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April 5, 1983

Mr. R. T. Zitting
Santa Fe Mining Inc.
4775 Indian School Rd. N.E.
Albuquerque, N.M. 87110

RECEIVED

APR 08 1983

R. T. ZITTING

Dear Mr. Zitting:

I am taking this opportunity to send you two reports on mining properties that may interest your company.

Our mines are in the Cerbat area of the Wallapai Mining District. This district has a proven record of production from other mines as shown by the U.S.G.S. bullitin 978E.

We are open to sell, lease or co-adventure these properties. We will be glad to show them anytime. If you have any interests, please write or call me at the above address.

Yours truly


Carver Caple.

**GEOLOGICAL APPRAISAL
ST LOUIS MINE
MOHAVE COUNTY
ARIZONA**

**D. G. INNES AND ASSOCIATES LTD.
SEPTEMBER, 1962**

G E O L O G I C A L A P P R A I S A L

ON

THE ST. LOUIS MINE
MOHAVE COUNTY, ARIZONA

by

D. G. INNES AND ASSOCIATES LTD.

SEPTEMBER, 1982



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INTRODUCTION

During the period August 29 to September 1, 1982, the writer carried out a preliminary investigation (geological appraisal) of the St. Louis silver-lead-zinc-copper-gold property in Mohave County, northwestern Arizona. The field examination was carried out on August 31, and the writer was accompanied by: Mr. L. Urshel; Mr. K. Miller; Mr. R. Joslin; Mr. J. Chillson and Mr. C. Caple. The results of this investigation together with a review of available Government (State and Federal) and mining company data is herein presented.

The economic potential of this property is considered and recommendations for testing this potential are also given.



Property Location and Access

The St. Louis Property is located in the northwestern part of the State of Arizona, approximately ¼ miles north of Kingman and about 15 miles southeast of Chloride (fig. 1). Located in Mohave County, the property consists of 10 contiguous claims in Township 22 North, Range 17 West (of the Gila and Salt River Meridian), Sections 8 and 17.

The claim block lies along the south side of Cerbat Canyon in the south-central part of the Cerbat Mountains, Wallapai Mining District. Secondary roads leading from Highway 93 provide the principal access to the property, (ie. the Cerbat Road). Numerous other roads have been developed to access most of the known mineral showings. The main line of the Atchison, Topeka and Sante Fe Railroad passes through Kingman.

The St. Louis Property is contained within a larger land package being considered for exploration and development. The total property consists of; 8 JL claims; 6 Midas claims; 8 Empire claims; the 10 St. Louis claims; and Cerbat claims 1 and 2, (total of approximately 1040 acres).

Physical Environment

The Property is situated along the western slopes of the Cerbat Mountain Range which separates two great intermountain planes; the Sacramento Valley to the west; and the Hualpai

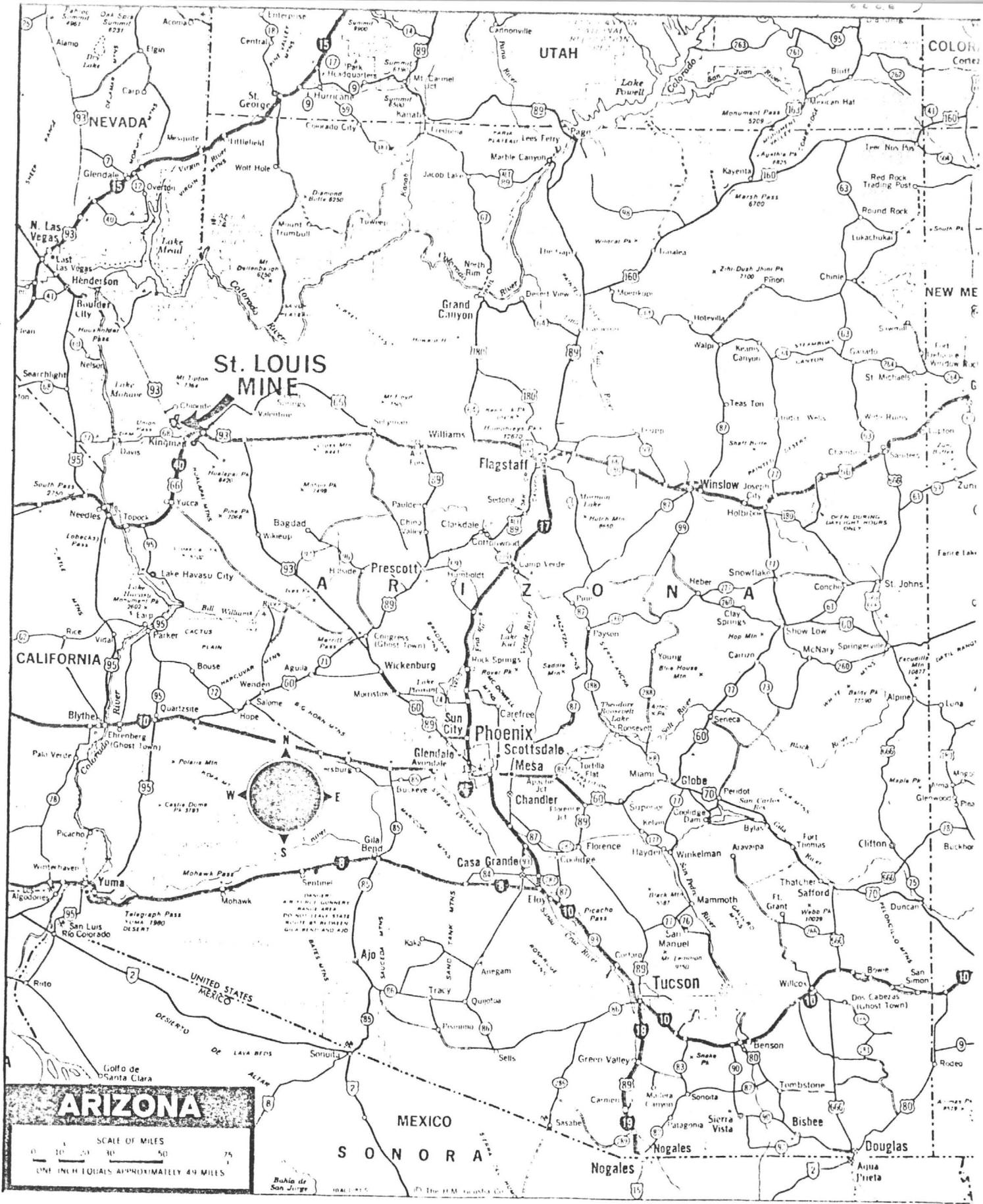


Figure 1: Location of the St. Louis Property.

[Handwritten signature]

Valley to the east. The Cerbats form a northwest trending range approximately 30 miles in length and up to 10 miles in width. In the vicinity of the St. Louis Property, the topography can be described as being rugged with a relief of about 3,500 feet. The topography of this area is illustrated by the Stockton Hill and Cerbat Quadrangle Topographic Sheets (1:62,500).

The climate is considered to be arid with precipitation averaging about 5 inches per year and varying somewhat with altitude. Summers are hot and dry while winters are generally cooler. Vegetation is of the desert type and consists mainly of cacti, sage, yuccas and grasses.

Water is available locally as evidenced by a spring on the St. Louis Property, (500 gal/minute, C. Caple, per. comm.) and the adjoining Golden Gem mine has an adequate water supply from a drilled well. Dings (1951) reports that the depth to the water table ranges from 20 to 400 feet.

Mining History

The St. Louis Property is located in the Wallapai Mining District, which includes the mining camps of Chloride, Mineral Park, Cerbat and Stockton. The history of these camps has been summarized by numerous authors (Dings, 1951; Thomas, 1949; Tainter, 1947; Schrader, 1909 and 1917; Hernon, 1938; Haury, 1947; and Bastin, 1924) and the reader is referred to these sources for a detailed history of mineral exploration and development.



Many of the deposits in the Cerbat Range were discovered in the early 1860's by prospectors in search of precious metals. Significant gold and silver production was achieved in the 1870's but activity waned when the price of silver began to decline in 1882. Base-metal mineralization below the oxidized zone has never been extensively mined (nor sought) and only limited development was attempted on completion of the branch railroad from Kingman to Chloride in 1899 (Hewitt et al., 1936). Lead-silver and lead-zinc mining reached its peak from 1915 to 1917 owing to high metal prices during World War 1 and declined abruptly after 1917. Since 1917, exploration was directed to "vein-type" deposits with relatively high gold and silver content. Production figures for some of the properties are listed in Table 1 (after Dings, 1951).

Most of the properties in the Wallapai District have been worked only to about 300 feet (ie, the oxidized zone) and mining was directed to the exploitation of very selective high-grade "ore-shoots". Much of the ore was hand-cobbed in shallow stopes and adits. Two mines, the Golconda and Tennessee and Schuylkill were the exception and were developed to about 1,400 feet (depth). As well, both of these deposits record the largest production. A brief review of many of these deposits would suggest that none has received any significant exploration to-date.

More recent activity involved the search for porphyry copper and copper-moly deposits. Duval's Mineral Park copper-moly deposit (49.5 million tons at 0.30% Cu and 0.036% MoS₂, Caple, 1981) located a few miles to the northwest of the St. Louis mine is an

| Mine | Gold (oz.) | Silver (oz.) | Copper (lbs.) | Lead (lbs.) | Zinc (lbs.) |
|--|---------------|-----------------|------------------|----------------|----------------|
| Alpha (m) | 292 | 35,499 | 22,265 | 16,276 | ----- |
| Altata and Altata Extension (c) | 382 | 36,024 | 136,616 | 7,691 | ----- |
| Badger, Hercules, and Hercules group (c) | 561 | 12,287 | 1,419 | 331,365 | 52,524 |
| Banner group (s) | 1,697 | 79,382 | 21,603 | 2,195,983 | 39,948 |
| Blackfoot (cer) | 158 | 11,836 | 19,617 | 104,565 | 144,369 |
| Blue Bell (s) | 469 | 50,954 | 44,274 | 182,001 | ----- |
| Cerbat (cer) | 42 | 2,055 | 1,153 | 4,120 | ----- |
| Champion (cer) | 982 | 23,689 | 14,931 | 825,993 | 335,391 |
| C.O.D. (s) | 1,550 | 151,263 | 23,924 | 348,972 | 23,188 |
| Columbus-Monroe Doctrine (cer) | 646 | 5,093 | 4,370 | 17,322 | 154,533 |
| Copper Age (c) | 3 | 1,062 | 265 | 24,575 | ----- |
| Distaff (c) | 93 | 55,883 | 1,392 | 149,600 | ----- |
| Elkhart (c) | 662 | 10,385 | 7,482 | 245,199 | ----- |
| Empire and Silver Union (c) | 1 | 2,475 | 122 | ----- | ----- |
| Eureka (c) | 7 | 2,311 | 3,371 | 23,861 | 42,714 |
| Flores (cer) | 422 | 366 | 172 | 512 | ----- |
| George Washington (m) | 114 | 11,059 | 15,777 | 34 | ----- |
| Golconda (m) | 20,752 | 510,180 | 354,703 | 2,031,719 | 56,226,020 |
| Golden Eagle and Bobtail (m) | 1,777 | 25,815 | 829 | 49,076 | ----- |
| Golden Gem (cer) | 2,478 | 8,243 | 3,365 | 14,980 | ----- |
| Hidden Treasure (c) | 251 | 9,074 | 7,897 | 159,861 | 231,345 |
| Idaho (cer) | 280 | 5,285 | 4,742 | 9,348 | 51,900 |
| June (c) | 1,239 | 43,128 | 4,517 | 235,498 | 154,138 |
| Keystone (m) | 2,703 | 452,049 | 340,778 | 348,845 | 114,063 |
| Little Chief (s) | 391 | 68,351 | 2,070 | 111,825 | ----- |
| Lucky Boy (c) | 1,923 | 40,438 | 230 | 8,140 | ----- |
| Mary Bell (c) | 26 | 955 | 557 | 19,155 | 28,733 |
| Midnight (c) | 44 | 8,533 | 10,746 | 4,122 | ----- |
| Minnesota-Connor (c) | 2,690 | 220,129 | 50,702 | 169,722 | 71,053 |
| Hint (m) | 222 | 15,265 | ----- | ----- | ----- |
| New London (cer) | 13 | 3,268 | 1,558 | 136,699 | 31,243 |
| Nighthawk group (m) | 324 | 16,297 | 5,410 | 1,589 | ----- |
| Old Colony (s) | 21 | 2,969 | 654 | 4,370 | ----- |
| Paymaster (cer) | 99 | 25,090 | ----- | ----- | ----- |
| Payroll (c) | 128 | 4,104 | 11,674 | 39,928 | 192,137 |
| Pinkham (c) | 55 | 14,695 | 55,136 | 3,133 | ----- |
| Rainbow (c) | 2,400 | 34,932 | 4,748 | 313,271 | 22,426 |
| Redemption (c) | 21 | 4,042 | 11,449 | ----- | ----- |
| Rico (s) | 1,149 | 15,309 | 1,449 | 2,620 | ----- |
| Sanna and Sanna (c) | 4,480 | 57,891 | 4,454 | 656,377 | 67,886 |
| St. Louis (cer) | 24 | 11,142 | 1,050 | 655,841 | 1,496 |
| Silver Age (c) | 24 | 3,550 | ----- | ----- | ----- |
| Silver Hill (c) | 708 | 8,842 | 10,722 | 279,949 | 143,594 |
| Tennessee and Schuykill (c) | 42,383 | 1,514,187 | 839,837 | 59,597,076 | 66,805,907 |
| Towne (c) | 144 | 6,286 | 2,108 | 5,516 | ----- |
| Vanderbilt (cer) | 1,012 | 2,119 | 327 | 2,568 | ----- |
| Washington and Washington Extension (m) | 58 | 2,205 | 1,610 | 1,700 | ----- |

(c) - Chloride camp (m) - Mineral Park camp (cer) - Cerbat camp (s) - Stockton camp

TABLE 1: Production of gold, silver, copper, lead and zinc of selected mines in the Wallapai District, Mohave County, Arizona, cumulative from 1901 through 1948, in terms of recovered metals (Dings, 1951).

example. Other recent activity centered mainly on re-activating small high-grade "vein-type" deposits.

