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03/20/90

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: DE SOTO

ALTERNATE NAMES:
PAT. CLMS. MS 1462 AND 1463
WHALE
COPPER LINK

YAVAPAI COUNTY MILS NUMBER: 1188A

LOCATION: TOWNSHIP 11 N RANGE 1 E SECTION 20 QUARTER NW
LATITUDE: N 34DEG 17MIN 07SEC LONGITUDE: W 112DEG 17MIN 09SEC
TOPO MAP NAME: BATTLE FLAT - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER
GOLD
SILVER
TUNGSTEN

BIBLIOGRAPHY:
USGS BATTLE FLAT QUAD
BLM MINING DISTRICT SHEET 10
YAVAPAI MAGAZINE MAR. 1918 P 4-6, JUN. 1918
P 4 SHARLOT HALL MUSEUM PRESCOTT, AZ
LINDGREN. W. ORE DEPTS OF JEROME & BRADSHAW
MTS QUADS USGS BULL 782 1926 P 162
ADMMR DE SOTO FILE
CLAIMS EXTEND INTO SEC. 17, 18, 19 & 20
GUITERAS, J.R. GOLD MINING AND MILLING USBM
IC 6905 1936 P 37
JAGGER, T.A. AND C. PALACHE USGS BRADSHAW MT
FOLIO 1905 P 5
ADMMR DE SOTO MINE & MAPS COLVO FILE

DE SOTO MINE YAVAPAI COUNTY

ABM Bull. 125 p 70
ABM Bull. 129 p 59

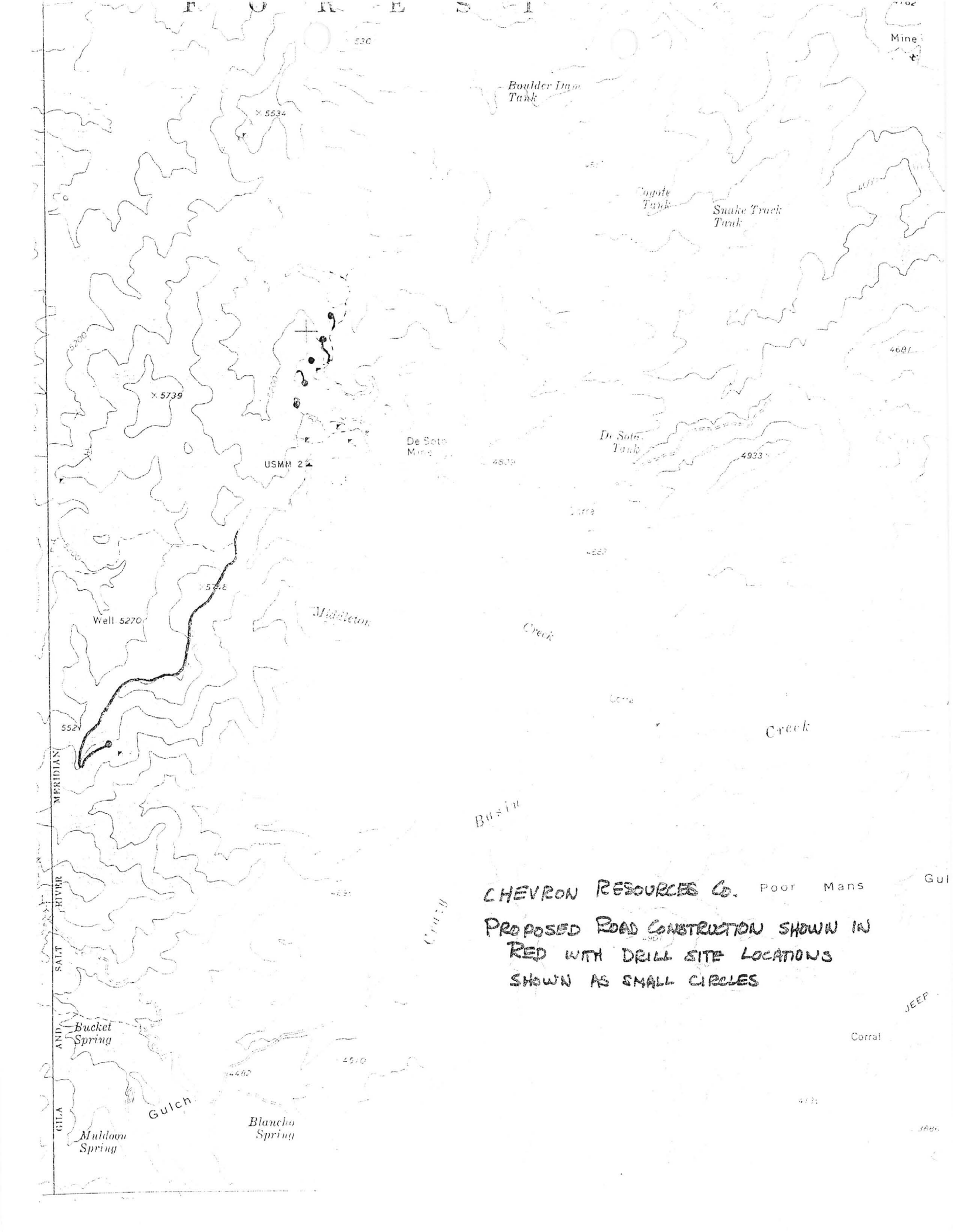
USGS Bull. 782 pp 146, 162-164
P.P. 610 p 50

I.C. 6905 p 37
I.C. 8236 p 65

Mining World - Oct. 1961 p 38

Production to 1930 $3,250,000 - major metal copper - J.W. Still figures corres. file

Arizona Mining Journal Issues of
July 1919 p 27, Aug. 1919 p 15
Oct. 1919 p 22, Dec. 1919 p 30
Jan. 1920 p 42, May 1920 p 53
Jan. 1921 p 6
June 1918 p 17,44



CHEVRON RESOURCES CO.

PROPOSED ROAD CONSTRUCTION SHOWN IN RED WITH DRILL SITE LOCATIONS SHOWN AS SMALL CIRCLES

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION FROM MINE CARDS IN MUSEUM

MM-9728 Unidentified

ARIZONA

Yavapai Co.

Cleator

DeSoto Mine

MILS #1188A
3. AKA's

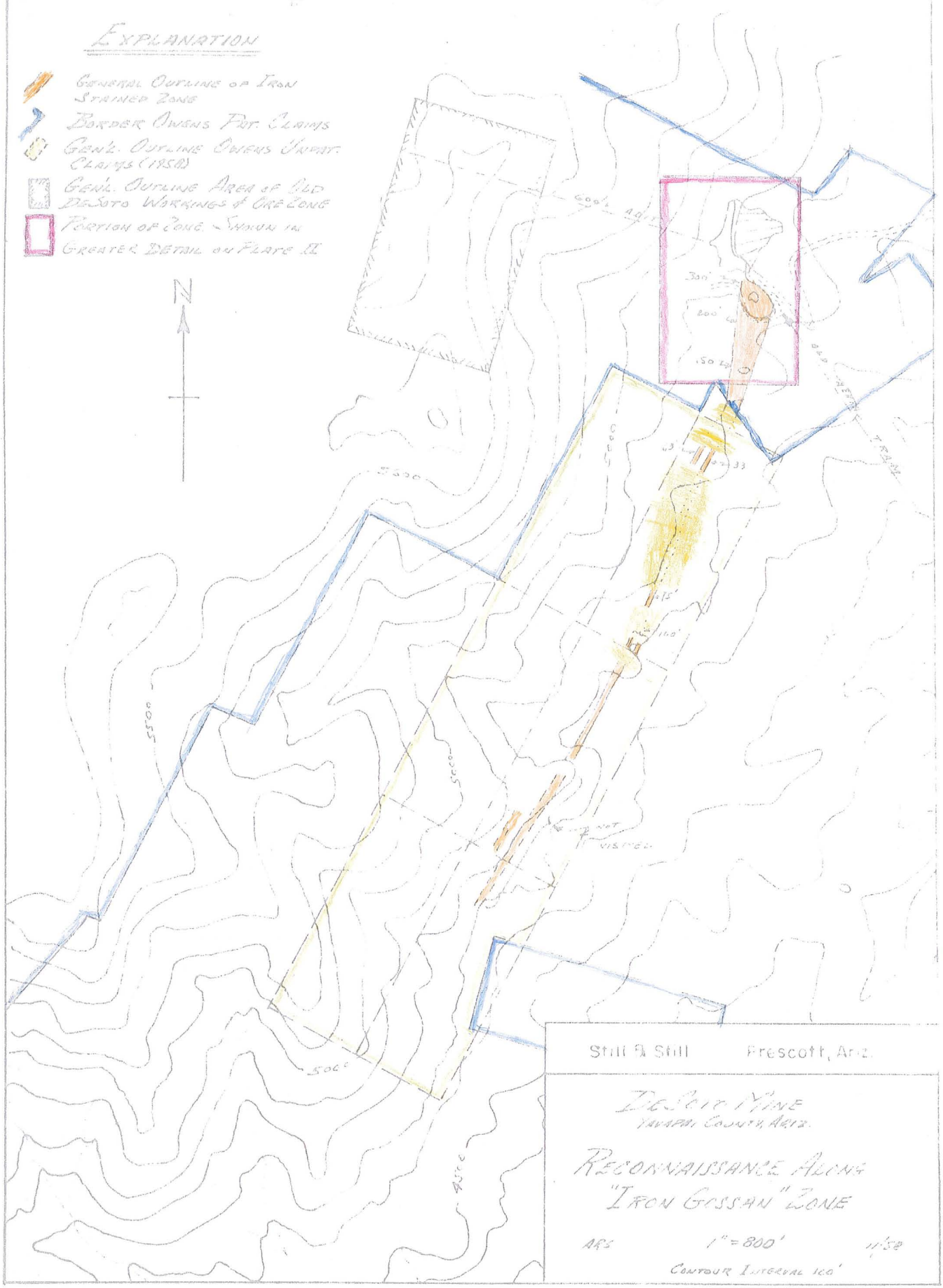

EXPLANATION
General Outline of Iron Stained Zone
Border Owens Pot. Claims
Genl. Outline Owens Invest. Claims (1858)
Genl. Outline Area of Old DeSoto Workings of Ore Zone
Portion of Zone Shown in Greater Detail on Plate II
N
5500
5000
4500
Not Visited
Still & Still Prescott, Ariz.
DeSoto Mine
Yavapai County, Ariz.
Reconnaissance Along "Iron Gossan" Zone
ARS 1" = 800' 11/38
Contour Interval 100'

PLATE I

Still & Still Prescott, Ariz.

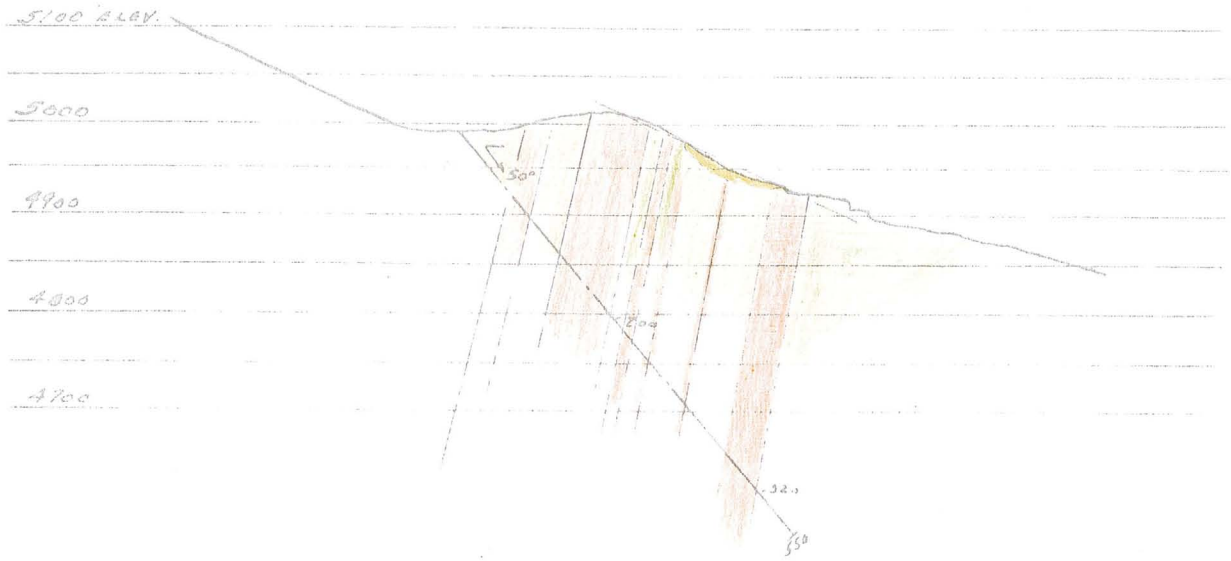
De Soto Mine
Yavapai County, Ariz.

Detail - North End Of "Iron Gossan" Zone

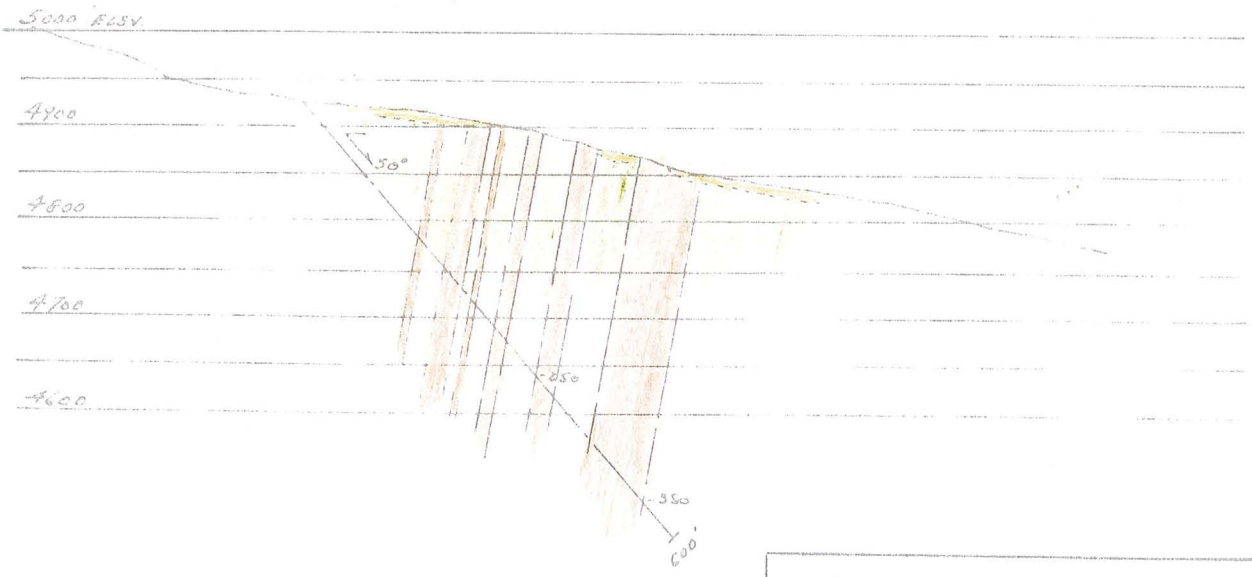
ARS 1" = 200' 1/58

CONTOUR INTERVAL 50'

PLATE II



SECTION A-A'
LOOKING N.E



SECTION B-B'
LOOKING N.E.

NOTE:
FOR EXPLANATION OF COLORS SEE PLATE II

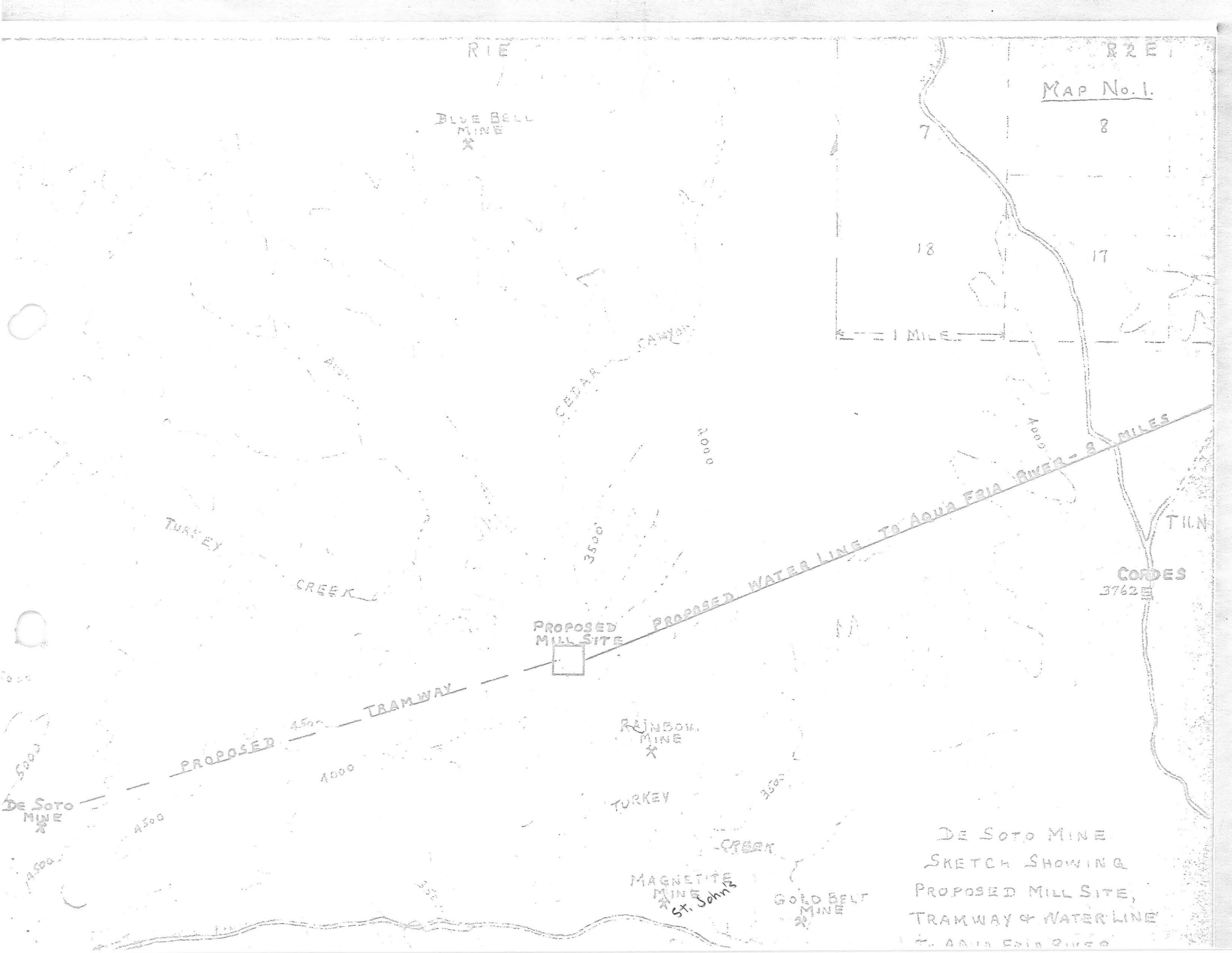
Still & Still Prescott, Ariz.

DE SOTO MINE
YAVAPAI COUNTY, ARIZ.

