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PRINTED: 08/16/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: STOCKTON HILL GROUP

ALTERNATE NAMES:
JORDAN

MOHAVE COUNTY MILS NUMBER: 90F

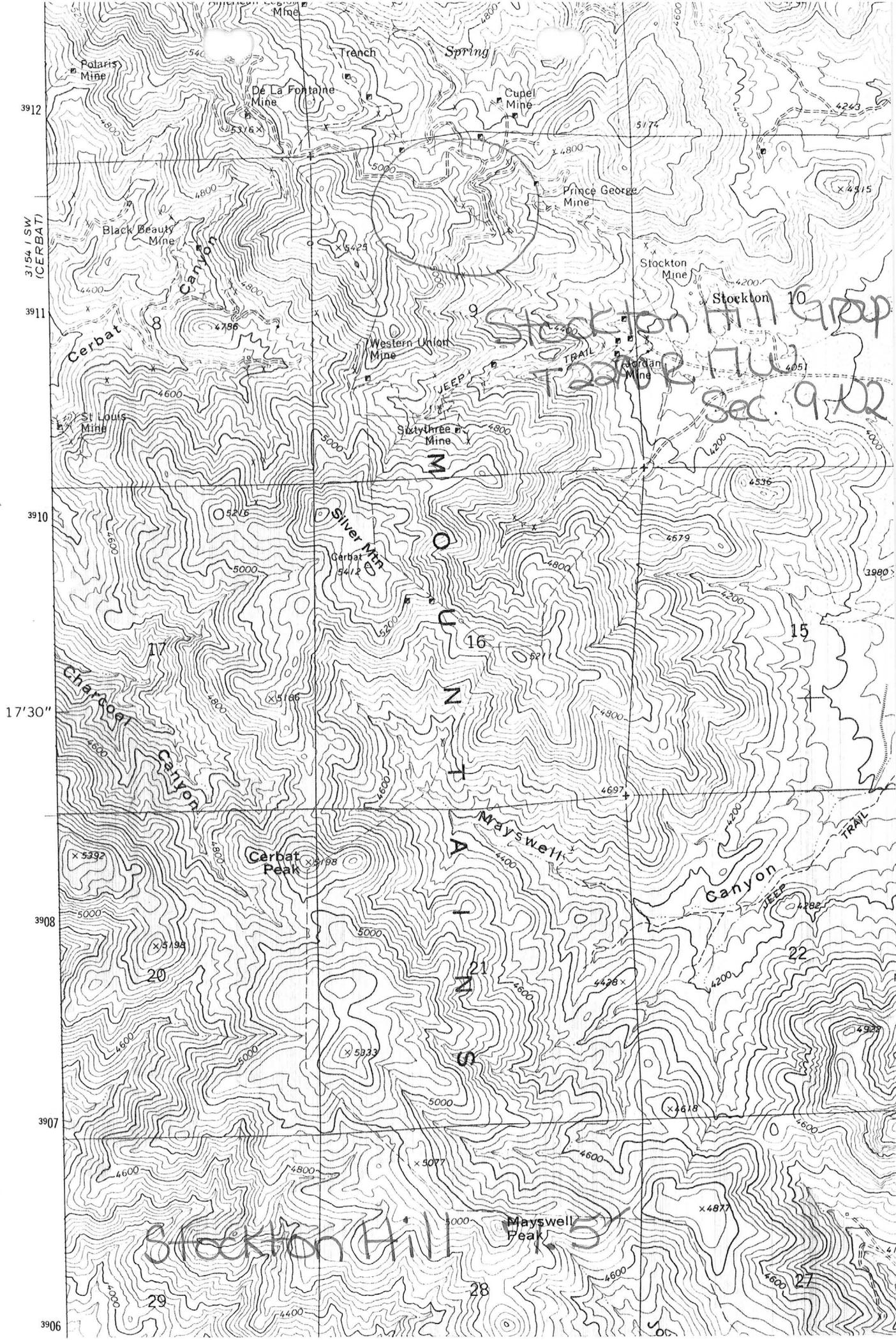
LOCATION: TOWNSHIP 22 N RANGE 17 W SECTION 9 QUARTER N2
LATITUDE: N 35DEG 18MIN 35SEC LONGITUDE: W 114DEG 05MIN 57SEC
TOPO MAP NAME: STOCKTON HILL - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
SILVER SULFIDE
GOLD LODE

BIBLIOGRAPHY:

ADMMR STOCKTON HILL MINE FILE
ADMMR HOUSEHOLDER CERBAT RANGE CLAIM MAP
BASTIN, E.S. "ORIGIN OF CRTN SILVER ORES NEAR
CHLORIDE & KNGMN,AZ" USGS BULL 750, P 17-39
AZ MNG JNL, 6/19,P 69; 3/20, P 23; 4/20, P 60
SCHRADER, F.C. "MIN. DSPTS OF CRBT RNGE, BLCK
MTN, GRND WSH CLFS, AZ" USGS BULL 397, P 111
ADMMR DE LA FONTAIN MINE FILE
TENNEY, J.B. "1ST RPT OF MIN. IND. OF AZ"
AZBM BULL 125, P. 87, 88; 1928
MALACH, R "MOHAVE CO. PLACE NAMES" P. 33
MALACH, R "CERBAT MTN CTRY" P. 5, 24
GIBSON, TOM L. "CERBAT TRANSPORTATION DEVEL.
DRAINAGE TUNNEL" (GEOLOGY FILE)
ADMMR "NELSON TRANSPORTATION TUNNEL" (GEOLOGY
FILE)
HYDE, PETER, 1994, FLD RPT: CERBAT MTNS,
MOHAVE COUNTY - WATER & SOIL SAMPLING OF FEB
7-10, 1994, AZDEQ FIELD RPT (GEOLOGY FILE)



3912
3911
3910
17'30"
3908
3907
3906

3154 L SW
(CERBAT)

Stockton Hill 3

Stockton Hill Group
T220 R NW
Sec. 9-12

Cerbat Canyon

Cerbat Canyon

Mayswell Canyon

Cerbat Peak

Mayswell Peak

Polaris Mine

De La Fontaine Mine

Cupel Mine

Black Beauty Mine

Prince George Mine

Stockton Mine

St. Louis Mine

Western Union Mine

Sixtythree Mine

Jordan Mine

Silver Mine

Cherokee

16

15

20

21

22

29

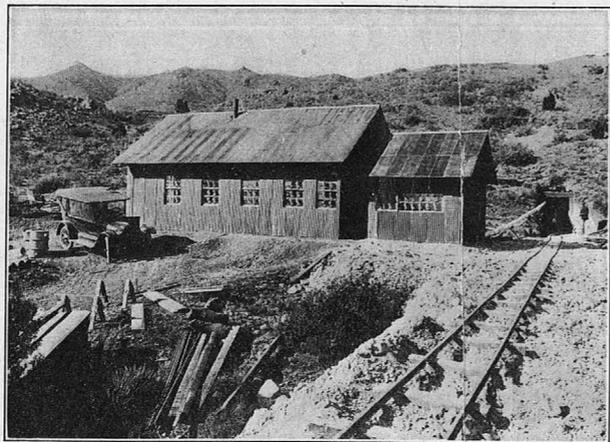
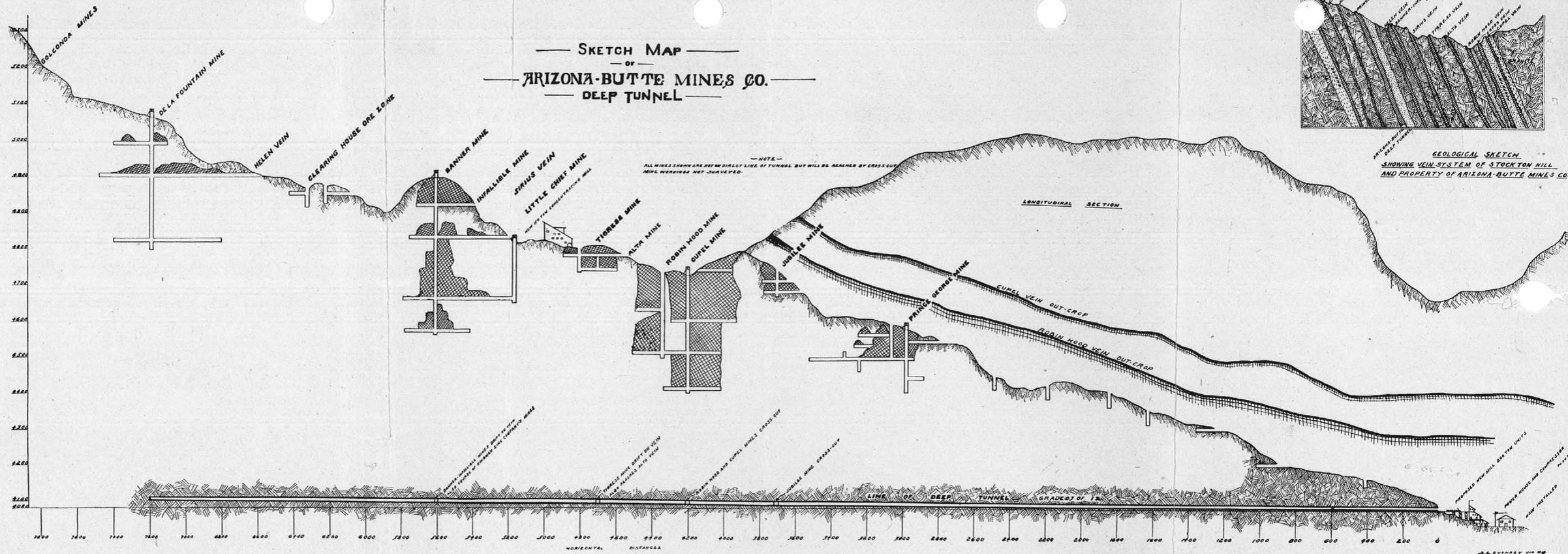
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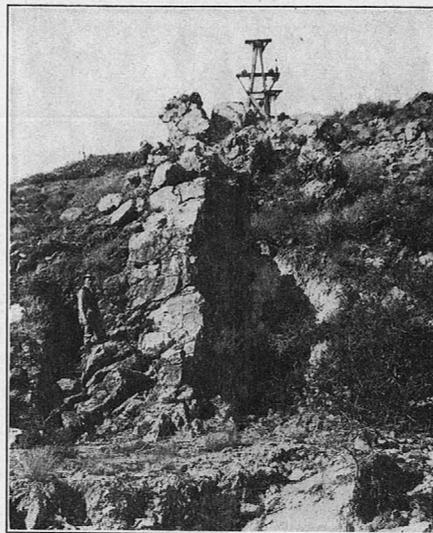
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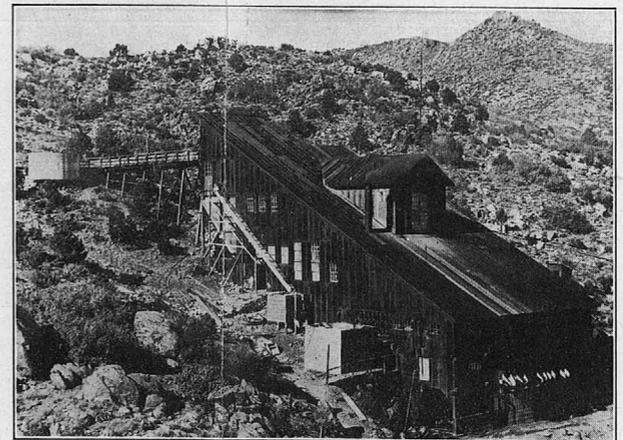
10



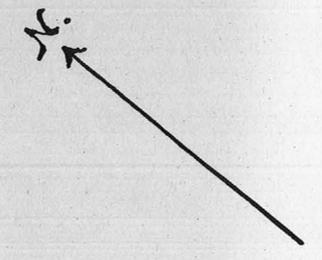
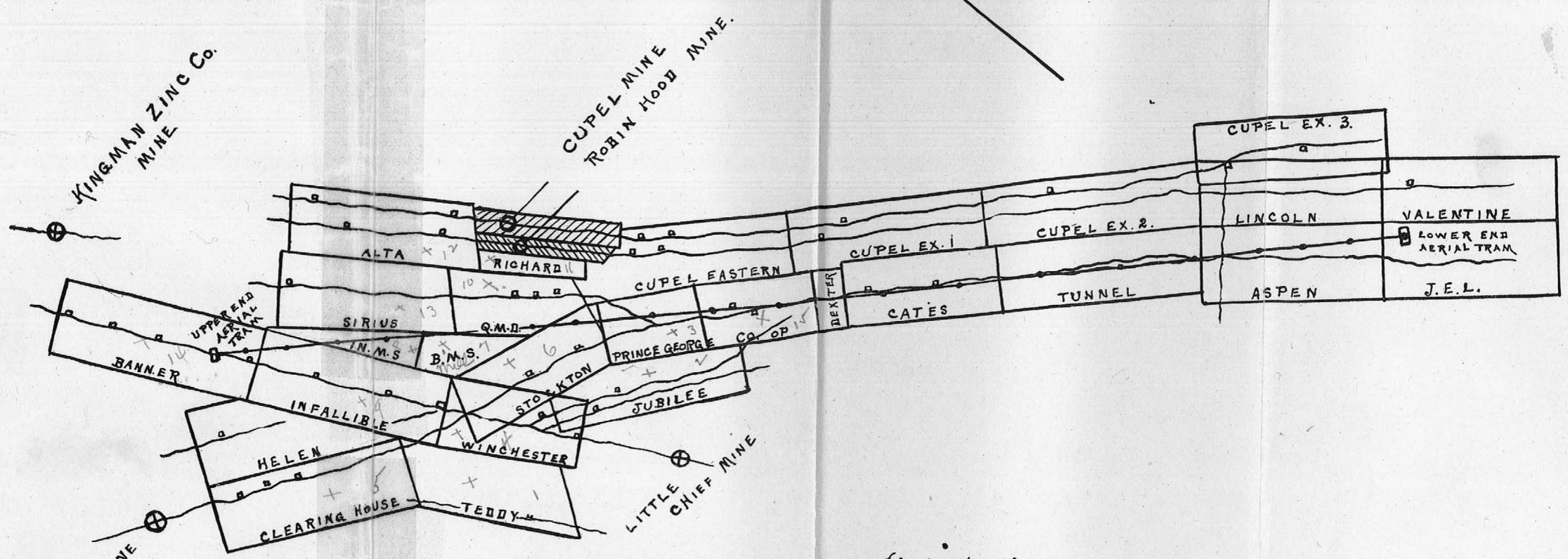
Arizona-Butte Mines—Deep Tunnel Portal and Power House



Prince George Vein Outcrop—900 Ft. From Deep Tunnel Mouth



New 150 Ton Concentrator—Location Shown on Map Above



CLAIM MAP
 STOCKTON HILL MINES
 OPERATED BY
 ARIZONA-BUTTE MINES CO.
 (EXCEPT SHADED PORTION.)

SHOWING VEIN SYSTEM. LENGTH ABOUT 2 MILES.

APPROXIMATE SCALE 1000 FEET = INCH

- VEIN OUTCROPS
- SHAFTS
- AERIAL TRAM

STOCKTON HILLS MINES
BANNER GROUP (TIGRESS)

MOHAVE COUNTY
CERBAT MTNS.

Sam Barbee, metallurgist and assayer for Cerbat Mining Company, discussed the operation of the mill at the Golden Gem mine. Also, he reported that 27 men are employed in total at the mill and the several mines under control of the Company, (the Golden Gem, Flores, Summitt and the recently acquired BANNER GROUP (TIGRESS) operated many years ago by U.S. Smelting).

TRAVIS P. LANE - Kingman Conference - 1-8-62

This property active Feb. 1962

May 16, 1962 - Visited the Golden Gem mill of Cerbat Mining & Milling Co. The mill is operating one shift per day (20-25 TPD) on ore from the Golden Gem mine and the Tigress claim (Banner group).

TRAVIS P. LANE - Weekly Report - 5-19-62

RRB WR 12/10/82: Aleigh Peterson was in to check our files on properties owned at least in part by her grandmother, Mrs. Blanche Peterson, 2012 Los Angeles Street, Kingman, AZ 86401. She also has several unpatented claims in the area. The files asked for were the Iowa, Vivian, Golden Era, Silver Coin, Old Timer, Old Colony and Prince George in the Oatman District. Mrs. Peterson's late husband was active in the area for many years with Al Beard.

RIH

From "The Wallapai Project" by Mountain States Resource Development, Inc.
 Complete report in Tennessee-Schuylkill file.

Ore minerals are principally cerargyrite (silver), native gold, galena (lead) sphalerite (zinc), and chalcopyrite (copper). Some arsenopyrite occurs along with cerrusite and oxidized base metal minerals. One can consider this to be a typical "Rocky Mountain Lead, Zinc, Copper Ore."

In March 1977 Messers Dale and Rudy reported on their efforts to justify a custom mill for the small miners of Mohave County. They were funded by a government grant and did their work in conjunction with a number of governmental agencies. In the northern part of the district they report 256,700 tons of dump and tailing ore grading .018 to .103 oz/T gold, .66 to 6.63 oz/t silver, .03 to .16% copper, .13 to 1.79% lead and .50 to 3.56% zinc. They considered this to be proven ore.

It is interesting to note that this is only the northern part of the district and only includes materials that were easily accessible. Items like the buried table and jig tails at the Tennessee were not included.

H. Mason Coggin, a well known and respected mining engineer, evaluated the Copper Age group of claims in April, 1980. He measured many ore occurrences and interpreted a number of undeveloped one in the Copper Age group has a potential of 4.730 million tons averaging \$200/ton.

In the Hidden Treasure section of the property Mr. Coggin estimates .5 million tons of ore grading \$200/ton or better.

The Arizona Bureau of Mines lists the following known reserves in the Wallapai Mining District:

Mine	Tons	% Cu	% Pb	% Zn	oz/T Au	oz/T Ag
Banner	3841	.5	22.6	11.9	.21	7.4
	5000	.5	22.6	11.9	.21	7.4
Summit	25,000	.58	4.3	6.3	.066	4.5
	25,000	.58	4.3	6.3	.066	4.5
Golconda	40,000	.5	.5	14.0	.20	4.0
	40,000	.5	.5	14.0	.20	4.0
Fountain Head	1,250	.61	.65	16.4	.2	3.5
	3,750	.61	.65	16.4	.2	3.5
Detroit	1600	2.31	1.0	5.5	.01	7.2
	1600	2.31	1.0	5.5	.01	7.2
Wrigley	56,000	.1	9.0	.1	.1	.2
Tennessee	29,503	.1	4.1	8.2	.01	.2
	50,000	.1	4.1	8.2	.01	.2

Mr. Eldon Lee

9 Jun 82

Page 4

Tennessee	100,000	.1	4.1	8.2	.01	.2
New Moon	11,000	.1	5.0	8.0	.05	7.5
	9,900	.1	5.0	8.0	.05	7.5
	10,000	.1	5.0	8.0	.05	7.5
Minnesota	900	.6	5.0	4.0	.01	.2
Lone Jack	2000	.19	5.51	4.66	.035	3.47
Copper Age	7,000	.1	3.6	7.3	.06	2.0
	7,000	.1	3.6	7.3	.06	2.0
Champion	570	.1	8.0	15.6	.26	10.0
	6,000	.1	8.0	15.6	.26	10.0
	6,000	.1	8.0	15.6	.26	10.0

While the above represent substantial exploration and are very conservative, especially since this is what their taxes are based upon, it is not fully conclusive. Mining costs, metallurgical techniques and markets must be developed. However these do show the substantial amounts of ore left in the mines.

Howard H. Heilman examined the Golconda Mine in great detail. He measured the reserves in numerous structures and defined those reserves as follows:

Virginia	350,000 tons
Tub	400,000
Little Jimmie	150,000
Peach Triangle	350,000
Golconda	300,000
Prosperity	80,000
Primrose	80,000
Blackfoot	90,000
	<u>1,800,000</u>

Mr. Heilman values these ores as follows:

Zinc	16%
Lead	.5%
Copper	.5%
Gold & Silver	\$120.00/T*

* Bases on \$300/oz gold and \$6.00/oz silver.