The St. Louis deposit was discovered sometime between 1864 and 1865 and has been worked intermittently ever since. Production from the deposit between 1901 and 1948 is illustrated by Table 1. Total estimated production since discovery is estimated (conservatively) at about 1,000 tons of high-grade lead-silver ores. According to Haury, (1947), approximately 2,000 feet of underground workings are developed in the property and include; the lower adit, 288 feet below surface; the middle adit, 107 feet below surface; and the upper adit, 60 feet below surface. The middle adit is connected with the upper adit through an old stope and a shaft and raise connect the upper adit with the surface, (figure 2, after Jacobson, 1922). The high-grade ores accessed by these workings were hand-cobbed for direct shipment to the smelter. Since 1948 very little new development has been attempted. Recently, the southeast part of the mineralized structure has been examined by surface cuts and a small quantity of hand-sorted ore was sold (J. Chillson, per. comm.). Two vertical drill holes were put down in the cut area, (approximately 700 feet total footage) but failed to intersect any mineralization.

At the time of writing, the St. Louis deposit remains unexplored. The deposit has never been mapped and there is no record of any drilling (exploration or development). The surface and adit exposures of "ore-veins" given the character of the "ore" are not sufficient to allow any reasonable estimate of any class of ore

reserves.

Regional Geological Setting

The St. Louis Property lies within the Cerbat-Stockton Hills Quadrangles of the Geological Survey's Topographical Atlas of the United States. Mohave County is located in the northwest corner of the State and embraces a part of the southern Basin and Range geomorphic province approximately 20 miles west of the edge of the Colorado Plateau. The Property lies along the southern flanks of Cerbat Canyon near the junction with Charcoal Canyon on the western slopes of the Cerbat Mountains. The Sacramento and Hualpai intermountain valleys flank the Cerbat Mountains to the southwest and northeast respectively.

Rock formations of the area, range in age from the PreCambrian (Proterozoic ?) to Recent, (Plate 18, in Dings, 1951). The Pre-Cambrian complex, termed the Cerbat Complex (Thomas, 1949), is represented by granitic plutonic and ortho and paragneiss sequences. These rocks are intruded by Cretaceous and Tertiary granitic and volcanic components.

The oldest rocks are represented by hornblende-plagioclase amphibolitic schists and gneisses which crop-out mainly in the northwestern part of the Cerbat Range near Chloride. This calc-silicate assemblage may represent a calcareous sediment as it occurs associated with paragneiss sequences. The major PreCambrian component is represented by granitoid rocks and undifferentiated

gneisses and schists. The granitoid component is dominant and shows considerable variation in morphology (colour, grain size, composition and size) with granite and quartz monzonites being most common. Late pegmatites including alaskites are mapped within the complex. Gneissic granite and injection gneiss constitute the orthogneiss component and occur throughout the Cerbat Range. Biotite-muscovite-plagioclase-quartz \pm garnet paragneiss sequences occur throughout the complex and are common near the St. Louis Property. Remnants of Tertiary age extrusive and intrusive volcanic rocks occur within and along the margin of the Cerbat Range.

Dings (1951) differentiated the stocks and batholithic masses of granite in the Range as the Chloride Granite, north and north-west of Chloride, and the Ithaca Peak stock in the Mineral Park district. The Chloride Granite may be Precambrian in age while the Ithaca Peak body is believed to be Late Jurassic or Early Cretaceous in age (Schrader, 1909). Porphyritic dikes and irregular elongated sills which are possibly genetically related to the Ithaca Peak body are recognized in the Cerbat and Stockton areas.

Irregular elongate sills of gabbro/diabase are mapped in the Cerbat and Chloride areas. These intrusions resemble the gabbro sills in the Grand Canyon series and are believed to be Precambrian in age, (Hernon, 1938).

Dike rocks of varying composition and age occur throughout the Wallapai District, and include; pegmatites, alaskite, aplite

rhyolite, felsic porphyries, diabase and lamprophyre. The reader is referred to Dings (1951) for detailed descriptions of each of these lithologies.

Alluvium which covers the floors of canyons and washes, and terrace deposits along canyon walls, are probably correlative with the Temple Bar conglomerate of Pleistocene age (Thomas, 1949).

Regional Structural Setting

The dominant structural elements affecting the region are Basin and Range tectonics. The uplifted Cerbat Mountain block consists mainly of granitic and paragneiss rocks cut by many northwest trending fault fissures which provided channel ways for later intrusive events. An early major deformation is represented by northeast trending gneissosity and schistosity. The northwest faulting is developed at right angles to this early deformation and is pervasive as parallel to subparallel fissure-type structures throughout the Cerbat Range. These structures dip steeply, commonly to the northeast. Faulting is characteristically in conjugate systems with branching and horse-tailing features being common. Fault zones are marked by gouge, breccia, dike and vein fillings and most appear to have a strong shear component suggesting repeated activation over significant geologic time.

Later cross-cutting faults offset the northwest structures, some of which show considerable displacement, (mineralized veins have been offset up to 1,400 feet, Dings, 1951).

The northwest trending boundary faults (to the Cerbat Range) are typically normal faults and the Sacramento fault brings Tertiary age volcanic rocks into contact with the Cerbat Complex along the western flank of the Cerbat Range.

Jointing is well developed and is parallel to sub-parallel to the northwest fault fissures. Significantly, these minor structures parallel the mineralized "veins" in the Cerbat Range. Northeast trending isoclinal folding is recognized in rocks of the Cerbat Complex which further complicates the structural history. Local complex drag folding is associated with both directions of faulting.

Regional Metallogeny

Regional metallogeny is discussed by Thomas (1949), Dings (1951) and others and the reader is referred to the reference list for additional reading. Only the main features of the regional metal distribution will be briefly summarized here so that the characteristics of the St. Louis Property deposit can be considered in some regional context.

Mineral deposits in the Wallapai Mining District can be segregated into three types; hydrothermal vein deposits associated with fault fissures (eg. St. Louis); porphyry copper-moly deposits associated with granitic stocks (eg. Duval); and alluvium hosted copper mineralization (eg. Emerald Isle). The fissure-vein type deposits and the porphyry copper-moly deposits are probably

genetically related.

The most common type deposit in the district are mineralized veins along fault fissures. Dings (1951) estimated upwards of 1,000 prospects are known. In most cases the fault fissures provide the host for intrusive sills and dikes of various lithologies and most authors would agree that the mineralized veins are younger than the dikes. As well, the possibility that the source of the veins and metals is genetically related to the intrusion of the Ithaca Peak stock seems reasonable. The vein deposits are classed as mesothermal-type (Lindgren, 1933). They show a strong north-westerly trend (N. 30° W to N. 60° W) and dip mainly to the northeast (60° plus). In places the vein systems are conjugate and most form a parallel to sub-parallel en-echelon to sheeted system. Veins occur in two main clusters north and south of the main body of the Ithaca Peak granite.

The veins range in thickness from a few inches to 33 feet and average 3 to 4 feet. Locally metal concentrations can occur in vein zones up to 100 feet (eg. Silver Hill and Payroll Mines, Schrader, 1909). Dings (1951) states that reported vein widths were often exaggerated as they included unmineralized wall rock between vein branches. The fault fissures and associated veins show considerable variation in strike length (less than 100 feet to greater than 1 mile). The veins commonly pinch and swell along both the strike and dip with numerous short branches being common.

In many of the vein systems, fault gouge and breccia are

intruded by mineralized veins, often in anastomizing quartz-rich seams and lenses. Fault fissures originally occupied by dikes of variable composition have been re-activated and the dike fillings are sheared and brecciated allowing channel ways for upward migrating metal-rich solutions. Vein outcroppings are marked by good gossans of iron and manganese stain. Variations in depth of oxidation are numerous but generally the upper parts of the vein structures have been intensely to moderately oxidized to depths of 75 to 200 feet. Partially oxidized ores to the 600 foot level are reported from the Payroll Mine.

Metal enrichments characteristic of the oxidized zone are: cerargyrite, native silver, cerussite and native gold with limonite-quartz gangue. Lower in the oxidized zone, downward sulphide enrichment occurs and argentite, chalcocite, covellite and proustite have been identified. Below the oxidized zone, primary sulphides including pyrite, sphalerite, galena and chalcopyrite are more common. Gangue minerals are quartz and Ca-Mn-Fe carbonates. All of the above sulphides can be found in the overlying oxidized zones. Figure 3, illustrates the oxidized, supergene enrichment and primary zonal patterns.

Sphalerite with variable iron content occurs in irregular masses and as coarse grained comb-type vein fillings. Various mines report a high gold content in sphalerite ores, and there is a general association of better gold values with better sphalerite concentration (however, there are notable exceptions). Sphalerite

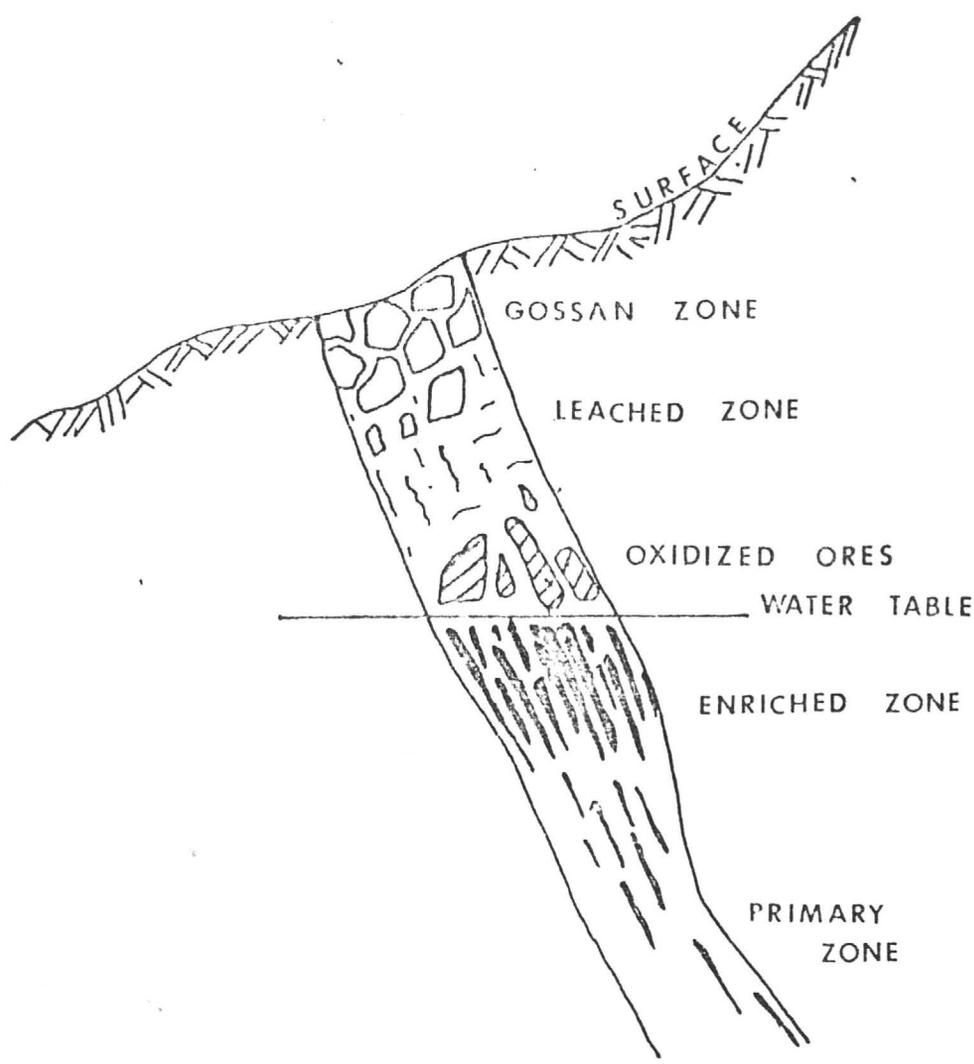


Figure 3: Idealized diagram of zones of a weathered vein, with oxidized, supergene enrichment and primary zones illustrated (from Jensen and Bateman, 1979).

is leached from the highly oxidized zone but has been noted from small late cross-cutting, flat dipping quartz veins.