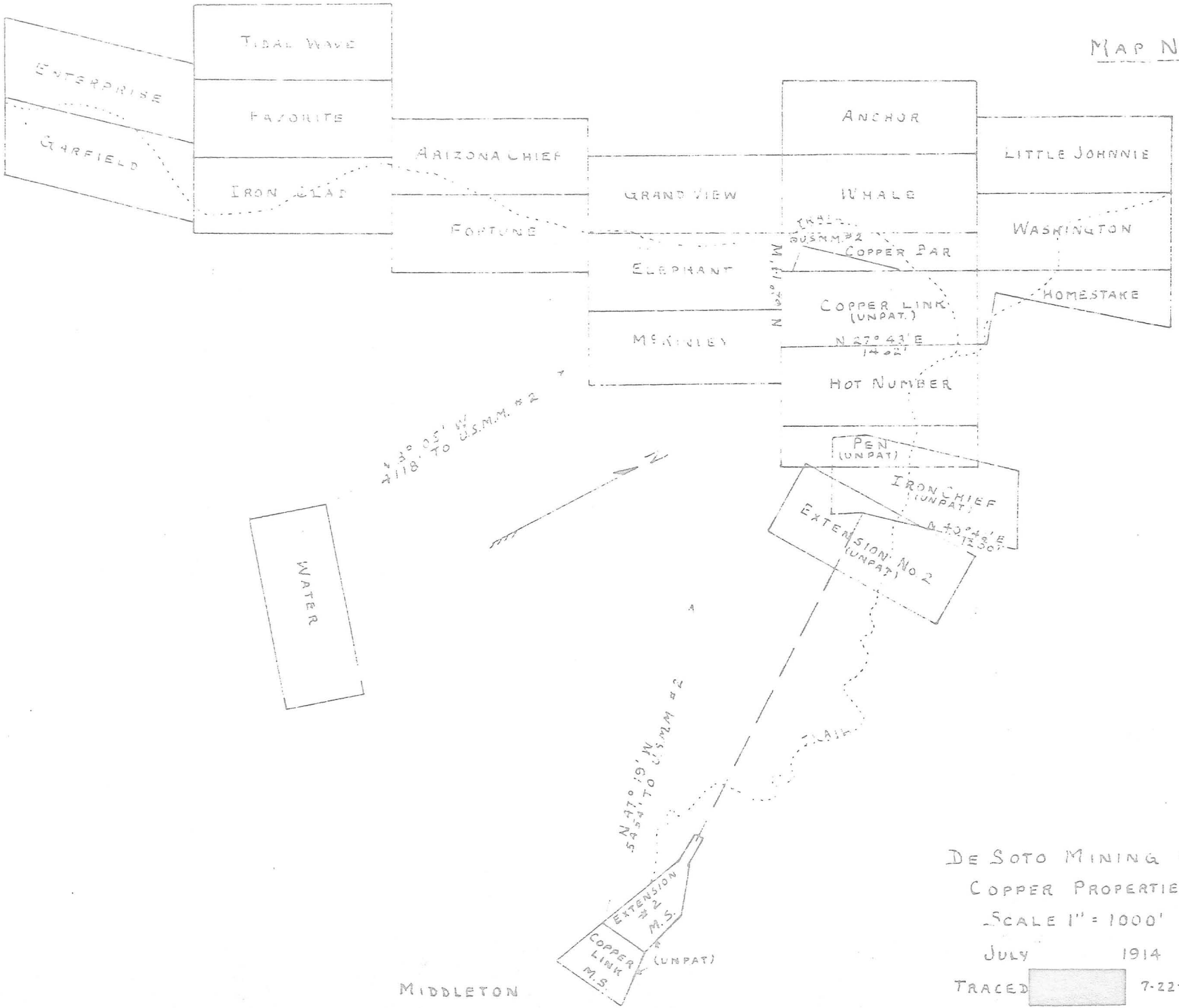
SECTIONS THRU PROPOSED
DRILL HOLES IN "IRON GOSSAN"

ARS 1"=200' 4/58

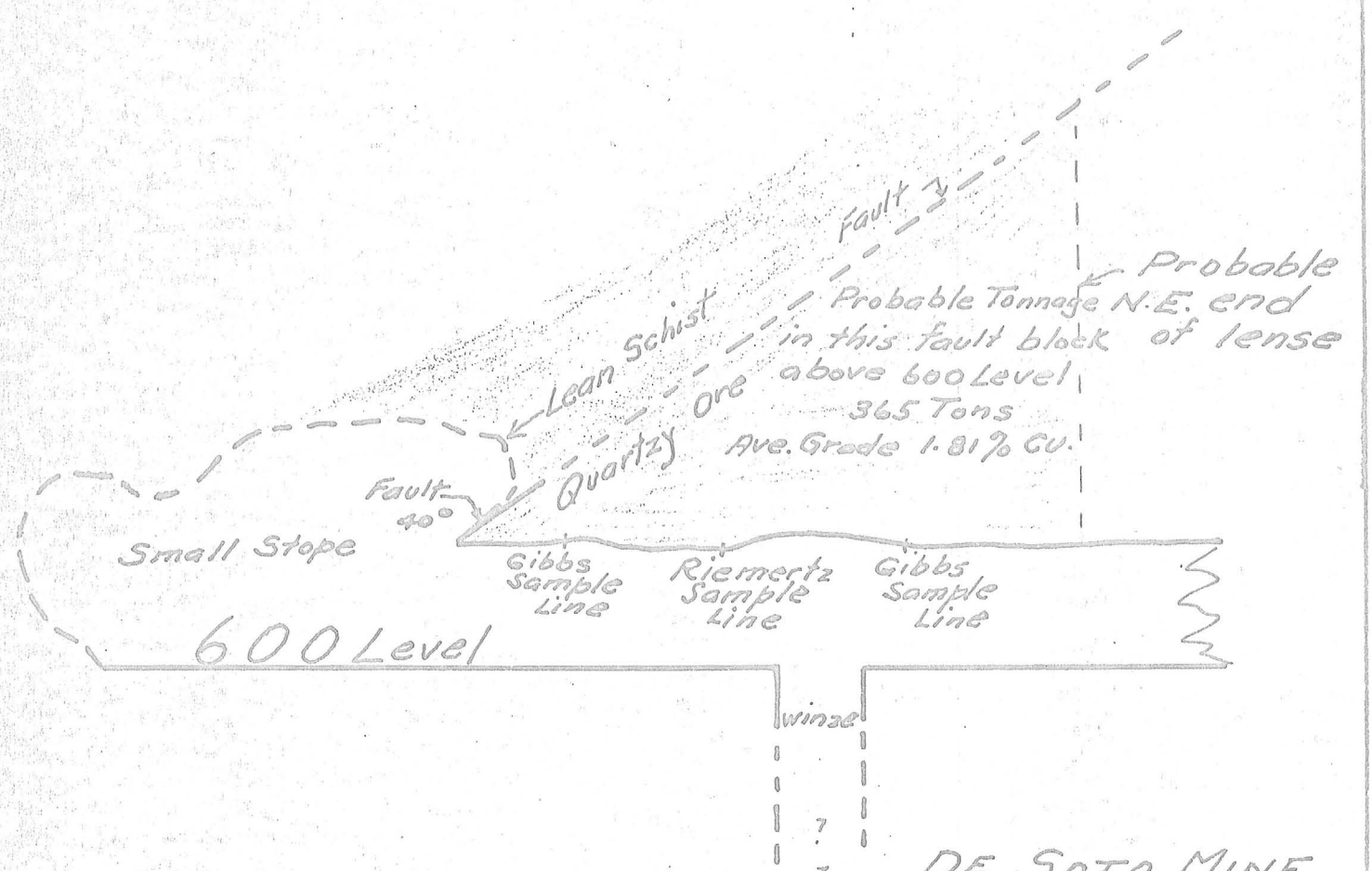
PLATE III


MAP No. 1.
7
8
18
17
1 MILE
BLUE BELL MINE
CEDAR CANYON
4000
3500
TURKEY CREEK
PROPOSED MILL SITE
PROPOSED WATER LINE TO AQUA FRIA RIVER - 8 MILES
PROPOSED TRAMWAY
RAINBOW MINE
TURKEY CREEK
DE SOTO MINE
MAGNETITE MINE
St. Johns
GOLD BELT MINE
CORDES
3762
TILN
DE SOTO MINE
SKETCH SHOWING
PROPOSED MILL SITE,
TRAMWAY & WATER LINE

MAP No. 2.



DE SOTO MINING CO.
COPPER PROPERTIES
SCALE 1" = 1000'
JULY 1914
TRACED 7-22-46

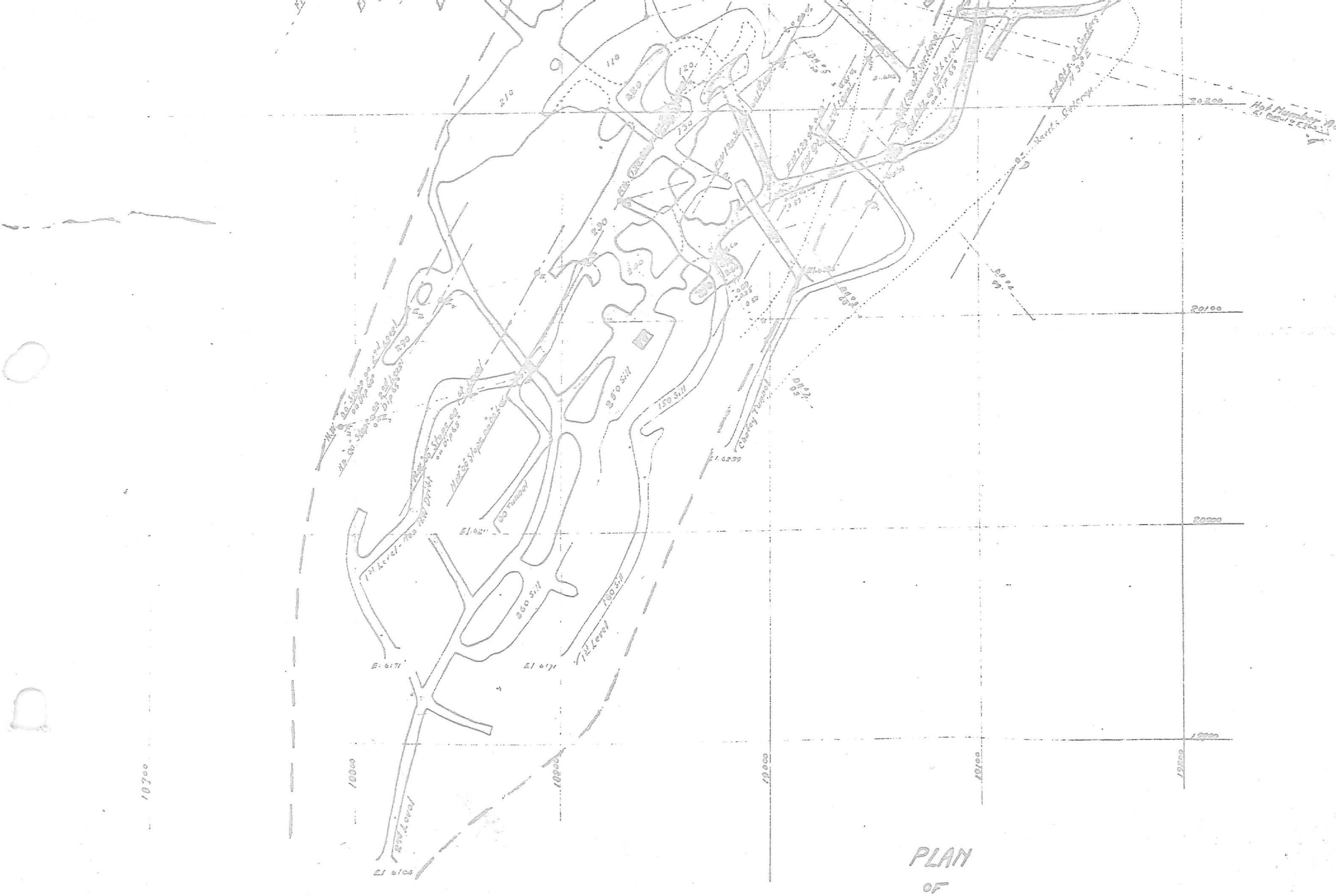


DE SOTO MINE
Part of 600 Level
Section A-A'
on
Plate No. 1'

Scale: 1"=10'

F. Gibbs. 5/18/59

Plate No. 2



— — Approx Outline of Low Grade Copper Body

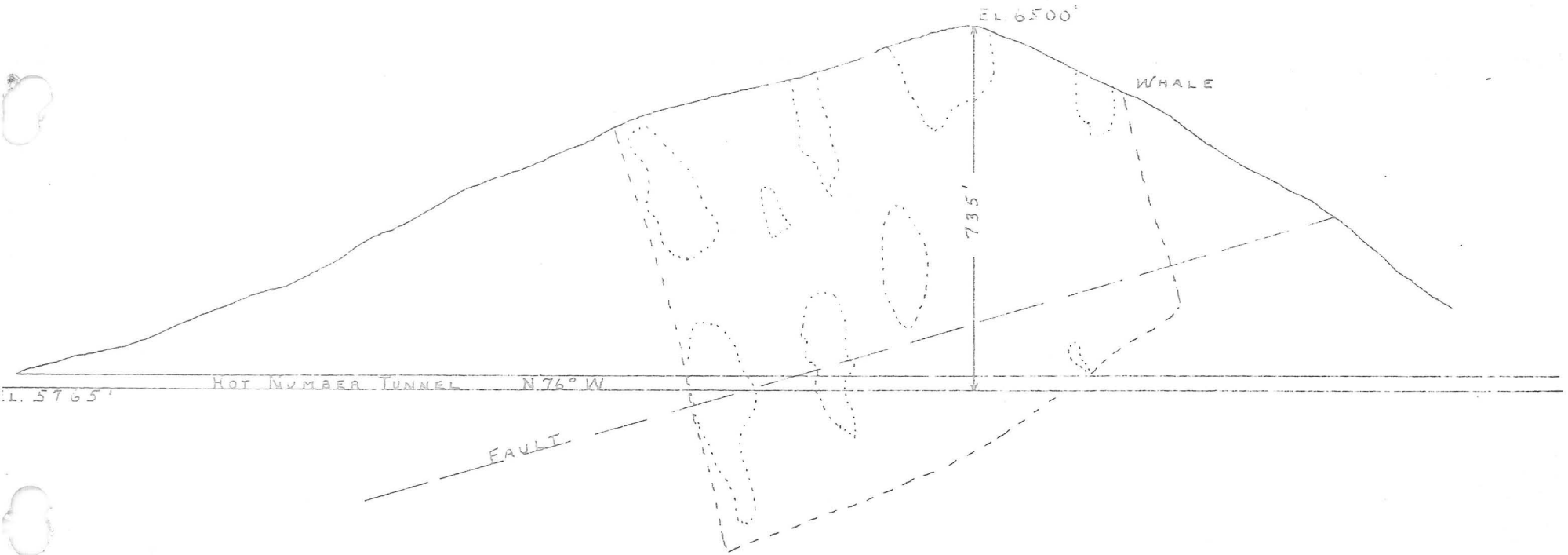
PLAN
OF
DE SOTO MINE
WORKINGS ABOVE 2ND LEVEL

Scale 1 in = 60 ft. Oct. 1st, 1920.

G.J.H.


Treadwell Shaft
El. 6262
N
Guthrie Tunnel
El. 6238
20400
20300
20200
El. 6215
El. 6202
110
120
210
250

MAP No. 5.



SECTION

LOOKING S 76° W

AREAS PARTLY STOPED

--- OUTLINE MINERALIZED AREA

— — FAULTS

DE SOTO MINE

YAVAPAI COUNTY, ARIZ.

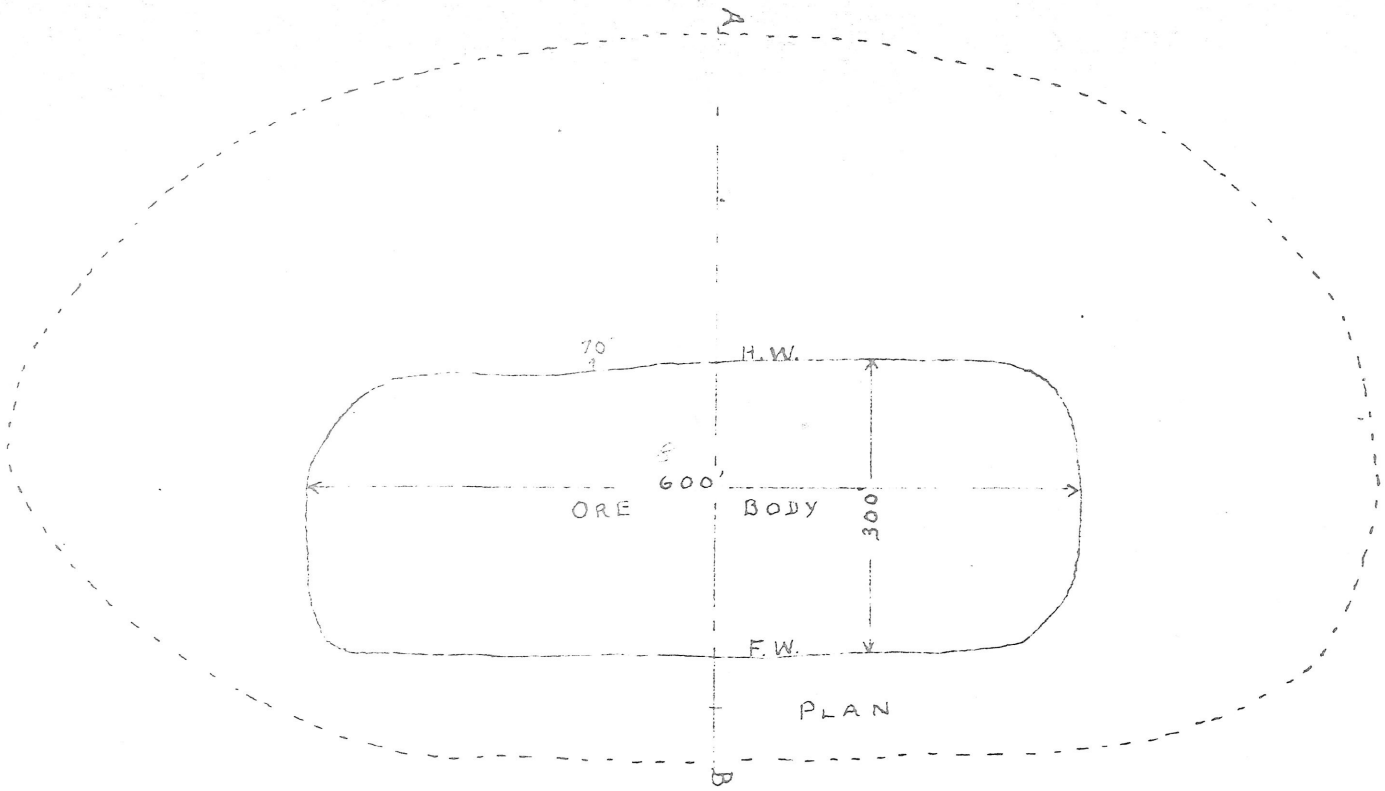
SCALE 1" = 300'

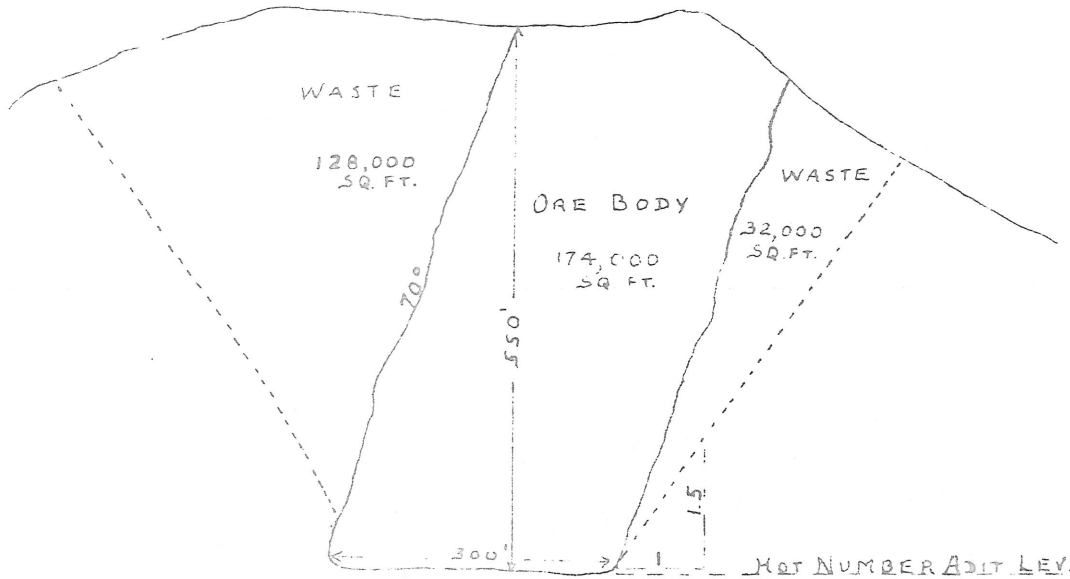
IDEALIZED SECTION BY

GEO. M. COLVOCORESSES

TRACED [redacted] 7-22-46

MAP No. 6.





SECTION A-B
LOOKING N-E

DE SOTO MINE
YAVAPAI CO., ARIZ.
SCALE 1" = 200'
SKETCH SHOWING GENERAL
OUTLINE OF ORE BODY AND
STRIPPING AREA.

7-24-46.