The whole emphasis that comes from the Golconda reports is that the mine was shut down when the fire occurred and once stopped was not restarted. The stopes that were in production are in approximately the same situation as when the mine closed.

Tonnages as indicated above were confirmed by H. G. Humes and The American Metal Company. Grades in their estimates ran higher in lead and copper and slightly lower in zinc.

Dump samples on the Golconda were taken and measurements of tonnage were made. The measured tonnages are as follows:

Chats	15,000 tons
Lower Blackfoot	3,000
Middle Blackfoot	7,000
Upper Blackfoot	500
Prosperity	8,000
Tub	3,000
Silver	7,000
Tails	20,000
Golconda	30,000
	<u>93,500</u>

Of the dump ore, approximately 6,000 tons of it will not meet \$65/T gross metal value criteria leaving some 87,500 tons.

Samples taken by CEC have confirmed some of the grades quoted. The ongoing program of sampling each dump by complete trenching and then metallurgical testing the sampled material will accurately prove not only the tonnage and assay of each dump, but will also define what can be recovered from these dumps.

Metallurgically the ores in the Wallapai District are best treated by flotation. Recoveries as follows can be expected on ores that are freshly mined:

Lead and Silver	90-95%
Copper and Gold	85-90%
Zinc	75-85%

Ores that have been oxidized by weathering (e.g. dump ores) are also best treated by flotation unless the weathering is severe. One might expect a 5% reduction in recovery, but otherwise the treatment should be unaffected.

Gravity separation means can also be used on the Wallapai ores. Recoveries are lower, but oxidation has no effect. Some cases of highly oxidized ores yield higher recoveries than flotation, but these are not very important in the district.

Ores with high sulfides should never be treated by leaching techniques. This is a waste of time, money and resources.

The most important item in determining the best method of treatment is metallurgical testing. Ores, even ores from similar mines, must be tested and the parameters for optimum treatment established. A few dollars spent on professional metallurgical testing will save hundreds of thousands in the final analysis.

Summarizing one can state that dump ores and tailings in the district that will meet a \$65/T gross metal value are substantial. If the reports issued by competent personnel quoted herein are correct the tonnage is in excess of 300,000 tons. While CEC is

Stockton Hill 416

12.0 x 8.5 x 8.5 cm

MINEY SPECIMEN FOR DEPARTMENT OF LITERARY AND ARCHIVES

K166

8-25

(Do not write in this space)

(Wrap each specimen separately, or place it in a substantial bag, by itself, with a number attached, identical with the number on this card.)

Ore _____

Cabinet _____

No. _____

Specimen No. 18, collected by Robert E. Morrow
Field Engineer

Name of ore Gold-Silver

Operator Lee & Harris

Minerals contained _____

Mine active or inactive Active

If inactive, when operated _____

Gangue _____

Specimen presented by Cecil Davis

Depth at which taken 150 ft. Level

Date Aug 19, 1940

Approximate mineral content (in terms of average per ton) \$70 per ton

Notes (Any general information regarding the history of the property.) _____

Name of mine or claim Lee-Hays

Group _____

District Stockton Hill

Location (distance and direction by highway from what town) 10 mi. NE. of Kingman

If more space is desired for notes, use other side.

Owner of property _____

Lee-Hays-Harris

This specimen is now in the ADMR Museum (see the K number).

T
on

A

GEOLOGICAL REPORT

on the

LITTLE
CHIEF

CHIEF ENGINEER PROPERTY

in the

Wallapai Mining District

Mohave County, Arizona

by

Wm. Vanderwall
Geologist
Scottsdale, Arizona

p-3

April 30, 1981

Little Chief Mine
Stockton Hill

SUMMARY OF GEOLOGICAL REPORT

CHIEF ENGINEER PROPERTY Wallapai Mining District Mohave County, Arizona

The Chief Engineer Property consists of four contiguous, unpatented mining claims located in Section 9, Township 22N, Range 17W, G&SRM, Mohave County, Arizona.

The property is a part of the Stockton Hill Camp. A late 1800's silver bonanza where oxidized ores ran as high as 3000 ounces silver per ton. The Chief Engineer property was worked until the turn of the century but production statistics are unavailable.

The property is located in the central portion of the Cerbat Mountain Range, one of the many north south trending, fault-block ranges of the southwest desert. Rocks exposed at the surface, on the Chief Engineer property, include pre-Cambrian metamorphic rocks cut by Mesozoic (?) intrusives and by mineralized veins of unknown (Tertiary?) age.

The ore deposits on the property may be of two types: Oxidized, near surface vein deposits often greatly enriched in silver; and deeper, primary, base metal-silver vein deposits which may extend to considerable depth.

The most favorable loci for ore is at the junction of veins with other structures, although it can be found randomly spaced along the veins in lenses or shoots. The main vein on the Chief Engineer property trends northwest and projects to a shallow underground intersection with neighboring dykes.

Results of field reconnaissance indicate the following:

- A) Mineralized structures traverse the property and ore is exposed in prospect pits, trenches, etc., indicating the oxide zone was not mined out by the first miners.
- B) Dykes and veins project to a shallow underground intersection which would provide a sizable locus for ore deposition.
- C) Past mining on the property has produced a considerable amount of dump material which may be amenable to cyanidation.

Wm. Vanderwall, Geologist
April 30, 1981

Geological Report
CHIEF ENGINEER PROPERTY
Wallapai Mining District
Mohave County, Arizona

LOCATION:

The Chief Engineer property consists of four contiguous, unpatented mining claims located approximately eight miles north of Kingman, Arizona, on the eastern slope of the Cerbat Mountains. The claims are situated in Section 9, Township 22N, Range 17W, G&SRM, and are accessible via county and private roads.

SCOPE OF REPORT:

Facts and opinions contained in the report are based on a cursory field examination of the property and on the author's specific knowledge of the area and general familiarity with the published literature concerning the Wallapai District.

HISTORY AND PRODUCTION:

The Chief Engineer property lies centrally in the famous silver bonanza ghost camp of Stockton Hill, where rich silver discoveries brought miners to the area as early as 1863. Oxidized silver ores (up to 3000 ozs. per ton) were mined at Stockton Hill with the bulk of production during the 1870-1880 period. The rapid decline in silver prices between 1885-1895, the recession of 1905 and the added cost of mining the deeper, leaner, sulfide ores caused the suspension of mining operations. The area, for the most part, has been idle ever since.

Schrader, 1909 (USGS Bulletin 397, pp. 112-113) briefly describes the Little Chief Mine (now the Chief Engineer) and estimates its production to be \$25,000 in silver (125,000 ozs. @ 20¢/oz.). Schrader credits the Little Chief with approximately 1000 feet of underground work and gives cerargarite (AgCl), galena (PbS) and native gold as the principal ore minerals. He states ore tenure as 350 ounces of silver per ton, 14% to 30% lead, and up to one half ounce gold. Physical inspection of dump material tends to support Schrader's values.

The value of metals produced in the Wallapai District during the years 1904-1948 (U.S. Bureau of Mines 1948 Annual Report) was about 22.5 million dollars at 1948 prices (nearly a half a billion dollars at today's prices). Values were principally in lead and zinc, but with substantial amounts of copper, silver and gold.

Currently Penzoil-Duval Corporation, approximately 4 miles northwest of the Chief Engineer property, is reportedly producing 18,000 to 20,000 tons per day of open pit ore averaging 0.5% copper and 0.045% molybdenum, plus other metals.

GEOLOGY AND ORE DEPOSITS:

The Cerbat Mountains constitute one of the many north-south trending, fault block ranges of the southwest desert. They consist primarily of metamorphosed pre-Cambrian igneous and sedimentary rocks, cut by later intrusions of Mesozoic (?) granite and monzonite porphyries, known locally as the Ithaca Peak Granite, and by Tertiary volcanic dykes. Centering around the Ithaca Peak intrusive, mineralization is typically copper and molybdenum sulfides, now being mined by Duval. Surrounding the intrusive is a zone several miles wide of copper-lead-zinc-silver bearing veins which gradationally change to veins of intense silver-lead-mineralization. The Chief Engineer property contains veins of the silver-lead type.

The vein type ore deposits occur in clefts or cracks in the country rock in which the mineral material precipitated from aqueous solution (hydrothermal fissure veins). It is probable that these fissures formed from forces accompanying the emplacement of the Ithaca Peak intrusive. With the intrusive acting as a heat engine, a convecting hydrothermal system developed that set up a hypogene enrichment process which deposited ore and gangue minerals near the top of the convecting cell and extracted metals and sulfur from sources at depth. Conceivably, as the solution approached the fissure level, it boiled, thereby distilling the acid forming constituents CO_2 and H_2S . Cooling and a slight pH rise of the residual liquids, due to loss of acid forming constituents, may be regarded as the mechanism of sulfide precipitation. Exposure of the veins to normal weathering processes oxidized the ore and, to a point, enriched it by the downward migration of slightly acidic rainwater carrying metals in solution.

Many veins, occurring in nearly vertical fault fissures, strike northwest and outcrop for considerable distances. The fault fissures are largely occupied by breccia with abundant shearing and some gouge. Ore lenses, or shoots, though not continuous are numerous and tend to have greater vertical rather than horizontal extent. Concentrations of extremely high-grade ore appear to favor vein junctures. These concentrations are attributable to chemical and physical changes which enhanced mineral deposition at the fissure level of the convecting cell.

The main vein on the Chief Engineer property is a prominent linear structure which extends from the Banner Mine southeastward. It cuts all lithologic units in the area, mostly pre-Cambrian granite, to intersect with no less than two dykes on the Chief Engineer property. The vein is composed of quartz and silicified granite breccia with some gouge. The vein trends $\text{N}40^\circ\text{W}$ and is nearly vertical. The vein is from 3 to 9 feet wide and heavily

stained in outcrop by iron and manganese. Evidence of mineralization in the vein is from pronounced gossan caps, in place mineralization underground and the number and extent of workings on the vein.

Dykes on the property include granite porphyry and diabase but are, presumably, less mineralized than the vein. No dyke-vein junction is apparent on the surface but attitude and trend of the dykes as well as mine dump material suggests an underground intersection.

The primary mineralization is one of proustite, galena, sphalerite, chalcopyrite, pyrite and arsenopyrite together with a variety of gangue minerals. The oxidized portion of the veins ranges from 50-300 feet and may be very rich in lead sulfide, silver chloride, native silver and lesser concentrations of native gold.

ORE RESERVES:

The Chief Engineer property contains a known ore body composed of primary base metal-silver values as well as oxidized silver-gold values. Data from past developments, publications and reports are insufficient, or unavailable, to completely delineate the ore body for volumetric analysis. However, there is ore exposed in various underground workings and in many places on the surface; prospect pits, trenches, dumps, etc.

Numerous veins traverse the Chief Engineer property, some of which are known to contain ore shoots rich in silver and gold. The shoots are generally less than three feet wide and tend to have a greater vertical than horizontal extent. The Little Chief Mine, located on the main vein of the Chief Engineer property, is on one such ore shoot but the extent and exact tenure of this shoot cannot be ascertained since the mine is presently caved and inaccessible. However previous developments on the same vein and in the immediate vicinity of the Little Chief Mine have shown considerable ore at depth which indicates commercial quantities of ore may be encountered beneath the present workings.

Previous mining operations on the property have produced some sizable mine dumps. The possibility of precious metal extraction from these dumps should not be overlooked.

CONCLUSION:

On the basis of surface observations and in accessible old workings, plus facts provided in the published literature and by local people of reputation it is the author's conclusion the property contains well developed structures with strong to moderate silver-lead mineralization.

It is also the author's conclusion that the results of an adequate exploration program consisting of detailed geological mapping and diamond drilling would justify initiating a mining venture.

Respectfully submitted,

(Wm. Vanderwall)ss
Wm. Vanderwall, Geologist
April 30, 1981

BIBLIOGRAPHY OF THE
WALLAPAI MINING DISTRICT
Mohave County, Arizona

BY

William Vanderwall
Geologist

29 April 1981

Compiled and annotated, with special
attention given to the PINKHAM PROPERTY
(Chloride Area), and CHIEF ENGINEER
PROPERTY (Stockton Hill Area).

BASTIN, E.S., 1924. Origin of Certain Rich Silver Ores Near Chloride and Kingman, Arizona: United States Geological Survey (U.S.G.S.) Bulletin 750, pp. 17-39.

Includes general features of area, detailed descriptions of major mines with petrographic examination results of surface and subsurface ores. Concludes proustite (Ag_3AsS_3), galena (PbS), sphalerite (ZnS), chalcopyrite (CuFeS_2), are primary (hypogene) ore minerals in the Chloride (pp. 24-33) and Stockton Hill (pp. 33-35) areas. Thus silver, copper, lead and zinc values should persist throughout the primary ore zone. Oxidation products giving rich silver values near the surface are cerargyrite (AgCl) and native metal, which were caused by secondary enrichment. Concludes primary silver ores warrant further explorations and development.

DINGS, M.G., 1950. Wallapai Mining District, Mohave County, Arizona: Arizona Bureau of Mines (ABM) Bulletin 156, pt. 1, pp. 138-142.

Brief and sketchy description of geology and mines in the district. Mentions Pinkham Mine on page 142.

DINGS, M.G., 1951. The Wallapai Mining District, Cerbat Mountains, Mohave County, Arizona: USGS Bulletin 798, pp. 162.

Detailed description of geology, structures, ore deposits, mines and prospects. Production records from selected mines. Pinkham production given as over 14,000 ounces of silver, 27.5 tons of copper plus lesser quantities of gold and lead. Concludes future economic importance of district lies chiefly in base-metal sulfides. Author states that discovery of large orebodies of massive sulfide veins and/or disseminated porphyry type deposits by proper exploration very probable.

ELSING, M.J. and HEINEMAN, E.S., 1936. Arizona Metal Production: ABM Bulletin 140, pp. 73.

Establishes Wallapai District production from 1908-1933 as just over half a million tons producing \$1,037,468 in gold; 1,913,345 ozs. Ag; 966,235 lbs. Cu; 35,990,504 lbs. Pb; 95,587,344 lbs. Zn.

Revised United States Bureau of Mines figures 1908-1948 give totals as just over one and a quarter million tons producing 124,491 ozs. Au; 4,813,757 ozs. Ag; 5,712,992 lbs. Cu; 71,473,292 lbs. Pb; 169,520,515 lbs. Zn.

NOTE: Neither of these reports take into account early production from the rich oxidized veins before the turn of the century. That production estimated to be greater than 1,000,000 ounces of silver came, for the most part, from the mines of the Stockton Hill area. Nor do these reports consider the production of copper and molybdenum from the Penzoll-Duval open pit mine at Mineral Park (1962-present). Mineral Park is located midway between the Pinkham and Chief Engineer properties.

HAURY, P.S., 1947. Examination of lead-zinc mines in the Wallapai Mining District, Mohave County, Arizona: United States Bureau of Mines (USBM) Report On Investigation, Number 4101, 43p.

Brief description of geology, history and ore deposits. Detailed description of selected mineworkings. Notable among these are the Lone Jack, page 18-19 (near the Pinkham property and comparable) and the Jim Kane and DeLa Fontaine mines pages 32-35 (near the Chief Engineer property and comparable). Mine descriptions include above and below ground geology, USBM ore and wall rock assay results, mine history, ownership and development. Maps of mine workings with sample locations included in the report. Concludes Wallapai District has substantial primary silver-lead-zinc-copper reserves with considerable enrichment of silver, copper and gold in the shallow, oxidized zone.

HERNON, R.M., 1938. Cerbat Mountains: In Some Arizona Ore Deposits, ABM Bulletin 145, pp. 110-117.

Brief description of topology, geology, history, etc., followed by adequate description of Tennessee Mine developed to a depth of 1600 feet and still in ore. The Tennessee produced silver lead zinc ore from veins in the chloride area until the close of World War II. The author elaborates on ore character, alteration and secondary enrichment in the chloride area.

MC KNIGHT, E.T.. Mesothermal Silver-Lead-Zinc Deposits; In Ore Deposits of the Western States (Lingren Volume), pp.592-93, American Institute of Mining and Metallurgical Engineering.

Brief geological overview; character and genesis of ore deposits, total production, regional geology and history.

High silver values in shallow oxidized zone noted throughout district especially in the Stockton Hill area and ascribed to secondary enrichment processes. Concludes primary sulfide deposits in veins are mesothermal base metal-silver deposits which may widen with depth.

SCHRADER, F.C., 1909. Mineral Deposits of the Cerbat Range, Black Mountains and Grand Wash Cliffs, Mohave County, Arizona: USGS Bulletin 397, 220p.

Considered the textbook for much of the geology, production and history of the Wallapai District. Detailed descriptions of selected mines both above and below ground. Shows Pinkham Mine as being developed to the 240 foot level, describes ore as oxidized in upper workings to 85 foot level then primary ore to total depth. Notes copper secondary enrichment products, chalcocite and bornite in upper two levels. Notes primary ore encountered in 140 foot level averaged 9% Cu and 60 ozs: Ag per ton. Map (pp.75) shows total depth 400 foot, 5 levels, totaling 1200 feet of progress and approximately one third of the inferred orebody mined out. Author suggest orebody located at junction of Pinkham and Midnight vein, suggests veins may horsetail at this junction and implies a continuation of Pinkham orebody both north and south from the present workings (Diagram pp. 76). See also Midnight Mine description pp. 76-77.

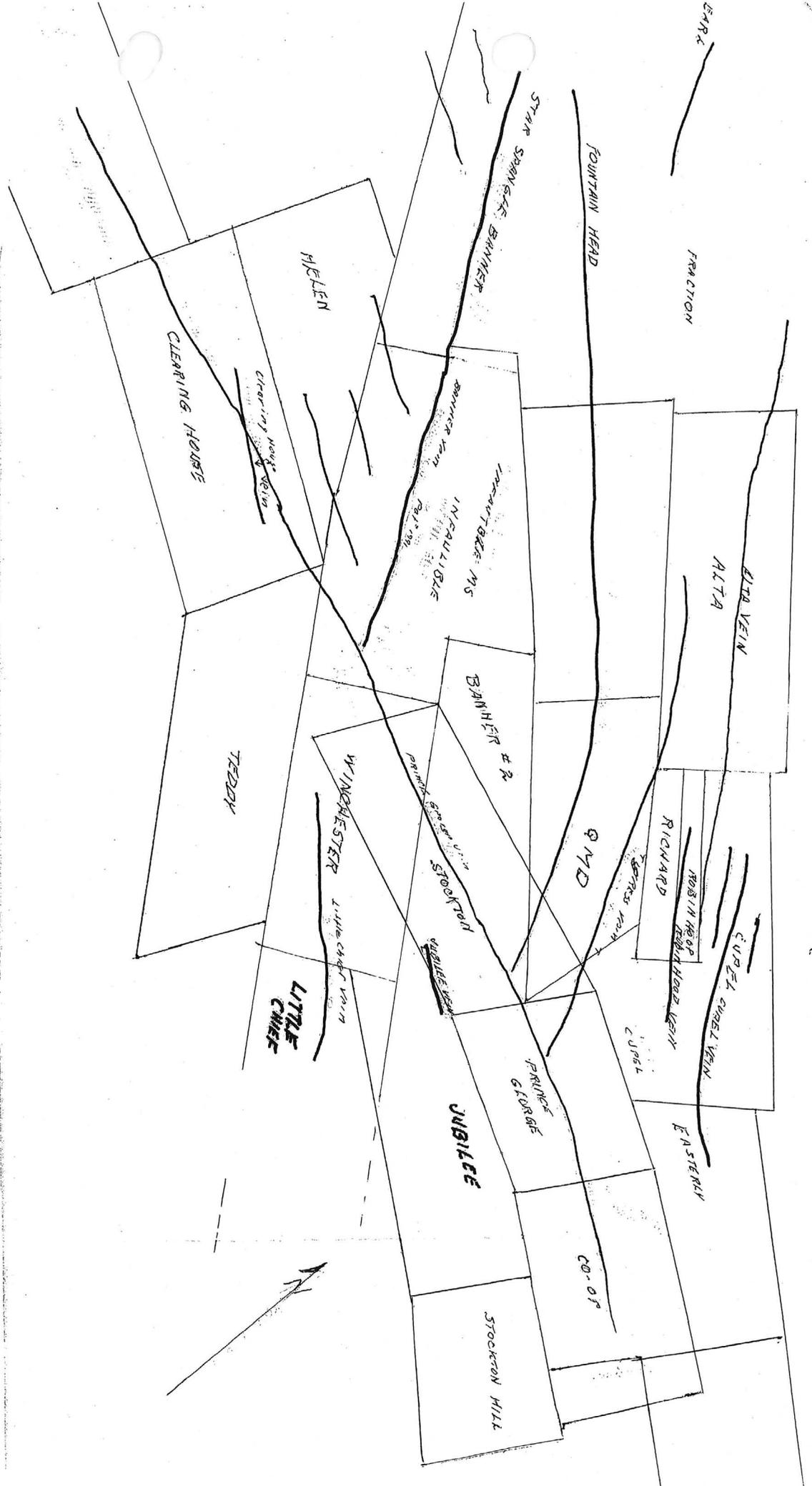
Schrader describes the Stockton Hill area, pp. 107-115, equally as well. The Little Chief Mine, pp. 112-113 (now the Chief Engineer property) is described as being developed to the 200 foot level with some 1000 feet of total progress. The Author likens the Little Chief Mine with the Banner Mine and the Treasure Hill Mine, observing that all are on the same (Banner) vein, all had the same surface expression and all produced the same type of ore. The Little Chief produced ore averaging 350 ozs. Ag and 14% to 30% Pb per ton.