Galena occurs as fine to very coarse grained masses in veins and is always silver bearing (often high-grade silver values). Like sphalerite, galena can be found both in the oxidized and sulphide zones, however it is commonly altered to cerussite in the upper oxide zone. High gold values are reported from each of the above as well as from pyrite-rich mineralization.

Ore-shoots within the fissure-vein structures are small, ranging in thickness from 3 inches to 4 feet. The Tennessee Mine hosted the thickest shoot which measured 20 feet. The length and depth of most ore-shoots varied from 10 to 50 feet. The Tennessee Mine contained one shoot which extended for 400 feet horizontally and 700 feet vertically and Dings (1951) reports that the Golconda Mine was larger still. Much of the vein material in the known deposits is very low grade and although narrow stringers and small irregular masses of mineralization persist throughout the length of the vein, they are too small to be considered economic. The exception would be those containing very rich gold and/or silver concentrations.

Most of the deposits that have been worked have not penetrated below the oxidized zone. Both the Tennessee and Golconda deposits have demonstrated that metal concentration of sufficient grade can extend to considerable depths (ie. 1,600 feet). The intersection of vein structures, branch junctions and strike changes all have examples of metal enrichments. However, these same locations also

record lower than average grade mineralization in other deposits.

There is some evidence (most of it conflicting) for mineral zoning. Certainly there is zoning developed between the oxidized and primary sulphide zones. Sphalerite and chalcopyrite increase at the expense of galena with depth. There are exceptions as always. There is evidence of lateral zoning away from the copper-moly mineralization associated with the Ithaca Peak stock (Duval's deposit). Garrett (1938) suggests also that silver values increase with distance from the Ithaca Peak granite.

Alteration in the form of sericitization, silisification, pyritization and chloritization is present to varying degrees throughout the Wallapai district. Neither the alteration nor the metal zoning has been studied sufficiently to draw any conclusive relationship. However, what evidence is there is compatible with a porphyry copper-moly system (eg. Duval) surrounded by the commonly associated hydrothermal vein-type deposits (eg. St. Louis).

Production figures for some of the vein-type deposits in the Wallapai District are illustrated by Table 1, (Dings, 1951).

St. Louis Mine

On August 31, 1982, the writer together with Messers. Urshel, Miller, Joslin, Chillson and Caple visited the St. Louis Mine workings. All of the known surface exposures were examined, as were exposures in and around the old workings.

The best descriptions of the St. Louis Mine are given by



Schrader (1909) and Haury (1947): internal reports for Jaylee Inc., by J. D. Warne and Coe and Vanloo were also reviewed. Figure 2 illustrating² the past workings is taken from R. C. Jacobson (1922).

Several veins are reported on the property and are described as being thin (few inches to 3 feet) fissure fillings (N 30°W) mineralized with galena, sphalerite, chalcopyrite, pyrite in a gangue of quartz. Secondary oxidation minerals are no doubt present but have not been identified. High-grade lenses of sphalerite and galena have been selectively mined with the ore being hand sorted for direct shipment to the smelter. Total production is estimated at approximately 1,000 tons grading about 25 to 50 % Pb, 2 to 10% Zn, 0.2% Cu, 5 to 60 oz Ag/ton, and 0.002 oz Au/ton. The Jewelry Store vein exposed in a short adit below the No. 1 Tunnel has uncovered a thin irregular massive galena vein (up to 6 inches in width).

At the time of writing the St. Louis deposit remains untested and as such no statement as to reserves in any category can be reasonably made. The distribution and morphology of the "ore-shoots", veins or controlling fault fissures has never been defined (mapped) nor has the deposit been drilled. One dimensional exposures (on surface and adits) are not sufficient to define meaningful reserves. Past sampling for "ore-tenor" is confined to the thin high-grade lenses and these data do not truly represent grades over mineable widths. Assay data reported in the literature seems reasonable in that they agree with recent assay checks. The writer had specific types of mineralization assayed by Bell-White Laboratories, and these data are given in Table 2, (certificate attached). High silver values

Wbl

TABLE 2 ... Selected Grab Samples, St. Louis Mine

| <u>Sample No.</u> | <u>Au(oz/ton)</u> | <u>Ag(oz/ton)</u> | <u>Cu %</u> | <u>Pb%</u> | <u>Zn%</u> |
|-------------------|-------------------|-------------------|-------------|------------|------------|
| F 45301 | 0.004 | 1.73 | 0.060 | 0.58 | 4.36 |
| F 45302 | 0.040 | 8.14 | 0.166 | 7.2 | 0.62 |
| F 45303 | 0.004 | 12.16 | 0.026 | 15.6 | 0.029 |
| F 45304 | 0.006 | 2.50 | 0.16 | 9.0 | 1.88 |
| F 45305 | 0.001 | 0.20 | 0.010 | 0.32 | 0.079 |
| F 45306 | 0.006 | 53.40 | 0.024 | 21.0 | 0.024 |

Sample Locations and Descriptions

- F 45301: Grab sample of sphalerite-rich vein material.
Tunnel No. 1 (Lower tunnel) dump, St. Louis Mine.
- F 45302: Grab sample of pyrite-rich mineralization with associated galena and sphalerite. Tunnel No. 1 dump, St. Louis Mine.
- F 45303: Selected sample of 1" thick galena seam. NW road-cut opposite Jewelry Shop adit, St. Louis Mine.
- F 45304: Grab sample of all material from dump. Shaft area, St. Louis Mine.
- F 45305: Chip sample across 23 feet, sheared intrusive including F 45303 above. NW road-cut opposite Jewelry Shop adit, St. Louis Mine.
- F 45306: Selected grab sample of massive galena (4" to 6" vein) from the Jewelry shop adit, St. Louis Mine.

and low gold values are confirmed. The Jewelry Store vein (sample F. 45306) gave 53.40 oz Ag/ton over 4 to 6 inches. Approximately 30 feet north of the above sample on the same lense of massive galena (sample F 45303) gave only 12.16 oz Ag/ton. As well, the galena seam here was only 1 to 2 inches wide. The sheared and altered fault fissure hosting the Jewelry Store vein was chip sampled over its entire width (23 feet) and returned only 0.20 oz Ag/ton (sample F 45305). The Jewelry Store vein, as it is presently observed must be considered to be uneconomic unless of course very small tonnages were hand-cobbed and even these are not guaranteed. Samples of material other than the massive galena contain significantly less silver (and other metals). This sampling was by no means sufficient to test the deposit, but combined with other published data would tend to confirm the general tenor of what was mined in the past. It should be further noted that massive galena does not guarantee high silver values (eg. F 45303, this report and Sample 2897 from Haury, 1947).

Other Observations and Economic Considerations

1. Two main vein structures have been identified and these have hosted very small tonnages of high-grade "ores". Both of these structures have surface exposures readily identified by gossan zones. During the writer's investigation numerous other gossanous structures (of the same type) were observed. Along the road access between the Jewelry Store adit and the southern most open cut, at least seven vein-shear structures were observed. East of the two main (or known) veins there are 3 more parallel



gossanous structures along the flanks of the higher hills. Large quartz-vein and manganese-limonite stained boulders lie scattered along the slopes above the main veins. Near the St. Louis shaft, approximately 250 feet east, old pits were observed in a mineralized structure. There is no record of these workings. Five more mineralized structures were observed along the access road southwest of the main St. Louis veins. It is reasonable to suggest that many more would be found if outcrop were fully exposed. A gabbro dike (or sill ?) near the old camp site is heavily veined and sulphides including pyrite and chalcopyrite were noted. Thin ($\frac{1}{4}$ inch) quartz-veins that cut the main structures and the host gneisses were also observed to carry galena and sphalerite mineralization. There is no mention of the above vein-structures in any of the data reviewed by the writer. Since the property was never drilled it is reasonable to assume that these have never been tested for their metal content.

2. The above vein structures record a very close spaced parallel system of fault-fracture structures which show intense alteration and late veining. The area between the previously worked high-grade mineral lenses ("ore-shoots") has never been sampled. These rocks are intensely sheared and altered suggesting that they might have been open to the mineralizing solutions. Metals may be deposited as fine disseminations throughout the structure and also as coatings on microfractures. Extensive sampling would have to be done to test this environment. Sample F 45305 would suggest that this is not the case, however, one chip sample is not sufficient to make that assumption. The mining of small irregular and discontinuous, steeply-dipping "ore-shoots" as was done in the past, would be very difficult in today's economics (especially, since only low tonnages might be expected). However, should mineralization persist across and between the fault fissures, significantly more tonnage could be



realized (but lower grade). This would also allow consideration of open pit mining of some of the oxidized zones. In the vicinity of the old workings, the vein-structures strike north-westerly along the southwest flank of the rather rugged and steep slopes. The structures dip into the hills. This would make open pit mining rather simple but on the other hand, stripping ratios might be too high.

3. The main St. Louis vein-structure dips near vertically in the shaft area. The dip flattens to about 60° in the tunnel areas and in the Jewelry Store area. However, a small cut made by Jaylee Inc. approximately 100 feet below Jewelry Store horizon shows the vein to have flattened considerably dipping about 45° to the northeast. These changes in dip must be documented in considerable detail prior to any mining. For example, the mining plan proposed by the Warne Report assumes a relatively constant dip. Should that mining method and plan be accepted, the main vein will be effectively by-passed below the Jewelry Store horizon. Controlled diamond drilling will not only determine if an economic deposit exists but also where it is.

4. The potential of the St. Louis Property (and the total property in the Cerbat package) must be considered to be high. The number of mineralized structures, their spacial association with a porphyry copper-moly deposit, the tectonic control on mineralization and the intensity of alteration would suggest that the area is "pregnant". From past "mining" it is obvious that there are small high-grade pockets of mineralization and some properties have produced significant tonnages. The two largest mines have shown that there is potential to considerable depth while 90% of the deposits have only been worked to shallow depths confined to the oxidized zone (ie. above 300 ft.). Most of the past mining was developed on the obvious and all lack meaningful exploration away from the obvious. Coe and Van Loo



estimated the total reserves, (most inferred), of the Wallapai District from the 12 best deposits, not including any on the St. Louis-Cerbat group and arrived at a figure of 436, 914 tons grading 0.26% Cu, 4.50% Pb, 8.41% Zn, 0.07 oz Au and 2.49 oz Ag. They state that "in the absence of maps and assays from previous operations, it is not possible to make estimates of how much more of any particular vein may be minable". These estimates are not encouraging, however, it must be emphasized that they apply only to the known, (ie. cleaning-up what has already been exposed). These estimates can in no way be considered a reflection on the unexplored ground.

Conclusions

1. At the time of writing, the St. Louis deposit exists as a good prospect only and meaningful reserve tonnages in any category cannot be calculated.
2. The property's potential to host a significant mineralization is considered to be high, in a geological sense. However, in the absence of any exploration the potential to host an economically viable deposit remains an unknown.
3. A detailed, well planned exploration program is required to determine:
 - a) does a deposit exist on the property
 - b) is it of sufficient grade
 - c) does it have significant tonnage potential
 - d) is it minable (physically)
 - e) what are the recovery ratios of each of the metals

All of these questions must be addressed before the deposit, if it exists, can be considered a potential mine. This information can then be considered together with start-up costs, mining and

milling costs, marketing of the metals, and current metal prices, etc. Only then can some meaningful estimates on return of investment and worth be estimated.