FEB02-9N

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: DE SOTO (f) & BLUE BELL (f)
2. Mine name if different from above:
3. County: Yavapai
4. Information from: Dick Mieritz

   Company:

   Address: 2940 N. Casa Tomas

   Phoenix, AZ 85016

   Phone: 277-6053

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

Mr. Mieritz reports that Pronto Exploration still has a lease on the De Soto mine. They have run up to the geology, geophysics etc. limit for exploration work counting as assessment work. This year they will need to do physical work on the ground if they wish to keep the property. Apache Stone continues to lease the Blue Bell and produce schist dimension stone from quarries on the property.

Date: February 1, 1989

Nyal J. Niemuth, Mining Engineer

DE SOTO MINE YAVAPAI COUNTY

KAP WR 8/31/84: A visit was made to the De Soto Mine, Yavapai County, Az. where Richard Lunden of Wallaby Enterprises reported he is supervising an exploration and drilling program for Pronto Explorations Limited, 3001 S. Tower, P O Box 45, Royal Bank Plaza, Toronto, Canada M5J 2J1. A Mr. James Proudfoot is directing the work for Pronto. Mr. Wallaby explained that over the period of late August 1984 and early September 1984 two years worth of assessment work was to be complete on the unpatented claims which are part of the patented De Soto patented property. Work planned (reportedly now completed - September 4, 1984) was to include drilling to intersect a possible gold-silver mineralized zone which has been predicted by geology and geochemistry. During the visit entrance was made into part of the underground development workings on the 100 and 200 levels which are both in fair condition. Both access the same large open stope. The walls and backs of the stope are slabbing. The drill target area is a pyritic zone on strike south westward from the old workings. The 600 level is open timber in good shape but making water. About 1-2 feet for water covers the floor of the drift and the collars of numerous winzes. Remains of an earlier copper leading operation remain on the surface of the dump at the 600 level. The wooden coarse ore bins of the old De Soto operation have partially tumpled down and deteriorated. Little is left of the old arial tram which carried ore down the mountain to the site of Middleton. Pronto is leasing the property from Sherwood Owens.

KAP WR 8/31/84: A note on the rumor page of the De Soto Mine (file) Yavapai County MG WR 12/17/82 mentions that Pronto Exploration is a subsidiary of Noranda. In fact Pronto is a member of a syndicate which has leased a potash deposit in Canada to Noranda.

NJN WR 12/21/84: Rich Lundin (c) visited and reported he's currently supervising a drilling program at the De Soto (f) and Blue Bell (f) Mines Yavapai County for Pronto Lmtd.

NJN WR 1/16/86: Rich Lundin (c) reported that Pronto Exploration Limited (c) has conducted a surface geochemical testing and surface drilling project at the DeSoto Mine, file, Yavapai County indicating near surface gold potential.

DE SOTO MINE YAVAPAI

Amoco Minerals has acquired the old De Soto Mine near Prescott. Mining Congress Journal, 2/76, p. 102

WR/MG 9/7/79 - Mr. Sherwood B. Owens, owner of the DeSoto reports a major company will begin drilling deep holes in the DeSoto-Binghampton area in about one month. 7/26/79 a.p.

CJH WR 12/12/80: George E. Travis, P.E. Consultant, 125 E. Whipple Place, Prescott Ariz 86301, phone 778-4568. Interested in the following mines in Yavapai County: Trails End, Indian Girl, Transcendent and DeSoto. Pulled mine files.

KAP WR 11/20/81: James M. Proudfoot of James M. Proudfoot LImited, 157 Campbell, Ave., North Bay, Onterio P1A 1W2, phone (705) 474-4728 reported he is working with Pronto Exploration Ltd. (a penny stock), Suite 3001 South Tower, Royal Bank Plaza, Toranto, Ontario M5J 5JI phone (416) 865-0005. He explained that they have leased the De Soto Mine, Peck District and plan exploration on the property.

MG WR 12/17/82: Mr. Sherwood B. Owens reports that Pronto Exploration, ~~a subsidiary of Noranda~~, holds options on his Blue Bell and De Soto mines in Yavapai County. Pronto is interested in the gold potential at Blue Bell and the copper potential at the De Soto.

KAP WR 2/18/83: An unconfirmed rumor was received that work is going on at the De Soto in Yavapai County.

Mrs. Manly said that four truckloads per day were going by her post office. Silica flux ore from the DeSoto mine still being mined by Dexter Broyles et al. FPK WR 6-4-69

Visited the DeSoto - shut down due to some litigation. FTJ WR 7-18-69

Interviewed Dexter Broyles who is shipping from the DeSoto. Having partner troubles. FTJ WR 1-23-70

Dexter Broyles and partner visited office re DeSoto which is still idle. FTJ WR 8-21-70

Dexter Broyles and son from Cleator visited office - he said the DeSoto had been turned back to Sherwood Owens. FTJ WR 1-1-71

Dexter Broyles, P. O. Box 216, Mayer, 86333, and associate were obtaining information regarding leaching. Broyles is Vice President & General Manager of Kyprus Mining Company and they have a lease on the DeSoto Mine. Mike Dibble, 29 Pima Plaza, Scottsdale, is President, Joe Wong is treasurer and Tom Sawyer is secretary. They also intend to mill sulphides at the Golden Belt mill. FTJ WR 8/9/72

Stopped at the Iron King mine and visited with Walt Statler who said Cutlass Exploration Ltd. (Canadian) were drilling on the DeSoto copper property west of Cleator.n GW WR 2-8-74

A Canadian group (Cutlass) is exploring the DeSoto group of claims. JHJ telephone conversation with Jack Pierce 3/27/74

Mr. Charles Skinner, Vancouver, B.C. came in for geologic information on the southern part of the Dome Rock Mountains. He and Charles Robbins are officials of Royal Aggasiz Mines Ltd. and Cutlass & Highland Mines and are presently drilling the old Desoto Cu property west of Cleator. GW WR 3-25-74

Mr. Ferrin, driller for Pinal mine report. He said Cutlass Mining Company of Canada had option on the Pinal and also the De Soto mine in Yavapai Co. FTJ WR 4-23-74

Went on to Walt Statler's assay office at the Iron King mine where he reported that Sonesta (Cutlass) of Vancouver were continuing drilling at the De Soto. GW WR 5-2-74

Sonesta Exploration Ltd. (subsidiary of Cutlass Mining, Royal Agassiz & Highland Star Mining) of Vancouver, B.C. is presently doing considerable drilling on the old De Soto copper property west of Cleator. GW AR 73-74

Cutlass is trying to sell their interest in the De Soto property. GW WR 1/23/75

DeSoto copper ore will be milled at a rate of 50 tpd at the Golden Belt mine and mill, mail address - Bumble Bee. FTJ WR 11-17-65

Visited Golden Belt Mill - plant shut down after milling a small stockpile. No one at mill. Road to DeSoto was blocked and all hands were trying to get a dozer to the job. Roads practically impassable. FTJ WR 1-21-66

Visited Golden Belt Mill - Larry Weisman, supt. of mill. Mill running 2 shifts @45 tpd, but was shut down due to "out of ore" from DeSoto. 4 men employed at mill. Work at DeSoto interrupted because of compressor breaksown. Most of work on 600' level preparing shrink stopes. Pulling already broken ore from the 550' where an estimated 20,000 tons of 2% grade ore is available. It expected to ship oxide ore (from 550' level) to Hayden as fluxing ore ranging about 2% Cu plus $3-$4 Au and 4 oz. Ag. 18 men working in mine, including timbermen and truck drivers. The work force is to be cut about half when repairs and chutes are completed. FTJ WR 3-18-66

Visited the Golden Belt Mill. Work at the DeSoto and Golden Belt has ceased. Dexter Broyles has sold his interest and the remaining group are trying to refinance. FTJ WR 5-20-66

The DeSoto mine has been leased to Arizona Yavapai Mining Co., Inc., 3223 S. Robinson, Oklahoma City, Oklahoma. South Wire Co. of Atlanta figures in the deal. Details were not known. FTJ WR 9-23-66

Arizona Yavapai Mining Co. are trying to finance further work on the DeSoto. FTJ WR 11-18-66

Interview - learned Boyles Bros. Drilling Co. were moving drill to DeSoto mine for exploration in behalf of South Cable Co. of Atlanta, Georgia. Address not known. FTJ WR 1-20-67

Drilling at the DeSoto has discontinued. FTJ WR 3-24-67

Henry Childs has leased the DeSoto. Road Impassable without four wheel drive but it is understood he will attempt a leach operation. Two men employed. FTJ WR 5-19-67

DeSoto is idle due to shut down of the smelters. FTJ WR 9-22-67

DeSoto mining and stockpiling 20 tpd. Dexter Broyles is in charge of the work. FTJ WR 5-24-68

DeSoto is in litigation - 2 men working and stockpiling ore. FTJ WR 9-20-68

D. L. Davis report on DeSoto - American Copper Corp. operator of DeSoto - 30M-40MT broken ore - 1.5-4 mil ore in walls of stope. Excellent exploration project. Ore in sight to pay for most of cost of exploration. DeSoto working 200T/mo - ship to El Paso. FPK Note 12-16-68

DE SOTO MINE YAVAPAI COUNTY

The Chilson Mining Company, headed by R. E. Chilson of Tucson, Arizona, has a small crew employed in preliminary work at the old DeSoto mine, not far from Mayer, Arizona. The company proposes to mine the old pillars and fringe material in the upper part of the mine, then recover the copper by a modified form of heap leaching. The ore will be broken up, pushed into the old Glory hole, then leached by water percolation, with precipitation of the pregnant solution in launders in the tunnel. Mining World June 1960

Mr. Phil Reasoner at his "Rock Originals" shop at Cleator reports that the DeSoto mine leach operation (Chilson) is active, with a crew of 4 men, and has made several truckload shipments of cement copper. TPL WR 8-13-60

Learned at Cordes ASMOA conference that Dick Chilson is shipping out 5-6 tons of copper sludge per week from his leach operation at the DeSoto, said to assay 80% Cu. TPL WR 1-28-61

Learned at Cordes that Dick Chilson has discontinued his DeSoto leach operation and that Mettler Bros. recently drilled 2 holes for Allison. Property now idle. Visited Golden Belt mill near Cleator. Lewis Development Co. had the mill in operation running some DeSoto dump material. TPL WR 4-15-61

The DeSoto copper leach project which suspended for a time will resume with Chilson associated with 2 partners - Roberts and Kappedell. TPL WR 9-26-61

Newt White at Cordes advised that Chilson is resuming work at the DeSoto. The project is now a partnership composed of Roberts and Kappedell and Chilson - all residents of the Tucson area. The road to the mine has been improved and equipment has been sent in to conduct a new program of breaking into the various pits the material which surrounds the pits and then leaching by downward percolation to the main adit. TPL Memo 9-26-61

Visited Mr. & Mrs. Reasoner at Cleator and talked with Mrs. John Slak. Learned that Dick Chilson et al have resumed the DeSoto leaching operation following suspension last spring. TPL WR 12-2-61

This property active Feb. 1962 - 3 men working

Learned that leaching operations are continuing at the DeSoto mine. TPL WR 5-26-62

Dick Chilson was working for Stovall, as supt., before Dec. 1962, so work at the DeSoto must have stopped before that. EGW 7-16-64

Broyles Bros. and a ? Collins are chloriding a small high grade (15%) vein at the DeSoto mine. Small shipments made to Miami. FTJ WR 7-23-65

Visited DeSoto mine - no one working or at property. Broyles & Wiseman suspended operation to set up mill at Golden Belt. FTJ WR 9-17-65

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine DeSoto - Cu Date June 3, 1960

District Peck, Yavapai County Engineer Travis P. Lane

Subject: Visit of May 25, 1960.

Status: Producing.

Property: The DeSoto group of patented mining claims in the Peck Mining District is located on the top of the ridge separating Peck Canyon from Crazy Basin. The workings are high above Middleton, a former station on the Crown King and Prescott RR, to which it was connected by aerial tram. This section of the railroad was abandoned and the tram destroyed by fire many years ago. The mine is reached by 5 miles of steep road taking off from the Cleator-Crown King road at a point about a mile down grade from Middleton.

Owner: Sherwood B. Owens et al of Tucson.

Operator: R.E. Chilson d.b.a. Chilson Mining Co., 8350 Tanque Verde Road, Tucson.

History and Production: The property began ore production about 1890 and produced substantially, and more or less continuously, until about 1926. This mine and the nearby Blue Bell mine were operated in conjunction with a smelter at Humboldt and they were the principal ore suppliers for the smelter. The mining and smelting operation in its long history has passed through many vicissitudes - prosperous periods, shutdowns, reorganizations, etc. The last substantial work was done in 1929 when the Sheldon Mining Company acquired control from the Southwest Metals Co., and began rehabilitating the smelter, etc. However, the depression intervened and, except for a short period of leaser production (terminated when the tram burned), the property made no production until this year when R. E. Chilson initiated a leaching operation in the old workings. Arizona Bureau of Mines Bulletin 140 (1931) lists the total value of past production at $3,250,000 (18,200,000 lbs. Cu, $250,000 Au and $150,000 Ag).

Description of Property: The ore occurs as lenses in chloritic Yavapai schist in an ore zone approximately 350' long by 200' wide. The schist bedding strikes about 25° NE and dips steeply northwest. The principal workings consist of a shaft 1000' deep with 4 adit levels. The main adit is the 600' level of the shaft and the major production of the mine has been derived from seven overlapping and close together ore lenses above this level. Mining was principally by glory hole method. The ore is principally pyrite-chalcopyrite with a considerable amount of oxidized copper mineralization.

Toward the end of 1959 R. E. Chilson, operating as the Chilson Mining Co., began setting up a plant to extract copper from the croppings and old workings by a combination of leach-in-place and heap-leach methods. The plant consists of a compartmented precipitation box of concrete block construction, a high pressure pump driven by 60 HP motor, and a mixing box and sump. These are located on the dump a short distance out from the main adit portal. Other equipment consists of a Diesel-generator set, a bulldozer and miscellaneous pipe and tools. Barren solution flowing from the tail of the box is brought up to proper acid strength by addition of sulphuric acid and is then pumped through 2" plastic pipe up the steep hill surface to discharge into the openings at the top of the mine and trickle down through the workings. Maximum pumping head is 600'.

Pregnant solution is collected in settling ponds in the lower adit level and flows out

the adit and into the head of the precipitation box. The precipitant is iron in the form of cans, scrap iron and bailing wire. At the time of this visit the boxes were choked with cement copper sludge and Chilson was preparing to clean up and ship the product. The quantity of cement copper on hand was estimated at from 8 to 10 tons with copper content upwards of 80%.

Water is obtained by pumping from the shaft below the main adit level. The shaft had been filled by run-in of rain and snow water. Continuity of operation in the future apparently will depend upon seasonally collecting an adequate volume of water. Two men are employed, and Chilson works also at the time of his frequent visits to the mine.

DeSoto #1

NOTICE OF INTENT TO OPERATE
(F.S.M. 2817.1)

SEP 24 1980

TO: District Ranger, Bradshaw Ranger District,
Prescott National Forest

Address

PRESCOTT, Arizona

FROM: Operator: CHEVRON RESOURCES Co.
Name

P.O. Box 4001
Address

GOLDEN, COLORADO 80401 303-279-8692
Address Telephone No. 279-7431

Pursuant to 36 C.F.R. Part 252, the above Operator proposes to conduct operations at the site shown on the attached map on the following mining claim(s): PATENTED SURVEY: #1463, 1462, #1534 (DeSoto mine)
UNPATENTED: Owens Lode #1-18 (inclosive), Mckinley Ext. #1-6 (inclosive)

which ~~is~~ are within the approximate area of Sections 30 & 31, Township 11 N., Range 1 E, G&SRB&M, Yavapai County.
and Sections 5 & 6, Township 10N., Range 1 E.

1. Access

The route of access to the area of operations is shown on the attached map. The means of transportation is by truck and pickup
(4-wheel drive, helicopter, etc.)

Construction and/or improvement (using machinery) of the access route (is) (~~is not~~) needed as a part of this operation.
(circle one)

2. Operation

The nature, in some detail, of the proposed operation, especially all surface disturbing activities, is as follows (use extra sheet if needed):

Repair existing access road into the DeSoto mine, installing water bars where necessary. Construct 7000' of drill road (as shown on attached map) and six drill sites - all except 800' of road and five drill sites being on patented mining claims. Core a minimum six drill holes from these constructed sites, using truck mounted drill.

We would like to begin the above operation by October 15 1980, and believe that approximately 14 weeks will be required to complete it.

9/24/80
Date

R D Luethe R. D. LUETHE
Signature of Operator
FOR CHEVRON RESOURCES CO.

STILL & STILL
CONSULTING MINING ENGINEERS & GEOLOGISTS
ROOM 24 - UNION BLOCK PRESCOTT, ARIZONA

J. W. STILL
ARTHUR R. STILL

TELEPHONE 658
P. O. BOX 1512

December 5,1958

Mr. D. K. Kentro, Ass't. Vice Pres.
Shattuck Denn Mining Corporation
Prescott, Arizona

Re: "Iron Cossan", De Soto Property
Yavapai County, Arizona

COPY

Dear Mr. Kentro:

As per your instructions of October 27th, we have examined the "Iron Cossan" that occurs adjacent to the old De Soto mine workings. This zone was called to your attention by Mr. Sherwood D. Owens, the owner of the De Soto patented claims and also of new unpatented claims recently laid out to cover the bulk of the "Iron Cossan" area. The following briefly summarizes our opinions and conclusions regarding this structure.

Summary & Recommendations:

As shown in over all aspect on Plate I, attached, there does exist a limonite stained zone of highly siliceous and magnetiferous schist that, in general, parallels the ridge upon which the De Soto orebodies occurred. This zone is some 300 feet wide where cut off by a fault on its north end, it narrows to a width of about 200 feet some 1,000 feet to the south but it persists for at least an additional 3,000 feet, to the southwest, beyond that point.

The fact that this zone is a development of alteration of carbonaceous pre-Cambrian metasediments is obvious, but the question of whether it is a product of regional metamorphism or of more direct hydrothermal activity is not readily apparent.

De Soto Yav

While, based upon the evidence at hand, I am inclined to think that this magnetite rich zone is probably due principally to regional metamorphism, and would thereby have little potential from a base metals point of view, the possibility still remains that it may represent the upper most part of a very sizeable zone of hydrothermal mineralization. Due to its size, persistance, accessibility and proximity to your firms operations at Humboldt I have herein recommended that at least one, and preferably two, diamond drill holes be drilled to test its economic possibilities. The drilling, and a small amount of bulldozer road building which will be necessary if the second hole is to be drilled, is estimated to cost approximately $ 9,000. This drilling is recommended if an equitable option can be negotiated without an entrance fee. However, the potential of the structure is questionable to the extent, in my opinion, that it does not warrant paying Mr. Owens for the privilege of testing the ground.

General Discussion:

The large limonite stained zone that occurs on the Owens claims near the old De Soto mine is quite impressive at first glance but becomes less so under a more diligent study. One's immediate impression is that this zone represents a sizeable gossan of limonite after pyrite, that it extends over a relatively unbroken width of some 300 ft. on the north end and that, due to its proximity to the previously exploited De Soto orebodies (*), its potential should be quite large. However, upon a closer study it becomes immediately obvious that the

(*) Seven ore shoots, most of which bottomed against flat faults. Total production 1890-1930 (Ariz. Bur. Mines Bull.#140) of 16,200,000 lbs. copper plus $ 400,000 combined gold & silver.

De Soto Year

oxidation of the outcrop extends to a depth of only three or four feet and that, there unoxidized, a very siliceous and chloritic material that is rich in magnetite and garnet but very meager in pyrite is revealed. In addition to the above evidence that essentially all of the limonite in the outcrop is after magnetite, rather than pyrite, no visible copper minerals, or copper staining, can be found and mapping of the widest portion of the zone (Plate II) shows that it is actually made up of a series of bands, separated by lesser metamorphosed metasediments, that are probably repeated in the outcrop in this area by folding.

In all, the zone has the aspect, to me, of most probably being merely a band of high magnetite-garnet schist that was developed by the regional metamorphism of calcareous pre-Cambrian sediments. Other such zones occur within the Yavapai schist in the Bradshaw Mountains province, although they normally do not weather to yield so much limonite.

However, as against the above reasoning, there is some evidence that would indicate that this zone just might be due to hydrothermal alteration, either in its entirety or superimposed over an area that had already been highly altered by regional metamorphism. These factors are 1) the presence of some copper and silver in the outcrop (as revealed by assay), 2) the fact that this zone stops very abruptly (probably against a fault) on its north end and no continuation can be found on to the north and 3) its very proximity to the De Soto area of copper mineralization.

Five samples were taken of outcrop material, as shown on Plate II, their results being as listed in the table on the following page.