SCHRADER, F.C., 1917. Geology and Ore Deposits of Mohave County, Arizona: AIME Trans., Vol. 56, pp. 197-236.

Similar to USGS Bulletin 397. Describes history, topology, geology and ore deposits. Describes selected mines both above and below ground.

THOMAS, B.E., 1949. Ore Deposits of the Wallapai District,
Arizona: Economic Geology, Vol. 44, pp. 663-705.

Describes general geology and characteristic fissure veins with associated wall rock alteration and secondary enrichment. Emphasis on ore shoots; mineralogy, age, texture and genesis. Concludes mineralizing fluids followed pre-existing conduits and are subsequent to majority of dykes and veins. Suggests that veins may widen with depth and increase in lead-zinc relative to copper-silver-gold. Considers district has good potential for future base-metal production.



EARL

FRACTION

FOUNTAIN HEAD

HELEN

CLEARING HOUSE

CLEARING HOUSE & VEIN

BANNER # 1
BANNER # 2
BANNER # 3
BANNER # 4
BANNER # 5
BANNER # 6
BANNER # 7
BANNER # 8
BANNER # 9
BANNER # 10
BANNER # 11
BANNER # 12
BANNER # 13
BANNER # 14
BANNER # 15
BANNER # 16
BANNER # 17
BANNER # 18
BANNER # 19
BANNER # 20

TEDDY

WINDLESTER
LINDSEY VEIN

LITTLE CHIEF

BANNER # 2

STOCKTON
VEIN

JUBILEE

PRINCE GEORGE

STOCKTON HILL

ALTA VEIN
ALTA

RICHARD

QMD

MOSIN HEAD
HEAD VEIN

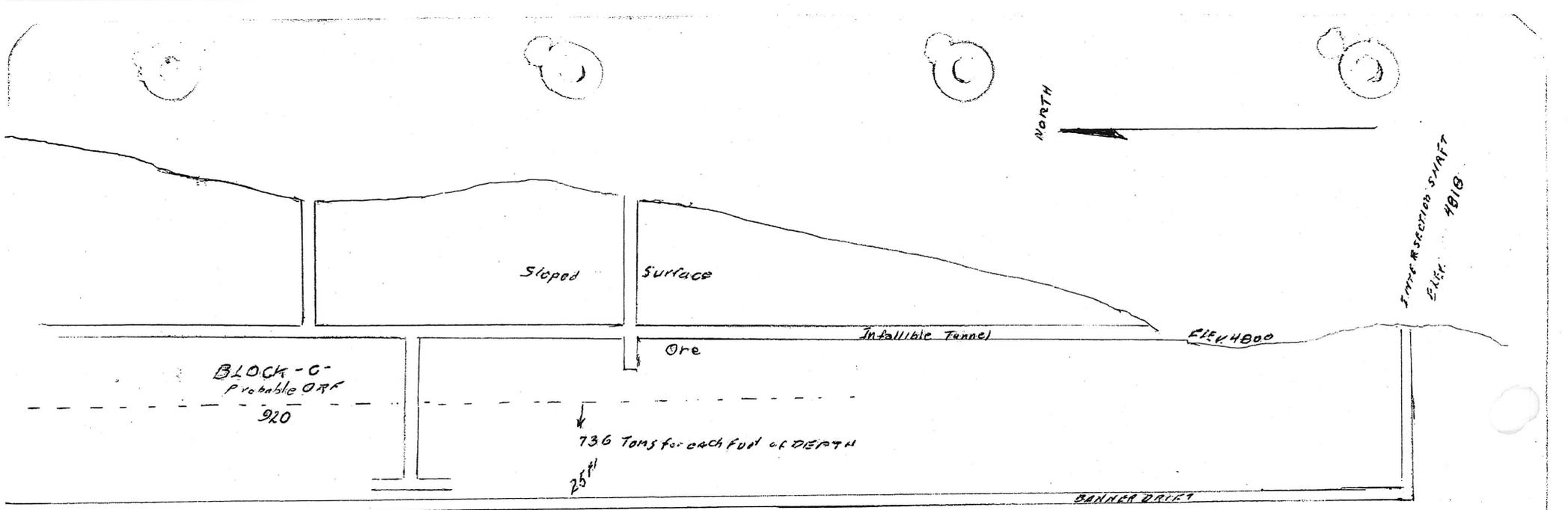
CUPESL

EASTERNLY

CO-OP

SUPERIOR VEIN

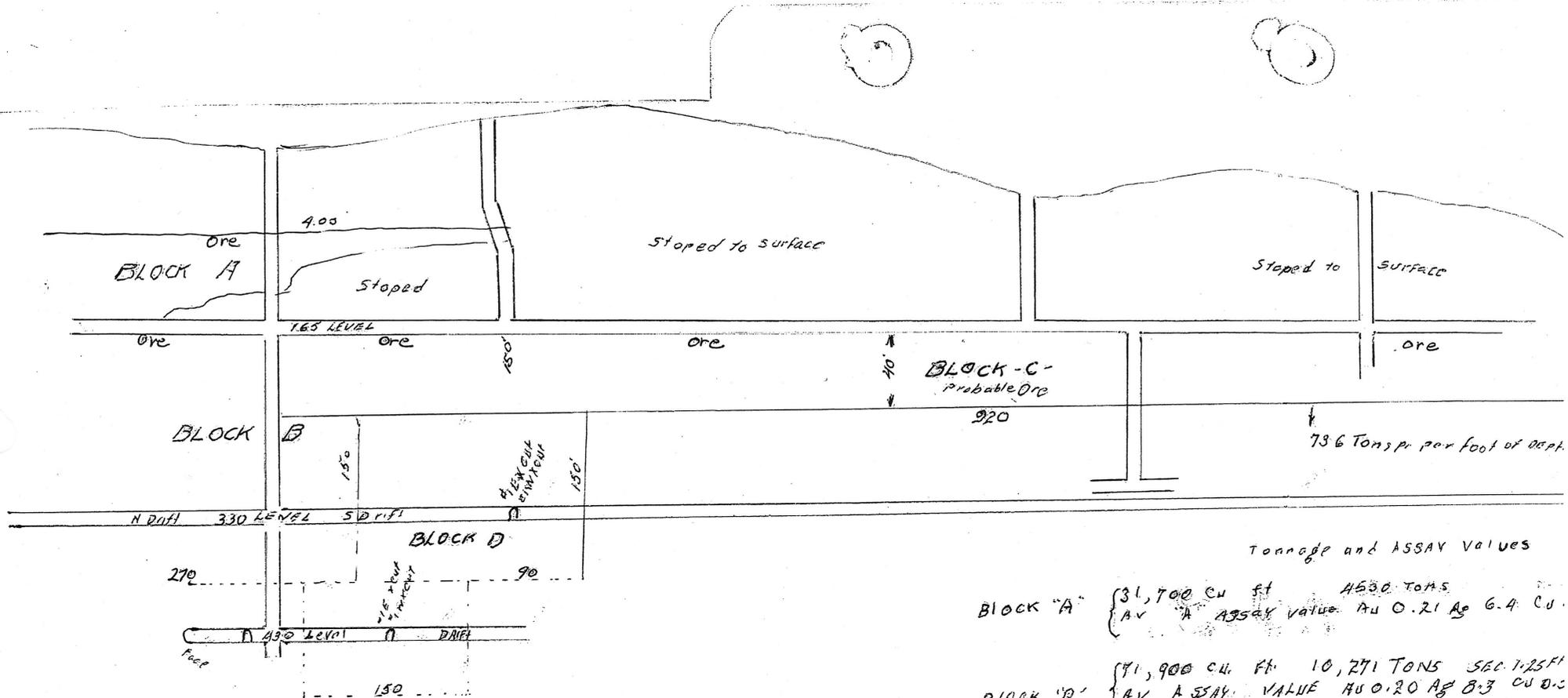




Tonnage and Assay Values

Block "A"	{	31,700 cu. ft.	4530 TONS	AV	SECT. 1.55 ft.
		AV	ASSAY VALUE	AU 0.21	Ag 6.4
				Cu 0.5	Pb 23.8
				Zn 10.5	Fe 3.0
Block "B"	{	71,800 cu. ft.	10,271 TONS	AV	SECT. 1.25 ft.
		AV	ASSAY VALUE	AU 0.20	Ag 8.3
				Cu 0.5	Pb 26.6
				Zn 11.8	Fe 3.1
Block "C"	{	26,000 cu. ft.	1,000 TONS	AV	SECT. 0.66 ft.
		AV	ASSAY VALUE	AU 0.46	Ag 14.2
				Cu 0.45	Pb 19.9
				Zn 13.1	Fe 4.0
Block "D"	{	63,510 cu. ft.	803 TONS	AV	SEC 1.46 ft.
		AV	ASSAY VALUE	AU 0.22	Pb 17.4
				Zn 12.8	

ARIZONA BUTTE MINES CO
MINEPORT, ARIZ.



Tonnage and ASSAY Values

- BLOCK "A" { 31,700 CU FT 4530 TONS
AV "A" ASSAY VALUE Au 0.21 Ag 6.4 CU.
- BLOCK "B" { 71,900 CU. FT. 10,271 TONS SEC. 1.25 FT
AV ASSAY VALUE Au 0.20 Ag 8.3 CU 0.2
Pb 26.6 Fe. 3.1 Zn 11.8
- BLOCK "C" { 26,000 CU. FT. 1,00 TONS AVE SEC. .66
ASSAY VALUE Au 0.16 Ag 14.9
CU 0.45 Pb. 19.9 Zn. 13.1 Fe 1.0
- BLOCK "D" { 63,510 CU. FT. 803 TONS AVE. SEC. 11.46
AV ASSAY VALUE Au 0.22 Ag 7 Pb. 17.4
Zn 12.8

REMARKS

After a careful preliminary examination of the 3 lode mining claims, comprising the CHIEF WAGNER mine group, located in the Stockton Hill section of the Hallegard Mining District, in Mohave County, Arizona, it would seem that the indications on the property, its past production record, and the quality of the ore now exposed, warrants the carrying out of the proposed development and further exploration to open up the ore bodies and veins on the group; that has been outlined in this report. Upon the completion of this exploration program the management could decide intelligently upon any future development program, such as the mining and extraction of any ore bodies thereby opened up, in the primary zone.

The other promising veins having excellent ore exposures can be explored after this main development program is underway. At some future time it might be advisable to continue the drifting from your present Little Chief tunnel of the CHIEF WAGNER mine, that is now 500 feet northwesterly from its portal, along the main vein of the mine toward the Windeberer claim of the Constock Silver, which will give you a depth of about 200 feet below the surface, and will explore the ore bodies above, from which earlier shipments have been made.

It is possible, by granting the continuance of the ores and assuming it to be of a vein similar to like ore bodies in the district under similar conditions, that this work will prove remunerative to the owners. For economical operation in prospecting this work, suitable mechanical equipment would here be necessary also.

There exists at this mine property every apparent geological similarity with the other productive mines of the section, such as the fissure veins, the same ore characteristics, the same strike and dip of veins as those of the neighboring producing mines, which occur in the geological formations recognized as the most favorable in which to expect commercial ore deposits of importance in the district.

The veins on your property are strong and well defined, and there is no question as regards their permanency and continuity to a very great depth, the future explorations of which will likely result in the uncovering of important ore bodies of remunerative content that will prove profitable to the operators.

Another thing to be considered is the past record of the many neighboring mines in the immediate vicinity, and the present producers, such as the Constock Silver, Wagon, Cupel, Prince George, Arizona Premier, De La Mountain, C. O. D., I. K. M., Wiggley, etc. In other words, your property is in a proven production area. Your CHIEF WAGNER mine has had important production.

WAG

The ores subsequently found in the CHIEF ENGINEER mines will readily respond to treatment such as is now in practice in this same district with similar ores. There is always a ready and available market for either ores of shipping grade direct from the mine or concentrates from the mill, such as those that have already been produced from these mines.

HISTORY

The exact date of discovery and original location of the Little Chief, now the CHIEF ENGINEER, cannot be definitely determined, but evidently the first substantial ore shipments were made between 50 and 60 years ago, when the operators at that time packed their high grade ores out on animals. In an article published in the Mohave County Miner, the mining editor who was personally familiar with this property, having been a successful operator of the neighboring Cupel mine, stated, "In the early days the Little Chief (now the CHIEF ENGINEER) was a shipper of high grade silver ore, many car-loads of ore averaging 1100 ounces going out to the smelters. At that time it was owned by John Kennedy, known to the Indians as 'Little Scalway' (meaning man with tooth out in front). With the money from the ore sales Kennedy purchased a good-sized cattle ranch". After the mines had passed into other hands lessors shipped largely from the property, the ore being from the oxidized zone."

Since the earlier operation of these mines, now included in the CHIEF ENGINEER group, this area has been owned and operated on a small scale intermittently to the present time, as was the case with the other mines of the Stockton Hill section of the Wallapai Mining District.

In the earlier operations only the oxidized ores were extracted because it has only been comparatively recent that sulphide ores could be mined at a profit. The rate of progress in the last fifteen years in the development of differential flotation, and the construction of suitable mills at the smelters, has been rapid beyond the realization of most people. So today sulphide ores such as are shipped from the Stockton Hill section can be mined at a profit, stimulating mining here, with the result that such mines as the CHIEF ENGINEER can find a ready market for their ores.

FURTHER HISTORY OF CHIEF ENGINEER MINE

Although I have been familiar with the Little Chief, now known as the CHIEF ENGINEER mines, for over 20 years, having been an operator in the immediate area; in order to complete the record at my request the following remarks were furnished me by E. Ross Housholder, E. M., of Kingman, Arizona, a widely known mining engineer, who is the present owner of the property. His remarks as to the early day operations give a good account of those conditions consistent with the obtainable facts as I believe them to be:

HOUSEHOLDER'S REMARKS

"Andy Goodwell, an old timer, and owner of the property between the CHIEF ENGINEER and the Cupel, including the Pt. George, as well as the property on which is located the Stockton Hill development tunnel, was familiar with the early operation on the CHIEF ENGINEER mine, in those days known as the Little Chief. He said, several years before he died, that the original locator of the Vigilanty lode claim, between this mine and his Pt. George shaft, had also acquired the Little Chief. The ruins of the old rock cabins can yet be seen from the surface workings of the Little Chief in the wash below.

"Although he made considerable money from the ore shipments from his Vigilanty claim, he later turned the Little Chief (now the CHIEF ENGINEER) property over to the Faggert Mercantile Company, of Kingman, Arizona, to settle his account with them. As often was the case in those early days the mercantile company was also in the mining business. It was their policy to grant 90 to 120' leases to miners for a portion of the vein, having a length of between 50 and 100 feet. The miners would be furnished a grub stake of tools and supplies and they would go to work on the ore. As long as they were in the ore they would keep sinking, with the idea in mind that after they had reached a depth of 75 to 80 feet they could easier mine the ore by stooping.

"But when they attempted to get an extension on their leases the mercantile company owners would not grant such a time extension. So the leaser-miners would stop sinking and endeavor to stoop out all the ores they could in the time that was left. No more timber was used than absolutely necessary. Much of the timber that was used was local cedar or juniper. The owners would be willing to grant other leases on their property, but never in a place that had been opened up.

"This accounts for the seven or eight surface holes that had a depth of from 30 to 60 feet with the ore stooped out on each side of the original shaft.

"Greeley Clack still living in Kingman was the youngest of several brothers who were early day mine operators. He told me that he visited, for several days, his brother William Clack who was extracting ore from one of these Little Chief leases, when he was a young man. He said his brother was mining ore that contained over 60 ounces of silver per ton and some went well over 100 ounces per ton.

"When I first visited these workings about 1925 or 1926, several of these old shaft holes were still open, and some of the reject from the ore sorting operations was still in little piles on the surface.

"Since then the holes have caved in or been filled with the surface soil and debris. It is my knowledge of the ore, that I actually saw there, supplemented by the geological conditions existing on the property, together with the substantiating information from the well informed old timers who personally related their information and knowledge to me that has caused me to hold on to these three lode claims comprising the CHIEF ENGINEER mine group.

"In 1941 and late 1942 I had established a camp at the mine and had several men doing work there. But shortly after the attack on Pearl Harbor I was called back into Military Service and could not return until after the war ended. I had served in World War I also. This I relate here, so you will understand that as an individual I found conditions changed when I returned and could not on my own continue a development program. I have had a road built from the new county road across the CHIEF ENGINEER claim to the mine campsite above the development tunnel and accessible to some of the surface workings, besides other valuable improvements to the mine, within my means to do so.

"It is the one property that I have held, because I have faith in it based on my study and understanding of the situation, made clear to me by my experience as a mining engineer familiar with production mines of this area. That, too, is the reason why I am more interested to take my royalty off the mine production, instead of selling outright. This also helps the operator. In the long run it will be best for me, too."

"E. Ross Housholder."

DEVELOPMENT TUNNEL

The Little Chief development tunnel on the CHIEF ENGINEER lode mining claim, just off the old county road was first run in the mountain as a cross-cut to a place from which a steep and narrow way made a connection with a known ore shoot in the intermediate workings above.

Then the tunnel was driven in further with a view to getting on the main Little Chief vein and it was expected that drifting would be done to the westward to get under the known productive surface openings, and thus penetrate the ore shoots.

However, about two thirds of its present (1950) length, ~~the~~ mineralization lead the operators, at that time, to veer to the right where a mineralized vein was encountered. The showing of sulphides over a width varying from three to four feet was such that a winn was started and sunk about 22 feet. So much water was encountered that the operators could not handle it with the equipment available to them. Then, too, altho the sulphides persisted, the commercial values were not present. Some of the last ore taken from this winn is still on the tunnel dump. Assay returns show very low silver and gold values.

DAG

Now, this work was all done apparently without a proper survey to tie in the surface workings and correlate them with the underground work. It became apparent to the workmen, however, that they had been drifting on a vein parallel to the productive Little Chief vein. This drifting had proceeded about 60 feet beyond the wing, then cross-cutting started to the left, for about 40 feet more, where the work was stopped due to lack of funds.