Recommendations

The following recommendations are given with the objective of defining the extent of mineralization on the St. Louis Property specifically. Additional recommendations are detailed to explore the potential of the total property available to the principles.

St. Louis Property

1. A surveyed control baseline should be established on the property. This baseline should run southeasterly through the property from the north boundary of the St. Louis claim at least to the recent cuts, south of the St. Louis shaft. The topography would dictate that this control baseline traverse very close to the old mine workings (ie. through the saddle above No. 1 Tunnel). A cross-line grid should be established at 200 foot intervals (for approximately 800 feet both east and west of the baseline). These control lines are necessary for accurate ground control in geological mapping and location of drill sites.
2. A base map should be prepared (on a topographic base) to cover this grid. Air photos at the same scale will be necessary for additional control. Using the grid and the air photos, all access roads, mine workings and other reference markers should be transferred to the base map.
3. The grid should then be mapped in some detail, differentiating

between as many lithologies as possible and paying particular attention to structural features. Every fault-fissure-vein zone should be mapped with particular care.

4. Coincident with the mapping, detailed outcrop sampling (chip and channel sampling) should be carried out. Sampling will be directed mainly to the vein structures, however, a series of sections across all of the intervening rocks (ie. between the veins and fault structures) should also be tested.
5. Based on the above exploration, a diamond drill program should be designed to test the mineralized and potentially metaliferous structures. Further, this drilling should be designed to consider the depth of oxidation and the potential for metal enrichments and depletions within this zone.
6. As part of the above recommended program, it is considered imperative that a competent geologist be retained to direct and carry-out the exploration. This would ensure consistency in mapping and in thought and he (or she) should be encouraged to review data on all other properties in the district. Familiarity with regional metallogeny will allow for better judgement and enable the development of new ideas and insight into the St. Louis type of mineralization.
7. An isopac map of metal values (ie. metal zonation) with depth, using the topography and other mine workings, is also recommended. If this zoning is defineable, it may allow for projection and prediction of different types of metal enrichments with depth. The apparent gold-zinc versus silver-lead association is a good example. This information would be useful in designing the drill program.

Total Property

1. It is strongly recommended that the total property be reviewed both through a literature research and in the field.
2. The property should be mapped, (using air photos) at a scale of 1" to 400 feet with the objective of defining the vein-structures in their geological and structural setting.
3. Coincident with 2 above, all vein structures should be properly sampled for assay.
4. A complete review of all of the data gathered will determine if and where additional exploration is carried out.



addition, the core must be logged in detail, split and sampled for assaying. Drill sections must also be prepared.

Phase 3

This proposed exploration should ideally precede all of the above. A rough estimate of cost to map and sample the total 1,040 acre property is given at \$25,000.00. This exercise might define the St. Louis Mine area as being the best target on the property. However, since none of the property has been mapped, it is conceivable that better targets may exist. Certainly new areas of interest will be found. This phase can easily be combined with phase 1 and can continue during phase 2.

A realistic time frame for the above programs is given as follows:

Phase 1 : 4 weeks

Phase 2 : 6 weeks

Phase 3 : 5 weeks

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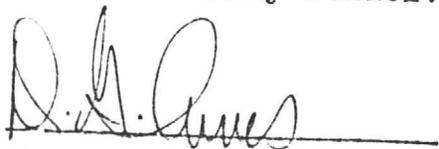
Maps

1. Arizona Highway Geological Map; Arizona Geological Society, 1967, scale 1:1,000,000.
2. Topographic maps: Stockton Hills, Cerbat Quadrangles; scale 1:62,500.
3. Geologic Map of the Wallapai Mining District, Mohave County, Arizona, Bulletin 978, Plate 18; scale 1:24,000.
4. Various mining company maps and sketches.

C E R T I F I C A T E

I, DANIEL GRANT INNES, of the City of Sudbury, in the District of Sudbury, in the Province of Ontario hereby certify as follows:

1. That I am a consulting geologist and reside at 8 Thorncliffe Court, Sudbury, Ontario.
2. That I hold degrees in Geology from Laurentian University, Sudbury, Ontario: H. B.Sc., M. Sc., Post-Grad Studies to 1978.
3. That I am a Fellow of the Geological Association of Canada.
4. That I have been practising in my profession since 1968 in Canada and the United States.
5. That my report dated September 5, 1982 on the St. Louis Property, Mohave County, State of Arizona, is based on personal examination, published government and university geological reports and maps and mining company files.
6. That the examination and field investigation was made by me on August 29, 30 and 31, 1982 in my capacity as President, D. G. Innes and Associates Ltd.
7. That I have no interest or equity in the St. Louis Property or adjoining lands or lands in the vicinity relative to this property.

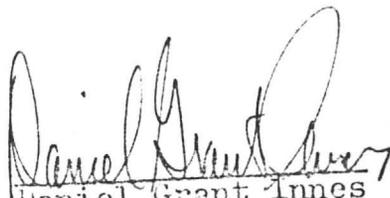

D. G. Innes
H. B.Sc., M. Sc., F.G.A.C.
September 5, 1982

C O N S E N T

I, DANIEL GRANT INNES, do hereby consent to the use by TRI-STARR CAPITAL INC., of my report on the geology of the St. Louis Mine, Mohave County, State of Arizona, September 5, 1982, in any statement of material facts by TRI-STARR CAPITAL INC.

Dated this 5th day of September, 1982.



Daniel Grant Innes
H. B.Sc., M. Sc., F.G.A.C.





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No. 14370

DATE: September 3, 1982

SAMPLE(S) OF: Rock(6)

RECEIVED: September 1982

SAMPLE(S) FROM: Mr. D. G. Innes, D. G. Innes and Associates Ltd.

| <u>Sample No.</u> | <u>Oz. Gold</u> | <u>Oz. Silver</u> | <u>% Copper</u> | <u>% Lead</u> | <u>% Zinc</u> |
|-------------------|-----------------|-------------------|-----------------|---------------|---------------|
| 45301 | 0.004 | 1.73 | 0.060 | 0.58 | 4.36 |
| 45302 | 0.040 | 8.14 | 0.166 | 7.2 | 0.62 |
| 45303 | 0.004 | 12.16 | 0.026 | 15.6 | 0.029 |
| 45304 | 0.006 | 2.50 | 0.16 | 9.0 | 1.88 |
| 45305 | 0.001 | 0.20 | 0.010 | 0.32 | 0.079 |
| 45306 | 0.006 | 53.40 | 0.024 | 21.0 | 0.024 |

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PER.

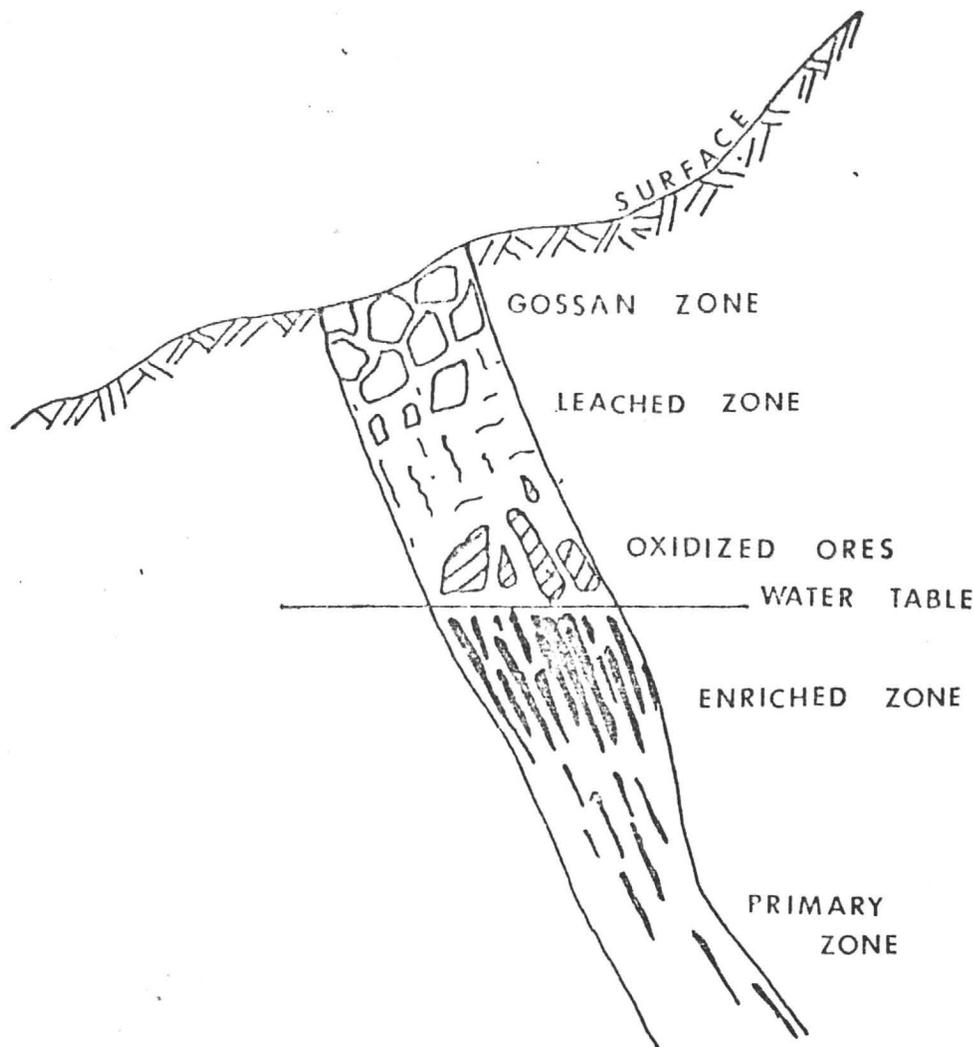


Figure 3: Idealized diagram of zones of a weathered vein, with oxidized, supergene enrichment and primary zones illustrated (from Jensen and Bateman, 1979).

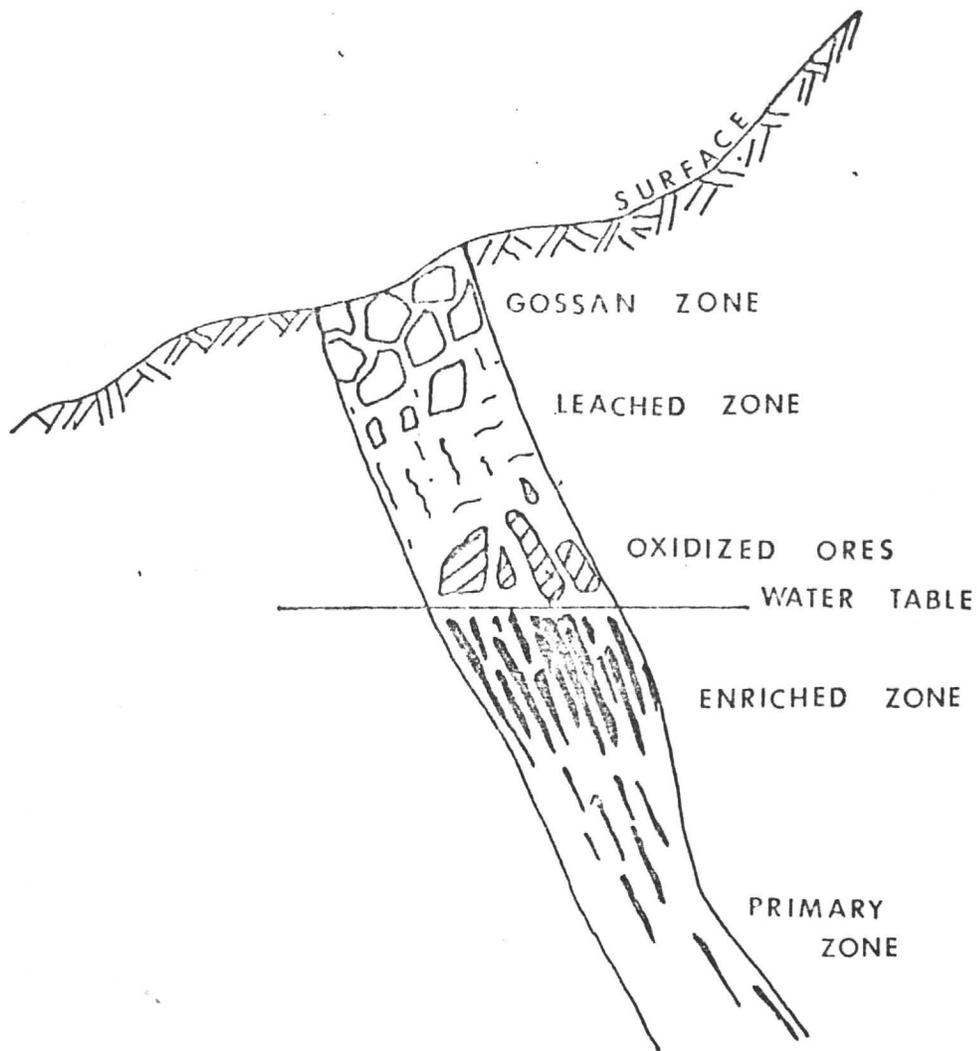


Figure 3: Idealized diagram of zones of a weathered vein, with oxidized, supergene enrichment and primary zones illustrated (from Jensen and Bateman, 1979).