D. Soto Yar

Assays From Surface Samples
(Run by Iron King Lab)

Sample No.	Width	Type	Au (oz)	Ag(oz)	%Pb	%Zn	%Cu
DS - 1	30 ft.	Chip-channel	Tr	0.075	Nil	Nil	0.02
DS - 2	30 ft.	" "	Nil	Tr	"	"	0.02
DS - 3	60 ft.	" "	Tr	0.050	"	"	0.02
DS - 4	Grab sample of relatively unoxidized material		Tr	Tr	"	Tr	0.04
DS - 5	150 ft.	Chip-channel	Nil	Tr	"	Nil	0.02

While the assays of these samples are indeed not high, they do indicate that some copper and silver are present and that some gold and zinc might possibly be indicated. Also of interest is the fact that all of the samples of "gossan" are uniform in their copper content and that the one sample representing relatively unoxidized material contains twice the copper content of the "gossan".

The very sizeable lateral extent of the zone, in conjunction with its accessibility for drilling and its proximity to Humboldt that would make for cheap supervision of a short exploration project, make the structure worthy of a drill hole or two even though the evidence indicative of a true hydrothermal origin is not strong.

It is my recommendation that at least one diamond drill hole, but preferably two since the results from a single hole may be uniquely misleading, be drilled as shown on Plates II and III. The information from this drilling should be sufficient to clearly indicate the mode of origin of the zone and, thereby, give more definite data on which to actually evaluate its ultimate potential. Because of the high magnetite content indicated in the outcrop, assays should be run for iron on any high magnetite sections of the core since it is possible that this

De Soto Yav

material might prove to be of some economic importance by itself.

I would estimate that the cost of drilling the two proposed holes would be as follows:

Road Building (road clean up on way in and prepare road to site B-3')....	$ 300
Drilling of 1,150 ft. (BX) at $6.50/ft....	7,475
Supervision, core logging & evaluation....	750
Assays, core boxes & misc. expenses....	500
	$ 9,025

Conclusion:

Even though it is my opinion that this zone is most apt to be attributable to regional metamorphism, that fact cannot be definitely established on the basis of the evidence at hand. If proven to be due to hydrothermal mineralization, due to the very size of the structure the ultimate potential could be quite large. Although this venture is somewhat speculative, the limited program recommended herein is, in my opinion, warranted by the possible prize.

Very truly yours,

Arthur R. Still
Mining Geologist

ARS/

DEPARTMENT OF MINERAL RESOURCES
State of Arizona
MINE OWNER'S REPORT

Date Aug 9, 1972

1. Mine: De Soto
2. Location: Sec. 31+32 Twp. 11 Range 1E Nearest Town Cleator Distance 7 mi
   Direction SE Nearest R.R. Humboldt Distance 28 mi
   Road Conditions Poor from mine to Crown King road.
3. Mining District and County: Peck Mining dist. Yavapai.
4. Former Name of Mine: same
5. Owner: Sherwood B. Owens et al of Tucson
   Address: 5140 E. Mission Hill Rd., Tucson.
6. Operator: Kyprus Mining Co Mike Dibble, Pres. Joe Wong, Treasurer.
   Address: 29 - Pima Plaza Scottsdale and P.O Box 216 Mayer, AZ 86333
7. Principal Minerals: Cu. minor amts Au Ag. (Dexter Broyles VP + Gen Mgr.
8. Number of Claims: Lode — Patented Unpatented
   Placer Patented Unpatented
9. Type of Surrounding Terrain: Rugged

10. Geology and Mineralization: lenses of Chalcopyrite and oxides of Copper in Chloritic Yavapai schist.
    Operators plan to leach ov broken stopes, said to be Considerable and to mine sulphide ore to be milled in Golden Belt Mill

11. Dimension and Value of Ore Body: Ore zone 300' length by 200' wide 1000' Shaft. Main adit is 600' level.

Please give as complete information as possible and attach copies of engineer's reports, shipment returns, maps, etc. if you wish to have them available in this Department's files for inspection by prospective leasors or buyers.

(over)

12. Ore "Blocked Out" or "In Sight":

Ore Probable:

13. Mine Workings—Amount and Condition:

No.	Feet	Condition
Shafts		
Raises		
Tunnels		
Crosscuts		
Stopes		

14. Water Supply:

15. Brief History:

16. Remarks:

17. If Property for Sale, List Approximate Price and Terms:

18. Signature:

(over)

DE SOTO MINE

YAVAPAI COUNTY
BIG BUG DIST.

TRAVIS P. LANE - WR - 10-31-59

Learned at Iron King Mine that the company is drilling a portion of the De Soto Mine (not the main workings) under an agreement with the owner, S. B. Owens. I learned also that Dick Chilson of Tucson, is planning a leaching operation in the old workings.

TRAVIS P. LANE - WR - 10-31-59

Visited Newton White at Cordes store to report on specimen he had presented for identification, also to check on regional activity. He said that Shattuck-Denn had terminated diamond drilling at the De Soto property - one hole 600' deep (?). Also, Chilson is going ahead with his project to leach in place a portion of the De Soto deposit. Chilson has arranged to use the Gold Belt Camp as headquarters.

Visited the DeSoto Mine. Dick Chilson (R.E.Chilson, 8350 Tanque Verde Road, Tucson) is operating here as the Chilson Mining Co. He proposes to mine the pillars and fringe material in the upper part of the mine. He will break this material and push it into the old glory hole where it will be leached by water percolation (with perhaps the addition of some acid at times). The solutions will drain out through a deep tunnel. He plans to precipitate the pregnant solution in launders in the tunnel and thus reduce moisture loss by evaporation. As leaching of a batch is completed the leached material will be pushed off the top of the base of the inverted cone of the glory hole and a new batch of ore piled on top of the material remaining in the cone. The operation therefore will be a modified heap leaching method. His main problem is a supply of water at this high dry location, but he anticipates collecting enough run-off and snow water in the deep shaft workings to tide over the seasonal dry periods. At the time of visit a truck with heavy equipment blocked the high steep very muddy road near the mine. The crew consists of three men who live at the Gold Bar mine camp on the Cleator road some 5 miles below the DeSoto Mine.

TRAVIS P. LANE - WR - 1-30-60

COPIED FROM:

BRIEF ON ICC HEARING TO ABANDON MAYER RAILROAD - 8-6-57

Page 2

WITNESS SHERWOOD B. OWENS, Mine Owner and Operator during the past 15 years, with mining interests over entire State of Arizona, testified (316-17), in substance:

Presently, is the owner of the De Soto Mine in the Big Bug District about 12½ miles from Blue Bell siding (317-18-45-6). Said mine is being developed under lease arrangement by the De Soto Copper Corpn., which was formed in December 1956, and actual work began about January 15, 1957 (318-19).

The De Soto was first operated in about 1890. It produced slightly in excess of 300,000 tons of pretty good grade ore until 1926 (342-3).

The present management appropriated $250,000, aside from money I previously expended, to determine the ore reserve (319). After preliminary investigation of ten months, conclusion was reached that there was better than a 50-50 chance of developing a six million plus tons ore body of one percent copper (320-25).

From January 15 to May 31, 1957, slightly more than $70,000 were expended (321), leaving roughly $180,000 of private money still on hand (348).

The witness described the methods being used in developing the mine; the first stage of the work has been completed, and 350 to 400 samples taken which practically completes the sampling on the 600-foot level. While it has cost a lot of money, the management is more than satisfied (320-1).

Open-pit operation is proposed with a mill to produce 2,000 tons of concentrates daily which will be shipped to El Paso (325). The open-pit possibilities have not been completely explored but they will be determined by drilling and sampling the mine. Presently, sufficient quantity of good grade ore justifies underground operation (326). In the event it develops that open-pit operation is not feasible, lesser tonnage of high grade ore, ranging from 2,000 to 2,500 tons per month, will be produced by underground mining (325), employing 25 to 30 people (336).

Page 3

Under present conditions, our engineering estimates overall costs of placing the property and mill in operation will be between 6½ and 7 million dollars, of which the 2,000-ton mill will cost approximately 3½ million dollars, of which the 2,000-ton mill will cost approximately 3½ million dollars (332). The effects of the present development work in the De Soto Mine must be obtained not later than May 1, 1958, (336-7).

The Blue Bell Mine, four and one half miles from end of track at Blue Bell, owned by the witness, Sherwood B. Owens, has opened up outstanding area of direct smelting ore (326-7). Exploration work has developed 35,000 to 40,000 tons of high-grade siliceous ore running 2.5 to 2.9 percent copper. As the witness is furnishing fluxing ores for American Smelting and Refining Company, he is in position to ship this ore. Qualified engineer has made complete study of the mine. There is no question but that it can be substantial producing mine by further expenditure of $50,000, which is going to be made (327-8).

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Flux is simply low grade ore which is of value to smelter because of content of other metal (341).

In the past, the Blue Bell Mine produced and shipped over one million tons of commercial ore over the two loading ramps at Blue Bell which are still there, thus making perfect loading situation (329).

During World War II it shipped about 20,000 to 25,000 tons of ore (350).

The plans of the owners for the development of both the De Soto and Blue Bell Mines took into consideration availability of railroad service from Blue Bell (229). Cost of trucking to Humboldt, instead of to Blue Bell, would be approximately 96 cents per ton compared with rail charge of 28 to 30 cents per ton (330). Continuation of rail service from Blue Bell is absolutely vital to successful operation of the De Soto and Blue Bell Mines not only for the outbound movement of ore and concentrates, but for the inbound movement of machinery and supplies (331).

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The Iron King and Blue Bell Mines were formerly owned by the Consolidated Arizona Smelting Co., which owned the former smelter at Humboldt, which company went broke (333-42-43). The Iron King Mine was reopened in 1942 by the Shattuck Denn Mining Corporation since which time it has been continously in operation, and presently making a small profit, although the price of zinc is much depressed (333-34).

While the De Soto and Blue Bell Mines were previously shut down, it was not because the metals therein were exhausted (353-4).

It would require 12 bob-tail trucks to haul the ore or concentrates to Humboldt because of the longer distance, while only three such trucks can perform the same service to Blue Bell (354-55).

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Other principal producing mines tributary to the line between Iron King and Blue Bell, incl., are the Bing Hampton, Copper Queen, Hackberry, Butternut, Minor, Stoddard, Golden Turkey and Silver Cord (376-7-8-9-80-.

The Nipponese Mining Co., Ltd., which is Canadian capital, has an option on the Bing Hampton and Copper Queen Mines. During three or four months in 1956, the properties were being diamond drilled to determine the size of the ore bodies and the grades thereof (382-3).

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The Hackberry Mine has a good long-range chance; not in the next three years, unless the price of lead and zinc increases. Then there might be considerable activity, depending more on economic conditions (391-2).

The Minor Mine is in the exploration phase. It has good ore indications, but its operation will be further removed than in the case of the De Soto (391).

The Bing Hampton and Copper Queen Mines have a large outcrop of an iron-stained shear carrying small amounts of copper, lead a nd zinc that have never been explored prior to the work performed in 1956 (392).

WITNESS JOE STARNICK, engaged in the mining business about 35 years and presently Superintendent of the U. S. Consolidated Mines, known as Minor properties, 5 miles east of Mayer, testified (409-10), in substance:

That the Minor Mine has both milling and shipping grades of copper and zinc ores. It has done development work such as diamond drilling and presently is at the point where it can go ahead. It is further planning to drive a 700-foot drift (410).

In the near future we will ship ore. We have ore and are exploring, but we still have to run our drift to determine how much ore we will ship. It is hard to say when and what will develop. It could be 2,000 or 200 tons a day. There could be some shipping ore as well as milling ore. We might ship some and blend the ore (411-12).

The high grade ore is definately shipping ore, while the low grade siliceous ores, which the smelters want, would be more profitably milled and blended with high grade ores. To start, we contemplate erection of a mill with capacity of 200 tons per day (411-12).

The Iron King Mine has zinc, gold, silver and lead, and the Minor Mine has copper, zinc, gold and silver ores (412).

We struck ore at the 200-foot level. Ore was shipped out of the Minor Mine during World War II, and six carload trial shipments have recently been made (412-13).

We were going to ship from Mayer but since the line is our of operation, we have to truck the ore to and ship from Humboldt. We must call the Iron King in order to get a place to load and then go and see the station agent at Mayer to order a car. We can move the ore on the Iron King ramp if it is not busy. If Iron King is using the ramp, we must wait until the car is spotted for loading (414).

The additional cost of trucking the ore to Humboldt is $1.50 a ton higher than the cost of trucking it to Mayer (414-15-16-17). Illustrating the importance of $1.50 additional trucking cost to Humboldt over Mayer, if we were shipping 200 tons a day, the additional operating cost to us would be $300 a day, which is sufficient to mean a profit or a loss (418).

We have shipped 5 carloads of test ore from Humboldt since January 1, 1957. We expect to ship a few cars during the next six months or a year (420-421).

In operating a mine, every foot you penetrate has to be developed (421). We expect to be in production within six months to a certain degree. Development and operation go hand in hand. The proposed mill, close to the mine, should be in operation inside of a year. The concentrates from the mill will move by rail to El Paso (422-23). I could not be definite about the date; might be before a year or a little thereafter. I am sure that within a year we will have the mill on the property ready to operate (425).

WITNESS EUGENE FREDERICK, President and General Manager of the U. S. Consolidated Mine, Inc., and in charge of the Minor properties, testified that $125,000 cash has been spent in development of the mine since work began in August 1955 in exploration, purchase of new machinery and hoist (426-7-30).

WITNESS M. L. HECKLTHORN, practical mine operator, who owns the Oro Fino Mine 18 miles southwest of Mayer, and has a lease on the Stoddard Mine, and is driving a shaft on the St. Anthony Mine testified (421), in substance:

I am not developing a large mine. I am an independent operator and obtain my living by putting up my own money and services for producing ore from various ming properties (437).

Shipped orefrom the Stoddard and Half Moon Mines from Mayer in 1956.

C O P Y

BLUE BELL & DE SOTO MINES — APRIL 20, 1955

BIG BUG DISTRICT, YAVAPAI COUNTY — MARK GEMMILL

Property inactive.

COPY

Mine BLUE BELLE AND De SOTO March 28, 1957

District - Peck Engineer - Mark Gemmill

Subject: Present Status

These two mines are but a short distance apart and were owned and operated by the owners of the Humboldt Smelter. The last owner of record was the Southwest Metals Company. This company operated last in 1928. Since then there has been some leasing on both. They were served with Aerial Trams which transported the ore to sidings on the railroad, which was then in operation.

The overall average from the two mines was about the same, being gold .05 oz. Silver 1.0 oz. Copper 3%. Reported production up to 1930 is in round figures De Soto - 280,000 tons. Blue Belle - 1,200,000 tons.

Maps and records of the mines are in possession of Allison Steel Co. Phoenix. These records were compiled by Geo. M. Colvocorresses who managed the properties for a good many years and up to the time of the last shut-down.

It is reported that the properties are presently being investigated by some by some exploration company. Reliable information concerning this is not available.

DE SOTO MINE

Five miles (air line) southwest of Blue Bell Mine.
Owner; Southwest Metals Co;
Bernard A.Clark,Pres; Ford Bldg; Detroit,Mich.

No Production during the past 20 years.

This old property has had a creditable past production of copper.The large main orebodies are largely worked out and have probably been bottomed.However,there are some smaller outlying copper deposits that could produce a worth while amount of ore.
With about 3% copper it is estimated that 150,000 lbs could probably be produced the first year.

In the past an aerial tramway was used to transport the ore from the mine to the railroad.Now both the tram and the railroad are gone.To get into production the property would hardly need more than an access road.

L. L. Farnham

October 21,1950

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October 6, 1942

Mr. Frank A. Ayer, Chief
Mr. F. H. Hayes, Assistant Chief
Copper Branch, War Production Board
Washington, D. C.

Re: Blue Bell and De Soto Mines.

Dear Sirs:

In reference to previous correspondence regarding these properties and in reply to letters from Mr. Hayes dated September 30th and October 1st, file 4H-HGM, I sincerely regret to advise you that the litigation in which these mines have been involved has taken a very unfavorable turn in so far as my associate, the Ohio Copper Company, and I are concerned.

Entierly contrary to our expectations, the Arizona Supreme Court reversed the decision of the lower court in which the title of E. G. Snedaker, who holds this property on our behalf, had been confirmed and the effect of the recent decision is to deprive us of all our rights in these mines and to permit their redemption by a party who claims to represent the Southwest Metals Company.

We have decided to apply for a rehearing of this case but I recognize that there is only the slimmest chance that the Supreme Court will reverse its decision and in the event that the Southwest Metals Company resumes title to the property neither the Ohio Copper Company nor I will have any connection with its future operation in so far as we now have reason to believe.

Since the Southwest Metals Company, a Delaware Corporation, has been dissolved since April 1st, 1939, and the party who has been given the right to redeem on its behalf, although holding certificates for a large block of the stock, is not at present a stockholder of record, it appears likely that many lengthy legal proceedings will have to be completed before any active work can be undertaken at the mines; even assuming the new owners are able to finance such operations.

From a practical standpoint the recent decision of the Supreme Court is likely to make it impossible to find purchasers for a great many mines in Arizona which have been sold to the State for taxes since it now seems that no title which might thus be acquired would have any value until after a year had elapsed and that any money which might have been spent to improve them during that period would be entirely lost if they should be redeemed by some party who could convince the court that he had at one time held an equitable interest in the property. This is a point which will be stressed to the utmost in our request for a rehearing of the case.

October 20, 1942

MEMORANDUM

BLUE BELL-DE SOTO

TO: Bill Broadgate

FROM: Earl F. Hastings

Referring to your memorandum of October 16 and September 20 we quote from a letter by G. M. Colvocoresses relative to the recent court decision on this group.

"Entirely contrary to our expectations, the Arizona Supreme Court reversed the decision of the lower court in which the title of E. G. Snedaker, who holds this property on our behalf, had been confirmed and the effect of the recent decision is to deprive us of all our rights in these mines and to permit their redemption by a party who claims to represent the Southwest Metals Company.

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Should we fail to obtain a reversal of the decision it will osviously be useless for mr to attempt to furnish you with the information requested in Mr. Hayes' letter of Octoberlst or to continue corresponding regarding the above mining properties unless there is some way in which I could cooperate with the War Production Board toward actually putting them into active operation.

I desire to thank both of you for past assistance in this matter and for having urged the Supreme Court to terminate the litigation as promptly as possible but since the outcome of this litigation has not been in line with our hopes and expectations I presume that you will wish to carry on any furthercorrespondence with the parties who eventually acquite (sic) title to the mines and put themselves in a position to recondition and operate the same.

Personal regards to you both.

Yours very truly,

s/ G. M. Colvocoresses

GMC/CG

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REPORT ON EXAMINATION OF SOME QUESTIONS PERTAINING TO THE DESOTO MINE YAVAPAI COUNTY, ARIZONA

By

FRED GIBBS

Prescott, Arizona

May, 1959

DeSoto Yav.

PURPOSE and FORESTATEMENT:

The purpose of this examination was to check the accuracy of certain representations made by Sherwood B. Owens of Tucson, Arizona, relative to four features of the DeSoto Mine property. Mr. Owens reputedly owns the mine and is seeking to get it into operation under some form of lease or lease with option to purchase. He has contacted the Shattuck Denn Mining Corporation on the matter several times, the most recent being in May of this year. It was because of statements and representations made and propositions advanced during this latest attempt to interest the Company that this examination eventuated.

The representations made by Mr. Owens were four in number, as follows:

(1) That an "iron gossan" area close to the DeSoto mine which he located recently warrants core drilling to determine whether or not this gossan is the capping over commercially valuable ore deposits.

(2) That on and above the 600 level in the mine there is a block of ore containing a minimum of 15,000 tons grading between 3% and 4% copper which can be mined and marketed at a sufficient profit to permit payment to him of a substantial down payment and also cover the exploration cost of the "iron gossan" and some exploration of the oxidized capping of the main DeSoto orebodies.

(3) That between the 600 and 200 levels of the DeSoto Mine there are 6,000,000 tons of 1% sulphide ore which can be mined by open pit followed by flotation-milling to produce a good profit under present conditions and metal prices.

(4) That the oxidized capping of the orebodies above the 100 level contains 2,000,000 tons of 1% ore which can be pit mined and heap leached at a profit.

Mr. Owen's representations (3) and (4) are based on the information contained in a report made by Mr. George Colvocoresses in 1946. The latter was the manager of the copper smelter located at Humboldt, Arizona, owned and operated for many years by the Southwest Metals Company. The DeSoto Mine was owned and operated by this Company, the ore being handled at their Humboldt smelter. Mr. Colvocoresses had a rather complete file, including maps and production data, on the DeSoto mine, and his report of 1946 was compiled from this data and his personal knowledge of the mine. Mr. Owens is reputed to have purchased the mine from the Southwest Metals Company a few years ago.