PROPOSED DEVELOPMENT & REFINANCE

Although a more precise survey should be completed, enough work was done in late 1942 to show that this last crosscut would not enter the Little Chief vein at right angles. It is proposed to direct this crosscut, after the suggested mapping has been completed, directly to the Little Chief vein, estimated now to be about 35 to 40 feet. Then, when the Little Chief vein has been entered, to drift, possibly easterly and westerly to get under the known productive ore shoots to tap the ore reserves at a depth of about 100 to 200 feet below the surface. Extraction of the ores can then begin, but the drifting should also be continued westerly to the end-line of the CHIEF ENGINEER claim where it adjoins the Winchester claim of the Banner mine owned by the U. S. States Smelting & Refining Co. The production from this same vein which is known as the Banner vein on the Banner mine group has been over a quarter of a million dollars. The ores have similar mineralogic and geologic characteristics as well as a like width in this Banner vein as its easterly extension on the CHIEF ENGINEER mine property where it has been designated as the Little Chief-Banner vein.

Once having tapped the Little Chief-Banner vein ore shoots from this tunnel level, the ores can be transported through the tunnel to the surface portal where it can be placed in suitable bins for loading. Besides mining ores by steeping is much less expensive. Haulage of the ores to the rail head for shipment to a smelter or to a treatment mill presents no problems.

TOPOGRAPHY

The district ranges in elevation from 3,000 feet in the foothills on the northeast to 5200 feet at the crest of the Gerbat mountains on the west. The western end of the CHIEF ENGINEER group is almost 800 feet higher than the eastern end of the property. The average elevation of this group is about 4,500 feet.

The topography of this portion of the district is typical of eroded igneous formations in this region belong to the pro-cambrian, essentially granitic. The accompanying photographs will give one a splendid idea of the topography of the CHIEF ENGINEER mine estate and the surrounding territory.

LOCATION AND DRAINAGE

The CHIEF ENGINEER mine group is located on the eastern slope of the Steadon Hill section, of the Malpais Mining Distr in the Gerbat mountains, Mohave County, Arizona, and comprises 4 lode mining claims, at a maximum elevation of 5000 feet. The western portion of the group is endlined and sidelined by the

H. J. J.

Banner-Prince George mining property of the Comstock Silver Mining Company and includes what has been known for years as the Little Chief mines. The famous Cupel mine is about 2000 feet north of the Little Chief workings.

The Western Union mine property adjoins this estate on the southwest. A good grade of lead silver ore is now being extracted from this adjoining mine. South of the Windsor group is the Mountain Queen, and the "78" mine that has been a heavy producer of high grade ores and is today producing 42 ounce silver ore for shipment to the smelters. The De La Fountain mine lies to the west about a quarter of a mile.

The CHIEF ENGINEER mine group is in section 9, Township 22 North, Range 17 West, Gila and Salt River Base Meridian, Arizona.

There is a good county truck road traversing the entire length of the estate, which with connecting mine roads on the property affords easy access to the more important workings of the property. This same road connects with another county road at the northwest corner of the group, a few hundred feet from the Little Chief main tunnel, and again with this same road near the east end of the property in the lower foothills. This latter road section is of easier grade and is being used daily for transportation of supplies to the different mines and ranches and the hauling of the shipping ore to the reduction plants or to the railroad at Kingman, Arizona, on the main line of the Atchison Topeka & Santa Fe R. R., a distance of about 12 miles from the CHIEF ENGINEER mine property. This road is kept up by the county and is in excellent shape.

CLIMATE & WATER SUPPLY

The district has a healthful climate with mild winters which permits good working conditions the year round. The rainfall is about 10 inches a year. The deeper shafts on the property produce enough water to insure an ample supply for mining as outlined in the present development program.

GEOLOGY OF STOCKTON HILL SECTION OF THE WALLAPAI MINING DISTRICT

The country rock is the pre-Cambrian granite, gneiss and schist complex, belonging to the laminated metamorphic series of that age, with a tendency to grade into mica chlorite schists in places. It is intruded by dykes of minette, granite, granite porphyry, diabas basalt, and other rocks, that are products of differentiation in the pre-Cambrian series.

The veins for the most part are regular and persistent with well defined walls. They occur chiefly in the pre-Cambrian granitic rocks. Many of the pay chutes coincide with the intersection of fissures. Oxidation has altered the upper part to a depth ranging from 50 to 300 feet, and this oxidized zone changes to the primary ore within a vertical range of 10 to 40 feet. The old time operators were unable to market the sulphide ores at a profit such as can be mined in the district today. Only the oxidized and secondarily enriched ores were they able to treat and ship. Therefore, today there

are mines being developed here which may be capable of great production. The veins have suffered great erosion, and their mode of occurrence leads to the belief that they were deposited at comparatively great depth by hot circulating waters.

LOCATION OF THE STOCKTON HILL SECTION

The Stockton Hill district joins the Carbat district on the east, and is about parallel and coextensive with it north and south, being situated on the opposite slope of the Carbat Mountains, in the Wallapai Mining District. It is about four miles in width and but little more in length. It ranges in elevation from 3000 feet at the edge of the Wallapai Valley on the east to 5,800 at the crest of the range.

The principal and oldest camp for many years was Stockton Hill, situated in the foothills in the eastern part of the district, just north of the present CHIEF ENGINEER group ~~South of the main mining company's estate~~, 10 miles north of Kingman, at an elevation of about 4,800 feet. It dates from early in the sixties, when the principal veins were first discovered and began to produce. In former days much ore was shipped to Swansea, Wales, but later it was treated in the Mineral Park and Carbat mills and shipped to the smelters in San Francisco and to New Mexico. Then followed a period when the ores were hauled by wagon to the station of Berry on the then new railroad, or to Kingman, whence it was shipped to the mill and smelter at Needles, California, on the Colorado River.

During the past years the shipping ores and concentrates from the milling plants have been trucked over excellent highways to a sampler at Kingman or to the reduction works in the district, where the ores of the district have found a ready market.

ORE DEPOSITS OF THE STOCKTON HILL SECTION

In writing about this section in United States Geological Bulletin #397, F.C.Schrader, the government geologist, stated, "The deposits occur in the pre-Cambrian gneiss or schist, intruded in places by a later aplitic granite or by basic dikes. They are fissure veins, which in general strike northwesterly and are vertical or dip at steep angles to the northeast. The gangue is quartz and the ores contain chiefly silver, with some gold, lead, zinc, and copper. Primary sulphide minerals are galena, zinc, blende, chalcopyrite, and pyrite, but the district owes its reputation to the rich silver ores, such as native silver, cerargyrite, argentite, and ruby silver, which were found in large quantities in the upper levels. The water level is about 100 feet below the surface. Galena is often found above it, while rich silver minerals descend to a considerable distance below it. The greatest depth so far attained is 400 feet."

CHIEF ENGINEER GEOLOGY

Commenting upon the Little Chief, now the CHIEF ENGINEER, mine in the same government report, the author, F.C.Schrader, wrote, "The country rock is pre-Cambrian complex. To judge from talus debris on the surface at the mine, it seems to be intruded by diabase near by, and portions of a light-colored altered rock, which seems to be the intrusive porphyry, are associated with the vein.

"The vein trends N.40° W. and dips steeply northeast. It is about 6 feet in width and is supposed to be the Banner vein. The gangue is quartz and crushed and altered silicified rock. The ore shoot locally coincides in width with the vein and is stained throughout with copper carbonate. The ore contains principally green horn silver, galena, and gold, is all of shipping grade, and is said to average about as follows: Silver, 350 ounces to the ton; gold \$5 to \$10 a ton; and Lead, 8 to 40 per cent."

Since the above government report was written the entrances to the works referred to, have been caved and are now with few exceptions impassible. Samples that have been taken from rather narrow streaks in the vein as now exposed and left by the early miners gave assay returns between 20 ounces and 80 ounces in silver, besides about \$1 in gold per ton. Samples from the old shaft sorting dumps also carried up to 27% lead. The ore shows a low percentage of copper, but zinc is now present in any appreciable quantity.

Other openings on the CHIEF ENGINEER mine group have exposed veins of varying width and metallic content, which were not extensively investigated, as the two mines of this estate more fully described will warrant the immediate attention of the owners as to the present and near future exploration program.

DEVELOPMENT

The development work on the CHIEF ENGINEER consists for the most part in six or seven shafts, connecting drifts, stopes, raises, crosscuts, etc., between the northwest skyline along the vein toward the portal of the present development tunnel a distance of about 1200 feet. This development tunnel has been driven northwest a distance of 500 feet. As this tunnel is pushed ahead it will open up this same vein about 200 feet below the surface and between 100 and 160 feet below the older workings and enter the ore chutes exposed above at the depth indicated.

Taking into consideration all the shallow shafts, tunnels, crosscutting, and drifting, that has been completed in all the workings of the three claims of this CHIEF ENGINEER group, there is in excess of 400 feet of shaft work, with a maximum depth of 120 feet on the Little Chief, now the CHIEF ENGINEER. This has been supplemented by several tunnels having a maximum length of 500 feet on the CHIEF ENGINEER, formerly the Little Chief, together with other tunnels on the remaining parts of the group, where one tunnel has several thousand feet of underground work. The tunnel work crosscutting, drifting, etc., will exceed 1000 feet of work. Considerable ore has been shipped from some of these openings during the history of the property, that is reported to be better than a hundred thousand dollars.

FURTHER EXPLORATION OF THE CHIEF ENGINEER

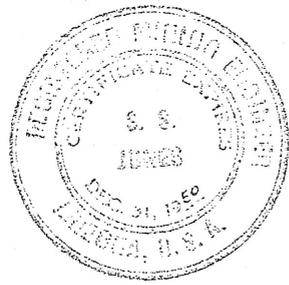
An accompanying topographical and claim map, on which the general geology of the property has been superimposed will give one an idea about the trend of the more important veins and dykes, together with the general character of the country rock, and the relative position of neighboring mines.

RECOMMENDATIONS

It would be advisable to continue the drifting from your present main tunnel, that is now 500 feet northwestwardly from the portal to and along the main vein of the CHIEF ENGINEER mine toward the northwest endline that joins the Winchester claim of the Comstock Silver, which will give you a depth of about 200 feet below the surface, and will explore the ore bodies above from which earlier shipments have been made. It is possible, by granting the continuance of the highgrade ore and assuming that it will maintain its present value per ton, this work of drifting could be made to almost pay for itself from ore shipments after the chute was entered.

In carrying on this development program I would further suggest that you open up the known ore bodies and thereby give you an opportunity to begin production on such a scale that will, I believe, prove profitable to you and your associates, for the conditions here prove the existence of ore bodies of magnitude and remunerative content and I expect the result of such development on this property will prove it to be one of the wealthiest ever opened up in the Stockton Hill section.

to be one of
the profitable



ADD

ARIZONA BUTTE MINES CO.

District: Stockton Hill

Location: Stockton Hill; about 15 miles by wagon road northwest of Kingman, Arizona. Elevation of 4800 feet.

Owners: Arizona Butte Mines Co., incorporated under laws of Arizona, Capital stock 2,000,000 shares, one dollar per. Of this 1,375,000 shares are issued and outstanding, balance in treasury. Officers: H. M. Crowther, President and General Manager, Kingman, Arizona.

Date visited: September 1 and 2, 1919.

NOTES:

55 Claims located along what is known as the Prince George vein, striking N. 40° W. and dipping to the N. E. 80°.

G E O L O G Y

Veins are fissures of movement, occurring in a Pre-Cambrian complex consisting of Gneiss, Gneissoid Granite and Schist cut by numerous acid and basic dikes of per-mineral age. The main vein at one point may be in a fine grained Gneiss, and at other points in the Gneiss but with parallel bands of pegmatite on either wall. The walls are badly sheared and crushed, necessitating heavy timbering or filling. The usual method is to mine out the ore and fill with barren vein filling or wall rock.

H I S T O R Y

In the early eighties the various claims shown on the attached maps as the Banner, Prince George and De La Fontaine are credited with a production of a million ounces of silver, taken largely from the rich surface ores.

During 1917 the properties were consolidated under present management, \$100,000.00 raised from sale of stock, the greater portion of which was expended in the construction of a mill and in opening some of the old workings - entirely by hand methods of mining. A leasing system was adopted and approximately 90 cars of ore and concentrates were shipped during 1919.

The following is an average of the above shipments, though there was no means at hand of identifying concentrate from crude ore shipments:

<u>Tons</u>	<u>Au</u>	<u>Ag</u>	<u>Pb</u>
2024	.35 oz.	15.1 oz.	27.5 %

At the present time the Company has two sets of leasers working in the upper levels and contemplates the reconstruction of the mill, which has been idle for nearly a year. They are also preparing to drive a tunnel, already in 600 feet, a distance of 11,000 feet to tap their main workings at a maximum depth of one thousand feet. The tunnel will be on the vein. They are also equipping with air in order to increase number of leasers, and under the splitcheck system will supply everything, charging for air, steel, sharpening, hauling and milling.

D E V E L O P M E N T

Development consists of several thousand feet of tunnels as well as some drifting from the intersection shaft as shown on the accompanying blue print. The infallible tunnel is open for the greater portion of its length, and it is from this tunnel and the winze shown that the present production is being made.

Blue print of elevation shows various blocks of ground and tonnage and grade of ore contained. There is no reason to doubt this estimate, and in fact deep development should produce much larger tonnage. Widths of ore vary from a few inches up to 3 feet. The owners have no exact knowledge of these orebodies except from previous shipments around their borders, and there are no assay maps at hand.

Concentrator, using jigs and tables, has a capacity of 180 tons per day, although it will be several months before this tonnage is attained. It is their intention to use this mill as custom mill for leasers on split-check system; also, to buy some outside ore and a sampler will be installed for this purpose.

A 75 H. P. Fairbanks Morse type engine has been installed at mouth of deep tunnel; also, a 10 x 12 single stage Ingersoll-Rand Compressor, belt driven from the gas engine. This equipment appears inadequate for a long tunnel. The power line of the Desert Light and Power Company crosses the portal of the tunnel, but for some reason the operators think they can operate more cheaply on their own power.

A similar plant is being installed at the upper workings of the mine with a view of supplying air for the leasers. Jackhammers

MILLING RESULTS - 849 TON LOT

	Weight Pounds	Tons	Oz. Gold	Oz. Ag.	% Cu.	% Lead	% Zinc	% Sil.	% Iron	% Lime	% Sulph.
Crude Ore	1,892,195	849	.324	4.97	.29	15.67	10.4	55.5	5.2	1.	9.7
Lead Concentrates	311,440	155	.277	10.51	.20	63.07	6.2	8.1	3.05	0.9	15.1
Lead Concentrates	108,026	54	2.58	17.91	.49	51.1	12.2	3.3	3.5	0.9	20.4
Zinc Concentrates	260,000	130	.356	6.53	.95	4.22	42.3	15.	6.9		
Tailings			.055	1.35	.13	.42	3.6	90.9	1.15		
Percent Recovery			83.	81.8	--	98.0	80.8	--	41.5		

4.04 Tons Crude Ore - - - - 1 Ton Lead Concentrates
 6.53 " " " - - - - 1 " Zinc "

AVERAGE ASSAYS FROM SAMPLES MAPS

	Feet	Oz. Gold	Oz. Silver	% Lead	% Zinc	Total Value
Banner Shaft, 36 Assays	1.59	.255	5.4	20.8	14.6	\$38.92 per ton
Banner Shaft, 165 Ft. Level, 37 Assays	1.5	.21	9.0	27.2	13.0	43.25 " "
Banner Shaft, 330 Ft. Level, N., 21 Assays	1.3	.35	4.3	15.0	13.2	34.00 " "
Banner Shaft, 330 Ft. Level, S., 35 Assays	1.29	.21	5.4	15.0	13.1	31.79 " "
Banner Shaft, 450 Ft. Level, N., 3 Assays	.8	.31	3.0	7.9	7.6	21.31 " "
Banner Shaft, 430 Ft. Level, S., 13 Assays	1.7	.30	5.0	11.1	12.7	30.71 " "

Based on (Gold, \$19., Silver 50¢ Oz.)
 (Lead 4¢ Zinc 5¢ Lb.) Net from Smelters

Assuming double striping width: approx grade = 2 1/2 to 3% Cu, 13% Ag, 8% Zn

will be used both at the tunnel and by leasers, and are entirely adequate for the character of ground encountered along the vein; and in fact, in stoping operations due to heavy ground and soft ore, I doubt the wisdom of using machines, since handwork is quite efficient and would save a great admixture of waste.

C O N C L U S I O N

Estimate of 25,000 tons of grade of ore as follows:

Au \$4.00, Ag 5 oz., Pb 15%, and Zn 10% is probably reasonable.

In the event that the Company continues operations as planned and reconstructs the mill, the property can produce approximately four to five cars monthly of crude ore and concentrates of approximately the following composition: Au .8 oz., Ag 12.3 oz., Pb 50%, Zn 7%.

The veins are narrow, or at least the ore is narrow, varying as mined by leasers from six inches to two feet - costs will be high.

Mining Cost	\$7.00	Per ton
Milling "	2.50	" "
Haul ratio Stol	1.00	" "
Freight 5 to 1	.90	" "
Total	11.40	

Crude ore, where mined, will cost \$15.00 to Humboldt, due to haul.

Total cost, including treatment on mill concentrates will be for

Milling ore	\$12.60	Per ton
Shipping "	25.40	" "

Margin of profit for leasers and Company will be small, although Company will get some benefit from shipments of zinc, which they do not propose to pay for at the mill.

As a producer of lead the Company should be able within five months to produce five cars monthly of 15 to 50 per cent lead ore, either as concentrates or coarse ore, but can hardly be depended on for any great amount of coarse ore, and their maximum shipments of such ore will probably not exceed two cars per month varying from 22 to 40% lead.

W. V. DeCamp

gmc

Kingman Ariz, June 8th 1919

Messrs. Consolidated Arizona Smelting Co,
Humboldt, Arizona

Gentlemen:

The Arizona Butte Group requires a special automobile to reach it, for which reason I did not visit the property, but have made a number of enquiries. I find from Mr. McGinley, an engineer who has been in the district some 4 years, that possibly two cars a week are now being shipped from the property by leasees. Mr. Crowthers the manager is now in the East, to finance the driving of a 2000 ft. tunnel to strike the ore bodies at depth. The property has been a shipper of some note in the past, and the belief is that it will again be a shipper.

I might remark that throughout the Chloride district as a whole, an impoverished zone seems to obtain near or immediately below the oxidized zone. This zone of impoverishment may persist for a hundred feet or thereabouts, when the unaltered sulphides are again encountered, often of a grade high enough to ship, at other places being but a milling ore. The conditions seem to prevent the shipping of an ore below \$25.00 per ton, the smelter and freight rates being such as but a small margin is left even with such grade.

Referring again to the Arizona Butte, a mill of 50 to 75 tons capacity is now erected on the ground, but little if any concentrate has been produced. I understand the mill was built without an immediate supply of ore being available.

Respectfully submitted,

A. Burnett.

DISTRICT: Stockton Hill, Mojave County.

