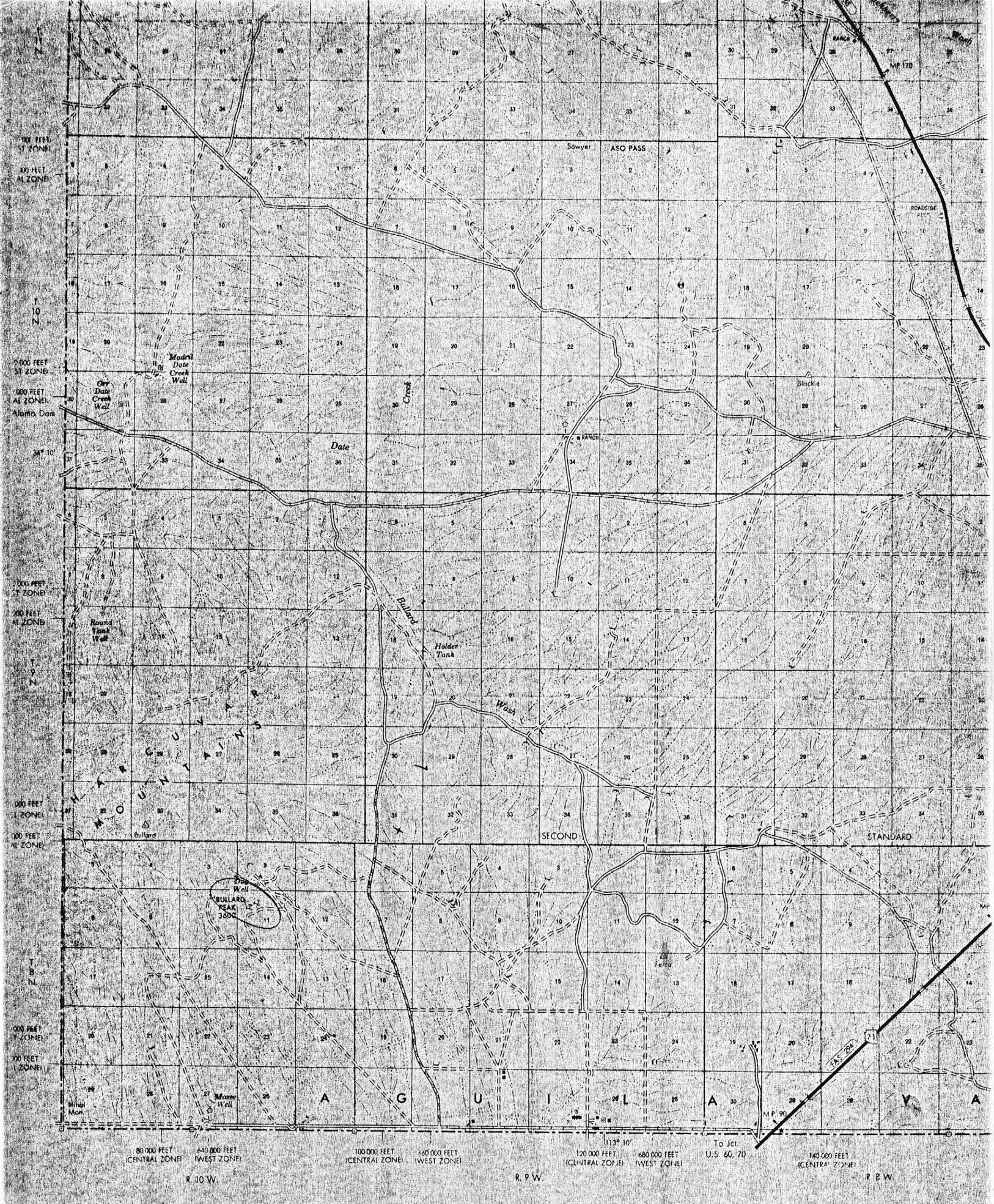
GENERAL OFFICE
BOX 1492
PRESCOTT

SHATTUCK DENN MINING CORPORATION

IRON KING MINE
HUMBOLDT, ARIZONA

In my opinion there is a possibility of the ore body continuing in depth, but further examination of the property would be necessary and several drill holes should be put down at the base of the mountain on the southeast side before contemplating any further developments.