At the initiation of my examination I had access to the following:

(a) A copy of Mr. Colvocoresses's report of 1946 and a copy of most of the old maps and some of the data contained in the old DeSoto file.

(b) The benefit of information gained by me in an examination of the sulphide portion of the mine in 1956.

(c) Copy of a report by Still & Still, geologists, covering the subject of the "iron gossan" made in December, 1958.

(d) Copy of a report made by R. E. Meritz, mining consultant of Phoenix, Arizona, made in 1957, covering exploration activities carried on by him during that year.

In what follows I shall not go into the location, history, production or geology of the DeSoto Mine or any other matters not directly pertinent to the four subjects mentioned above.

CONCLUSIONS:

(1) The "iron gossan" should be tested with one core drill hole, the results thereof to govern any further action.

(2) The 15,000 tons of 3%-4% ore on and above the 600 level does not exist.

(3) The sulphide orebody between the 600 and 200 levels contains less than one-third of the tonnage claimed by Owens (and Colvocoresses) and the grade is a bit less than one half of their figures. It cannot be exploited at a profit with any method of mining at present copper prices.

(4) There may be some profit potential in mining and heap leaching of the oxide capping if necessary exploration should determine that the grade is 1% or better; that the material is profitably leachable; and that an adequate supply of water is available. The tonnage is a little less than one-half that given by Owens.

PROCEDURE FOLLOWED:

Four days were spent in the field during which time the "iron gossan" was studied from end to end; the existence of 15,000 tons of "highgrade" on the 600 level was investigated by sampling and geological work; the sulphide orebody between the 600 and 200 was re-observed and studied; and the oxide capping was re-examined and a study made of the feasibility of core drilling to obtain grade data.

FINDINGS:

(1) "Iron Gossan":

The field examination substantiated the thoughts expressed by Arthur Still in his report of December 4, 1958, except that I feel perhaps more strongly than Still that this formation is the product of both regional metamorphism and hydrothermal alteration.

These limonitic zones are not unusual in this part of Yavapai County and experience gained in exploring two of them located about a mile east of the Iron King Mine definitely bears out the hydrothermal alteration concept. A few years ago, with associates, I core drilled one of these formations to a depth of 600 feet. The lower part of the holes showed primary pyrite which seemed to be definitely of hydrothermal origin. Assaying of the better looking portions of the cores showed very small amounts of copper, lead, zinc, gold and silver. Later, the New Jersey Zinc Company drilled three holes on the same formation, the deepest of these being close to 1200 feet. Results were the same as we had had. Still later, the Miami Copper Company core drilled the other formation nearby. I understand that three holes were drilled, all over 1,000 feet deep, and though I don't know the results obtained, the fact that they pulled out and abandoned the project would indicate that their experience was similar to ours.

At the DeSoto, the iron stained zone does not look as good on surface as the two above described, but the fact that it is adjacent to the known orebodies at the DeSoto, poses the question as to whether or not the hydrothermal solutions that were responsible for the copper at that mine did not also penetrate the "gossan" formation and deposit therein minable orebodies. Because of the similarity of this zone with those described near Humboldt, I feel that the chance of the existence of commercially valuable ore deposits in this zone is extremely thin; however, sometimes the playing of these long

odds in mining exploration pays off very handsomely, and since the cost of playing this long shot to the extent of drilling at least one hole is quite modest, I feel that the gamble should be taken.

Aside from the possible merits of this particular situation, my thought on this is influenced by the conviction that the initial exploration of any structures or formations which give even the slightest geological evidence that they may be economically important should be one of the functions, if not actually one of the duties, of any mining company active in any given district. With the exception of the two above mentioned, these limonitic zones in this area have had only very superficial exploration by prospectors digging shallow surface pits and tunnels. Deeper exploration, especially on those zones located near known orebodies, is warranted to a sensible degree.

(2) "High-grade" Shipping Ore:

This is the matter of the 15,000 tons of plus 3% ore which Mr. Owens states exists on and above the 600 level. The area where this ore is supposed to be is outlined and noted on the assay map of the 600 level (See Appendix). It is shown in greater detail on my Plate No. 1 in the Appendix and further portrayed in the vertical sections A-A' and B-B' shown on Plates Nos. 2 and 3. As will be noted on Plate No. 1, the highest of the three samples by Mieritz across this exposure returned 3.60% copper, while the average for the three was 2.57% copper. The average of the four samples cut by me to the north and to the south of Mieritz' samples is 1.25% copper. The weighted average of the Mieritz samples and mine is 1.81% copper. Thus, it is apparent that there is no basis for Mr. Owen's estimate of plus 3% grade. Ore having a grade of 1.81% copper cannot be mined and shipped at a profit with present price of copper.

How Mr. Owen's estimate of 15,000 tons was arrived at is incomprehensible. Referring again to Plate No. 1 it will be seen that this quartzy ore lense is cut off by a fault on the south end and that to the north the width is narrowing rapidly. Plate No. 2 showing Vertical Section A-A' perhaps shows the situation more clearly and illustrates why the fault segment above the 600 level and below the fault plane contains only 365 tons as against Owen's figure of 15,000 tons. Examination of the 565 and 540 sills which are depicted on Plate No. 3 disclosed that the ore lense if projected upward on its 70 degree dip does not show in the drift or crosscut on the 540 sill, but it does show that ore was mined farther east with an underhand stope down below the 565 sill to a depth which roughly corresponds with the projection of the

fault on this B-B' section. This situation suggests strongly that the ore mined in the underhand stope and above it in the 560 stope is the faulted segment of the ore showing down on the 600 level. If so, this would call for an east-west movement on the fault of approximately 25 or 30 feet which is entirely possible. It is clear that no ore can be expected in this block above the 600 other than that in the triangular shaped mass shown on Section A-A'. The amount of ore in this block below the 600 cannot be estimated but since all of the orebodies in the mine decrease very rapidly in size and grade below this level it is highly probable that there is much more below the level than there is above it. Since the 600 marks the water level in the mine, the winze shown on Plate No. 1 is full of water and could not be examined.

(3) Sulphide Ore Between 200 and 600 Levels:

This is the block of ore which Colvocoresses estimates contains a minimum of 6,000,000 tons having a grade of 1.00% copper which can be mined with open pit methods and flotation-milled at a substantial profit.

My estimate gives 1,700,000 tons having a grade of 0.47% copper.

The reason for this great disparity in estimates becomes clear in perusing pages 6 and 7 of his report of 1946. Therein it is apparent that he used a length of 600 feet and a width of 300 feet as the dimensions of the sulphide mass. Actually, the length is 350 feet and the width 200 feet as disclosed both in surface and underground measurements and measurements taken from the mine maps. The orebody has its greatest dimensions on surface and these decrease in length and width as the mass plunges steeply to the southwest and pitches to the northwest. On the 600 the width is barely 175 feet and the length less than 300 feet.

Pages 6 and 7 of Colvocoresses report again give a clue to the discrepancy between his grade estimates and mine. He states that the bulk of the sampling from which he figured the grade was done on the walls and ends of the old stopes and very little in the inter-lense material. All that now remains to be mined in this block is the inter-lense material, and this is a great deal lower in grade than the lense material and the stuff closely surrounding the lenses, - in effect, the shells two or three feet thick around the hearts of the lenses. The lenses themselves probably averaged about 3% copper while the thin shells ran about 2% copper. The material between the lenses is weakly mineralized and the average of this inter-lense stuff as arrived at using the weighted average of the

samples taken by Mieritz, the S. W. Metals Company, and myself, is just under a half of one percent. As just mentioned above, the only material remaining to be mined in this block is this inter-lense stuff.

Waste to ore ratio, if an attempt were made to mine this block with open pit methods, would be 3 to 1. Operating costs, at a capacity of 1,000 tons per day, would approximate $3.50 per ton for mining, milling, and general, while smelter returns on 0.47% ore assuming 90% mill recovery and after crediting 35¢ per ton for gold and silver would approximate $2.50 per ton at present copper prices. The answer to the sulphide ore question is obvious.

(4) Oxide Ore:

This comprises the oxidized capping of the mineralized zone from the 100 level to surface and which Owens claims contains 2,000,000 tons of 1% copper.

My estimate is 600,000 tons of presently unknown grade but very possibly on the order of 1% copper.

Here again the disparity in figures seems to stem from the dimensions of the mineralized area used by Colvocoresses and those used by me. Further, it would seem that he pictured the mass as a rectangular block, whereas, due to erosion, it is actually a pyramidal shaped mass with a fairly sharp cone and steep sides.

Judging solely by appearance and by the grade of some of the ore shipped from this section as disclosed in the old DeSoto file, I would guess that the remaining ore might well run 1% copper. Distribution of copper values on this capping differs widely from that in the sulphide zone due to the fact that the leaching action of meteoric waters carried the dissolved copper far from the relatively high grade hearts of the lenses and redeposited it in the inter-lense schist. However, in order to determine with some accuracy the actual grade of the remaining ore it would be necessary to resort to core drilling, as caving action has closed most of the openings in this part of the mine. Due to the multiplicity of openings the drilling job would be tedious but I think that $25,000 spent on such a program would give a reasonably correct answer as to grade.

This ore could be rather cheaply mined by open pit benching methods as the waste to ore ratio would be only 0.4 to 1 and the topography is favourable. Mining cost per ton of ore, including waste removal, would not exceed 50¢ per ton.

If this ore were to be heap leached it would be well to add the 330,000 tons of mixed oxide-sulphide ore in the block between the 200 and 100 levels as this would provide sulphides in the top layer of the heap necessary in building up the acid content of the leach water.

The usual orthodox method of precipitation of copper using shredded tin cans could be used. However, in addition to determining the grade of the oxide ore as above mentioned, it would also be necssary to carry out leaching tests to determine its amenability, and a supply of water to the extent of at least 100 gallons per minute would have to be found or provided within reasonable distance from the mine.

Accordingly, there may be some profit potential in this 930,000 tons of oxide and mixed oxide-sulphide ore, if mined by open pit methods and then heap leached. However, to determine this definitely would entail taking the steps just above mentioned, and thereafter, if the answers to these questions were favourable, it would be necessary to provide a minimum of $500,000 to carry out the mining of the ore and building the heap and at least another $100,000 for water supply and precipitation plant. To avoid capital expense for rock breaking and moving equipment the mining job could be contracted, and for tax purposes most of this cost could be expensed rather than capitalized.

After initiation of leaching there would be no appreciable return for at least a year and possibly two years. Thereafter, assuming that the answers to the questions posed above were all favourable, it could be reasonably expected that 80% of the contained copper could be recovered over a period of eight or ten years at a per pound cost in the order of thirteen cents. Assuming an average copper price of 30¢ over the 10-year period the total net profit from the job would be in the order of $2,250,000, - or about $225,00 per year. These figures are based on ore carrying 1% copper. If the grade proved to be greater than this, the added increment would be mostly cream at the top of the bottle.

RECOMMENDATIONS:

If satisfactory contract terms can be arranged with Mr. Owens I would recommend that one diamond drill hole be put down on the "iron gossan" at a location and to a depth as recommended by Arthur Still in his report of December, 1958. If this hole proves to be a blank then I would abandon the whole DeSoto Mine project.

DeSoto Var.

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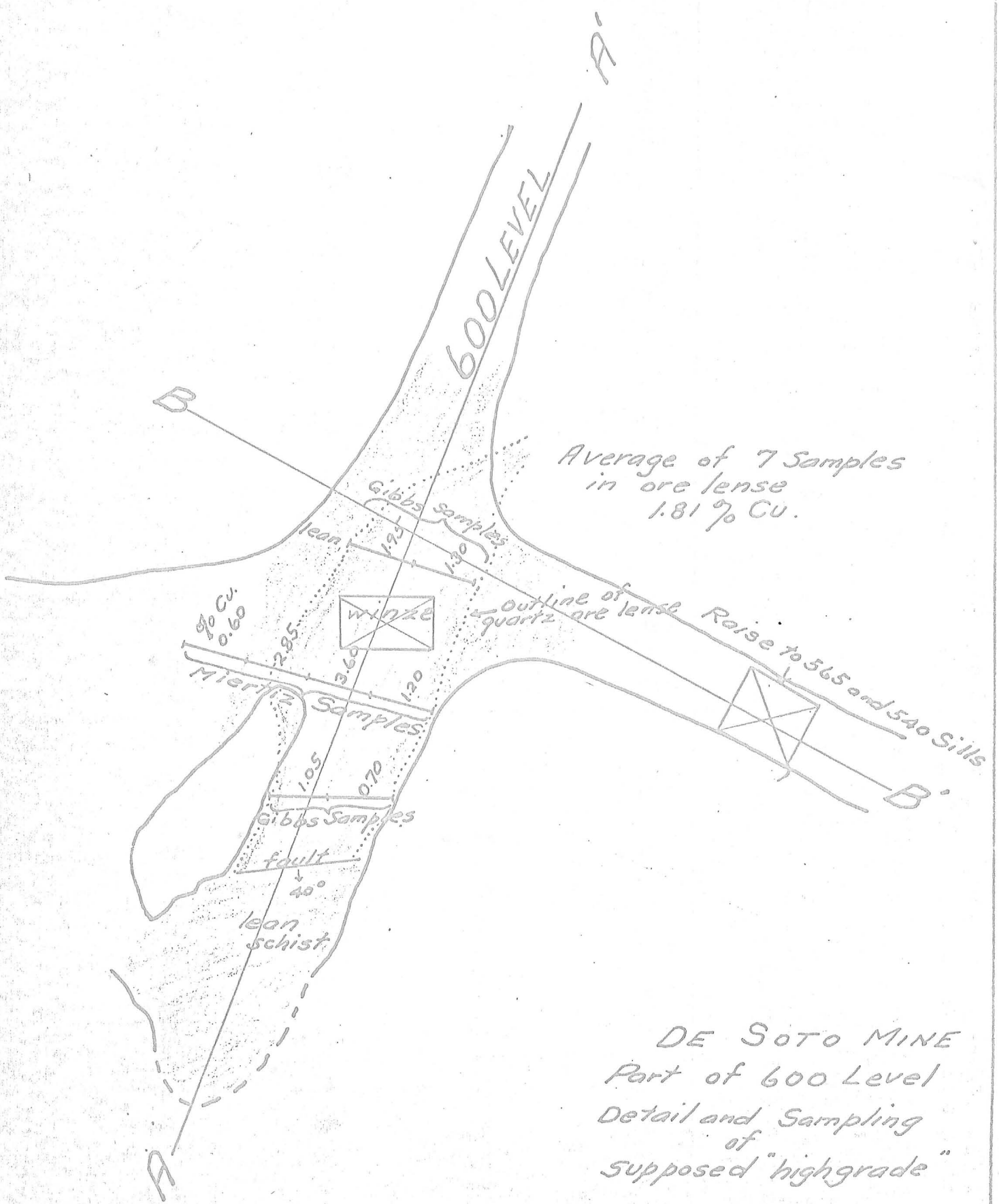
APPENDIX:

Claim Map

Composite level map, - 200 to 900 levels
Plates 1, 2 and 3
Assay Map of 200 level (2)

Assay Map of 600 level

2 Snapshots of oxidized capping and upper workings



DE SOTO MINE
Part of 600 Level
Detail and Sampling
of
Supposed "highgrade"
Scale: 1" = 10'

F. Gibbs 5/18/59

Plate No. 1

ARTHUR R. STILL
MINING GEOLOGIST

TELEPHONE: 658
P. O. BOX 1512

ROOM 24, UNION BLOCK
PRESCOTT, ARIZONA

June 20, 1955

Mr. H. F. Mills, Gen'l. Mgr.
Iron King Branch
Shattuck Denn Mining Corp.
Prescott, Arizona

Re: De Soto Mine, Yavapai County, Ariz.

Dear Mr. Mills:

The following briefly summarizes my conclusions regarding the above named property as based upon a study of your file.

Summary:

A careful study has been made of the George M. Colvocoresses report (Feb. 5, 1946) and the Sherwood B. Owens letters and calculations (May 16th and 25th, 1955).

Based uopn this study I am convinced that the DeSoto Mine is not a worthwhile venture for your firm largely because of the following reasons:

1) Even accepting the possibility of 6,000,000 tons of 1.0% copper, the occurrence of the deposit and the limited tonnage involved do not, in my opinion, offer the possibility of a sufficient return for the capital investment required,
2) Owens total price, and terms for a six months examination option, are entirely out of line for what is known about the property, and
3) From a geological standpoint, I seriously doubt the existance of the 6,000,000 tons of proposed low grade ore.

Due to the above, I have no alternative but to recommend that your firm abandon its interests in the property.

General Discussion:

Calculations made by yourself, in a letter to Mr. Thomas Bardon of this date, amply illustrate the small return possible from this property as compared the the initial capital investment required to place the property in operation and, as such, the economics will not be discussed further here.

DeSoto Yav

The very existance of such a sizeable tonnage of low grade material surrounding the small higher grade (+3%Cu) shoots is doubtful in my mind due to the quantity of copper that it would require in comparison to the total contained copper in the higher grade shoots. The shoots, based upon Colvocoresses figures, produced 280,000 tons of +3% material or something slightly in excess of 16,800,000 pounds of copper. In comparison to this, six million tons of 1.0% Cu would contain 120,000,000 pounds of copper giving rise to a ratio of 7:1 of copper contained in the halo as against copper contained in the actual ore shoots. From my knowledge of the numerous copper deposits, including the DeSoto, which occur in the Yavapai schist in the general Humboldt-Mayer-Cleator district this ratio does not seem geologically reasonable at all.

I say this due to the very impervious nature of the Yavapai schist except where it has been "pre conditioned" by shearing, flexing or some other physical disturbance. The type of occurrence that Mr. Colvocoresses postulates would require a soaking action outward from the higher grade shoots, which represent solution channelways, and I do not feel that such soaking is probable, if at all possible, in the dense pre-Cambrian greenstones.

Another dissenting factor is that, from my own knowledge of the DeSoto, I am confident that even if a sizeable tonnage of 1% total copper material should exist that it would, in the zone being considered, be split into sulphide, carbonate and silicate fractions such that probably only something in the order of 0.6 to 0.7% copper would be in the sulphide form and thus be readily recoverable by a flotation process.

In light of all of this, I have no alternative but to turn the property down as stated in the summary.

Very truly yours,

Arthur R. Still

ARS/

GEORGE M. COLVOCORESSES
MINING AND METALLURGICAL ENGINEER
1102 LUHRS TOWER
PHOENIX, ARIZONA

February 5, 1946

Notes on Feasibility of Reopening the DeSoto Mine for the Recovery and Treatment of Remaining Low Grade Copper Ore

These notes are based upon my personal acquaintance with this mine and investigations by engineers made under my direction.

I first examined the property in November, 1913, subsequently supervised its reopening and operations from 1915 until 1921 and to a certain extent the work of the leasers until the autumn of 1929 since which date I have visited the property only at infrequent intervals, the last occasion being in September, 1941.

LOCATION

The eighteen (18) patented lode mining claims and one mill site which comprise the DeSoto Group with an area of 364 acres (see map attached as Exhibit A) are located in the Bradshaw Mountains, Yavapai County, Arizona, five (5) miles S. 20° W. from the Blue Bell Mine.

The Crown King branch of the Santa Fe Railway formerly passed within a mile of the mine from which the ore was sent down to Middleton Siding by a gravity aerial ropeway. The lower ropeway towers and siding bins burned down in 1930 and this section of the railway has since been taken up as far as Cordes Siding which is some 7 miles from Middleton. Present access to the mine is by way of the Black Canyon and Crown King Highway to the site of Middleton Siding, a distance of 48 miles from Prescott, 19 miles from Mayer or 18 miles from Blue Bell Siding.

From the Crown King Road to the mine there is only a steep horse-trail nearly two miles in length and this would have to be replaced by about four miles of mountain road in order to make the workings accessible by auto or truck.

The mining claims cover the summit of a steep ridge extending northeast-southwest for over a mile and they extend down along its eastern and western slopes for a considerable distance. Most of the outcrops and mine openings are located along the upper portion of the eastern slope which descends over 1,500 feet to a gulch locally known as "Crazy Basin." The west slope of the ridge extends down into Peck Canyon. (See Map Exhibit B)

D. S. to Yav

CLIMATE AND GENERAL CONDITIONS

Climate

The altitude of the main haulage level known as the "600" or "Hot Number Adit Tunnel" is 5,765 feet above sea level and the ore shoots extend upwards from this point to the various outcrops, the highest of which --near the summit of the ridge--has an elevation of about 6,500 feet.

The climate is pleasantly cool throughout the summer with considerable frost and often some snow in winter. The mean annual rainfall is about 17 inches and both surface and underground work can be conducted at all seasons with very little inconvenience due to weather conditions.