PROPERTY: Arizona Butte

LOCATION: Some 15 miles northerly from Kingman

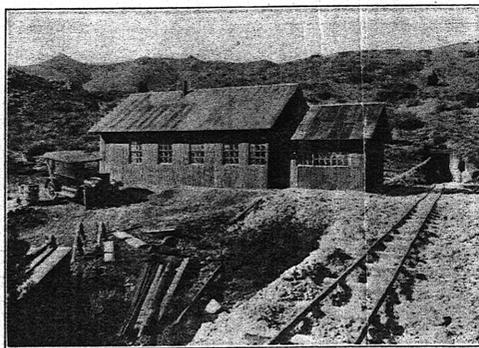
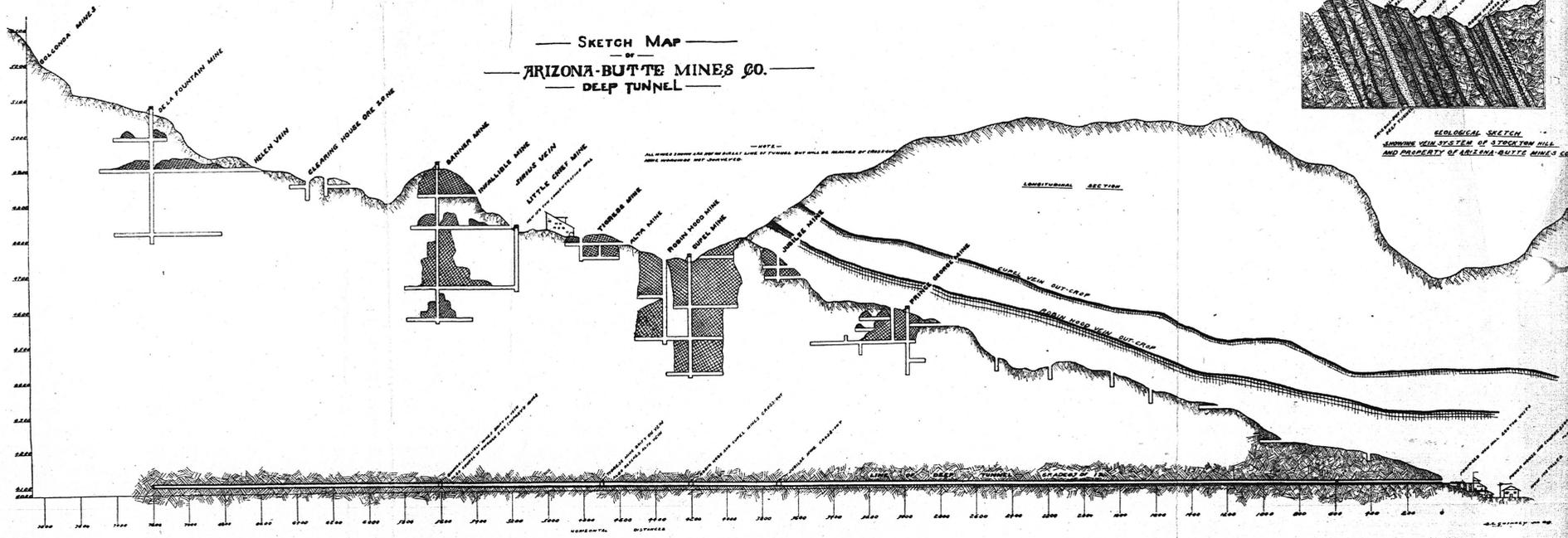
*See Claim Map. D-2-37-
D-2-38*

OPERATORS: Now being operated by a number of lessees.

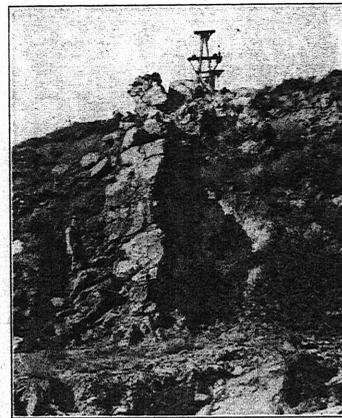
Several properties have been consolidated and a tunnel to open up deeper ones is being planned for. Mr. H. Crowther, Genl. Mgr. now in New York in connection with financing of this tunnel.

Did not visit the property, but it is reputed as being most promising, and there is a likelihood of it' becoming a lead silver producer of some prominence.

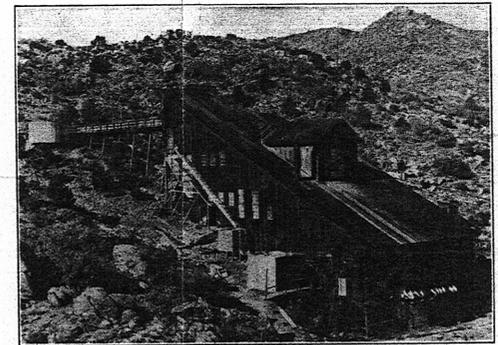
A. Burnett.
June 14, 1919



Arizona-Butte Mines—Deep Tunnel Portal
and Power House



Prince George Vein Outcrop—900 Ft. From
Deep Tunnel Mouth



New 150 Ton Concentrator—Location Shown
on Map Above

STOCKTON HILLS MINES
BANNER GROUP (TIGRESS)

MOHAVE COUNTY
CERBAT MTNS.

Sam Barbee, metallurgist and assayer for Cerbat Mining Company, discussed the operation of the mill at the Golden Gem mine. Also, he reported that 27 men are employed in total at the mill and the several mines under control of the Company, (the Golden Gem, Flores, Summitt and the recently acquired BANNER GROUP (TIGRESS) operated many years ago by U.S. Smelting).

TRAVIS P. LANE - Kingman Conference - 1-8-62

This property active Feb. 1962

May 16, 1962 - Visited the Golden Gem mill of Cerbat Mining & Milling Co. The mill is operating one shift per day (20-25 TPD) on ore from the Golden Gem mine and the Tigress claim (Banner group).

TRAVIS P. LANE - Weekly Report - 5-19-62

RRB WR 12/10/82: Aleigh Peterson was in to check our files on properties owned at least in part by her grandmother, Mrs. Blanche Peterson, 2012 Los Angeles Street, Kingman, AZ 86401. She also has several unpatented claims in the area. The files asked for were the Iowa, Vivian, Golden Era, Silver Coin, Old Timer, Old Colony and Prince George in the Oatman District. Mrs. Peterson's late husband was active in the area for many years with Al Beard.

T
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A

GEOLOGICAL REPORT

on the

LITTLE
CHIEF

CHIEF ENGINEER PROPERTY

in the

Wallapai Mining District

Mohave County, Arizona

by

Wm. Vanderwall
Geologist
Scottsdale, Arizona

P-3

April 30, 1981

Little Chief Mine
Stockton Hill

SUMMARY OF GEOLOGICAL REPORT

CHIEF ENGINEER PROPERTY
Wallapai Mining District
Mohave County, Arizona

The Chief Engineer Property consists of four contiguous, unpatented mining claims located in Section 9, Township 22N, Range 17W, G&SRM, Mohave County, Arizona.

The property is a part of the Stockton Hill Camp. A late 1800's silver bonanza where oxidized ores ran as high as 3000 ounces silver per ton. The Chief Engineer property was worked until the turn of the century but production statistics are unavailable.

The property is located in the central portion of the Cerbat Mountain Range, one of the many north south trending, fault-block ranges of the southwest desert. Rocks exposed at the surface, on the Chief Engineer property, include pre-Cambrian metamorphic rocks cut by Mesozoic (?) intrusives and by mineralized veins of unknown (Tertiary?) age.

The ore deposits on the property may be of two types: Oxidized, near surface vein deposits often greatly enriched in silver; and deeper, primary, base metal-silver vein deposits which may extend to considerable depth.

The most favorable loci for ore is at the junction of veins with other structures, although it can be found randomly spaced along the veins in lenses or shoots. The main vein on the Chief Engineer property trends northwest and projects to a shallow underground intersection with neighboring dykes.

Results of field reconnaissance indicate the following:

- A) Mineralized structures traverse the property and ore is exposed in prospect pits, trenches, etc., indicating the oxide zone was not mined out by the first miners.
- B) Dykes and veins project to a shallow underground intersection which would provide a sizable locus for ore deposition.
- C) Past mining on the property has produced a considerable amount of dump material which may be amenable to cyanidation.

Wm. Vanderwall, Geologist
April 30, 1981

Geological Report
CHIEF ENGINEER PROPERTY
Wallapai Mining District
Mohave County, Arizona

LOCATION:

The Chief Engineer property consists of four contiguous, unpatented mining claims located approximately eight miles north of Kingman, Arizona, on the eastern slope of the Cerbat Mountains. The claims are situated in Section 9, Township 22N, Range 17W, G&SRM, and are accessible via county and private roads.

SCOPE OF REPORT:

Facts and opinions contained in the report are based on a cursory field examination of the property and on the author's specific knowledge of the area and general familiarity with the published literature concerning the Wallapai District.

HISTORY AND PRODUCTION:

The Chief Engineer property lies centrally in the famous silver bonanza ghost camp of Stockton Hill, where rich silver discoveries brought miners to the area as early as 1863. Oxidized silver ores (up to 3000 ozs. per ton) were mined at Stockton Hill with the bulk of production during the 1870-1880 period. The rapid decline in silver prices between 1885-1895, the recession of 1905 and the added cost of mining the deeper, leaner, sulfide ores caused the suspension of mining operations. The area, for the most part, has been idle ever since.

Schrader, 1909 (USGS Bulletin 397, pp. 112-113) briefly describes the Little Chief Mine (now the Chief Engineer) and estimates its production to be \$25,000 in silver (125,000 ozs. @ 20¢/oz.). Schrader credits the Little Chief with approximately 1000 feet of underground work and gives cerargarite (AgCl), galena (PbS) and native gold as the principal ore minerals. He states ore tenure as 350 ounces of silver per ton, 14% to 30% lead, and up to one half ounce gold. Physical inspection of dump material tends to support Schrader's values.

The value of metals produced in the Wallapai District during the years 1904-1948 (U.S. Bureau of Mines 1948 Annual Report) was about 22.5 million dollars at 1948 prices (nearly a half a billion dollars at today's prices). Values were principally in lead and zinc, but with substantial amounts of copper, silver and gold.

Currently Penzoil-Duval Corporation, approximately 4 miles northwest of the Chief Engineer property, is reportedly producing 18,000 to 20,000 tons per day of open pit ore averaging 0.5% copper and 0.045% molybdenum, plus other metals.

GEOLOGY AND ORE DEPOSITS:

The Cerbat Mountains constitute one of the many north-south trending, fault block ranges of the southwest desert. They consist primarily of metamorphosed pre-Cambrian igneous and sedimentary rocks, cut by later intrusions of Mesozoic (?) granite and monzonite porphyries, known locally as the Ithaca Peak Granite, and by Tertiary volcanic dykes. Centering around the Ithaca Peak intrusive, mineralization is typically copper and molybdenum sulfides, now being mined by Duval. Surrounding the intrusive is a zone several miles wide of copper-lead-zinc-silver bearing veins which gradationally change to veins of intense silver-lead-mineralization. The Chief Engineer property contains veins of the silver-lead type.

The vein type ore deposits occur in clefts or cracks in the country rock in which the mineral material precipitated from aqueous solution (hydrothermal fissure veins). It is probable that these fissures formed from forces accompanying the emplacement of the Ithaca Peak intrusive. With the intrusive acting as a heat engine, a convecting hydrothermal system developed that set up a hypogene enrichment process which deposited ore and gangue minerals near the top of the convecting cell and extracted metals and sulfur from sources at depth. Conceivably, as the solution approached the fissure level, it boiled, thereby distilling the acid forming constituents CO_2 and H_2S . Cooling and a slight pH rise of the residual liquids, due to loss of acid forming constituents, may be regarded as the mechanism of sulfide precipitation. Exposure of the veins to normal weathering processes oxidized the ore and, to a point, enriched it by the downward migration of slightly acidic rainwater carrying metals in solution.

Many veins, occurring in nearly vertical fault fissures, strike northwest and outcrop for considerable distances. The fault fissures are largely occupied by breccia with abundant shearing and some gouge. Ore lenses, or shoots, though not continuous are numerous and tend to have greater vertical rather than horizontal extent. Concentrations of extremely high-grade ore appear to favor vein junctures. These concentrations are attributable to chemical and physical changes which enhanced mineral deposition at the fissure level of the convecting cell.

The main vein on the Chief Engineer property is a prominent linear structure which extends from the Banner Mine southeastward. It cuts all lithologic units in the area, mostly pre-Cambrian granite, to intersect with no less than two dykes on the Chief Engineer property. The vein is composed of quartz and silicified granite breccia with some gouge. The vein trends $\text{N}40^\circ\text{W}$ and is nearly vertical. The vein is from 3 to 9 feet wide and heavily

stained in outcrop by iron and manganese. Evidence of mineralization in the vein is from pronounced gossan caps, in place mineralization underground and the number and extent of workings on the vein.

Dykes on the property include granite porphyry and diabase but are, presumably, less mineralized than the vein. No dyke-vein junction is apparent on the surface but attitude and trend of the dykes as well as mine dump material suggests an underground intersection.

The primary mineralization is one of proustite, galena, sphalerite, chalcopyrite, pyrite and arsenopyrite together with a variety of gangue minerals. The oxidized portion of the veins ranges from 50-300 feet and may be very rich in lead sulfide, silver chloride, native silver and lesser concentrations of native gold.

ORE RESERVES:

The Chief Engineer property contains a known ore body composed of primary base metal-silver values as well as oxidized silver-gold values. Data from past developments, publications and reports are insufficient, or unavailable, to completely delineate the ore body for volumetric analysis. However, there is ore exposed in various underground workings and in many places on the surface; prospect pits, trenches, dumps, etc.

Numerous veins traverse the Chief Engineer property, some of which are known to contain ore shoots rich in silver and gold. The shoots are generally less than three feet wide and tend to have a greater vertical than horizontal extent. The Little Chief Mine, located on the main vein of the Chief Engineer property, is on one such ore shoot but the extent and exact tenure of this shoot cannot be ascertained since the mine is presently caved and inaccessible. However previous developments on the same vein and in the immediate vicinity of the Little Chief Mine have shown considerable ore at depth which indicates commercial quantities of ore may be encountered beneath the present workings.

Previous mining operations on the property have produced some sizable mine dumps. The possibility of precious metal extraction from these dumps should not be overlooked.

CONCLUSION:

On the basis of surface observations and in accessible old workings, plus facts provided in the published literature and by local people of reputation it is the author's conclusion the property contains well developed structures with strong to moderate silver-lead mineralization.

It is also the author's conclusion that the results of an adequate exploration program consisting of detailed geological mapping and diamond drilling would justify initiating a mining venture.

Respectfully submitted,

(Wm. Vanderwall)ss
Wm. Vanderwall, Geologist
April 30, 1981

BIBLIOGRAPHY OF THE
WALLAPAI MINING DISTRICT
Mohave County, Arizona

BY

William Vanderwall
Geologist

29 April 1981

Compiled and annotated, with special
attention given to the PINKHAM PROPERTY
(Chloride Area), and CHIEF ENGINEER
PROPERTY (Stockton Hill Area).

BASTIN, E.S., 1924. Origin of Certain Rich Silver Ores Near Cloride and Kingman, Arizona: United States Geological Survey (U.S.G.S.) Bulletin 750, pp. 17-39.

Includes general features of area, detailed descriptions of major mines with petrographic examination results of surface and subsurface ores. Concludes proustite (Ag_3AsS_3), galena (PbS), sphalerite (ZnS), chalcopyrite (CuFeS_2), are primary (hypogene) ore minerals in the Cloride (pp. 24-33) and Stockton Hill (pp. 33-35) areas. Thus silver, copper, lead and zinc values should persist throughout the primary ore zone. Oxidation products giving rich silver values near the surface are cerargyrite (AgCl) and native metal, which were caused by secondary enrichment. Concludes primary silver ores warrant further explorations and development.

DINGS, M.G., 1950. Wallapai Mining District, Mohave County, Arizona: Arizona Bureau of Mines (ABM) Bulletin 156, pt. 1, pp. 138-142.

Brief and sketchy description of geology and mines in the district. Mentions Pinkham Mine on page 142.

DINGS, M.G., 1951. The Wallapai Mining District, Cerbat Mountains, Mohave County, Arizona: USGS Bulletin 798, pp. 162.

Detailed description of geology, structures, ore deposits, mines and prospects. Production records from selected mines. Pinkham production given as over 14,000 ounces of silver, 27.5 tons of copper plus lesser quantities of gold and lead. Concludes future economic importance of district lies chiefly in base-metal sulfides. Author states that discovery of large orebodies of massive sulfide veins and/or disseminated porphyry type deposits by proper exploration very probable.

ELSING, M.J. and HEINEMAN, E.S., 1936. Arizona Metal Production: ABM Bulletin 140, pp. 73.

Establishes Wallapai District production from 1908-1933 as just over half a million tons producing \$1,037,468 in gold; 1,913,345 ozs. Ag; 966,235 lbs. Cu: 35,990,504 lbs. Pb: 95,587,344 lbs. Zn.

Revised United States Bureau of Mines figures 1908-1948 give totals as just over one and a quarter million tons producing 124,491 ozs. Au: 4,813,757 ozs. Ag: 5,712,992 lbs. Cu: 71,473,292 lbs. Pb: 169,520,515 lbs. Zn.

NOTE: Neither of these reports take into account early production from the rich oxidized veins before the turn of the century. That production estimated to be greater than 1,000,000 ounces of silver came, for the most part, from the mines of the Stockton Hill area. Nor do these reports consider the production of copper and molybdenum from the Penzoil-Duval open pit mine at Mineral Park (1962-present). Mineral Park is located midway between the Pinkham and Chief Engineer properties.

HAURY, P.S., 1947. Examination of lead-zinc mines in the Wallapai Mining District, Mohave County, Arizona: United States Bureau of Mines (USBM) Report On Investigation, Number 4101, 43p.

Brief description of geology, history and ore deposits. Detailed description of selected mine workings. Notable among these are the Lone Jack, page 18-19 (near the Pinkham property and comparable) and the Jim Kane and DeLa Fontaine mines pages 32-35 (near the Chief Engineer property and comparable). Mine descriptions include above and below ground geology, USBM ore and wall rock assay results, mine history, ownership and development. Maps of mine workings with sample locations included in the report. Concludes Wallapai District has substantial primary silver-lead-zinc-copper reserves with considerable enrichment of silver, copper and gold in the shallow, oxidized zone.

HERNON, R.M., 1938. Cerbat Mountains: In Some Arizona Ore Deposits, ABM Bulletin 145, pp. 110-117.

Brief description of topology, geology, history, etc., followed by adequate description of Tennessee Mine developed to a depth of 1600 feet and still in ore. The Tennessee produced silver lead zinc ore from veins in the chloride area until the close of World War II. The author elaborates on ore character, alteration and secondary enrichment in the chloride area.

MC KNIGHT, E.T.. Mesothermal Silver-Lead-Zinc Deposits; In Ore Deposits of the Western States (Lingren Volume), pp.592-93, American Institute of Mining and Metallurgical Engineering.

Brief geological overview; character and genesis of ore deposits, total production, regional geology and history.

High silver values in shallow oxidized zone noted throughout district especially in the Stockton Hill area and ascribed to secondary enrichment processes. Concludes primary sulfide deposits in veins are mesothermal base metal-silver deposits which may widen with depth.

SCHRADER, F.C., 1909. Mineral Deposits of the Cerbat Range, Black Mountains and Grand Wash Cliffs, Mohave County, Arizona: USGS Bulletin 397, 220p.

Considered the textbook for much of the geology, production and history of the Wallapai District. Detailed descriptions of selected mines both above and below ground. Shows Pinkham Mine as being developed to the 240 foot level, describes ore as oxidized in upper workings to 85 foot level then primary ore to total depth. Notes copper secondary enrichment products, chalcocite and bornite in upper two levels. Notes primary ore encountered in 140 foot level averaged 9% Cu and 60 ozs: Ag per ton. Map (pp.75) shows total depth 400 foot, 5 levels, totaling 1200 feet of progress and approximately one third of the inferred orebody mined out. Author suggest orebody located at junction of Pinkham and Midnight vein, suggests veins may horsetail at this junction and implies a continuation of Pinkham orebody both north and south from the present workings (Diagram pp. 76). See also Midnight Mine description pp. 76-77.