Louis F. Bombardieri
Chief Engineer



Exceptions } Part of Mrs Mathews estate
Little H

December 17, 1943

War Price and Rationing Board
No. 81.7.1
137 North Second Avenue
Phoenix, Arizona

Gentlemen:

Mrs. George D. French, Route 8, Box 230, Phoenix, is making application for supplemental gasoline. Her husband, Mr. George French, is operating the Bullard Mine, a siliceous copper ore producer, and both Mr. and Mrs. French use the car.

The property is located about 12 miles north and west of Aguila, making a round trip of 175 miles from Phoenix to the mine. Numerous trips are required due to the obtaining supplies for mining operations and rustling other material necessary.

The property is one that is well developed and is producing a critical mineral and I can gladly certify to the need of supplemental gasoline for this work.

Yours very truly,

J. S. Coupal, Director

JSC:LP

Washington, D.C.
May 31, 1943

SUBJECT: Bullard Mine Loan
Docket # ND-5391

This loan has been declined.

Confidentially, I think one of the principle difficulties is that RFC has the idea that the management at the mine leaves much to be desired and that it will not be operated satisfactorily. They have the idea that Smith, who I understand is not a mining man, is trying to operate from a desk in Phoenix and has no-one to put in charge at the property who is experienced and reliable.

I talked to WPB and they will set the mine up for a higher price as soon as they get the data they asked for. It was not in the material furnished to RFC as the wire from Smith stated.

The applicant for Special Additional Premiums must furnish the data asked for.

When the price is set up, which will automatically amount to WPB approval, there should be a request for reopening and I will be in a good position to push it.

Bill Broadgate

May 28, 1943

MEMORANDUM

$20,000 Loan Application
Docket No. ND-5391
Bullard Gold Mine, Inc.
J. P. Smith
Heard Building
Phoenix, Arizona

TO: W. C. Broadgate

FROM: J. S. Coupal

Mr. Smith has just called at the office regarding this loan. He has shown me a letter dated May 22, 1943 from Frank H. Hayes which in part reads as follows: "We have referred your message relative to your loan application to the RFC and believe that you will hear from them shortly."

This application was submitted on February 4, 1943 and an examination by the RFC engineer was made on March 4 and his report forwarded to Washington within a few days thereafter.

The ore from the Bullard Gold Mines as you know is a high silica fluxing ore running 75 percent and better in silica. On May 15 F. H. Hayes wrote the company asking for the necessary information to submit in order to obtain a higher price and increase production. A reply was sent to this letter stating that all of the information asked for was in the docket above mentioned.

I have just asked Mr. Smith and he has stated the he would immediately forward all of this information to L. F. Strobel, Quota Committee, War Production Board and mention in the letter that an application for a development loan was now in process and should be about acted upon.

The major concern right now is to get action on the loan. Probably Mr. Hayes' letter means that the WPB has rendered their decision to the RFC and Mr. Smith may be advised within a few days. However, I do wish you would check on this and advise.

The property is one of the few that is about ready to start immediate production of a much-needed fluxing ore containing copper.

I hope the question of an increased premium and the granting of the loan are not confused and mixed up so that delay in the loan results.

The application sets forth clearly that immediate production can go ahead simultaneously with the development work. With the need for fluxing ore and for added copper, here is an application which has lain idle for two months with no action.

September 10th, 1941.

Bullard Estate,
% R.H.Armstrong, Attorney,
1st Natl.Bank Building,
Phoenix, Arizona.

Dear Sir:

Having tabulated the several factors from all the ore shipments from the Bullard Mine during the period March 1940 through July 1941, taking such data from the smelter settlement sheets on file with the 1st National Bank of Arizona, at Phoenix, I submit herewith an analysis showing, by months, (1) the total tons dry weight, (2) the total ounces of gold contained, (3) the total ounces of silver contained, (4) the total pounds of copper contained and (5) the total gross value of this ore in place, computed at the average prices paid for the several metals during the period when these shipments were made.

It is my opinion that Seventeen Thousand (17,000) Dollars is a fair valuation of this group of patented mining claims.

Very truly yours,

Consulting Engineer.