The surrounding country is mountainous with deep gulches between the ridges and summits. There is little vegetation except for native shrubs and grasses and no large timber.

Water

Running water is found in the deeper gulches only during wet weather and on the "Water" claim there is a very small spring which has never been developed. Domestic water was obtained from a well near Middleton Siding and taken up to the mine on the aerial ropeway. From the Hot Number Adit (600' level in the mine) there is a steady flow of about 5,000 gallons per day which would be suitable for industrial purposes but to obtain a supply sufficient for large scale mining it would be necessary to tap the underflow in Crazy Basin which has never been thoroughly tested but would probably exceed 100,000 gallons per day. A much larger supply might be obtained from Turkey Creek, some three miles north of Middleton Siding, along which creek there are favorable sites for a large mill and storage space for tailings.

Power

The Prescott-Meyer-Blue Bell-Crown King high tension power line of the Arizona Power Company passes close to the portal of the Hot Number Adit where transformers were formerly installed and the compressor room and shops were located. The old rate for electric power averaged about 1.5¢ per kilowatt hour but it is reasonably certain that within the course of a few years the U.S. Reclamation Service will furnish Colorado River power throughout all this district at a cost of less than 0.5¢ per kilowatt hour.

Labor

Because of the long distance from any town, living accommodations would have to be provided at the mine and mill. All of the old dwellings and other buildings have been burned or wrecked.

A certain number of local men would be available from the vicinity of Mayer and Prescott. Mexican miners were formerly employed to a large extent and with satisfactory results while the excellent

DeSoto Mine

impregnation of copper into the wall rock was much more extensive than at Blue Bell particularly in the upper levels and between the various parallel lenses so that a large mass of rock between and around the shoots was found to carry appreciable copper values as will be mentioned later.

HISTORY AND PRODUCTION

The DeSoto mine, which formerly was known at different times as the "Buster" and "Copper Cobra" was discovered in about 1890 when at first a small tonnage of high grade carbonate ore was gouged out and shipped by burro and wagon from various outcrops; no records of this production have been preserved. Later on the mine was worked on a more extensive scale and the larger ore bodies were developed and partly mined above the 600 foot level.

In 1904 the mine was acquired by the Consolidated Arizona Smelting Company and equipped with the aerial ropeway to the siding where a steam power plant was located. The Hot Number Adit, otherwise known as the 6th level, was driven with double track to the main workings and connected with the upper stopes which were located in six ore shoots above the level while two of them, which were followed down by a winze, were mined for over two hundred feet below the adit.

From 1904 until August, 1907, about 40,000 tons of ore were produced with average content of 0.05 oz. gold, 1.30 oz. silver and over 4.00% copper.

The principal ore shoots had been partially developed by that date but, by reason of the low price of copper, no further work was done until 1915 when a careful measurement and sampling of the positive and probable ore, made under my direction, resulted in estimating a developed reserve of 31,588 tons with average 0.05 oz gold, 1.2 oz. silver and 4.28% copper. This estimate justified the reopening of the mine. A record of the total production to date is approximately as follows:

PRODUCTION OF DESOTO MINE

	Tons	Au-oz.	Ag-ozs.	Cu-%	
1890 to 1905	30,000	?	?	5.00	(Estimated)
1905 through 1907	40,000	.05	1.3	4.00	(Approximate)
1915	8,360	.0453	1.14	3.50	
1916	34,382	.0421	1.08	3.37	
1917	44,483	.0575	1.29	3.04	
1918	42,870	.0527	1.20	2.58	
1919	27,067	.0499	1.09	2.36	
1920	19,219	.040		2.09	
1922 to 1931 (Worked by leasers)	54,000	.050	1.20	3.75	(Approximate)
TOTAL(about)	280,000	.050	1.20	3.00	plus

DeSoto Par

During the period from 1915 to 1920 the relatively high price of copper made it profitable to mine and ship a lower grade of ore than had been estimated as commercial in January of 1915 and a substantial additional tonnage of ore was developed by the Consolidated Arizona Smelting Company operations which were discontinued after 1920 when the Humboldt Mill and Smelter were shut down for over a year.

When active operations were resumed at Humboldt and at the Blue Bell in 1922 it did not appear advisable for the Southwest Metals Company (successor to Consolidated Arizona) to reopen the DeSoto which was later leased to E. S. Chafey who in turn employed a number of sub-leasers and whose work proved to be much more extensive and profitable than had been anticipated. Chafey confined his mining largely to portions of the upper workings--above the 200 foot level--and to various outlying outcrops to the north and west of the mine and near the summit of the ridge. A large quantity of new ore was thus developed and mined much of it being highly oxidized and in some cases carrying 6 to 8% copper. These operations sometimes produced up to 1,000 tons per month but naturally very little development work was done by the leasers and my estimate of the 3% copper ore reserves made in 1931 was as follows:

	Positive	Probable	Possible Or Indicated
Old workings around main winze	6,000	4,000	-
In gouge of main fault	2,000	3,000	-
Above O and OO stopes and in hanging wall	2,000	4,000	10,000
Chafey tunnel		5,000	5,000
Treadwell shaft		4,000	4,000
Guthrie tunnel		3,000	2,000
Dipter cut		3,000	2,000
McCutchen stope		2,000	3,000
Whale adit and above near surface		4,000	10,000
	10,000	32,000	36,000

There would obviously be no incentive to recondition this mine in order to work out so small a tonnage of better grade ore unless one were assured a very high price for the copper.

D. S. & Yav

CHARACTER AND METALLURGY OF ORE

The following is a complete analysis of typical DeSoto sulphide ore as mined and milled at Humboldt:

Au	0.05 oz.
Ag	1.20 oz
Cu	3.08 %
Fe	5.9
S	6.54
CaO	1.2
MgO	0.77
Al_2O_3	4.9
SiO_2	72.3

Some 150,000 tons were treated by flotation from 1915 through 1920 with an average recovery of 85% of the gold and silver and 93% of the copper and with a ratio of concentration of about 6 to 1.

Obviously the lower grade copper ore would be much more siliceous and with combined iron and sulphur content not exceeding 4 or 5% and by dropping out some of the iron, the ratio of concentration might be expected to approximate perhaps as much as 20 to 1 with a 90% recovery of copper but probably not more than a 70% recovery of gold and silver.

LOW GRADE ORE RESERVES

Except for the mining of a considerable tonnage of slightly lower grade ore during '18, '19 and '20, it had always been the intention of the management of this mine to keep the average grade of production above 3% copper and no stoping was done except in the hearts of the various lenses where work was discontinued nearly as soon as the assay value of the ore fell below that point. There remains around all of these old stopes and between them a shell of lower grade material whose extent and character have only been investigated in a few places, and since the great bulk of the higher grade ore has been removed and chances for finding any large new bodies of such ore are dubious, the future value of the mine, if any, must depend upon the tonnage and average tenor of low grade material.

Because of the fact that some of the ore shoots and much of the mineralized rock extended to or very near to the surface of the eastern slope of the ridge, it occurred to me during the First World War, that an open pit might be started through opening benches along this slope and that a large tonnage of 1% copper ore might thus be cheaply mined after removing a comparatively small quantity of waste copping.

In order to obtain some basic data on this point I then started to explore and investigate the mineralized rock between and around the ore shoots and although this investigation was never carried to a logical conclusion, some of the data obtained, as noted below, appear to have been significant and not unfavorable.

Above the 400-foot level at points where the mineralization extended into the wall rock between the lenses, an investigation was carried out in one block of ground which might have been partly or entirely mined by a glory hole or benches from the surface. Here we put in a number of diamond drill holes whose cores were carefully sampled while 128 channel samples were cut in drifts and crosscuts. This block was then estimated to contain 275,000 tons with average content of 1.28% copper. Only a few samples were assayed for gold and silver from which it was judged that this ore would carry somewhat less than half as much of these metals as in the working stopes, say 0.02 oz. gold, and 0.6 oz. silver, with combined value of slightly over $1.10 per ton at present prices. It appeared that this estimate of tonnage could have been substantially increased by further exploration and development throughout a wider area in the same section of the mine.

A small block of low grade ore left in another section between the 3rd and 6th levels was found to contain 1,500 tons that would average 2% copper and this estimate was checked by a resampling in 1930.

Other investigations of low grade material adjacent to the main workings by drills and crosscuts have indicated that the following areas justify further investigations.

On 1st level (elevation 6171') a large number of samples taken in an area 300' north-south by 200' east-west averaged better than 2% copper.

2nd level (elevation 6104') area 350 x 200', samples averaged around 2%.

250' level (elevation about 5950') 5 samples along one wall averaged 1.61% copper.

300' level (elevation about 5900') area 300 x 150', samples averaged about 2% copper.

4th level (elevation about 5850') area 120 x 100, samples averaged about 2% copper.

5th level (elevation about 5800') area 120 x 100, samples averaged about 2% copper

6th level, Hot Number adit, (elevation 5765') area 150' north-south x 200' east-west, samples averaged about 2% copper.

Most of these samples were cut along the side walls of the old stopes while some were cut in the walls of crosscuts or were core samples from short drill holes. They were not taken in any logical pattern and hence cannot be used to calculate any weighted average of the sampled ore nor as a basis for any estimate of tonnage. However, a careful study of the assay maps has led me to conclude that

they roughly represent the outer shell of the ore zone from which the core has been removed with a remaining tonnage in the order of 1,500,000. This material should assay close to 2% copper with approximately $1.00 value in gold and silver and surrounding it is found a certain amount of mineralized rock which I shall call the outer ore-zone and this has a length (north-south) of well over 600 feet, a width of 300 feet and an average height to surface of probably 550 feet so that, allowing for the tonnage which has already been removed, there should remain some 7,000,000 tons of mineralized rock a large part of which, including as a sweetener the small tonnage of 3% ore left in place and the above described 2% ore in the shell of the ore shoots, may reasonably be hoped to have an average grade in excess of 1% copper and with values of perhaps $0.70 in gold and silver.

At some distance from the main workings are found several ore showings which probably have no connection with the principal ore body, but the ore found on and near the surface of the Whale claim along the east slope of the DeSoto ridge is in a different category and while the tonnage of better than 1% ore is very problematical, it appears as if it might either be mined with the main deposit or more probably worked from a separate open pit with a possible production of over one million tons. This ore was partly found in a porphyry dike near the surface but apparently petered out with depth; I have not taken it into account in making calculations of investment and returns and merely mention it as a possibility. In order to check the estimates of tonnage I also applied a different method of calculating based on such data as I possess concerning the contours of the surface and the extent of copper mineralization which had been actually noted on each of the underground levels. Although the estimate resulting from this procedure did not work out so well as in the first instance, it appeared that the quantity of mineralized rock which might be hoped to average 1% copper was in the order of six million tons which is the figure that I have used in subsequent calculations.

WORKING COSTS

After the mine had been properly prepared and equipped for operation and for the purpose of making preliminary calculations, one may assume that the working cost of the low grade ore, to be mined by open-cut or caving and milled at the rate of 3,000 tons per day, would be about as follows:

Mining including stripping and development	$ 0.40
Coarse crushing	.10
Transportation to mill, fine grinding and concentration	.40
Freight and treatment of concentrates ratio 20 to 1	.15
Refining and marketing Cu (over 2.5¢ per lb.)	.45
	1.50
Add for taxes and amortization of plant	.50
	$ 2.00

De Lo to, Yan

From a 1% copper ore it may be assumed that at least 18 pounds of copper would be recovered (making due allowance for the fact that some of the ore will be oxidized) and at 12¢ market price this would have a value of $2.16 to which one might add $0.44 for recovered gold and silver making the total return $2.60 and leaving a margin of profit of 60¢ per ton or say $3,600,000 for the entire venture if a total of 6,000,000 tons of ore should be produced.

PRELIMINARY CAPITAL EXPENDITURE

Local conditions are such that the preparation of the ore body for large scale operation by benching along the east slope of the hill should be a comparatively inexpensive matter.

A good road must first be built up from the old railway grade (now the highway to Crown King). This would probably have a length of some 4 miles to the top of the proposed workings and with hard rock surface and proper drainage it would cost in the order of $100,000.

The side roads or levels of the working benches would branch directly off this main haulage way and such capping as would have to be removed could be hauled on an average for not over half a mile and dumped on the west slope of the ridge south of the ore body.

The ore, as broken in the benches, would be loaded in self-dumping trucks and dumped into a large underground storage bin to be located above the present Hot Number Adit which was cut out for a double track and once provided with electric equipment could handle a large tonnage. At the bottom of this bin would be located the coarse crushing plant with belt conveyor to the fine ore bin on the surface from which either an aerial gravity ropeway or the main truck road would lead to the mill, the proposed site of which is near the junction of Turkey and Cedar Creeks about 3 miles from the mine and at an elevation of some 3,700 feet.

The total cost of mine equipment including the roads and trucks should not exceed $1,000,000 if coarse storage bin and crusher were installed at the mine and ropeway erected to the mill.

Such a plan would probably result in permitting the lowest operating cost but much more careful study will have to be given to the entire project before any detailed program of operation can be planned.

The Mill might possibly require some special equipment for the treatment of a small quantity of oxidized ore but essentially would consist of a very simple flotation plant with fine grinding equipment required to reduce the size of the ore to approximately 65% through 100 mesh, which we found adequate at Humboldt, and if built on a site where gravity could be utilized, it would not seem that its cost, with capacity up to 3,000 tons per day, should exceed $1,500,000 since no power plant needs to be provided. An additional $500,000 should be allowed for camp buildings and miscellaneous equipment making the total investment in the order of $3,000,000.

an elevation of 6,500 feet or 735 feet above the Hot Number Adit; however, the average elevation of the top of the deposit is around 6,365 feet so that the vertical dimension of the deposit is about 600 feet, and I have used a figure of 550 in my calculations to allow for capping and leached material near the surface.

The dip of the ore zone is to the northwest, about 70°, which would tend to produce an overhang in a pit unless the grade of material in the hanging wall should prove good enough to be mined.

To mine the eastern section of the ore body benches could be run along the slope and waste carried off at the south end, where there is quite a deep gulch while the ore could presumably be best handled by dumping it into a long chute or pocket to the Hot Number level crushing plant and fine ore bin from which it would be sent to the mill, preferably by an aerial ropeway of large capacity.

GENERAL

The text of the above is intended to present a general picture of the possibilities at the DeSoto Mine as these appear from scattered records and very incomplete data which were not originally gathered with any such program in mind. If it should appear that the acquisition, reopening and operation of this property might constitute an attractive mining venture capable of profitably producing some 120,000,000 pounds of copper over a period of six years and with chances of a larger production and longer life, it would first of all be advisable to recheck all of the records and data on which I have based this summary and at the same time to make certain minor physical examinations of the physical conditions at the mine, which is entirely abandoned at present, and to very quietly investigate the best method of securing title.

In order to more definitely determine the mining conditions and value of the low grade ore it would next seem advisable to make a thorough physical examination of the surface and all accessible workings and a topographical survey. If the result of this investigation should be favorable, it would then be in order to reopen portions of the old workings and put in a number of horizontal diamond drill holes on the various levels so as to thoroughly crosscut the formation. This last will probably involve some 6,000 to 8,000 feet of drilling and the total cost of the investigation, including the cleaning out of portions of the mine, may be estimated at around $40,000. The result of this work could be checked and combined with all of the data previously secured and it is my opinion that a basis wooud then be reached for drawing a pretty definite conclusion as to the merit of the entire venture, particularly in the light of the most recent developments in the copper market which will obviously be a factor of the greatest importance.

(Signed) G. M. Colvocoresses

DE SOTO MINE (file) YAVAPAI CO.

CENTRAL ARIZONA GEOLOGICAL SOCIETY

AUGUST FIELD TRIP

DESOTO MINE AREA

FIELD TRIP GUIDE

By:
Richard J. Lundin,
Consultant & President
Wallaby Enterprises Inc.

August 25,1984

INTRODUCTION

The Desoto Mine is located in central Yavapai County in an area of extensive past and current mining and prospecting activity. Several major mining companies have conducted exploration efforts in the general vicinity of the property in question and throughout the Mayer-Crown King mineralized schist belt. The main Desoto workings were developed on a series of copper bearing massive and semi-massive sulphide ore bodies in association with felsic volcanic and volcaniclastic units. Recent interest in the precious metal potential of these types of units has prompted the current interest in the belt as a whole and the the Desoto Mine area in particular.

OWNERSHIP, HISTORY AND PAST PRODUCTION

The Desoto Mine group consists of 18 patented lode claims owned by Mr. Sherwood B. Owens of Tucson, Arizona. The claims are thought to be currently leased to Mr. James Proudfoot and others of North Bay, Ontario, Canada. Chevron Resources held a lease on the property until March, 1981.

The Desoto ore body was discovered about 1890. At this time only a small tonnage of high-grade copper carbonate ore was mined. Later, the larger orebodies were extensively mined. In 1904, Consolidated Arizona Smelting Company acquired the mine and equipped it with an aerial tramway. The sixth level was driven and connected with the upper stopes. From 1904 to 1907, approximately 40,000 tons of ore were mined, yielding 0.05 oz. Au, 1.30 oz. Ag and over 4.00% Cu per ton. During this time, the principal ore shoots were being developed,but due to low copper prices, work was discontinued until 1907.

Consolidated Arizona Smelting resumed work in 1915, and worked the mine until 1920. When the Humboldt Mill and Smelter shut down during this period, the higher price of copper made it profitable to mine a lower grade of ore. Although the Humboldt Mill and Smelter reopened in 1922, the company did not reopen the Desoto, and later leased it to E. S. Chafey. Chafey's operation proved to be extensive and profitable because the highly oxidized material contained between 6 and 8% Cu. Much of the work was confined to the upper levels of the mine.From 1890 to 1931, the estimated total production was 280,000 tons of ore yielding an average of 0.05 oz. Au, 1.20 oz. Ag and greater than 3.00% Cu per ton. There has been no major production since 1931.

PRIOR INVESTIGATIONS

Prior work on the property by Still & Still, Gibbs and Colvocoresses dealt with the potential copper reserves of the Desoto. Mr. Colvocoresses was very optomistic as to the volume of mineable reserves. Mr. Art Still of Still & Still and Mr. Gibbs were more pessimistic about the property's potential. In 1957, the Desoto Copper Corp. began work on the property. After a preliminary investigation, Desoto Copper came to the conclusion that here was some chance of developing a 6 million ton ore body that would average 1% copper. This investigation confirmed Colvocoresses' previous findings. After Desoto Copper Corporation's investigations, 350-400 samples were taken from the property to investigate the possibility of an open pit mining operation. The final results of this study are unavailable, but it is clear that the mine never went into production. Subsequent to this effort, were a series of exploration and evaluation efforts by a number of major mining companies (Felmont, Chevron, Quintana and others). Chevron and Felmont recently drilled a series of deep holes on the property to test base and precious metal anomalies and targets. Wallaby's efforts on the property in 1981 on behalf of Quintana Minerals identified thick sections of anomalous but subore grade gold values associated with a number of different environments within the felsic volcanic units. Major geologic mapping studies of the general Mayer-Crown King precambrian belt were conducted over the past 80 years by several investigators.

Specifically, the area of the Desoto Mine was mapped on a reconnaissance basis by Jaeger and Palanche (1907). Further, site specific investigations of the various properties in the area were carried out by Lindgren (1926). Further studies of general and detailed reconnaissance nature were conducted by U.S.G.S. personnel during the period from 1950-1970. C. Anderson, P. Blacet and others published this work in a series of open file maps and Professional Papers that remain the major source works on the general area. Subsequent to this effort, E. DeWitt mapped a portion of the central Arizona greenstone belt that includes the Desoto Mine area as a part of his Master's thesis at the University of Arizona. P. O'Hara's recent Doctoral Dissertation on the structure and metamorphic history of the region also dealt with the Desoto Mine area. P. Anderson is mapping the general area as a part of his doctoral dissertation from the University of Arizona.

GENERAL GEOLOGY

Rocks outcropping in the Desoto Mine area are:

1. Precambrian mafic tuffs and andesite flows
2. Precambrian fragmental and non fragmental rhyolite rhyolitic tuffs that have been argilllized, chloritized, and silicified.

3. Precambrian exhalative massive and semi-massive sulphide faciesmaterial with contained pyrite, chalcopyrite, galena and sphalerite.
4. Laramide propylitically altered granodiorite dikes and sills.
5. Laramide(?) latite porphyry dikes and sills that are associated with high grade remobilized, hydrothermal vein deposits.