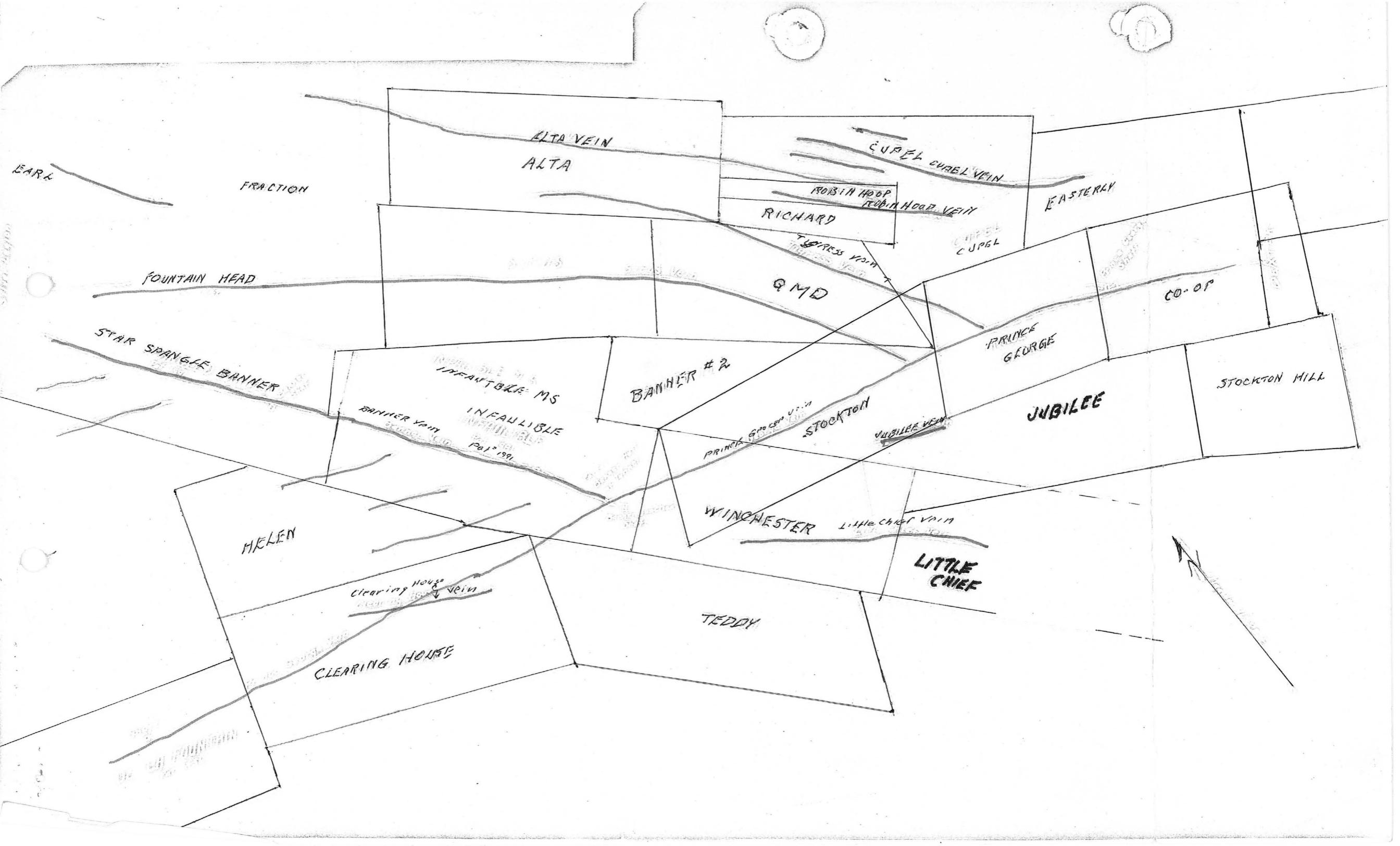
Schrader describes the Stockton Hill area, pp. 107-115, equally as well. The Little Chief Mine, pp. 112-113 (now the Chief Engineer property) is described as being developed to the 200 foot level with some 1000 feet of total progress. The Author likens the Little Chief Mine with the Banner Mine and the Treasure Hill Mine, observing that all are on the same (Banner) vein, all had the same surface expression and all produced the same type of ore. The Little Chief produced ore averaging 350 ozs. Ag and 14% to 30% Pb per ton.

SCHRADER, F.C., 1917. Geology and Ore Deposits of Mohave County, Arizona: AIME Trans., Vol. 56, pp. 197-236.

Similar to USGS Bulletin 397. Describes history, topology, geology and ore deposits. Describes selected mines both above and below ground.

THOMAS, B.E., 1949. Ore Deposits of the Wallapai District,
Arizona: Economic Geology, Vol. 44, pp. 663-705.

Describes general geology and characteristic fissure veins with associated wall rock alteration and secondary enrichment. Emphasis on ore shoots; mineralogy, age, texture and genesis. Concludes mineralizing fluids followed pre-existing conduits and are subsequent to majority of dykes and veins. Suggests that veins may widen with depth and increase in lead-zinc relative to copper-silver-gold. Considers district has good potential for future base-metal production.



EARL

FRACTION

ALTA VEIN
ALTA

CUPEL CUREL VEIN

ROBIN HOOD VEIN

RICHARD

EASTERLY

FOUNTAIN HEAD

STAR SPANGLE BANNER

QMD

BANNER #2

PRINCE GEORGE

CO-OP

STOCKTON MILL

JUBILEE

HELEN

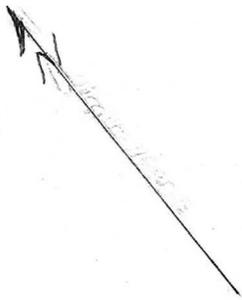
CLEARING HOUSE

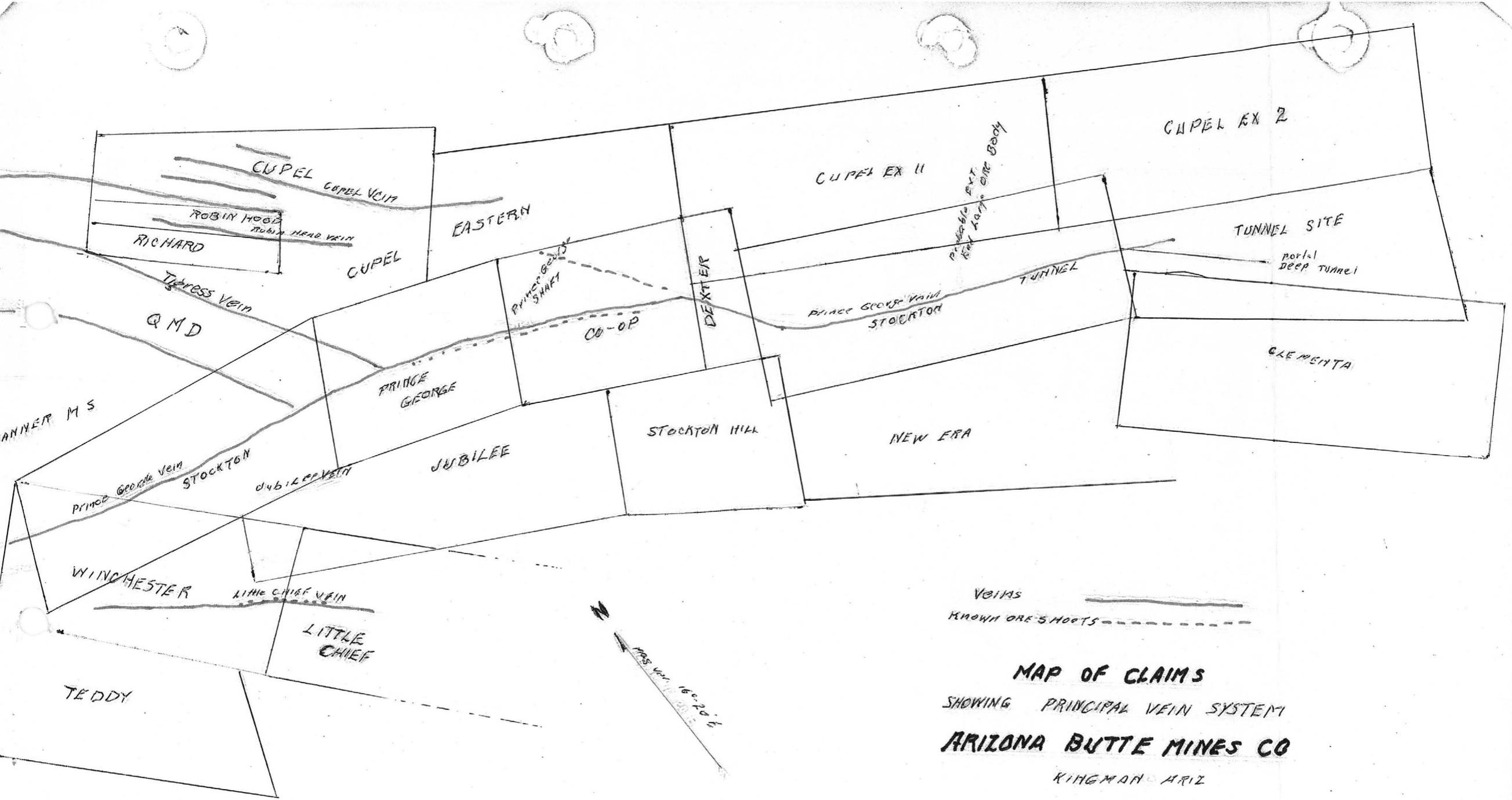
Clearing House vein

WINCHESTER

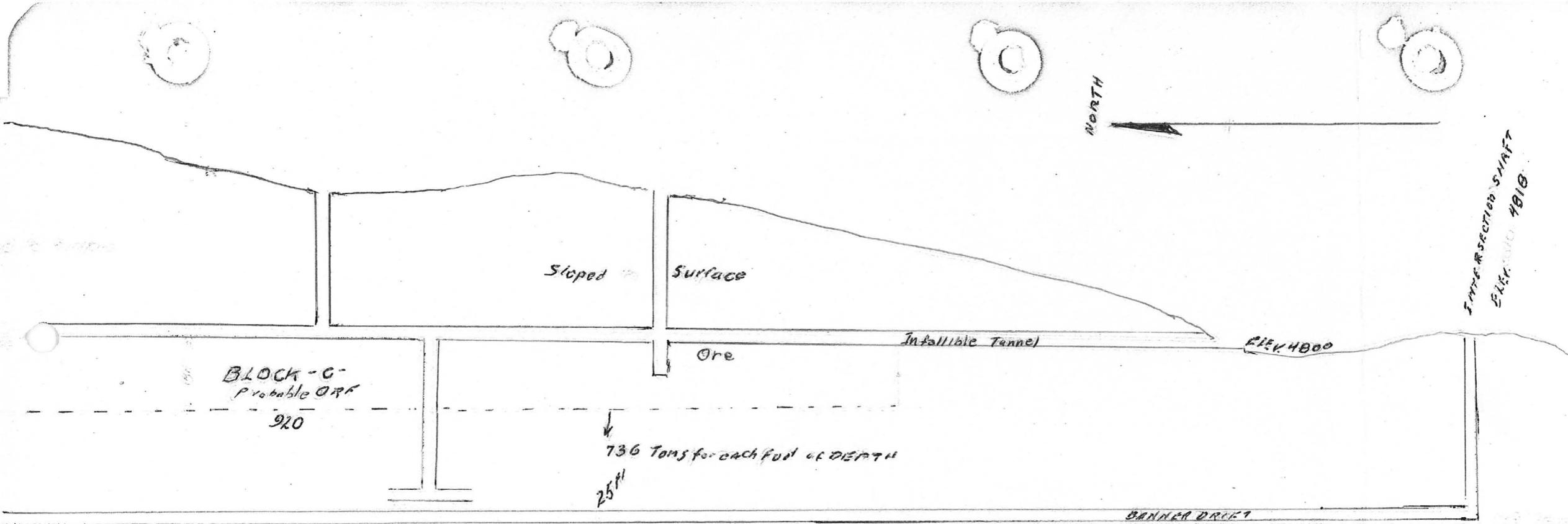
LITTLE CHIEF

TEDDY





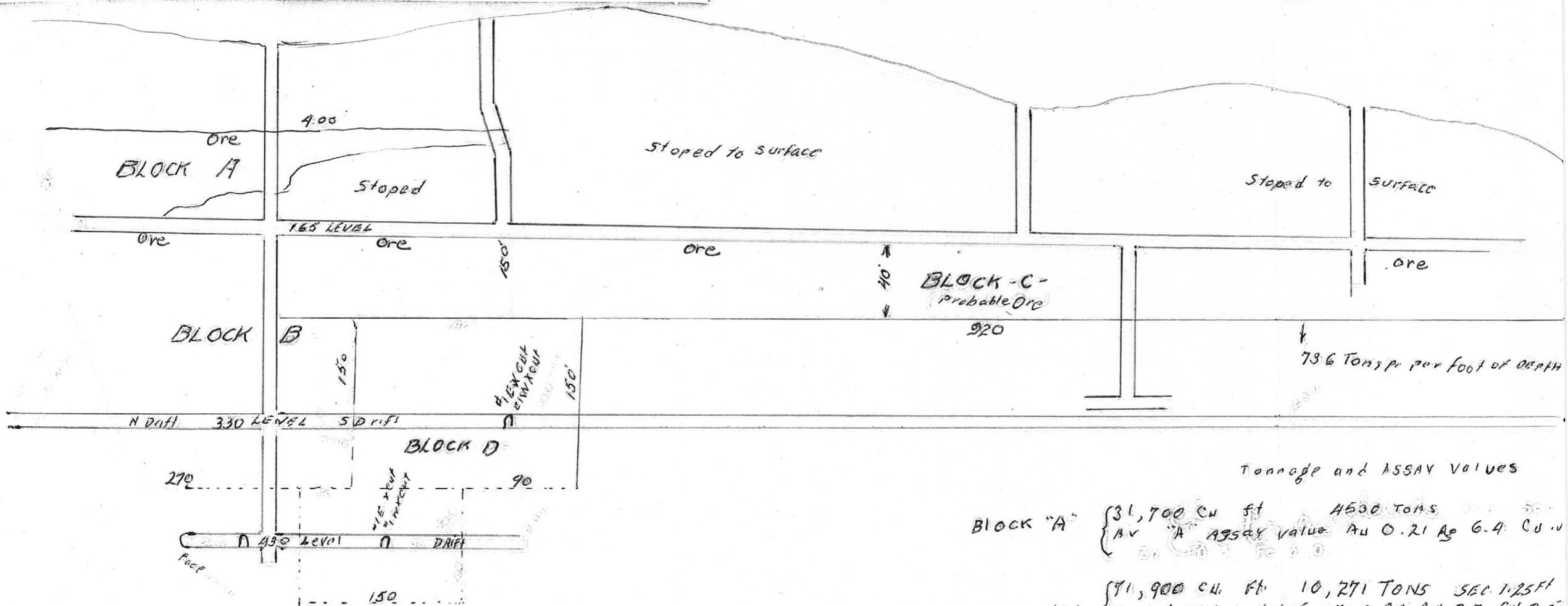
MAP OF CLAIMS
 SHOWING PRINCIPAL VEIN SYSTEM
ARIZONA BUTTE MINES CO
 KINGMAN ARIZ



Tonnage and Assay values

- Block "A" { 31,700 cu. ft. 4530 TONS AV. SECT. 1.55 ft.
 AV Assay value Au 0.21 Ag 6.4 Cu 0.5 Pb 23.8
 Zn 10.5 Fe 3.0
- Block "B" { 71,800 cu. ft. 10,271 TONS AV. SECT. 1.25 ft.
 AV Assay value Au 0.20 Ag 8.3 Cu 0.5, Pb 26.6
 Zn 11.8 Fe. 3.1
- Block "C" { 26,000 cu. ft. 1,000 TONS AV. SECT 0.66 ft.
 AV Assay value Au 0.46 Ag 14.2 Cu 0.45, Pb 19.9
 Zn 13.1 Fe 4.0
- Block "D" { 63,510 cu. ft. 803 TONS AV. Sec 1.46 ft.
 AV Assay value Au 0.22 Ag Pb 17.4
 Zn 12.8

ARIZONA BUTTE MINES CO
 KINGMOUNT, ARIZ.



Tonnage and ASSAY Values

BLOCK "A" { 31,700 CU. FT. 4530 TONS
 AV "A" ASSAY VALUE AU 0.21 Ag 6.4 CU 0.0

BLOCK "B" { 71,900 CU. FT. 10,271 TONS SEC. 1.25 FT.
 AV ASSAY VALUE AU 0.20 Ag 8.3 CU 0.5
 PB 26.6 Fe. 3.1 Zn 11.8

BLOCK "C" { 26,000 CU. FT. 100 TONS AVE SEC. .66
 ASSAY VALUE AU 0.46 Ag 14.2
 CU 0.45 Pb. 19.9 Zn. 13.1 Fe 4.0

BLOCK "D" { 63,510 CU. FT. 803 TONS AVE. SEC. 1.46 FT.
 AV ASSAY VALUE AU 0.22 Ag? Pb. 17.4
 Zn 12.8

SUMMARY

After a careful preliminary examination of the 3 lode mining claims, comprising the CHIEF ENGINEER mine group, located in the Stockton Hill section of the Wallapai Mining District, Mohave County, Arizona, it would seem that the indications on the property, its past production record, and the quality of the ore now exposed, warrants the carrying out of the proposed development and further exploration to open up the ore bodies and veins on the group, that has been outlined in this report. Upon the completion of this exploration program the management could decide intelligently upon any future development program, such as the mining and extraction of any ore bodies thereby opened up, in the primary zone.

The other promising veins having excellent ore exposures can be explored after this main development program is underway. At some future time it might be advisable to continue the drifting from your present Little Chief tunnel of the CHIEF ENGINEER mine, that is now 500 feet northwesterly from its portal, along the main vein of the mine toward the Winchester claim of the Comstock Silver, which will give you a depth of about 200 feet below the surface, and will explore the ore bodies above, from which earlier shipments have been made.

It is possible, by granting the continuance of the ores and assuming it to be of a value similar to like ore bodies in the district under similar conditions, that this work will prove remunerative to the owners. For economical operation in prosecuting this work, suitable mechanical equipment would here be necessary also.

There exists at this mine property every apparent geological similarity with the other productive mines of the section, such as the fissure veins, the same ore characteristics, the same strike and dip of veins as those of the neighboring producing mines, which occur in the geological formations recognized as the most favorable in which to expect commercial ore deposits of importance in the district.

The veins on your property are strong and well defined, and there is no question as regards their permanency and continuity to a very great depth, the future explorations of which will likely result in the uncovering of important ore bodies of remunerative content that will prove profitable to the operators.

Another thing to be considered is the past record of the many neighboring mines in the immediate vicinity, and the present producers, such as the Comstock Silver, "78", Cupel, Prince George, Arizona Premier, De La Fountain, C. O. D., I. K. L., Wrigley, etc. In other words, your property is in a proven production area. Your CHIEF ENGINEER mine has had important production.

Handwritten initials

The ores subsequently found in the CHIEF ENGINEER mines will readily respond to treatment such as is now in practice in this same district with similar ores. There is always a ready and available market for either ores of shipping grade direct from the mine or concentrates from the mill, such as those that have already been produced from these mines.

HISTORY

The exact date of discovery and original location of the Little Chief, now the CHIEF ENGINEER, cannot be definitely determined, but evidently the first substantial ore shipments were made between 50 and 60 years ago, when the operators at that time packed their high grade ores out on animals. In an article published in the Mohave County Miner, the mining editor who was personally familiar with this property, having been a successful operator of the neighboring Cupel mine, stated, "In the early days the Little Chief (now the CHIEF ENGINEER) was a shipper of high grade silver ore, many car-loads of ore averaging 1100 ounces going out to the smelters. At that time it was owned by John Kennedy, known to the Indians as 'Little Scalway' (meaning man with tooth out in front). With the money from the ore sales Kennedy purchased a good-sized cattle ranch". After the mines had passed into other hands lessors shipped largely from the property, the ore being from the oxidized zone."

Since the earlier operation of these mines, now included in the CHIEF ENGINEER group, this area has been owned and operated on a small scale intermittently to the present time, as was the case with the other mines of the Stockton Hill section of the Wallapai Mining District.

In the earlier operations only the oxidized ores were extracted because it has only been comparatively recent that sulphide ores could be mined at a profit. The rate of progress in the last fifteen years in the development of differential flotation, and the construction of suitable mills at the smelters, has been rapid beyond the realization of most people. So today sulphide ores such as are shipped from the Stockton Hill section can be mined at a profit, stimulating mining here, with the result that such mines as the CHIEF ENGINEER can find a ready market for their ores.