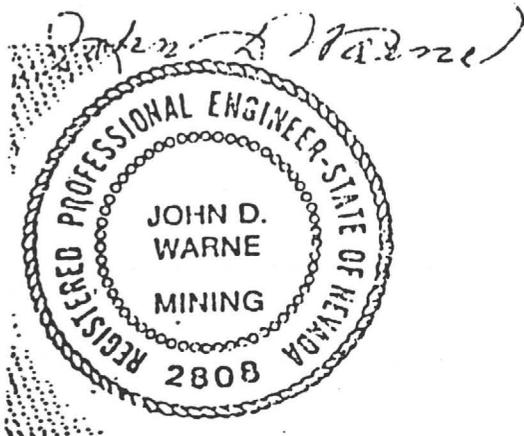
REPORT ON
ST. LOUIS MINE PROPERTY
MOHAVE COUNTY
ARIZONA

EVALUATION AND GEOCHEMICAL SURVEY

JULY 31, 1980

by

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Professional Engineer - Mining No. 2808, Nv.
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INTRODUCTION

A preliminary examination of the St. Louis Mine property of Jewelry Mountain Mines, Inc. by John D. Warne, accompanied by Mr. Nicholas M. Hughes and Mr. Carver Caple, was accomplished during the period June 17 and 18, 1980.

The examination was made for the present owners to guide future management in the exploration and development; and to satisfy current Government regulations pertaining to the holding of unpatented mining claims (Appendix A). Preliminary evaluations of the character and extent of the deposit was made (Appendix B). Recent acquisition of the mine property by the present owners, justification of initial operating funds, and impending plans of operation also prompted this examination.

An attempt is made in this report to properly assemble numerous data regarding previous mining and history of the property. Future engineering and mapping procedures are suggested, and a preliminary evaluation of the deposit is made. Some analysis are made to determine the character tenure, and metallurgical properties of the ore.

A jeep reconnaissance of the Wallapai Mining District was made during the examination. The general attitude and location of the St. Louis Mine deposits with relation to the other important mines and mills in the district was observed. Also, photographs were taken (Appendix C) of various mines and scenic views of the district and ore samples from several mine dumps were taken.

CONCLUSIONS

1. Sufficient shipping grade lead-silver ore is now exposed within the "Jewelry Store" shaft, drift and surface open-cut to allow mining at current market prices. Preliminary estimates, based on present sample sites are: 90 tons of "positive or measured ore", 540 tons of "indicated ore" and 2,160 tons of "inferred ore". Using a net value of the ore (F. O. B. at smelter) of \$322.00 per ton, a total of about \$898,380.00 worth of ore of all classes exists in the "Jewelry Store" deposit (Appendix B). Future development and exploration could appreciably increase these ore reserves.
2. Mapping, sampling, exploration and rehabilitation of other favorable previously mined sites (within the upper levels of the St. Louis Mine) will develop an unknown additional quantity of mineable grade ore.
3. Drifting southeastward along the "Jewelry Store" vein; and core drilling from both surface and underground sites will:

- (a) Allow an immediate production of about 20 tons per day of shipping ore.
 - (b) Establish actual ore reserves, grades, mining costs, and mode of future exploration and development.
 - (c) Delineate the limits of this vein deposit, and possibly locate extensions of ore below other previously mined veins.
4. Favorable features of the St. Louis ore deposits are:
- (a) Sufficient shipping grade ore now exposed to begin immediate mining.
 - (b) Excellent stable wall rocks, on both hanging and foot-walls, to allow low cost overhead or shrink stoping, and minimum supports.
 - (c) Good access roads to mine and mill sites.

RECOMMENDATIONS

1. Engineering:

- (a) Prepare surface and underground maps of sufficient scale to use as working maps, showing: claim monuments, surface and underground features, exploration, development sites and work progress.
- (b) Employ sufficient engineering talent to guide exploration, development, and drilling, and to implement Government regulations.

2. Exploration:

Stage I (Fig. No. 1)

- (a) Drive haulage tunnel-drift about S. 35 Degrees E. along strike of "Jewelry Store" vein, about 1,000 feet in length.
- (b) Simultaneously core-drill holes at 60 Degrees Southwest and vertical from surface open-cut at portal to explore for ore at about 50 foot and 100 foot depths below portal.

Stage II (Depending on results of Stage I)

- (a) Sink vertical shaft 100 feet in foot-wall of vein.
- (b) Cross-cut thru vein on 50 foot and 100 foot levels to explore and provide drill stations in hanging-wall.
- (c) Core-drill angle holes to explore "Jewelry Store" vein and flat holes in N. E. and S. W. directions to explore for the 7 or 8 other known veins and possibly more.

3. Development: (See Figs. Nos. 1 and 2)
- (a) Development drifts to be driven in foot-wall parallel to vein (or within vein).
 - (b) Over-head open or shrink stopes to remove ore. Development may employ sub-level drifts in ore, and finger-raises from tramming levels at 50 to 100 foot intervals.

LOCATION AND ACCESSABILITY

The St. Louis Mine is located within the Wallapai Mining District, Mohave County, Arizona. It is situated near the southern end of the Cerbat Mountains, about 8 airplane miles north of Kingman, Arizona about half a mile east of the old Cerbat town site. (Maps Nos. 1 & 2) The claims lie in Sections 7, 8 and 17, Township 22 North, Range 17 West, G. & S. R. B. & Mer. at an elevation of about 4200 to 4800 feet above sea level.

From Kingman, the property is reached by ordinary passenger vehicle by traveling northward along U. S. Highway No. 93 a distance of 8.9 miles to historical marker describing "Cerbat Mining Town", mile-post No. 62 via an improved graveled county road. Jeep access roads traverse various mines within the district.

The dumps and adit portals to various levels of the mine can be seen from near the Eastern terminus of Cerbat Canyon, near the Southern end of the mining district. The lower mine workings on the St. Louis claims and "Jewelry Store" workings are accessible by jeeproads leading from Cerbat Canyon.

The main line of Atchison, Topeka and Santa Fe Railroad affords ore shipping facilities at Kingman, Arizona. Both Kingman, (11 miles South) and Las Vegas, Nevada (100 miles North) via U. S. Highway No. 93 are the nearest sources for mining supplies.

HISTORY AND PROPERTY OWNERSHIP

The St. Louis Mine was discovered about 1865 according to F. C. Schrader¹. During his inspection of the mine, in 1905, mining operations were under the St. Louis Consolidated Mining and Milling Company of Los Angeles, California (owners).

Previous mining work was on a moderate scale, during intermittent periods. Development work was principally by drift adits and shafts within a vertical range of about 400 feet below the upper mountain exposures. Five distinct veins were exploited within the upper levels. The major north and south veins and some of the cross veins. No mining or exploration was done at depths below the strong ore exposure within the "Jewelry Store" drift near the base of the mountain, at the access road level, about 4150 feet in elevation.

Records of past operations and production from the mine are incomplete, but production records compiled by the U. S. Bureau of Mines from 1901 through 1948 are listed by Schrader (page 147).

During 1942 the property was examined by an Arizona State engineer² in company with Mr. A. T. Lietzow (the last mine owner and operator, prior to the present owners). About 400 tons of ore had been produced by this operator prior to that time.

The mine property consists of ten un-patented claims named: St. Louis and St. Louis Nos. 2 through 10, inclusive (Map Nos. 5 and 8). They were purchased from the estate of A. T. Lietzow.

Map No. 5 is a recorded plat of the ten un-patented mining claims, filed in Mohave County, Arizona about the time of acquisition of the mine property by the present owners.

A composite claim map: Claim Map of the Wallapai Mining District, Mohave County, Arizona (Map No. 6), depicts the St. Louis Mining Claims at the extreme Southern end of the district.

The general history of mining and production from the Wallapai District is outlined in U. S. Geological Survey Bulletin No. 871.

Map No. 7 shows previous underground mine development on the property and Maps Nos. 8 and 9 (prepared by Mr. A. T. Lietzow, former owner) show the original claim map and underground workings. These maps are included in an attempt to compile all pertinent records of the property.

DESCRIPTION OF THE PROPERTY

The geology and descriptions of deposits in the Wallapai Mining District are expertly described by Mr. McClelland G. Dings³ in U. S. Geological Survey Bulletin No. 978-E and others. (See list of references at the end of this report).

Deposits previously mined on the upper levels of the St. Louis Mine are described by Schrader¹ (Page 105-106) in 1909: "The two veins being worked are known as Numbers 2 and 3. They are about 3 feet wide and the ore varies from 4 to 16 inches in width ...the ore is said to average 60 percent Lead and \$2.00 in Gold and 14 ounces of Silver to the ton." Ore was shipped as mined during that period.

The report by E. B. Holt² lists the grade of ore shipped as typical of a 46.8785 ton shipment on April 6, 1938 as follows: Copper 0.22%, Lead 50%, Zinc 2.70%, Silver 8.6 oz, Gold 0.02 oz/ton, Insolvents 14.1%, Iron 8%, Sulphur 11.8% and Lime a trace.

The most promising ore deposit presently exposed on the property is termed the "Jewelry Store" vein. This vein on the St. Louis Number 2 claim averages about 3 feet in width, strikes South 35° East, and dips about 75° Northeast. Bulk samples taken from a surface open-cut exposure of this vein contains approximately 60oz. of silver and 57% lead per ton (See sample analysis). Run-of-mine, or shipping grade ore, should average over 15 oz. of silver per ton, and 60% lead, with some gold.

Edson S. Bastin⁴ describes the mineral deposits of the Cerbat Mountains (page 18), as worked mainly for their silver content. They are described as many veins of prevailing northerly and northwesterly strike and steep dip. Most of the wall rocks are granites, gneisses, schists and amphibolite. "Cerargyrite (Horn Silver) and native silver are the dominant silver minerals of these ores. In the lower part of the oxidized zone ruby silver (Proustite) was commonly present." Most of the rich oxidized ores have been previously mined, and the silver values are contained in the high lead sulphide (galena) veins. Bastin made exhaustive studies of the mineral constituents within the ores of the district. He concludes that the rich silver bearing ores could extend to many hundreds of feet in depth due to their primary origin. Insofar as they occur throughout the shallow previously mined range exploration at greater depths is encouraged by him (U. S. G. S. Bulletin No. 750).

DEVELOPMENT

1. Previous Development:

Principal development of the ore deposits at the St. Louis Mine consisted of a lower tunnel or adit at 4500 feet above sea level, and a middle adit driven at 181 feet higher in elevation. Mineralized portions of some veins or ore shoots exceed 175 feet in length; and extended throughout a vertical range of about 400 feet below the surface exposures. Some mining was done at higher elevations by short drift adits and shafts.

Most of these mines are still accessible and show remnants of excellent grade ore in veins from several inches to over 4 feet in width. Good wall rock allowed open stoping (without supports) throughout the mine, however, some timber above drifts was used to allow for waste gob. Veins average from South 20° to 45° East and generally dip steeply in a Northeast direction (See Fig. No. 2).

The "Jewelry Store" vein development consists of an inclined shaft about 48 feet in depth, on the St. Louis Number 2 claim. This is the lowest and most promising ore exposure on the property. The vein dips about 75° Northeast and strikes about 35° Northwest.

2. Planned Development:

Planned development projected to begin during the last quarter of 1980, or early 1981, will consist of a large dimension adit haulage tunnel with base of portal at about 4120 feet above sea level, (see Figs.