The Desoto mine lies in the fragmental and nonfragmental chloritic rhyolitic units where exhalative massive sulphide and gold mineralization is concentrated. It is thought by Dewitt, Anderson and others that the Desoto deposits is in a proximal volcanigenic setting wherein the massive sulphide and gold mineralization is syngenetic to the enclosing, highly sheared and altered, chloritic and sericitic felsic pile. Previous work interpreted the areas of high chlorite content as being areas of alteration effects. More recent work indicates that some of the chloritic "alteration" is restricted to distinct stratigraphic horizons and has a distinct geochemical and radiometric signature that may be suggestive of an original, chlorite-rich volcanic or exhalite unit. Structurally, the area is complex with locally impressive, large amplitude folding and intense zones of shearing and NE striking strike-slip faulting. Portions of the areas have been strongly metamorphosed by regional and local events.

ECONOMIC GEOLOGY

Mineralization in the Desoto Mine area consists of pyrite, chalcopyrite, chrysocolla, azurite and malachite. Mineralization occurs in two different settings:

1. Massive sulphide copper-lead-zinc-silver-gold deposits.
2. High grade remobilized copper-lead-zinc-gold-silver vein systems.

The massive sulfide copper-lead zinc-silver-gold deposits are associated with chloritic zones in siliceous fragmental and nonfragmental rhyolite and rhyolitic tuffs. These deposits were primarily worked for their copper values and accounted for more than 90% of the total production from the area. Precious metal content averaged .05 ozs. Au/ton and 1.20 ozs. Ag/ton. As these deposits were principally mined for copper, the production was mainly from chalcopyrite rich ore shoots which averaged around 3.00% Cu. According to local informants and the existing literature, the ore deposits were strongly enriched in the upper workings with copper grades in the range of 6-8% being common.

The individual orebodies have dimensions of roughly 350-400' long and from 50-100' wide. From our limited underground work and the information in the currently available literature, it appears that the orebodies are plunging to the southwest and have a typical down-dip extension of approximately 600-900'. The orebodies were extensively mined by open-stope method down to the 900' level.

Recent work in the areas has concentrated on the precious metal potential of the system. Several areas within the old workings and in the adjacent volcanic pile have anomalous to ore grade (.25-12.0 ppm) gold values. (see figure 10a) The areas of ore grade gold mineralization appear to be associated with strongly chloritic portions of the felsic volcanic pile that have a relatively low copper content.

FIELD TRIP GUIDE

The Field Trip will began at the parking lot of the Circle K store in Mayer, Arizona and proceed along the Mayer-Cordes road to the intersection with the Cordes-Creator Road. Most of the area traversed by this section of the road consists of a series of intermediate to felsic volcanics and volcaniclastics with interbedded sedimentary units of a pelitic composition. The prominant ridges that are found to the left and right of the road are composed of resistant masses of banded iron formation-oxide facies exhalite material that is generally found at the interface of intermediate and felsic volcanics or the top of felsic volcanic piles.

Leaving Cordes and taking the right hand turn on to the Cordes-Cleator road the road crosses a series of flat-lying Tertiary flows and volcaniclastic sequences that unconformably overlie the folded and sheared Precambrian section. At the top of Antelope Hill the Precambrian sedimentary and volcanic-volcaniclastic section is intruded by the Antelope Hill granodiorite, a supposed outlier of the Bumble Bee intrusive system and thought to be of Precambrian age. This intrusive mass has a number of small, vein type precious metal deposits in association with northeast striking fracture and felsic dyke systems. Coming down from Antelope Hill, a road intersection is encountered with one fork going to the left and to Bumble Bee and the other fork goin to the righ ant to Cleator and Crown King.

TAKE THE RIGHT FORK AND PROCEED TO THE INTERESCTION WITH THE CLEATOR-BUMBLE BEE ROAD. TURN RIGHT AT THE INTERSECTION AND CONTINUE ON TO CLEATOR.

This portion of the road crosses a series of interbedded felsic and intermediate volcanics that have been extensively sheared and isoclinally folded. There are numerous small prospects within this belt that have been developed for base and

precious metals. Production from most of the deposits within the volcanic belt has been small and confined to pyritic gossans with associated precious and minor base metal values.

The road continues on across Turkey Creek and past the Golden Turkey and Golden Belt millsites. These deposits and the nearby Silver Cord Mine are associated with low angle veins that cut across the felsic volcanics and were past producers of copper, lead, zinc, gold and silver. Approximately one half mile past the Golden Belt millsite, the road cuts through a thick banded iron formation-oxide facies exhalite unit. Directly adjacent to this unit is the St. Johns Mine, a past producer of lead, zinc, gold and silver. Passing the the St. Johns on the right, the road continues to Cleator through a series of pelites and metasediments. CONTINUE THROUGH CLEATOR APPROXIMATELY 2 MILES TO THE DESOTO MINE TURNOFF ON THE RIGHT. CONTINUE ON THIS ROAD APPROXIMATELY THREE MILES PAST THE CORRAL TO STOP 1.

STOP 1: Staurolite-Andalusite occurrence:

At this locality the metasediments (metapelite, quartzite, and clastic units) have been metamorphosed to staurolite-andalusite-muscovite schists. Directly adjacent to the metamorphosed units are a series of aplite-pegmatite dykes and sills that appear to locally control the alteration. Good staurolite crosses are available at this locality and in other areas within this series of metasediments. The aplite-pegmatie bodies are thought to have come off the nearby Crazy Basin Quartz Monzonite and are reported to contain tungsten, uranium and minor gold mineralization. PROCEED FROM THIS LOCALITY IN THE VEHICLES TO THE MAIN DESOTO ADIT AND PARK THE VEHICLES AT STOP 2.

STOP 2: The Pyritic Gossan Area:

At this locality the metasediments have an extremely high pyrite content and it has been proposed that this outcrop represents the alteration manefestation above a buried subvolcanic feeder system. The trip will proceed on foot along the road past the pyritic outcrops and the settlement site to main pyritic knob. This area was tested by Art Still in the 1960's for base metal content within the context of a traditional massive sulphide system. The areas has a slightly anomalous gold content associated with the most iron bearing of the gossan zones. At this location the characteristics of a subvolcanic feeder system will be discussed. PROCEED ALONG THE MAIN ROAD TO THE ROAD FORK, TAKE THE RIGHT HAND FORK AND PROCEED TO STOP 3.

STOP 3: Rhyolite-Mafic Volcanic-Sediment contact.

At this location is the contact between the altered sediments and a thin series of mafic volcanics that have been

strongly sheared and altered. The original metabasalts and andesites are strongly chloritic and contain quartz veins with anomalous base and precious metal values. Directly above? the altered mafic units are a series of felsic flow and fragmental units that form the host of the Desoto mineralization. These units appear to have been strongly deformed and sheared and have a high chlorite-silica-base metal composition. As noted above in the Introduction, the felsic units contain lensoid, steeply plunging, copper-rich orebodies that were mined in the past. The high chlorite content of the felsic units may be an alteration product of the original syngenetic system or a later effect caused by Laramide, quartz latite and latite porphyry intrusives.

The question of folding of the Precambrian felsic units has important implications on the genesis of the mineralization. Phillip Anderson, Ed De Witt and others have mapped the felsic units outcropping on this ridges as being tightly folded with a repetition of the ore-bearing horizon on both side of the ridge. Other investigators have mapped the units as being relatively unfolded on a major scale and that the occurrence of the copper-rich horizons can be explained by shearing or seperate exhalitive systems-horizons. The various units outcropping should be examined for evidence of folding, shearing or stratigraphic changes within the units. CONTINUE ALONG THE ROAD TO THE SADDLE AND THEN TAKE THE LEFT HAND FORK TO STOP 4.

STOP 4: Outcropping Copper Mineralization on the NW Zone.

At this location is the outcrop of the copper mineralization that was encountered in recent drilling by Chevron and Felmont. This mineralization is associated with a thin, chloritic felsic horizon and is adjacent to a Laramide? intrusive dike system and an area of the felsic pile that is strongly sericitic. CONTINUE ALONG THE ROAD TO THE KNOB DIRECTLY ADJACENT TO, AND ABOVE THE MAIN OPEN STOP WORKINGS, STOP 5.

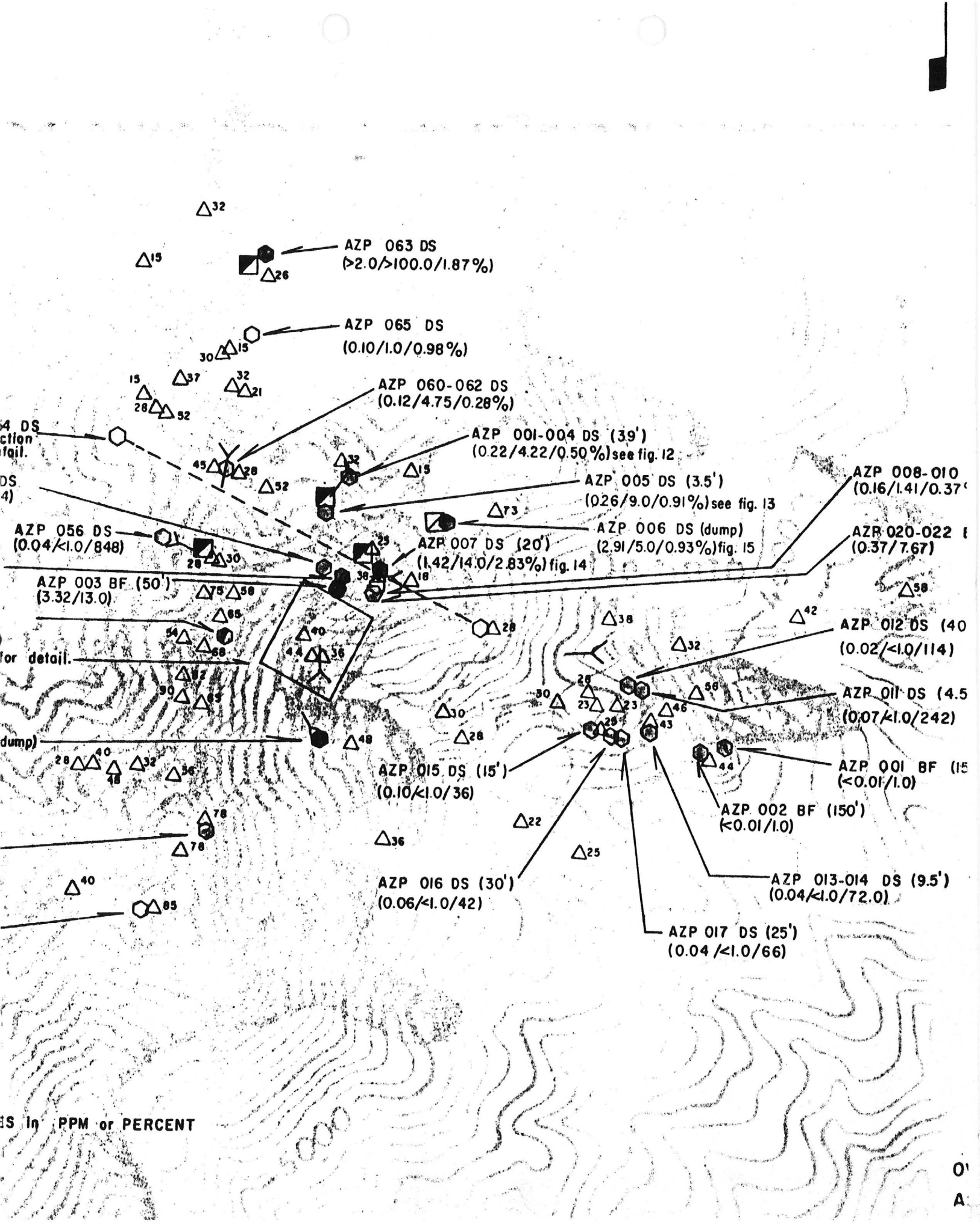
STOP 5: Outcropping Copper-Gold Mineralization on the SE Zone.

At this location is the occurrence of chloritic felsic units that contain up to 3.32 ppm Au over widths of up to 50 ft. The road traversed from STOP 4 a series of sericitic-silicic-argillic felsic units that contained only background base and precious metal values. It is interesting to note that the geochemical values are relatively symmetrical around a central core of highly silicic rhyolite that forms the prominent ridge to the SW. This will be the site of currently planned drilling operations designed to test the extent of the gold mineralization. FROM THIS POINT PROCEED DOWN THE RIDGE TO THE MAIN WORKINGS AND TO THE 100 LEVEL ADIT PORTAL. PUT ON HARD HATS, BOOTS AND UNDERGROUND EQUIPMENT AND PROCEED TO THE MAIN STOPE, STOP 6:

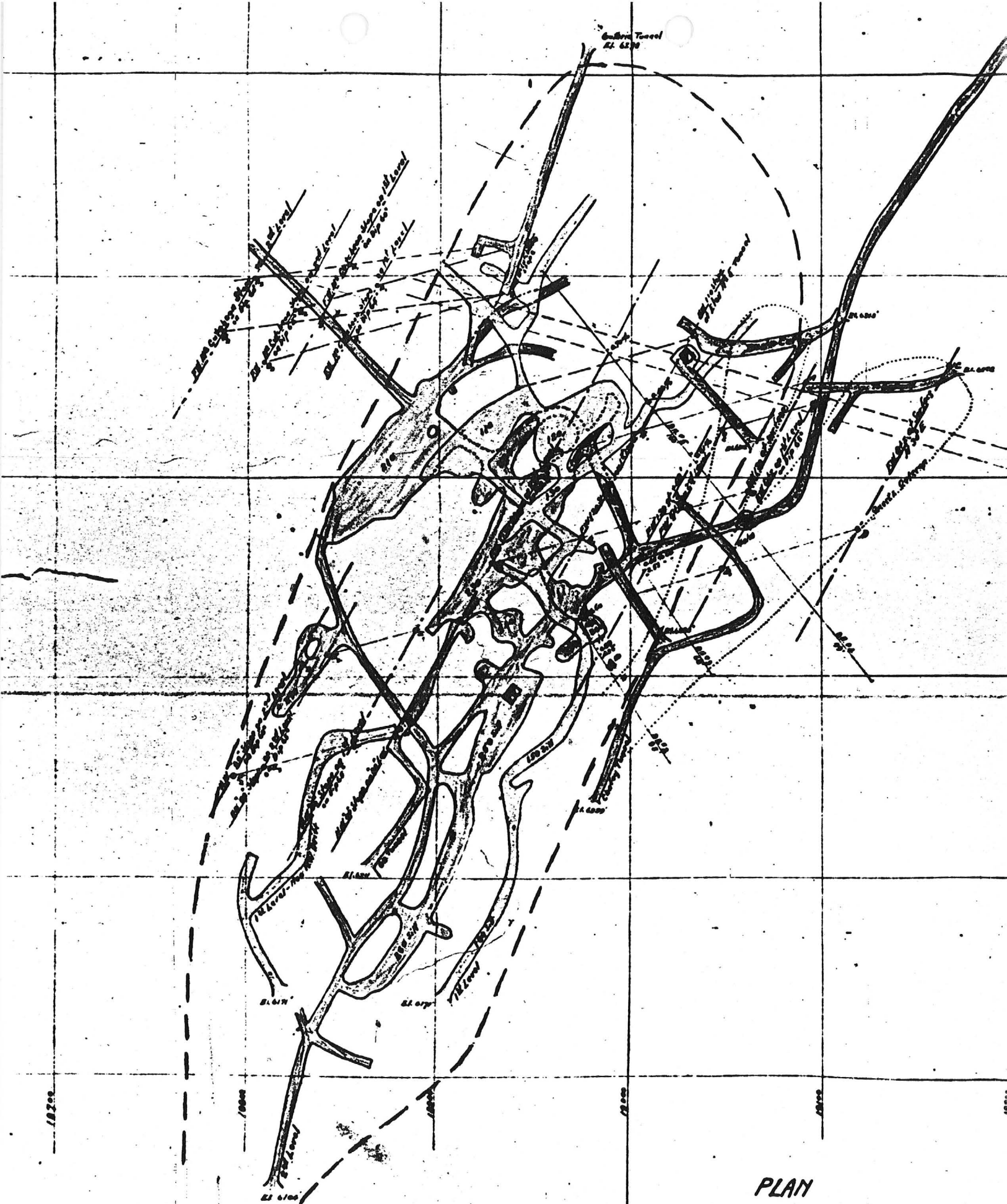
STOP 6: Main Stope of the 100 level of the DeSoto Mine

The DeSoto mineralization is well exposed and is noted in the attached figure 10a. The gold-rich portions of the system are usually associated with areas of low base metal content and strong chlorite-silica alteration. BE CAREFUL OF THE STOPED AND OVERHANG AREAS.

THIS CONCLUDES THE FIELD TRIP. RETURN TO YOUR VEHICLES AND RETURN TO MAYER ALONG THE SAME ROUTE. HAVE A SAFE TRIP HOME.


AZP 063 DS
(>2.0/>100.0/1.87%)
AZP 065 DS
(0.10/1.0/0.98%)
AZP 060-062 DS
(0.12/4.75/0.28%)
AZP 001-004 DS (39')
(0.22/4.22/0.50%) see fig. 12
AZP 005 DS (3.5')
(0.26/9.0/0.91%) see fig. 13
AZP 006 DS (dump)
(2.91/5.0/0.93%) fig. 15
AZP 007 DS (20')
(1.42/14.0/2.83%) fig. 14
AZP 008-010
(0.16/1.41/0.37
AZP 020-022
(0.37/7.67)
AZP 056 DS
(0.04/<1.0/848)
AZP 003 BF (50')
(3.32/13.0)
AZP 012 DS (40
(0.02/<1.0/114)
AZP 011 DS (4.5
(0.07/<1.0/242)
AZP 001 BF (15
(<0.01/1.0)
AZP 002 BF (150')
(<0.01/1.0)
AZP 015 DS (15')
(0.10/<1.0/36)
AZP 016 DS (30')
(0.06/<1.0/42)
AZP 013-014 DS (9.5')
(0.04/<1.0/72.0)
AZP 017 DS (25')
(0.04/<1.0/66)
for detail.
dump)
S in PPM or PERCENT