FURTHER HISTORY OF CHIEF ENGINEER MINE

Although I have been familiar with the Little Chief, now known as the CHIEF ENGINEER mines, for over 20 years, having been an operator in the immediate area; in order to complete the record at my request the following remarks were furnished me by E. Ross Housholder, E. M., of Kingman, Arizona, a widely known mining engineer, who is the present owner of the property. His remarks as to the early day operations give a good account of those conditions consistent with the obtainable facts as I believe them to be:

HOUSEHOLDER'S REMARKS

"Andy Goodwell, an old timer, and owner of the property between the CHIEF ENGINEER and the Cupel, including the Pt. George, as well as the property on which is located the Stockton Hill development tunnel, was familiar with the early operation on the CHIEF ENGINEER mine, in those days known as the Little Chief. He said, several years before he died, that the original locator of the Vigilanty lode claim, between this mine and his Pt. George shaft, had also acquired the Little Chief. The ruins of the old rock cabins can yet be seen from the surface workings of the Little Chief in the wash below.

"Although he made considerable money from the ore shipments from his Vigilanty claim, he later turned the Little Chief (now the CHIEF ENGINEER) property over to the Faggott Mercantile Company, of Kingman, Arizona, to settle his account with them. As often was the case in those early days the mercantile company was also in the mining business. It was their policy to grant 90 to 120 leases to miners for a portion of the vein, having a length of between 50 and 100 feet. The miners would be furnished a grub stake of tools and supplies and they would go to work on the ore. As long as they were in the ore they would keep sinking, with the idea in mind that after they had reached a depth of 75 to 80 feet they could easier mine the ore by stooping.

"But when they attempted to get an extension on their leases the mercantile company owners would not grant such a time extension. So the leaser-miners would stop sinking and endeavor to stoop out all the ores they could in the time that was left. No more timber was used than absolutely necessary. Much of the timber that was used was local cedar or juniper. The owners would be willing to grant other leases on their property, but never in a place that had been opened up.

"This accounts for the seven or eight surface holes that had a depth of from 30 to 60 feet with the ore stooped out on each side of the original shaft.

"Greeley Clack still living in Kingman was the youngest of several brothers who were early day mine operators. He told me that he visited, for several days, his brother William Clack who was extracting ore from one of these Little Chief leases, when he was a young man. He said his brother was mining ore that contained over 60 ounces of silver per ton and some went well over 100 ounces per ton.

"When I first visited these workings about 1925 or 1926, several of these old shaft holes were still open, and some of the reject from the ore sorting operations was still in little piles on the surface.

"Since then the holes have caved in or been filled with the surface soil and debris. It is my knowledge of the ore, that I actually saw there, supplemented by the geological conditions existing on the property, together with the substantiating information from the well informed old timers who personally related their information and knowledge to me that has caused me to hold on to these three lode claims comprising the CHIEF ENGINEER mine group.

"In 1941 and late 1942 I had established a camp at the mine and had several men doing work there. But shortly after the attack on Pearl Harbor I was called back into Military Service and could not return until after the war ended. I had served in World War I also. This I relate here, so you will understand that as an individual I found conditions changed when I returned and could not on my own continue a development program. I have had a road built from the new county road across the CHIEF ENGINEER claim to the mine campsite above the development tunnel and accessible to some of the surface workings, besides other valuable improvements to the mine, within my means to do so.

"It is the one property that I have held, because I have faith in it based on my study and understanding of the situation, made clear to me by my experience as a mining engineer familiar with production mines of this area. That, too, is the reason why I am more interested to take my royalty off the mine production, instead of selling outright. This also helps the operator. In the long run it will be best for me, too."

"E. Ross Housholder."

DEVELOPMENT TUNNEL

The Little Chief development tunnel on the CHIEF ENGINEER lode mining claim, just off the old county road was first run in the mountain as a cross cut to a place from which a stoop and manway made a connection with a known ore shoot in the intermediate workings above.

Then the tunnel was driven in further with a view to getting on the main Little Chief vein and it was expected that drifting would be done to the westward to get under the known productive surface openings, and thus penetrate the ore shoots.

However, about two thirds of its present (1950) length, ~~the~~ mineralization lead the operators, at that time, to veer to the right where a mineralized vein was encountered. The showing of sulphides over a width varying from three to four feet was such that a winz was started and sunk about 22 feet. So much water was encountered that the operators could not handle it with the equipment available to them. Then, too, altho the sulphides persisted, the commercial values were not present. Some of the last ore taken from this winz is still on the tunnel dump. Assay returns show very low silver and gold values.

PAJ

Now, this work was all done apparently without a proper survey to tie in the surface workings and correlate them with the underground work. It became apparent to the workmen, however, that they had been drifting on a vein parallel to the productive Little Chief vein. This drifting had proceeded about 60 feet beyond the winz, then cross-cutting started to the left for about 40 feet more, where the work was stopped due to lack of funds.

PROPOSED DEVELOPMENT & REPLENISHMENT

Although a more precise survey should be completed, enough work was done in late 1942 to show that this last crosscut would not enter the Little Chief vein at right angles. It is proposed to direct this crosscut, after the suggested mapping has been completed, directly to the Little Chief vein, estimated now to be about 35 to 40 feet. Then, when the Little Chief vein has been entered, to drift, possibly easterly and westerly to get under the known productive ore shoots to tap the ore reserves at a depth of about 160 to 200 feet below the surface. Extraction of the ores can then begin, but the drifting should also be continued westerly to the end-line of the CHIEF ENGINEER claim where it adjoins the Winchester claim of the Banner mine owned by the U. S. States Smelting & Refining Co. The production from this same vein which is known as the Banner vein on the Banner mine group has been over a quarter of a million dollars. The ores have similar mineralogic and geologic characteristics as well as a like width in this Banner vein as its easterly extension on the CHIEF ENGINEER mine property where it has been designated as the Little Chief-Banner vein.

Once having tapped the Little Chief-Banner vein ore shoots from this tunnel level, the ores can be transported through the tunnel to the surface portal where it can be placed in suitable bins for loading. Besides mining ores by steeping is much less expensive. Haulage of the ores to the rail head for shipment to a smelter or to a treatment mill presents no problems.

TOPOGRAPHY

The district ranges in elevation from 3,000 feet in the foothills on the northeast to 5200 feet at the crest of the Cerbat mountains on the west. The western end of the CHIEF ENGINEER group is almost 800 feet higher than the eastern end of the property. The average elevation of this group is about 4,600 feet.

The topography of this portion of the district is typical of eroded igneous formations in this region belong to the pre-cambrian, essentially granitic. The accompanying photographs will give one a splendid idea of the topography of the CHIEF ENGINEER mine estate and the surrounding territory.

LOCATION AND TRANSPORTATION

The CHIEF ENGINEER mine group is located on the eastern slope of the Stockton Hill section, of the Gallup Mining District in the Cerbat mountains, Mohave County, Arizona, and comprises 1 lode mining claims, at a maximum elevation of 5000 feet. The westerly portion of the group is endlined and sidelined by the

D-27

Banner-Prince George mining property of the Comstock Silver Mining Company and includes what has been known for years as the Little Chief mines. The famous Cupel mine is about 2000 feet north of the Little Chief workings.

The Western Union mine property adjoins this estate on the southwest. A good grade of lead silver ore is now being extracted from this adjoining mine. South of the Windsor group is the Mountain Queen, and the "78" mine that has been a heavy producer of high grade ores and is today producing 42 ounce silver ore for shipment to the smelters. The De La Fountain mine lies to the west about a quarter of a mile.

The CHIEF ENGINEER mine group is in section 9, Township 22 North, Range 17 West, Gila and Salt River Base Meridian, Arizona.

There is a good county truck road traversing the entire length of the estate, which with connecting mine roads on the property affords easy access to the more important workings of the property. This same road connects with another county road at the northwest corner of the group, a few hundred feet from the Little Chief main tunnel, and again with this same road near the east end of the property in the lower foothills. This latter road section is of easier grade and is being used daily for transportation of supplies to the different mines and ranches and the hauling of the shipping ore to the reduction plants or to the railroad at Kingman, Arizona, on the main line of the Atchison, Topeka & Santa Fe R. R., a distance of about 12 miles from the CHIEF ENGINEER mine property. This road is kept up by the county and is in excellent shape.

CLIMATE & WATER SUPPLY

The district has a healthful climate with mild winters which permits good working conditions the year round. The rainfall is about 10 inches a year. The deeper shafts on the property produce enough water to insure an ample supply for mining as outlined in the present development program.

GEOLOGY OF STOCKTON HILL SECTION OF THE WALLAPAI MINING DISTRICT

The country rock is the pre-Cambrian granite, gneiss and schist complex, belonging to the laminated metamorphic series of that age, with a tendency to grade into mica chlorite schists in places. It is intruded by dykes of minette, granite, granite porphyry, diabase basalt, and other rocks, that are products of differentiation in the pre-Cambrian series.

The veins for the most part are regular and persistent with well defined walls. They occur chiefly in the pre-Cambrian granitic rocks. Many of the pay chutes coincide with the intersection of fissures. Oxidation has altered the upper part to a depth ranging from 50 to 300 feet, and this oxidized zone changes to the primary ore within a vertical range of 10 to 40 feet. The old time operators were unable to market the sulphide ores at a profit such as can be mined in the district today. Only the oxidized and secondarily enriched ores were they able to treat and ship. Therefore, today there

are mines being developed here which may be capable of great production. The veins have suffered great erosion, and their mode of occurrence leads to the belief that they were deposited at comparatively great depth by hot circulating waters.

LOCATION OF THE STOCKTON HILL SECTION

The Stockton Hill district joins the Cerbat district on the east, and is about parallel and coextensive with it north and south, being situated on the opposite slope of the Cerbat Mountains, in the Wallapai Mining District. It is about four miles in width and but little more in length. It ranges in elevation from 3000 feet at the edge of the Wallapai Valley on the east to 5,800 at the crest of the range.

The principal and oldest camp for many years was Stockton Hill, situated in the foothills in the eastern part of the district, just north of the present CHIEF ENGINEER group ~~of the Stockton Hill Mining Company~~, 10 miles north of Kingman, at an elevation of about 4,800 feet. It dates from early in the sixties, when the principal veins were first discovered and began to produce. In former days much ore was shipped to Swansea, Wales, but later it was treated in the Mineral Park and Cerbat mills and shipped to the smelters in San Francisco and to New Mexico. Then followed a period when the ores were hauled by wagon to the station of Berry on the then new railroad, or to Kingman, whence it was shipped to the mill and smelter at Needles, California, on the Colorado River.

During the past years the shipping ores and concentrates from the milling plants have been trucked over excellent highways to a sampler at Kingman or to the reduction works in the district, where the ores of the district have found a ready market.

ORE DEPOSITS OF THE STOCKTON HILL SECTION

In writing about this section in United States Geological Bulletin #397, F.C.Schrader, the government geologist, stated, "The deposits occur in the pre-Cambrian gneiss or schist, intruded in places by a later aplitic granite or by basic dikes. They are fissure veins, which in general strike northwesterly and are vertical or dip at steep angles to the northeast. The gangue is quartz and the ores contain chiefly silver, with some gold, lead, zinc, and copper. Primary sulphide minerals are galena, zinc, blende, chalcopryrite, and pyrite, but the district owes its reputation to the rich silver ores, such as native silver, ceragyrite, argentite, and ruby silver, which were found in large quantities in the upper levels. The water level is about 100 feet below the surface. Galena is often found above it, while rich silver minerals descend to a considerable distance below it. The greatest depth so far attained is 400 feet."

CHIEF ENGINEER GEOLOGY

Commenting upon the Little Chief, now the CHIEF ENGINEER, mine in the same government report, the author, F.C.Schrader, wrote, "The country rock is pre-Cambrian complex. To judge from talus debris on the surface at the mine, it seems to be intruded by diabase nearby, and portions of a light-colored altered rock, which seems to be the intrusive porphyry, are associated with the vein.

The vein trends N. 40° W. and dips steeply northeast. It is about 6 feet in width and is supposed to be the Barnes vein. The gangue is quartz and crushed and altered silicified rock. The ore shoot locally coincides in width with the vein and is stained throughout with copper carbonate. The ore contains principally green horn silver, Galena, and gold, is all of shipping grade, and is said to average about as follows: Silver, 350 ounces to the ton; gold \$5 to \$10 a ton; and lead, 8 to 40 per cent."

Since the above government report was written the entrances to the works referred to, have been caved and are now with few exceptions impassible. Samples that have been taken from rather narrow streaks in the vein as now exposed and left by the early miners gave assay returns between 20 ounces and 80 ounces in silver, besides about \$1 in gold per ton. Samples from the old shaft sorting dumps also carried up to 27% lead. The ore shows a low percentage of copper, but zinc is now present in any appreciable quantity.

Other openings on the CHIEF ENGINEER mine group have exposed veins of varying width and metallic content, which were not extensively investigated, as the two mines of this estate more fully described will warrant the immediate attention of the owners as to the present and near future exploration program.

DEVELOPMENT

The development work on the CHIEF ENGINEER consists for the most part in six or seven shafts, connecting drifts, stopes, raises, crosscuts, etc., between the northwest endline along the vein toward the portal of the present development tunnel a distance of about 1200 feet. This development tunnel has been driven north-west a distance of 500 feet. As this tunnel is pushed ahead it will open up this same vein about 200 feet below the surface and between 100 and 160 feet below the older workings and enter the ore chutes exposed above at the depth indicated.

Taking into consideration all the shallow shafts, tunnels, crosscuttings, and drifts, that has been completed in all the workings of the three claims of this CHIEF ENGINEER group, there is in excess of 400 feet of shaft work, with a maximum depth of 120 feet on the Little Chief, now the CHIEF ENGINEER. This has been supplied by several tunnels having a maximum length of 500 feet on the CHIEF ENGINEER, formerly the Little Chief, together with other tunnels on the remaining parts of the group, where one tunnel has several thousand feet of underground work. The tunnel work crosscutting, drifting, etc., will exceed 1000 feet of work. Considerable ore has been shipped from some of these openings during the history of the property, that is reported to be better than a hundred thousand dollars.

SUMMARY EXPLORATION OF THE CHIEF ENGINEER

An accompanying topographical and claim map, on which the general geology of the property has been superimposed will give one an idea about the trend of the more important veins and dykes, together with the general character of the country rock, and the relative position of neighboring mines.

RECOMMENDATIONS

It would be advisable to continue the drifting from your present main tunnel, that is now 500 feet northwestwardly from the portal to and along the main vein of the CHIEF ENGINEER mine toward the northwest endline that joins the Winchester claim of the Comstock Silver, which will give you a depth of about 200 feet below the surface, and will explore the ore bodies above from which earlier shipments have been made. It is possible, by granting the continuance of the highgrade ore and assuming that it will maintain its present value per ton, this work of drifting could be made to almost pay for itself from ore shipments after the chute was entered.

In carrying on this development program I would further suggest that you open up the known ore bodies and thereby give you an opportunity to begin production on such a scale that will, I believe, prove profitable to you and your associates, for the conditions here prove the existence of ore bodies of magnitude and remunerative content and I expect the result of such development on this property will prove it to be ~~one of the wealthiest ever opened up~~ in the Stockton Hill section.

*to be one of
the profitable*



S.S.J.

Stockton Hill E. 6
8-2-46

12.0 x 8.5 x 8.5 cm

K166

MINE SPECIMEN FOR DEPARTMENT OF GEOLOGY AND ARCHIVES

(Do not write in this space)

(Wrap each specimen separately, or place it in a substantial bag, by itself, with a number attached, identical with the number on this card.)

Ore _____

Cabinet _____

No. _____

Specimen No. 18, collected by Robert E. Morrow
Field Engineer

Name of ore Gold-Silver

Operator Lee & Harris

Minerals contained _____

Mine active or inactive Active

If inactive, when operated _____

Gangue _____

Specimen presented by Pecil Davis

Depth at which taken 150 ft. Level

Date Aug 19, 1946

Approximate mineral content (in terms of average per ton) 70 PER TON

Notes (Any general information regarding the history of the property.) _____

Name of mine or claim Lee-Hays

Group _____

District Stockton Hill

Location (distance and direction by highway from what town) 10 mi. NE. of Kingman

If more space is desired for notes, use other side.

Owner of property _____

Lee-Hays-Harris

This specimen is now in the ADMR Museum (see the K number).

ARIZONA BUTTE MINES CO.

District: Stockton Hill

Location: Stockton Hill; about 15 miles by wagon road northwest of Kingman, Arizona. Elevation of 4800 feet.

Owners: Arizona Butte Mines Co., incorporated under laws of Arizona, Capital stock 2,000,000 shares, one dollar par. Of this 1,375,000 shares are issued and outstanding, balance in treasury. Officers: H. M. Crowther, President and General Manager, Kingman, Arizona.

Date visited: September 1 and 2, 1919.

NOTES:

35 Claims located along what is known as the Prince George vein, striking N. 40° W. and dipping to the N. E. 80°.

G E O L O G Y

Veins are fissures of movement, occurring in a Pre-Cambrian complex consisting of Gneiss, Gneissoid Granite and Schist cut by numerous acid and basic dikes of per-mineral age. The main vein at one point may be in a fine grained Gneiss, and at other points in the Gneiss but with parallel bands of pegmatite on either wall. The walls are badly sheared and crushed, necessitating heavy timbering or filling. The usual method is to mine out the ore and fill with barren vein filling or wall rock.

H I S T O R Y

In the early eighties the various claims shown on the attached maps as the Banner, Prince George and De La Fontaine are credited with a production of a million ounces of silver, taken largely from the rich surface ores.

During 1917 the properties were consolidated under present management, \$100,000.00 raised from sale of stock, the greater portion of which was expended in the construction of a mill and in opening some of the old workings - entirely by hand methods of mining. A leasing system was adopted and approximately 90 cars of ore and concentrates were shipped during 1918.

The following is an average of the above shipments, though there was no means at hand of identifying concentrate from crude ore shipments:

<u>Tons</u>	<u>Au</u>	<u>Ag</u>	<u>Pb</u>
2624	.35 oz.	15.1 oz.	27.5 %

At the present time the Company has two sets of leasers working in the upper levels and contemplates the reconstruction of the mill, which has been idle for nearly a year. They are also preparing to drive a tunnel, already in 600 feet, a distance of 11,000 feet to tap their main workings at a maximum depth of one thousand feet. The tunnel will be on the vein. They are also equipping with air in order to increase number of leasers, and under the splitcheck system will supply everything, charging for air, steel, sharpening, hauling and milling.

D E V E L O P M E N T

Development consists of several thousand feet of tunnels as well as some drifting from the intersection shaft as shown on the accompanying blue print. The infallable tunnel is open for the greater portion of its length, and it is from this tunnel and the winze shown that the present production is being made.

Blue print of elevation shows various blocks of ground and tonnage and grade of ore contained. There is no reason to doubt this estimate, and in fact deep development should produce much larger tonnage. Widths of ore vary from a few inches up to 3 feet. The owners have no exact knowledge of these orebodies except from previous shipments around their borders, and there are no assay maps at hand.

Concentrator, using jigs and tables, has a capacity of 180 tons per day, although it will be several months before this tonnage is attained. It is their intention to use this mill as custom mill for leasers on split-check system; also, to buy some outside ore and a sampler will be installed for this purpose.

A 75 H. P. Fairbanks Morse type engine has been installed at mouth of deep tunnel; also, a 10 x 12 single stage Ingersoll-Rand Compressor, belt driven from the gas engine. This equipment appears inadequate for a long tunnel. The power line of the Desert Light and Power Company crosses the portal of the tunnel, but for some reason the operators think they can operate more cheaply on their own power.

A similar plant is being installed at the upper workings of the mine with a view of supplying air for the leasers. Jackhammers

will be used both at the tunnel and by leasers, and are entirely adequate for the character of ground encountered along the vein; and in fact, in stoping operations due to heavy ground and soft ore, I doubt the wisdom of using machines, since handwork is quite efficient and would save a great admixture of waste.