Nos. 1 & 2) approximately 20 foot above the floor of Cerbat Canyon. This large drainage/haulage tunnel will have an ore back of 700 feet with raises to sub-level drifts at approximately 50 foot intervals above the 4120 level crosscutting 5 major veins in a SE/NW direction with stopes developed for safe shrinking and most efficient ore removal.

SAMPLES AND ANALYSIS

Analysis and description of the following samples were taken during this examination and at various other times, in the St. Louis Mine property, to demonstrate the character of ore:

| Sample No. | Oz. Gold | Per Ton Silver | % Lead | Description |
|------------|----------|----------------|--------|-------------------------------|
| 1. | | 122 | 62 | Bottom of Jewelry Store shaft |
| 2. | .02 | 43 | 55 | Taken from dump |
| 3. | .01 | 129.9 | 52 | Dozer cut on lower level |
| 4. | | 15.8 | 22 | Upper dump |
| 5. | | 122.82 | 48 | Second level drift |
| 6. | .03 | 53.02 | 61 | Jewelry Store drift |
| 7. | | 96 | 63 | Chip sample- Jewelry Store |
| 8. | .04 | 190 | 58 | 15' from shaft in drift |
| 9. | | 10.4 | 83 | Upper level |
| 10. | .04 | 30.7 | 66.8 | Surface open cut |
| 11. | .01 | 68.2 | 57.1 | Surface open cut |
| 12. | .01 | 36.3 | 33.1 | Lower surface dozer cut |
| 13. | | 108.8 | 67.15 | Rear of Jewelry Store drift |
| 14. | | 53.3 | 35.82 | Open cut $\frac{1}{4}$ mesh |
| 15. | .01 | 60.3 | 61 | Jewelry Store drift bottom |
| 16. | .03 | 624.1 | 80.7 | No. 1 stope upper level |
| 17. | | 25.16 | 18.65 | Dump |
| 18. | .01 | 57.1 | 61.1 | Selected 1" mesh AG PB |

Value \$916.00/ ton

Appendix D* to this report contains data relating to samples and analysis taken from the St. Louis Mine property.

Samples numbers 1, 5, and 7 above consist of 3 portions of a 75 pound bulk sample, from the "Jewelry Store" vein, surface open-cut, about 40' NW of the underground exposure of the vein. This sample was taken for future ore-dressing and metallurgical testing. A portion of this sample was recently delivered to the U. S. Bureau of Mines, Reno, Nevada for spectroscopic identification of mineral content. Results will be added to this portion of this report when completed.

* Appendix D - to be retained by owner - to contain miscellaneous analytical data pertaining to confidential information relating to the testing, assaying, recovery, flow systems and matters privy to the owners.

REFERENCES

1. Schrader, F. C. , 1909, Mineral Deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Arizona: U. S. Geological Survey Bulletin 397.
2. Holt, E. B., 1942, Department of Natural Resources, State of Arizona.
3. Dings, McClelland G., 1951, The Wallapai Mining District, Cerbat Mountains, Mohave County, Arizona: U. S. Geological Survey Bulletin 978-E.
4. Bastin, E. S. , 1924, Origin of Certain Rich Silver ores near Chloride and Kingman, Arizona: U. S. Geological Survey Bulletin 750, pp 17-39.
5. U. S. Geological Survey Bulletin 871, 1936, Mineral Resources of the Region Around Boulder Dam (Various Authors).
6. Robert L. Peterson, Chief, Branch of Records and Data Management, Bureau of Land Management. Letter dated June 3, 1980 to Nicholas M. Hughes, President of Jewelry Mountain Mines, Inc. (See page 23)

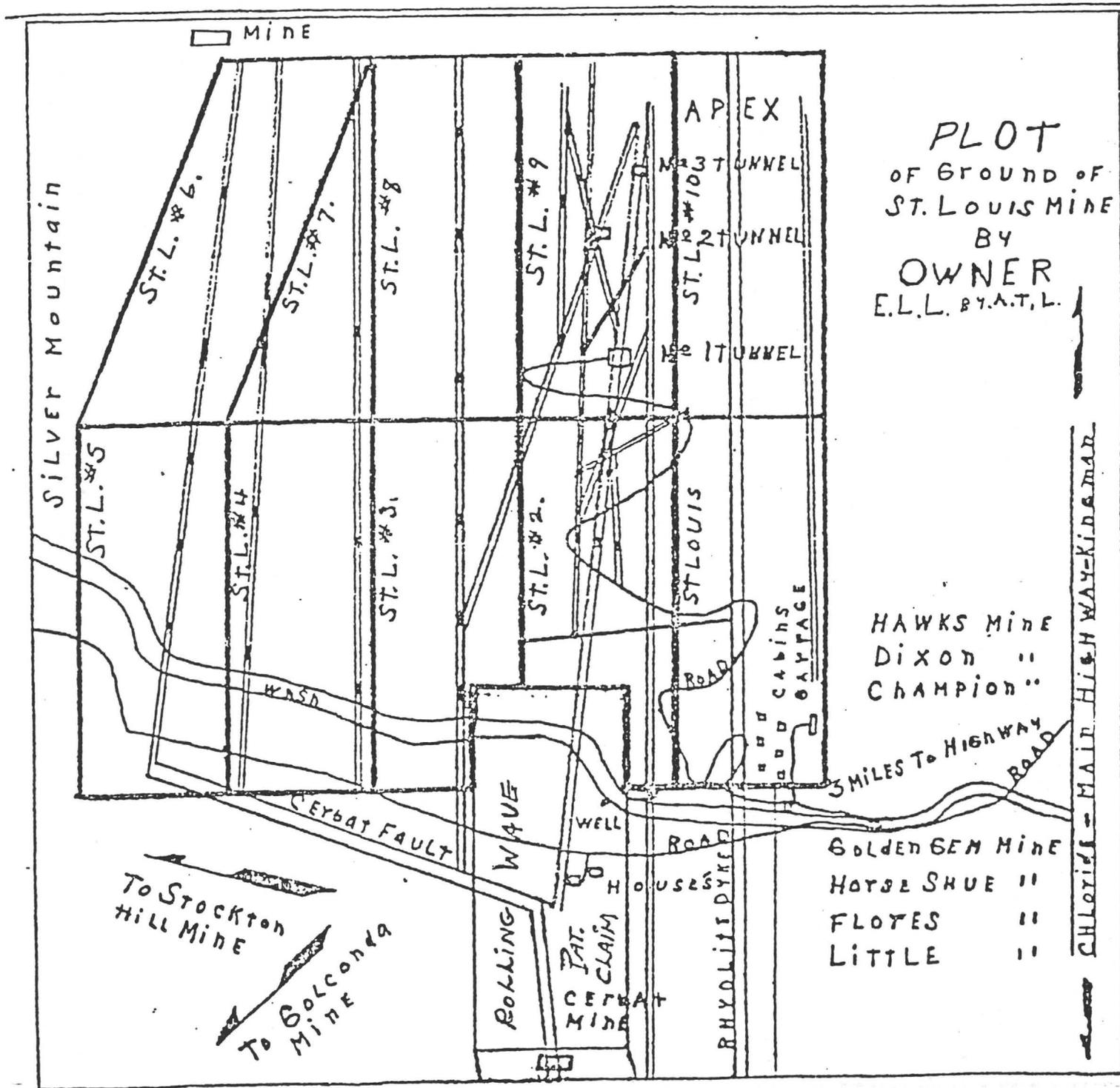
I L L U S T R A T I O N S

- FIG. NO. 1 RECOMMENDED EXPLORATION AND DEVELOPMENT
- FIG. NO. 2 HAULAGE TUNNEL PLAN (CONCEPT DRAWING)
- FIG. NO. 2A HAULAGE TUNNEL ALTERNATE PLAN
- FIG. NO. 3 ESTIMATED ORE RESERVES (ILLUSTRATED BLOCKS)

(Also page B-2 - Appendix B)

MAP NO. 8

ORIGINAL CLAIM MAP OF THE ST. LOUIS CLAIMS AS LAID OUT BY A.T. LIETZOW AND STAKED BY HIM FOR E.L. LIETZOW IN 1931.



PLOT
OF GROUND OF
ST. LOUIS MINE
BY
OWNER
E.L.L. BY A.T.L.

HAWKS Mine
DIXON "
CHAMPION "

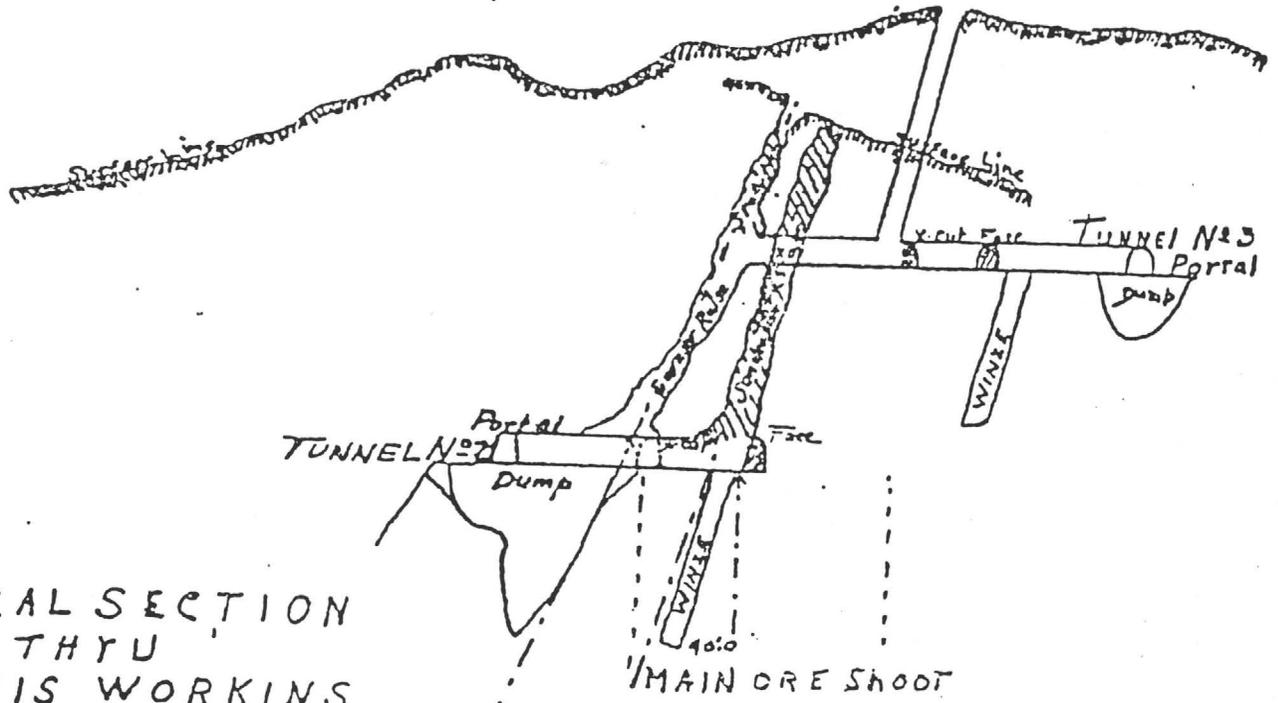
5 MILES TO HIGHWAY ROAD

GOLDEN GEM Mine
HORSE SHOE "
FLOYES "
LITTLE "

CHLORIDE - MAIL HIGHWAY-KIDGAMAR

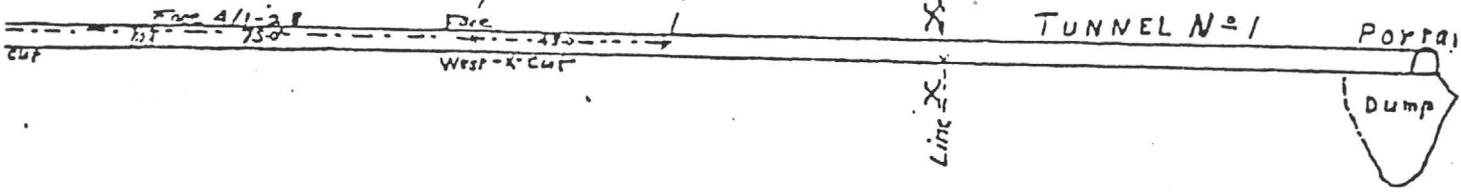
MAP NO. 9

UNDERGROUND WORKINGS
 ORIGINAL SKETCH BY A.T. LIETZOW FROM
 THE SURVEY BY R.C. JACOBSON



VERTICAL SECTION
 THRU
 ST. LOUIS WORKINGS
 90° FROM LINE XX
 APRIL 1928
 SURVEY BY R.C. JACOBSON
 SCALE 1, IN = 30 FT

DIP 65° 0' - 20° 0'
 DIP 25° 0' - 10° 0'
 181' 0'