5200
De Soto
Mine



PLAN
OF
DE SOTO MINE
WORKINGS ABOVE 2ND LEVEL

— — APPROX OUTLINE OF
LOW GRADE COPPER BODY

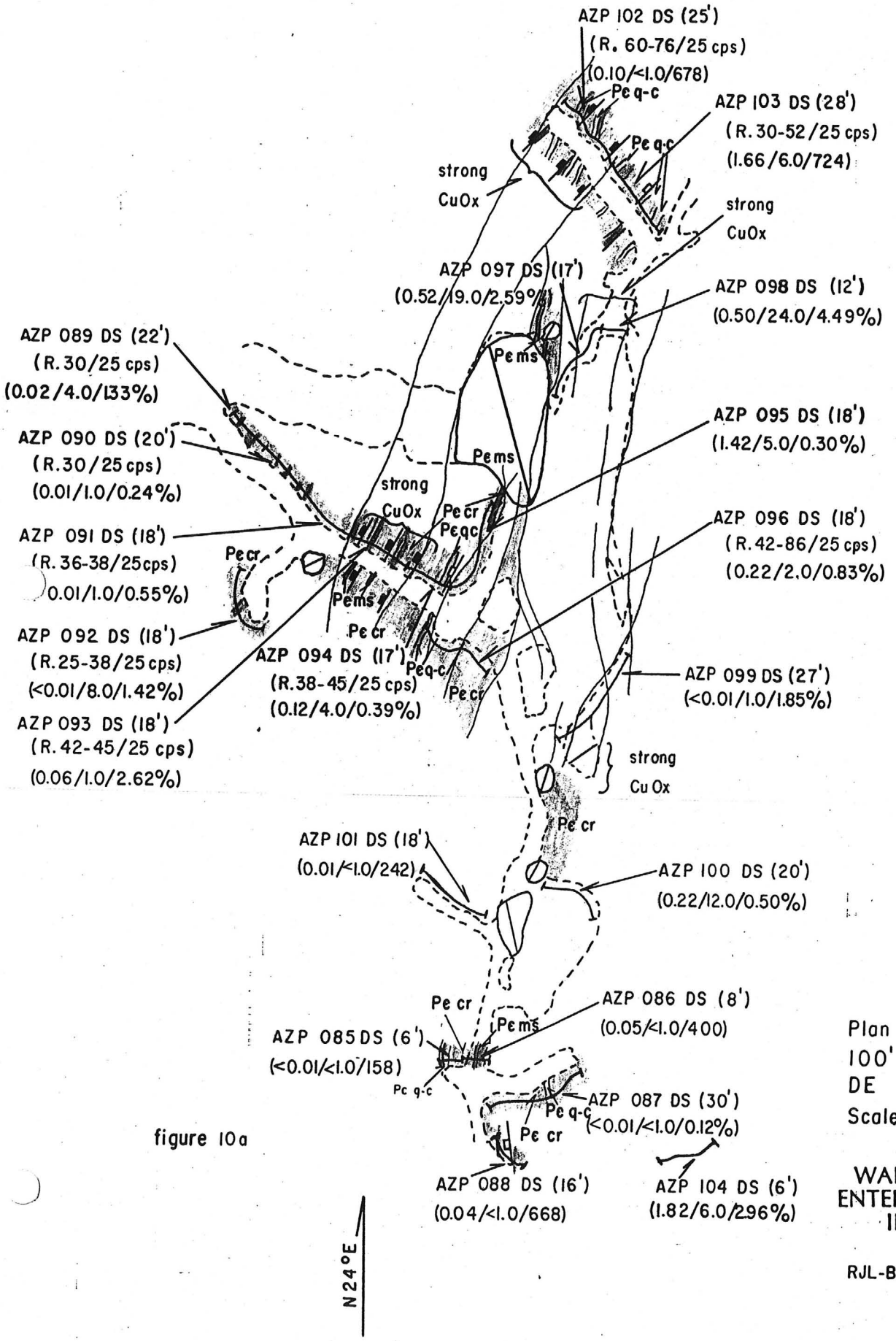
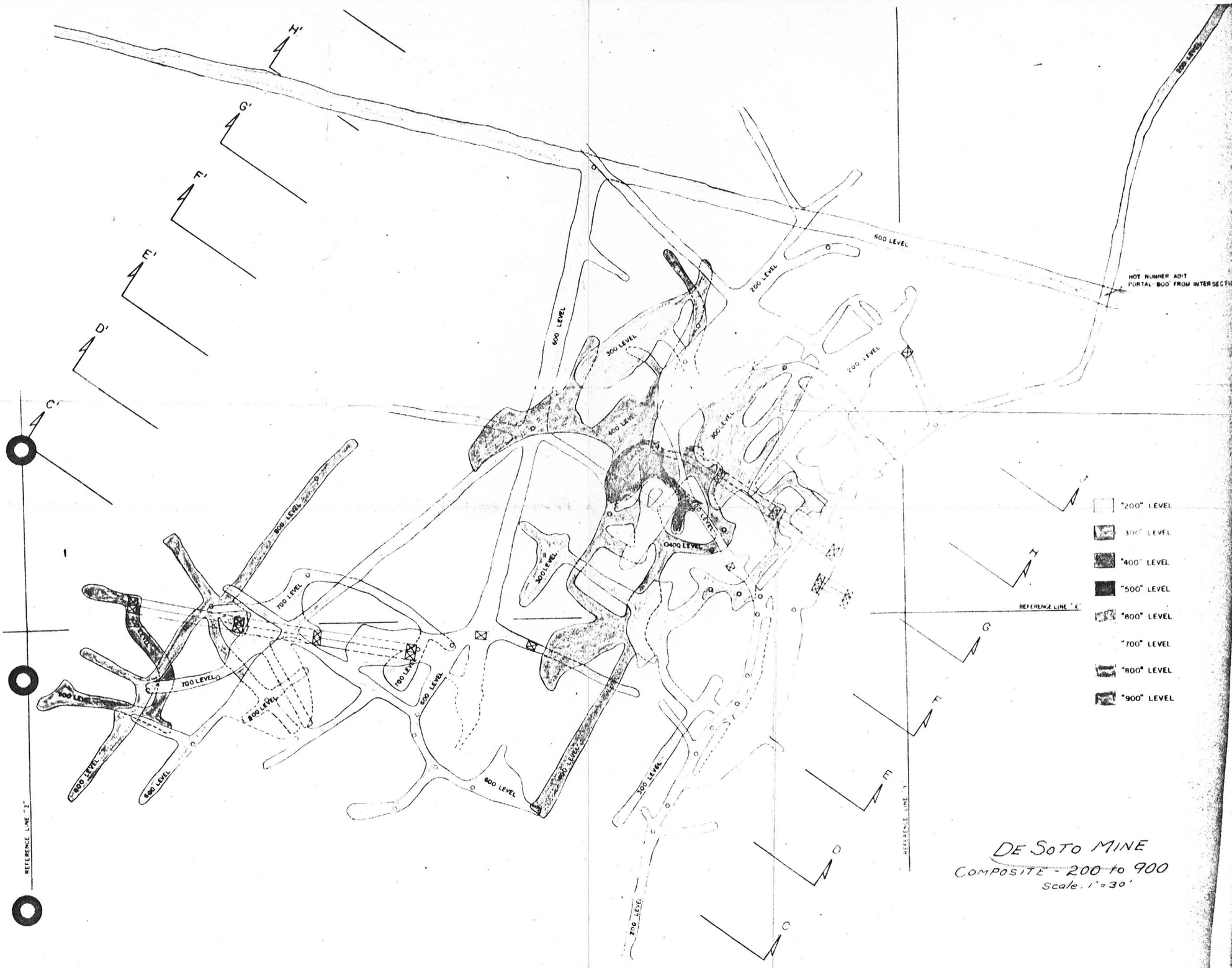


figure 10a

Plan View of
100' Level Workings
DE SOTO Mine
Scale 1" = 50'

WALLABY
ENTERPRISES
INC.

RJL-BJH-BGL/'81


"200" LEVEL
"300" LEVEL
"400" LEVEL
"500" LEVEL
"600" LEVEL
"700" LEVEL
"800" LEVEL
"900" LEVEL
REFERENCE LINE "Z"
REFERENCE LINE "X"
REFERENCE LINE "Y"
HOT NUMBER ADIT
PORTAL - 600' FROM INTERSECTION
DE SOTO MINE
COMPOSITE - 200 to 900
Scale 1" = 30'

DE SOTO COPPER CORP

CLAIM MAP

OF

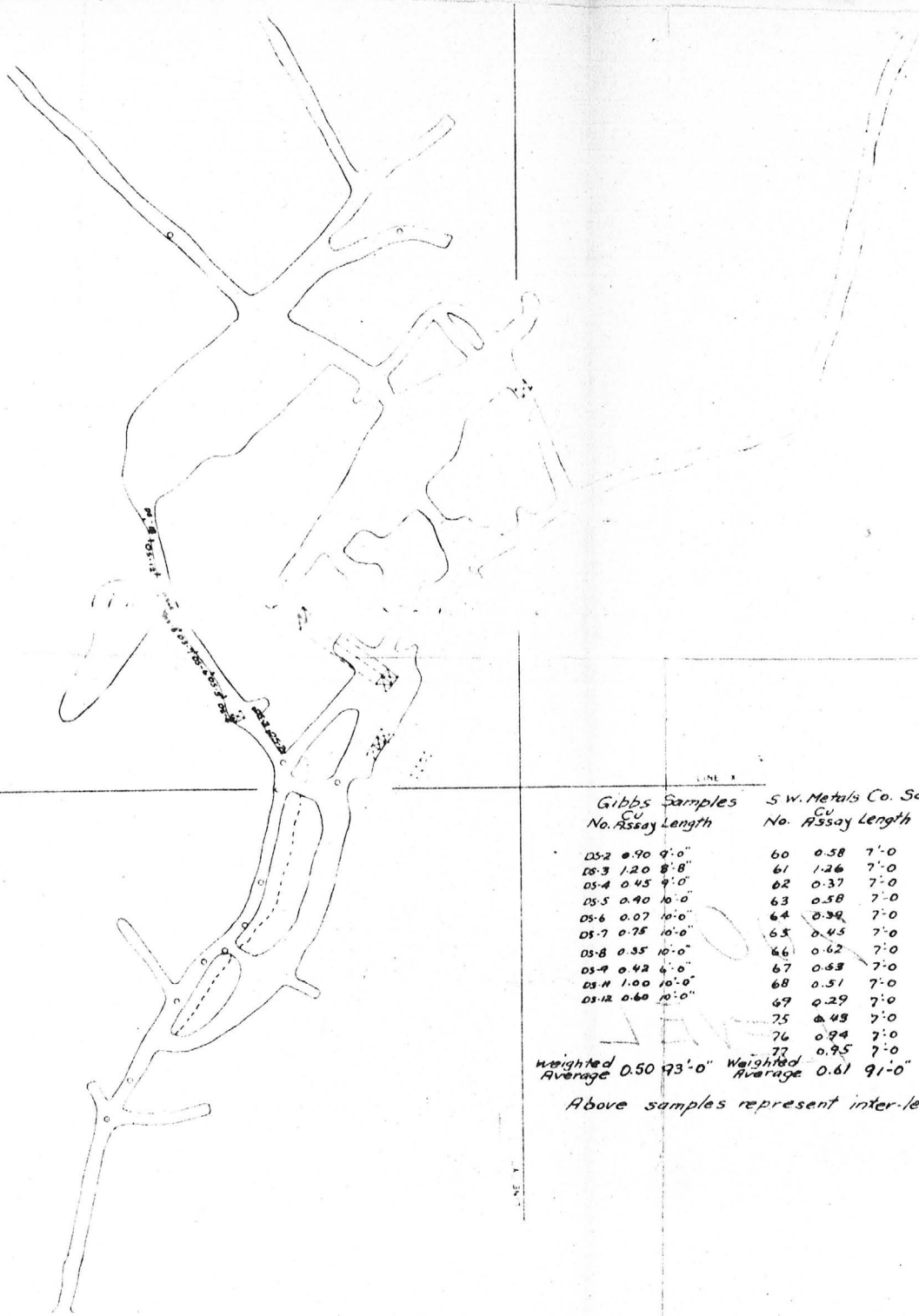
DE SOTO MINE

YAVAPAI COUNTY, ARIZONA

SCALE 1 IN. = 800 FT.

0' 800' 1600' 2400'

JUNE 1957 R.E.M.



Gibbs Samples

No.	Cu Assay	Length
DS-2	0.90	9'-0"
DS-3	1.20	8'-8"
DS-4	0.45	9'-0"
DS-5	0.40	10'-0"
DS-6	0.07	10'-0"
DS-7	0.75	10'-0"
DS-8	0.35	10'-0"
DS-9	0.42	4'-0"
DS-11	1.00	10'-0"
DS-12	0.60	10'-0"
Weighted Average	0.50	93'-0"

S.W. Metals Co. Samples (Covering Some Sections as Gibbs)

No.	Cu Assay	Length
60	0.58	7'-0
61	1.26	7'-0
62	0.37	7'-0
63	0.58	7'-0
64	0.39	7'-0
65	0.45	7'-0
66	0.62	7'-0
67	0.63	7'-0
68	0.51	7'-0
69	0.29	7'-0
75	0.48	7'-0
76	0.94	7'-0
77	0.95	7'-0
Weighted Average	0.61	91'-0"

Above samples represent inter-lense material

"200" LEVEL

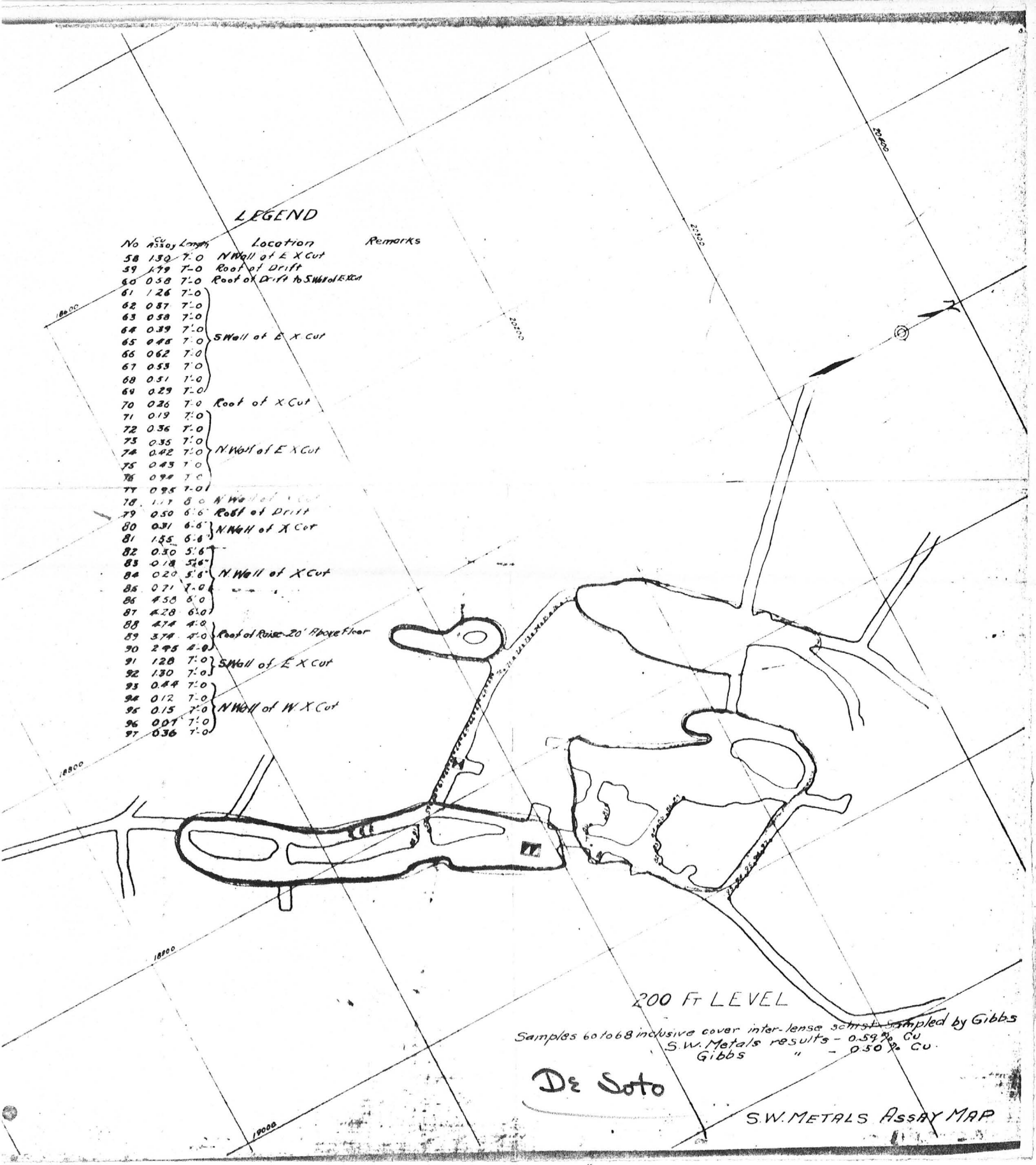
DE SOTO MINE

YAVAPAI COUNTY, ARIZONA

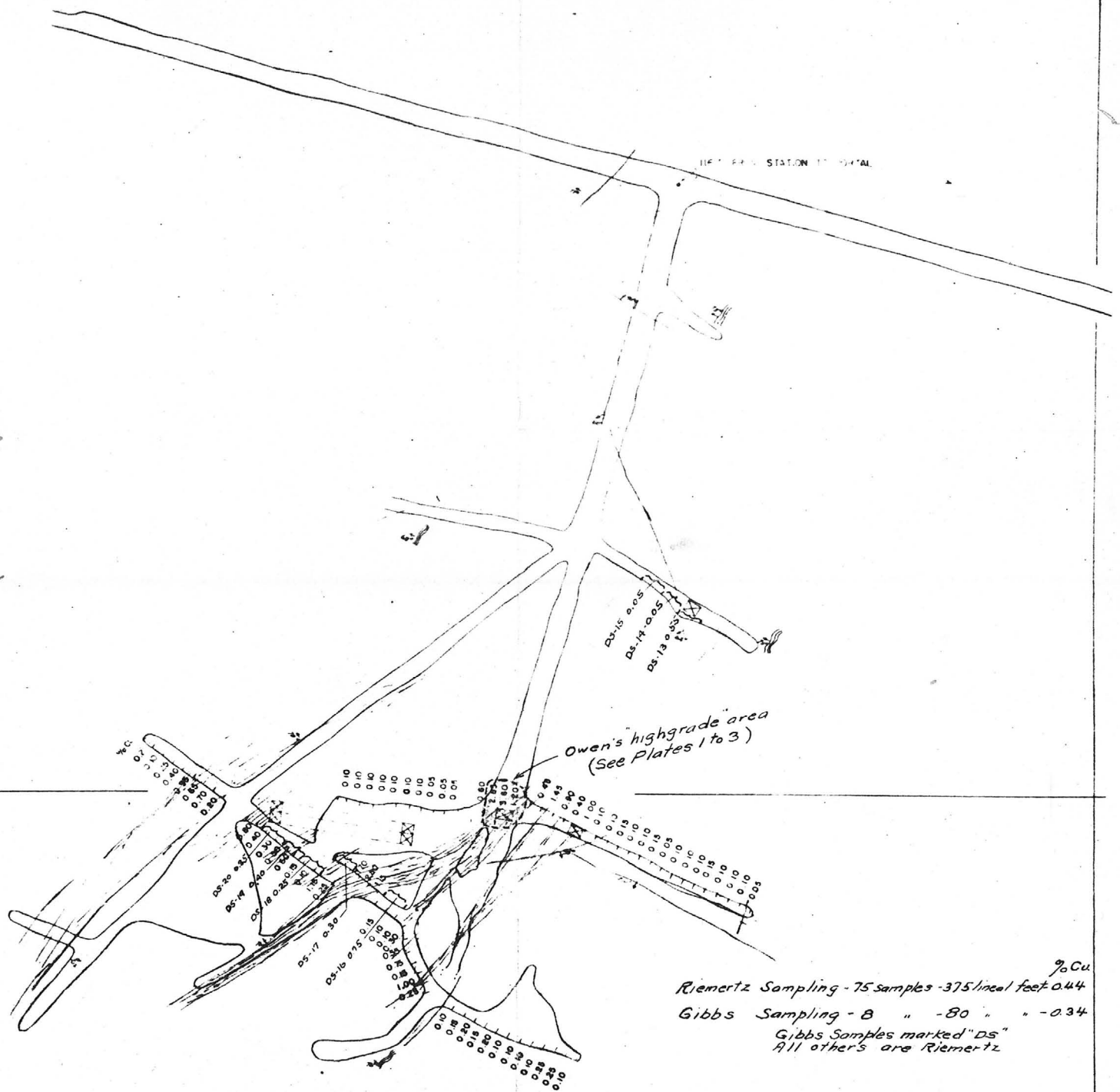
SCALE 1 IN. = 30 FT.

0 30 60 90

DeSoto Mines


LEGEND
No Cu Assay Length Location Remarks
58 1.30 7'-0 N Wall of E X Cut
59 1.79 7'-0 Roof of Drift
60 0.58 7'-0 Roof of Drift to S Wall of E X Cut
61 1.26 7'-0
62 0.87 7'-0
63 0.58 7'-0
64 0.39 7'-0
65 0.48 7'-0 S Wall of E X Cut
66 0.62 7'-0
67 0.53 7'-0
68 0.51 7'-0
69 0.29 7'-0
70 0.26 7'-0 Roof of X Cut
71 0.19 7'-0
72 0.36 7'-0
73 0.35 7'-0
74 0.42 7'-0 N Wall of E X Cut
75 0.43 7'-0
76 0.94 7'-0
77 0.95 7'-0
78 1.11 8'-0 N Wall of X Cut
79 0.50 6'-6" Roof of Drift
80 0.31 6'-6" N Wall of X Cut
81 1.55 6'-6"
82 0.30 5'-6"
83 0.18 5'-6"
84 0.20 5'-6" N Wall of X Cut
85 0.71 7'-0"
86 4.58 6'-0"
87 4.28 6'-0"
88 4.74 4'-0"
89 3.74 4'-0" Roof of Raise 20' Above Floor
90 2.95 4'-0"
91 1.28 7'-0" S Wall of E X Cut
92 1.30 7'-0"
93 0.44 7'-0"
94 0.12 7'-0"
95 0.15 7'-0" N Wall of W X Cut
96 0.07 7'-0"
97 0.36 7'-0"
18800
20200
20600
18800
18800
19000
200 FT LEVEL
Samples 60 to 68 inclusive cover inter-lense schist sampled by Gibbs
S.W. Metals results - 0.59% Cu
Gibbs " - 0.50% Cu
De Soto
S.W. METALS ASSAY MAP

De Soto Mine



% Cu

Riemertz Sampling - 75 samples - 375 lineal feet - 0.44

Gibbs Sampling - 8 " - 80 " " - 0.34

Gibbs Samples marked "DS"
All others are Riemertz

DE SOTO MINE
600 LEVEL
Riemertz and Gibbs sampling

Scale: 1" = 30'

F. Gibbs 5/20/59