C O N C L U S I O N

Estimate of 25,000 tons of grade of ore as follows:

Au \$4.00, Ag 5 oz., Pb 15%, and Zn 10% is probably reasonable.

In the event that the Company continues operations as planned and reconstructs the mill, the property can produce approximately four to five cars monthly of crude ore and concentrates of approximately the following composition: Au .8 oz., Ag 12.3 oz., Pb 50%, Zn 7%.

The veins are narrow, or at least the ore is narrow, varying as mined by leasers from six inches to two feet - costs will be high.

Mining Cost	\$7.00	Per ton
Milling "	2.50	" "
Haul ratio Stol	1.00	" "
Freight 5 to 1	.90	" "
Total	11.40	

Crude ore, where mined, will cost \$15.00 to Humboldt, due to haul.

Total cost, including treatment on mill concentrates will be for

Milling ore	\$12.60	Per ton
Shipping "	25.40	" "

Margin of profit for leasers and Company will be small, although Company will get some benefit from shipments of zinc, which they do not propose to pay for at the mill.

As a producer of lead the Company should be able within five months to produce five cars monthly of 15 to 50 per cent lead ore, either as concentrates or coarse ore, but can hardly be depended on for any great amount of coarse ore, and their maximum shipments of such ore will probably not exceed two cars per month varying from 22 to 40% lead.

W. V. DeCamp

gme

Kingman Ariz, June 8th 1919

Messrs. Consolidated Arizona Smelting Co,
Humboldt, Arizona

Gentlemen:

The Arizona Butte Group requires a special automobile to reach it, for which reason I did not visit the property, but have made a number of enquiries. I find from Mr. McGinley, an engineer who has been in the district some 4 years, that possibly two cars a week are now being shipped from the property by leasees. Mr. Crowthers the manager is now in the East, to finance the driving of a 2000 ft. tunnel to strike the ore bodies at depth. The property has been a shipper of some note in the past, and the belief is that it will again be a shipper.

I might remark that throughout the Chloride district as a whole, an impoverished zone seems to obtain near or immediately below the oxidized zone. This zone of impoverishment may persist for a hundred feet or thereabouts, when the unaltered sulphides are again encountered, often of a grade high enough to ship, at other places being but a milling ore. The conditions seem to prevent the shipping of an ore below \$25.00 per ton, the smelter and freight rates being such as but a small margin is left even with such grade.

Referring again to the Arizona Butte, a mill of 50 to 75 tons capacity is now erected on the ground, but little if any concentrate has been produced. I understand the mill was built without an immediate supply of ore being available.

Respectfully submitted,

A. Burnett.

MILLING RESULTS - 849 TON LOT

	Weight Pounds	Tons	Oz. Gold	Oz. Ag.	% Cu.	% Lead	% Zinc	% Sil.	% Iron	% Lime	% Sulph.
Crude Ore	1,698,195	849	.324	4.97	.29	15.67	10.4	55.5	5.2	1.	9.7
Lead Concentrates	311,440	155	.277	10.51	.20	66.07	6.2	8.1	3.05	0.9	15.1
Lead Concentrates	108,026	54	2.58	17.91	.49	51.1	12.2	3.3	8.5	0.9	20.4
Zinc Concentrates	260,000	130	.356	6.53	.95	4.22	42.3	15.	6.9		
Tailings			.055	1.35	.13	.42	3.6	90.9	1.15		
Percent Recovery			83.	81.8	--	98.0	80.8	--	41.5		

4.04 Tons Crude Ore - - - - 1 Ton Lead Concentrates
 6.53 " " " - - - - 1 " Zinc "

AVERAGE ASSAYS FROM SAMPLES MAPS

	Feet	Oz. Gold	Oz. Silver	% Lead	% Zinc	Total Value
Banner Shaft, 36 Assays	1.59	.235	5.4	20.8	14.6	\$36.92 per ton
Banner Shaft, 165 Ft. Level, 37 Assays	1.5	.21	9.0	27.2	13.0	43.25 " "
Banner Shaft, 330 Ft. Level, N., 21 Assays	1.3	.35	4.3	15.0	13.2	54.00 " "
Banner Shaft, 330 Ft. Level, S., 35 Assays	1.29	.21	5.4	15.0	13.1	31.79 " "
Banner Shaft, 430 Ft. Level, N., 3 Assays	.8	.31	3.0	7.9	7.6	21.31 " "
Banner Shaft, 430 Ft. Level, S., 13 Assays	1.7	.30	5.0	11.1	12.7	30.71 " "

Based on { Gold, \$19., Silver 50¢ Oz. } Net from Smelters
 { Lead 4¢ Zinc 5¢ Lb. }

Assuming double stoping width: approx grade = 2 1/2 to 3' - ^{Pb - Ag - Zn} 13, 3.5%, 8% - 6%

gmc

LIBRARY
MAGLE-PICHER M. & S. CO.

DISTRICT: Stockton Hill, Mojave County.

PROPERTY: Arizona Butte

LOCATION: Some 15 miles northerly from Kingman

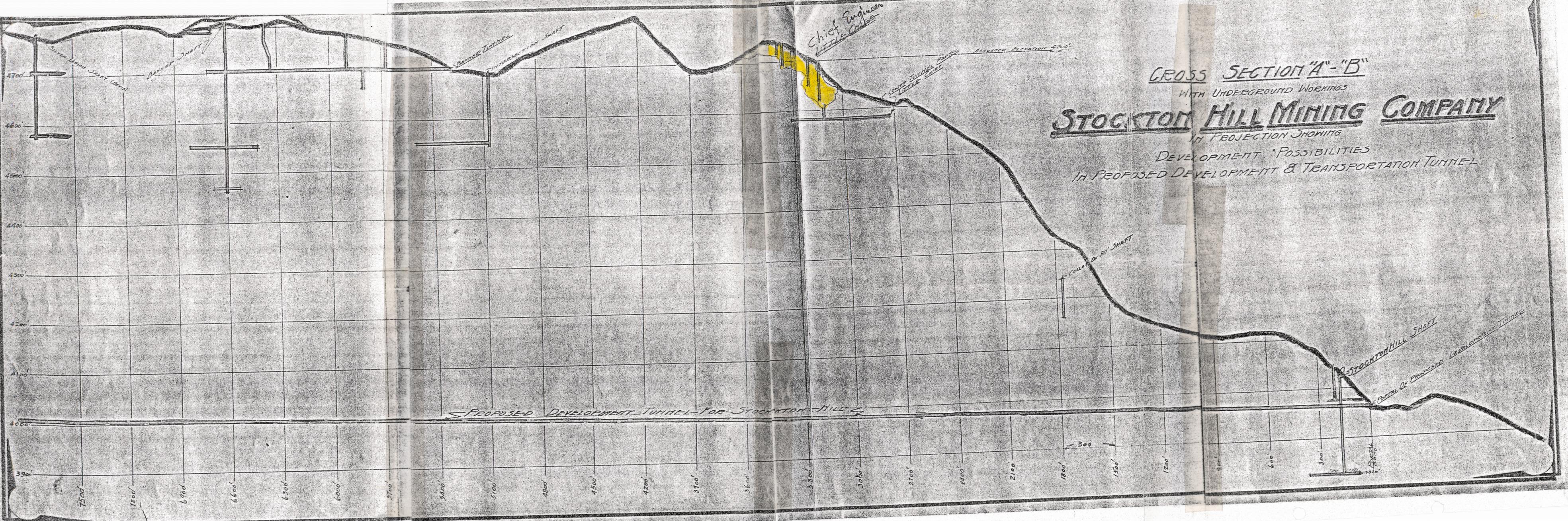
*See Claim Map. D-2-37-
D-2-38*

OPERATORS: Now being operated by a number of lessees.

Several properties have been consolidated and a tunnel to open up deeper ones is being planned for. Mr. H. Crowther, Genl. Mgr. now in New York in connection with financing of this tunnel.

Did not visit the property, but it is reputed as being most promising, and there is a likelihood of it becoming a lead silver producer of some prominence.

A. Burnett.
June 14, 1919



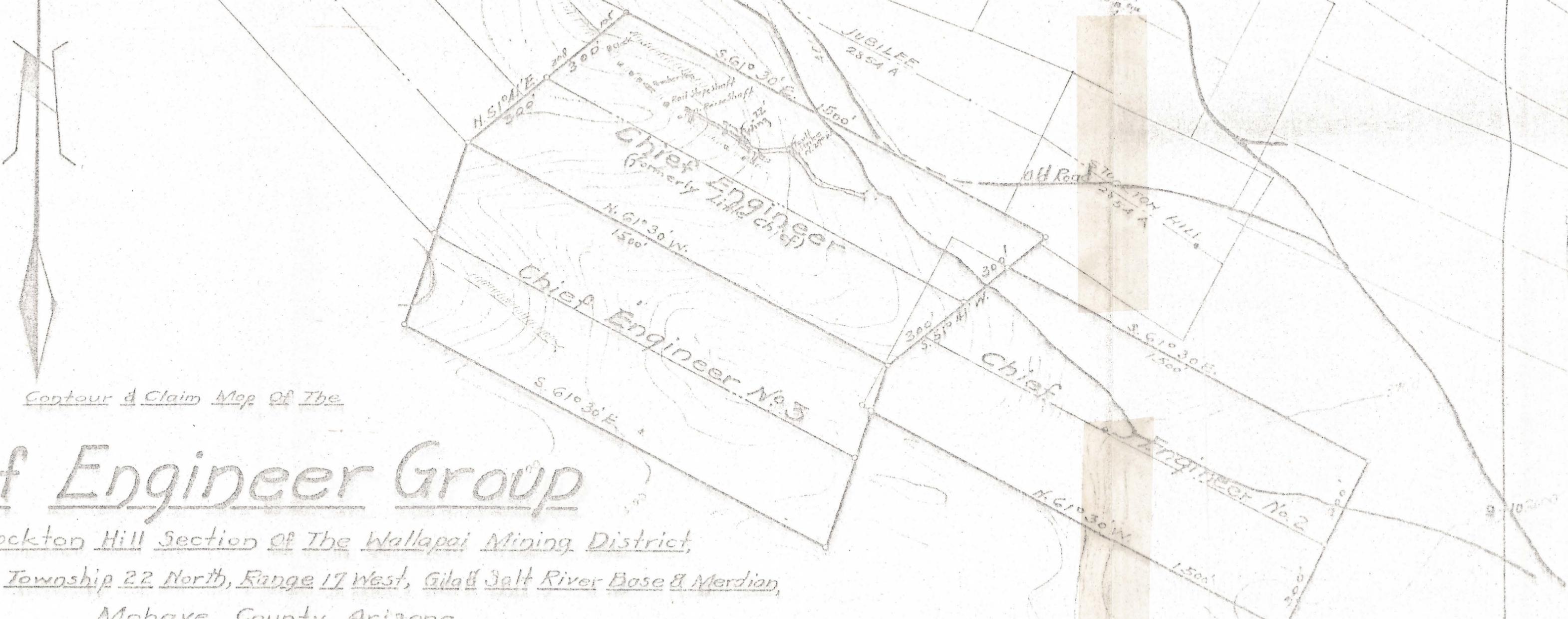
CROSS SECTION "A"-"B"
 WITH UNDERGROUND WORKINGS
STOCKTON HILL MINING COMPANY
 IN PROJECTION SHOWING
 DEVELOPMENT POSSIBILITIES
 IN PROPOSED DEVELOPMENT & TRANSPORTATION TUNNEL

PROPOSED DEVELOPMENT TUNNEL FOR STOCKTON HILL

Chief Engineer
 LITTLE OAKS

Stockton Hill Shaft
 Profile of Proposed Development Tunnel

300
 600
 900



Contour & Claim Map of The

Chief Engineer Group

○ In The Stockton Hill Section of The Wallapai Mining District,
Section 9, Township 22 North, Range 17 West, Gila & Salt River Base & Meridian,
Mohave County, Arizona

Surveyed June 1928
By: Elmer Haushalter

Mapped By: ERW

Revised June 1950

By: Willie Walker

Especially To Accompany

Report on Property By: (1950)

S. S. Jones, Reg. Mining Engr. #347

By
Elmer Haushalter E.M.
Registered Mining Engineer #257
Kingman, Arizona

Scale 1" = 300'

This Map Shows Part Of
Underground Workings
Chief Engineer Mine

Stockton Hill Section, Wallapai Mining Dist.,
Section 9, Township 22 North, Range 17 West
Gila & Salt River Base & Meridian,

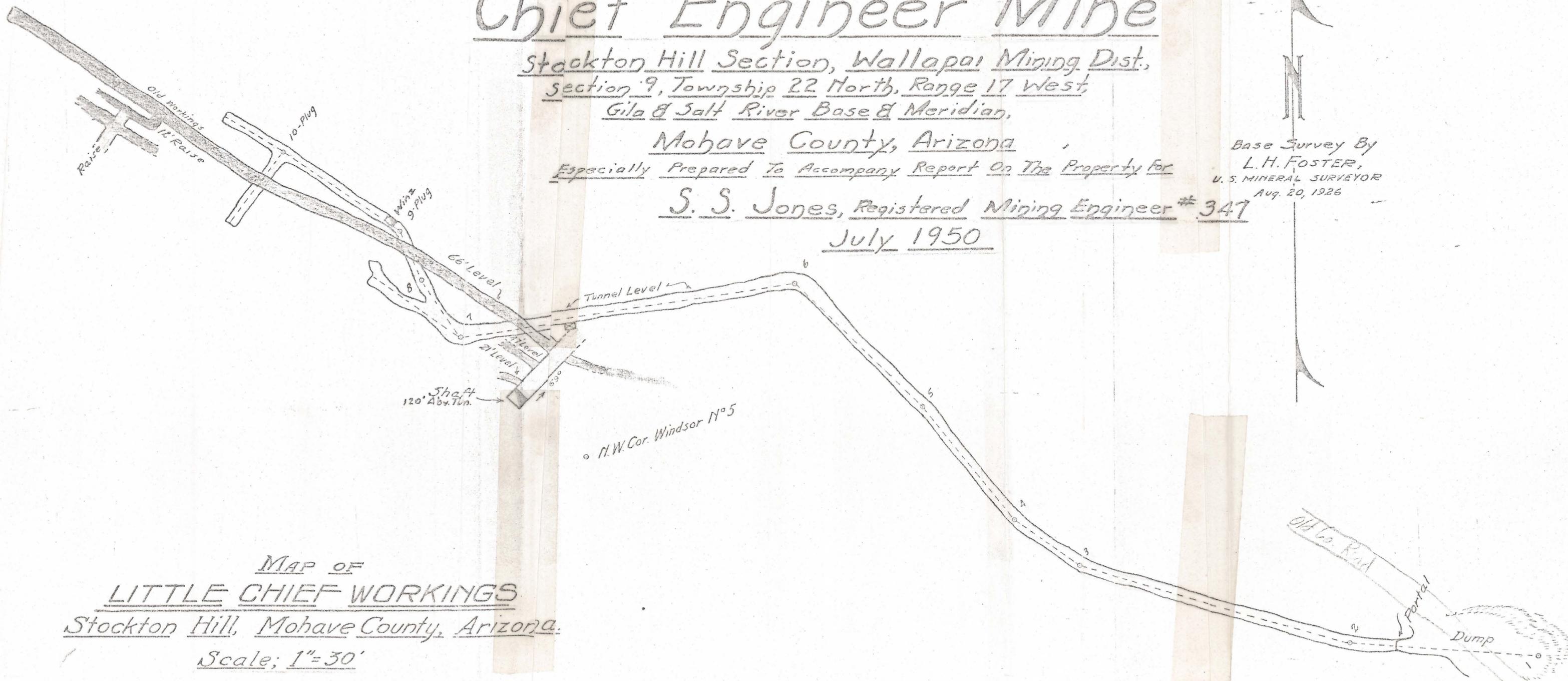
Mohave County, Arizona

Especially Prepared To Accompany Report On The Property For

S. S. Jones, Registered Mining Engineer # 347

July 1950

Base Survey By
L. H. FOSTER,
U. S. MINERAL SURVEYOR
Aug. 20, 1926



MAP OF
LITTLE CHIEF WORKINGS
Stockton Hill, Mohave County, Arizona.
Scale; 1"=30'

Wallapai Mining District
Stockton Hill Area
Stockton Hill Mines file - JH

AKA LITTLE CHIEF

This Map Shows Part Of
Underground Workings

Chief Engineer Mine

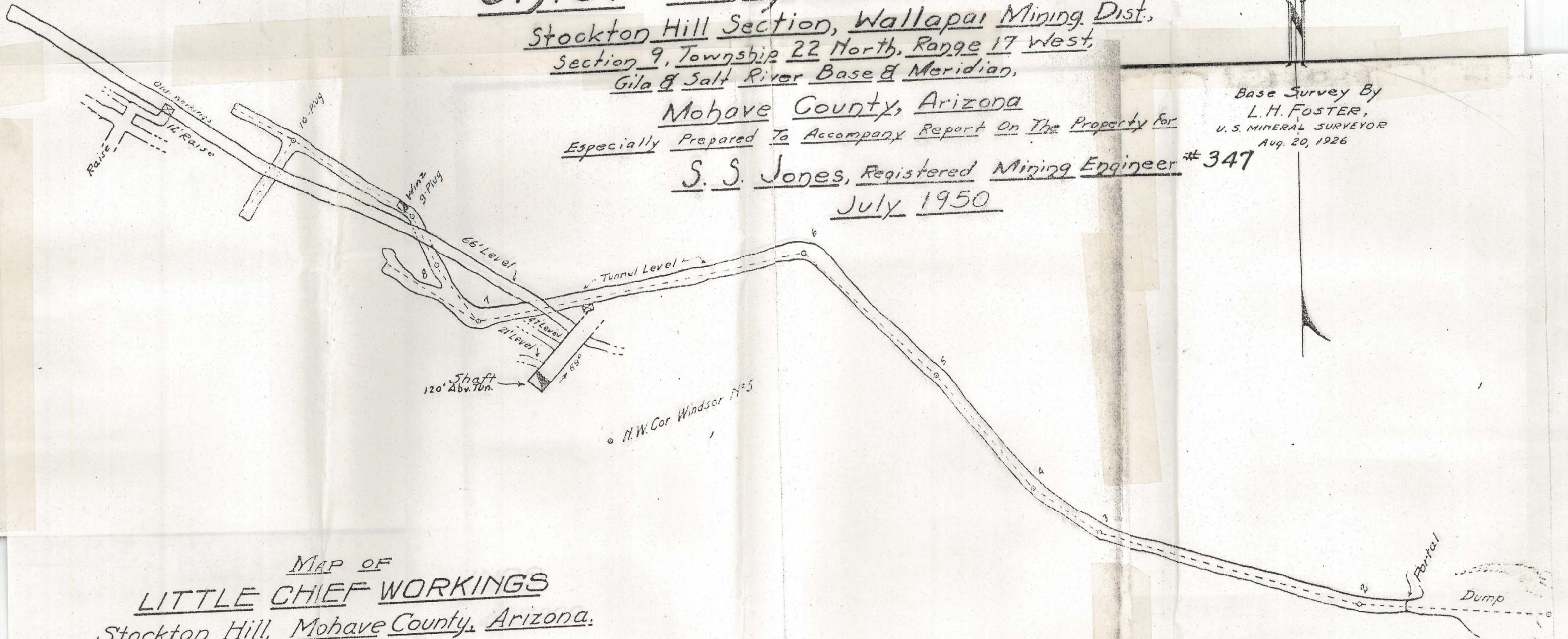
Stockton Hill Section, Wallapai Mining Dist.,
Section 9, Township 22 North, Range 17 West,
Gila & Salt River Base & Meridian,
Mohave County, Arizona

Especially Prepared To Accompany Report On The Property For

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MAP OF
LITTLE CHIEF WORKINGS
Stockton Hill, Mohave County, Arizona.

Scale; 1" = 30'

File No. 9-22-17