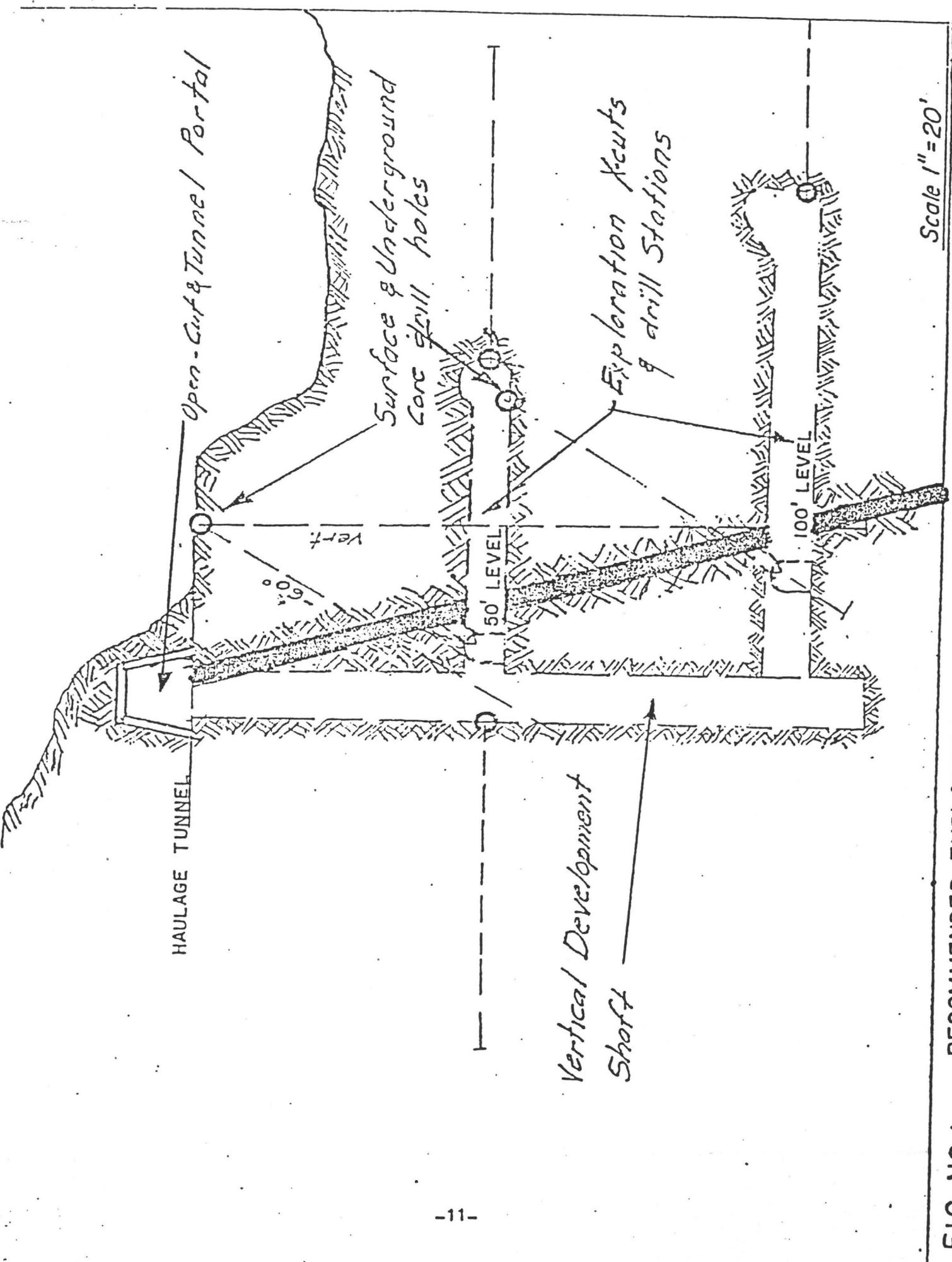
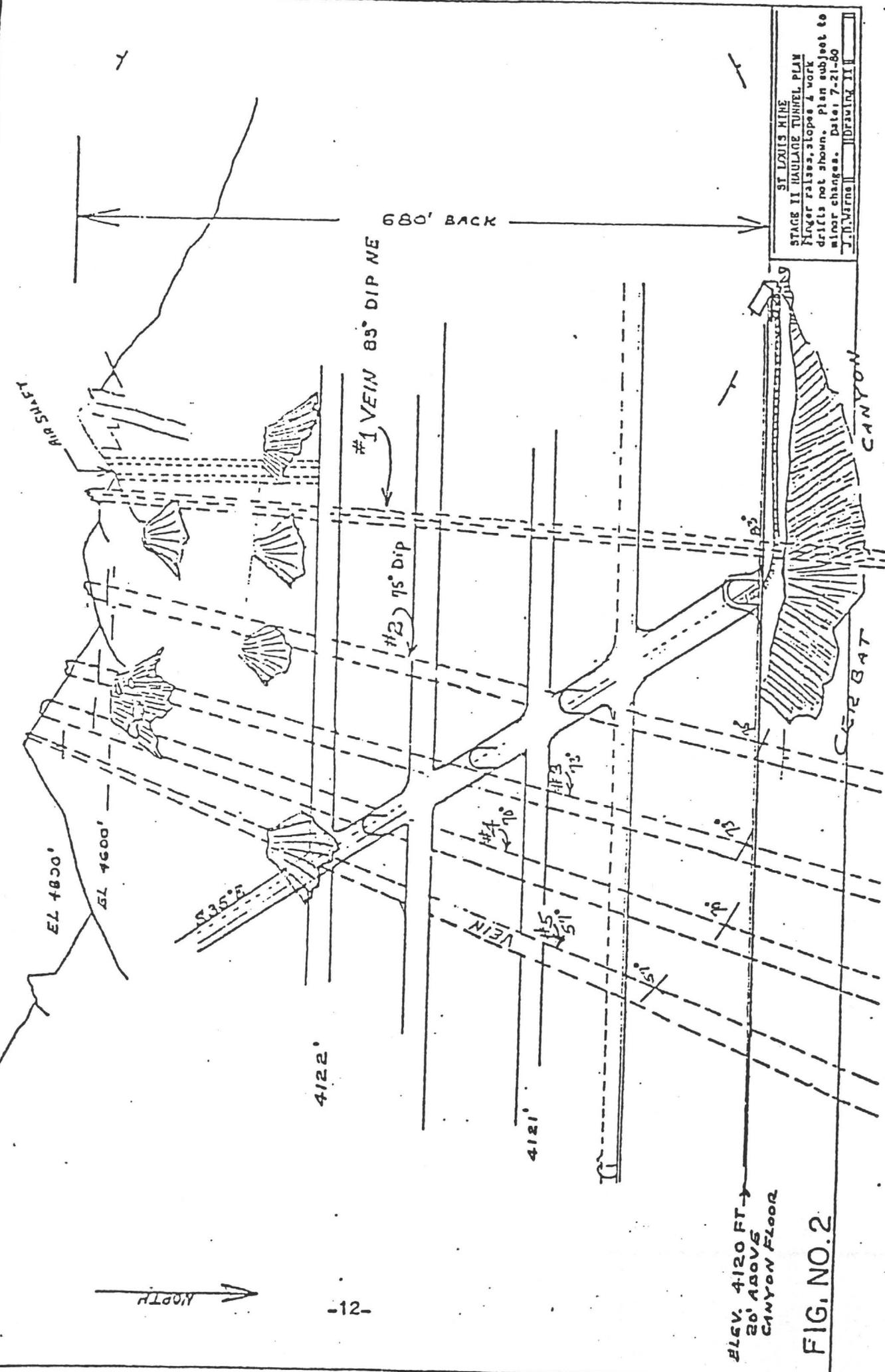


FIG. NO.1 — RECOMMENDED EXPLORATION & DEVELOPMENT



ST LOUIS MINE
 STAGE II HAULAGE TUNNEL PLAN
 Finger raises, slopes & work
 drifts not shown. Plan subject to
 minor changes. Date: 7-21-60
 J. H. Varne | Drawing II

↑ NORTH

4122'

4121'