ARIZONA DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA

~~December 10, 1957~~

February 6, 1958

To the Owner or Operator of the Arizona Mining Property named below:

BULLARD (Property) — COPPER GOLD SILVER (ore)

We have an old listing of the above property which we would like to have brought up to date.

Please fill out the enclosed Mine Owner's Report form with as complete detail as possible and attach copies of reports, maps, assay returns, shipment returns or other data which you have not sent us before and which might interest a prospective buyer in looking at the property.

PHOENIX, ARIZ. FEB 6 7 30PM 1958

FRANK P. KNIGHT,
Director.

Unknown

Mr. J. P. Smith
Heard Bldg.
Phoenix, Arizona

Analysis of Bullard Mine Shipments

March 1939 - July 1941

1939 Month	Tons Dry Weight	Total Oz Gold	Total Oz Silver	Total Pounds Copper	Total Gross Value
March	277.966	79.4712	139.6627	8505.24	3606.70 (*)
April	656.517	188.3411	247.9342	29940.57	9754.08
May	393.290	64.9061	184.6538	16829.43	4079.95
June	149.190	59.6750	61.5737	6535.61	2763.65
July	68.829	27.0263	28.8160	3805.69	1326.02
August	125.758	50.8146	40.6541	5499.61	2356.03
September	214.726	63.5158	75.7515	11436.13	3416.69
October	217.969	55.9233	82.8535	9566.47	2950.14
November	201.185	31.5762	70.7398	8296.20	1982.75
December	156.864	61.7750	82.7020	10652.66	3281.46
1940					
January	34.992	7.6982	20.2954	1728.61	489.18
February	29.402	14.0835	12.4958	1667.09	689.07
March	89.318	34.1008	35.3293	3268.39	1587.94
April	272.507	117.8133	131.6454	8023.13	5124.65
May	261.109	88.7952	77.0775	11730.64	4456.52
June	165.218	67.1117	58.2070	7450.15	3232.10
July	—	- -	- - -	- - -	-x-x-
August	212.683	81.1980	76.6580	9174.32	3933.47
September	105.324	53.5194	40.8277	5942.93	2297.87
October	279.267	62.1840	58.8132	10041.04	3352.62
November	80.662	19.6249	23.1956	2785.93	1018.15
December	91.015	49.3552	25.4527	5202.17	2324.35
1941					
January	219.454	126.0258	35.9178	10427.09	5844.11
February	196.461	86.4128	58.9060	7493.23	3909.46
March	234.020	94.5150	70.3069	12056.62	3590.34
April	236.405	98.0411	72.8835	9598.05	4567.77
May	167.385	37.5535	57.5679	7602.86	2214.57
June	158.880	80.8446	42.4385	8994.44	3876.06
July	145.680	77.2562	33.1929	6477.22	3459.56
	405	121	266	6499	

(*) Average price paid for metals:

	Gold Oz	Silver Oz	Copper Lb.
1939	$35.00	0.679	0.10
1940	35.00	0.71	0.113
1941	35.00	0.71	0.113

September 2, 1941.

BULLARD MINE

Cu, Au

Yavapai 13 - 7 T 8 N, R 8 W

[redacted] MINING JOURNAL - 4-30-42

[redacted] MINING JOURNAL - 7-30-42

NAME OF MINE: BULLARD
(6 mi. N. Aguila)

COUNTY: YAVAPAI
DISTRICT:
METALS: Cu,Au,Ag,Flux

OPERATOR AND ADDRESS: DATE:		MINE STATUS DATE:	
5/1/44	J. P. Klein, mine Supt. Aguila, Ariz.	5/1/44	Shipping
		6/44	Developing
10/44	J. P. Smith, Heard Bldg. Phoenix, Gen. Mgr. (Bullard Gold Mines, Inc)	9/44	Diamond drilling by U.S. Bur. Mines
		4/45	Idle

SMITH, J. P. - Deceased
Heard Bldg. 8-2-45
Phoenix, Ariz.

5-28-43

See BULLARD GOLD MINE, INC. * Re $20,000 loan application

VAN BUSKIRK, R. B. (LESSEE) & 10-6-42
BILL ALLISON → [illegible]

MINE - BULLARD- Aguila District, Yavapai County.