ELEV. 4120 FT ->
 20' ABOVE
 CANYON FLOOR

FIG. NO. 2

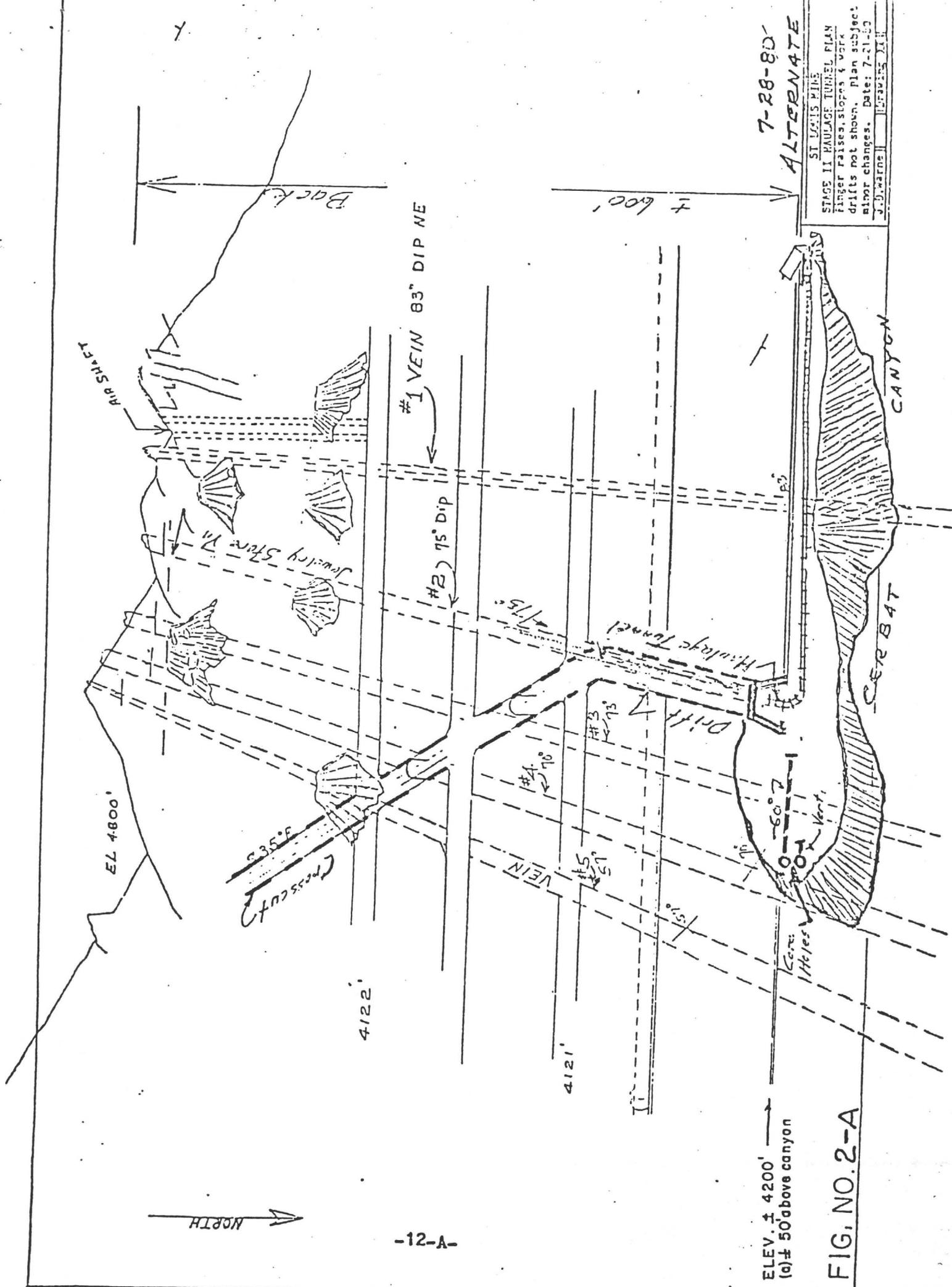


FIG. NO. 2-A

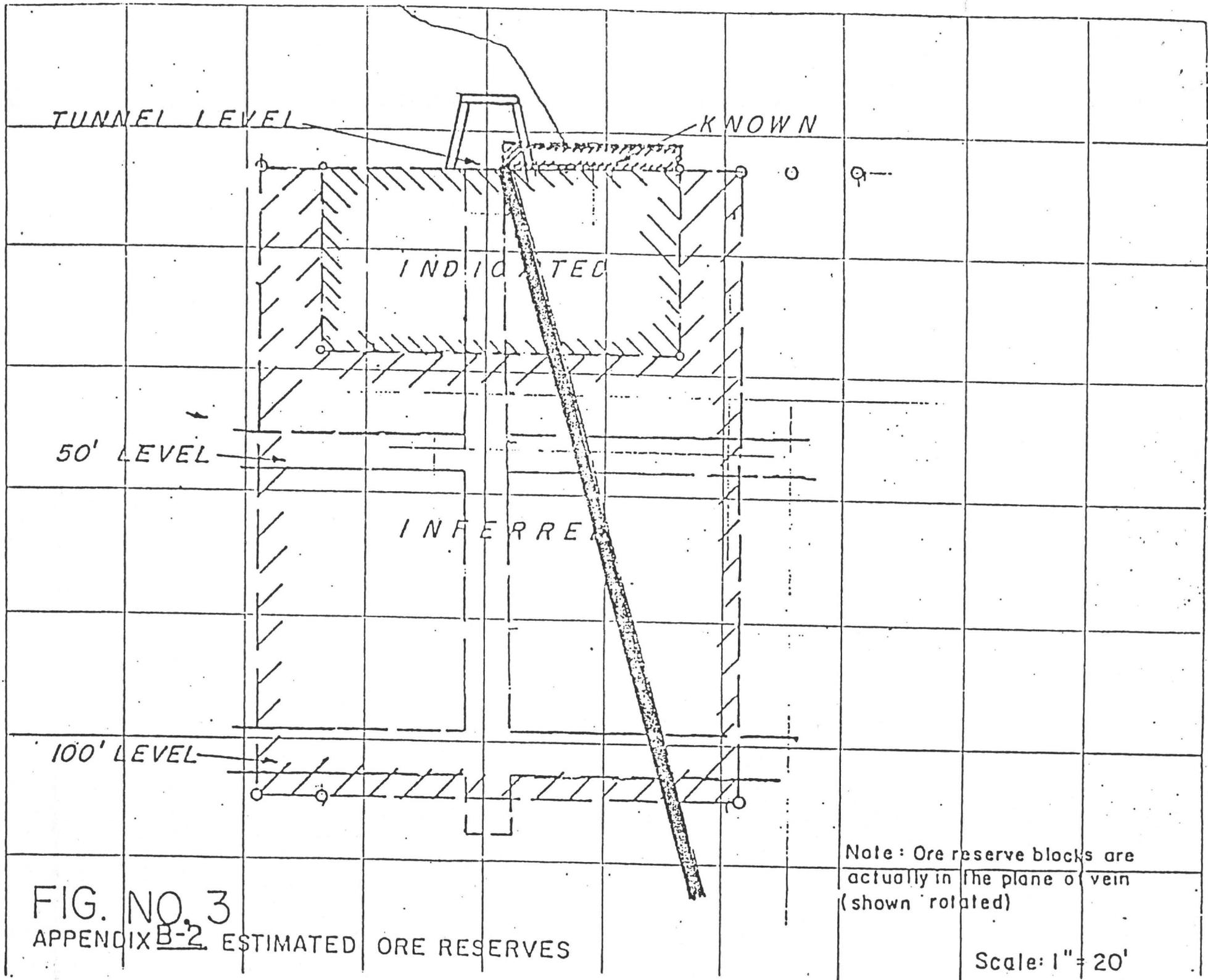


FIG. NO. 3
APPENDIX B-2 ESTIMATED ORE RESERVES

Note: Ore reserve blocks are actually in the plane of vein (shown rotated)

Scale: 1" = 20'

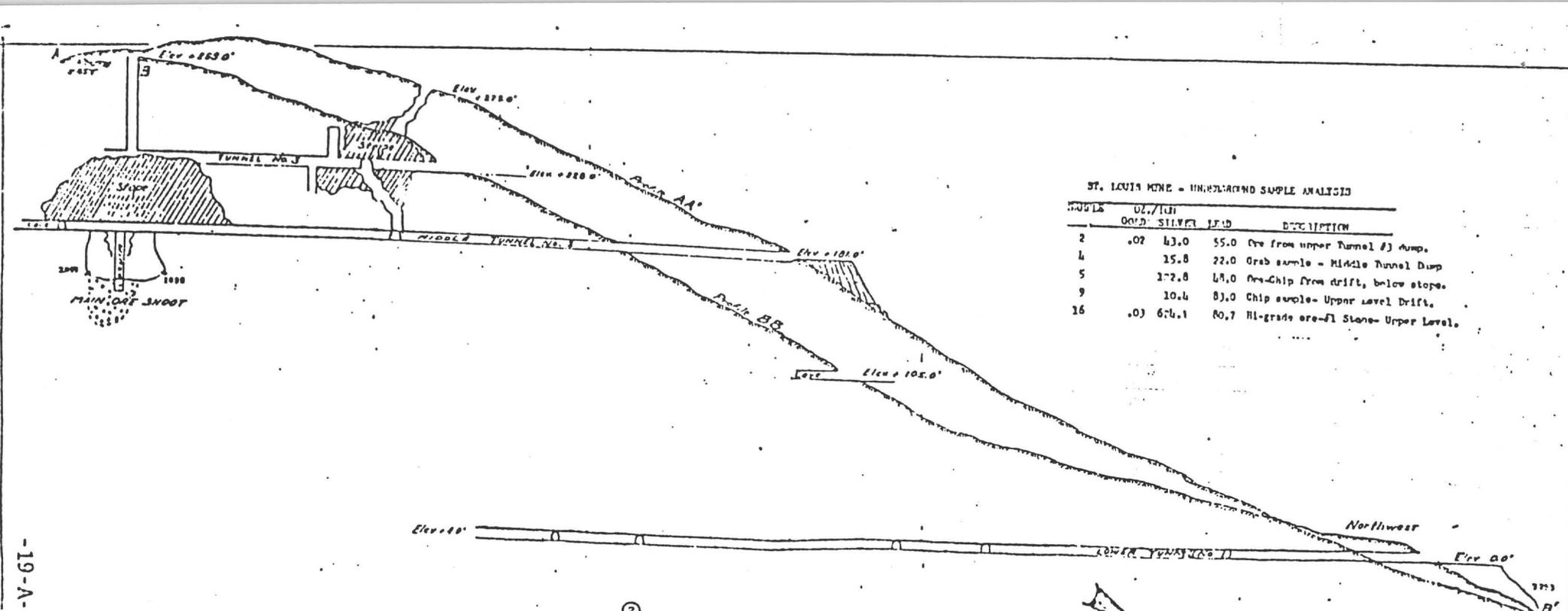
Figure 1. - Claim map of Wallapai mining district, Mohave County, Ariz.



LEE CLAIMS

MAP NO. 6 CLAIM MAP OF WALLAPAI MINING DISTRICT - MOJAVE COUNTY, ARIZONA

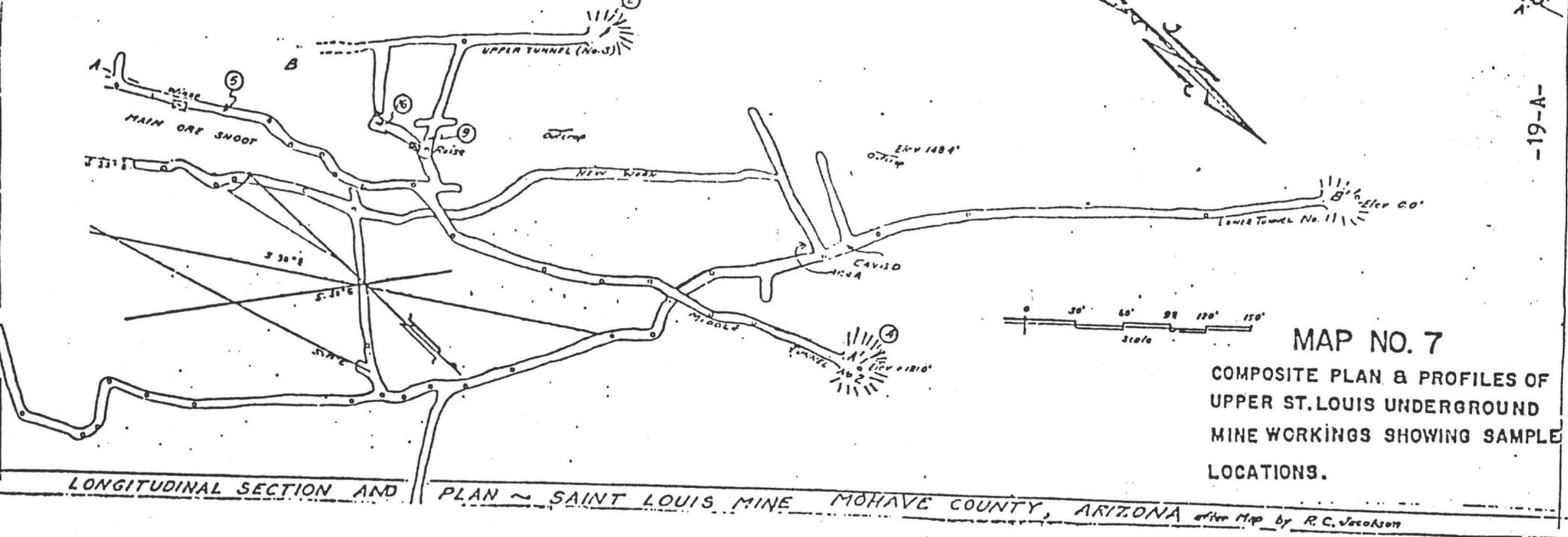
ST. LOUISE
EMPIRE
CLAY LEE
SECTIONS 16, 17, 21



ST. LOUIS MINE - UNDERGROUND SAMPLE ANALYSIS

| SAMPLE | OZ./TON | | DESCRIPTION |
|--------|---------|--------|--------------------------------------|
| | GOLD | SILVER | |
| 2 | .02 | 43.0 | Ore from upper Tunnel #3 Dump. |
| 4 | | 15.8 | Grab sample - Middle Tunnel Dump |
| 5 | 172.8 | | Ore-Chip from drift, below slope. |
| 9 | | 10.4 | Chip sample - Upper Level Drift. |
| 16 | .03 | 674.1 | Hi-grade ore-fl Stone - Upper Level. |

-V-61-



-19-A-

MAP NO. 7

COMPOSITE PLAN & PROFILES OF
UPPER ST. LOUIS UNDERGROUND
MINE WORKINGS SHOWING SAMPLE
LOCATIONS.

LONGITUDINAL SECTION AND PLAN - SAINT LOUIS MINE MOHAVE COUNTY, ARIZONA after Map by R. C. Jackson

A P P E N D I C E S

APPENDIX A - PROOF OF LABOR - ASSESSMENT WORK 1980

APPENDIX B - PRELIMINARY ESTIMATE OF ORE RESERVES

APPENDIX C - PHOTOS OF ST. LOUIS MINE AREA & VICINITY

Appendix C - Photos to be retained by
owner.

A P P E N D I X A

1. PROOF OF LABOR UPON MINING CLAIM 1980
2. ASSESSMENT WORK
(As outlined under regulations pertaining to
mining claims under General Mining Laws of 1872.
BLM Circular No. 2289, Par. 3851.2, P. 19

APPENDIX A (2)

ASSESSMENT WORK

1. NAME OF CLAIM: St. Louis and St. Louis numbers 2 thru 10
(10 Lode Claims):
BLM Serial Numbers A MC 29470 thru A MC 29479
Sections 7, 8 and 17, Township 22 North, Range 17 West, Gila and
Salt River Base and Meridian, Mohave County, Arizona, and recorded
in the Office of the Mohave County Recorder, Book 3N, Pages 109 to 118.
2. LABOR AND IMPROVEMENTS:

Proof of labor upon mining claims (attached)

Preliminary report by John D. Warne, P. E., registered Professional
Engineer No. 2808 (Mining), State of Nevada. Employing geological,
chemical and mining engineering techniques of sampling, and evaluation
analysis of mineral deposits on the St. Louis Mining Claims

Date: July 31, 1980 Value: \$1,850.00
3. Basic findings of the surveys: (1) Sampling and analysis indicate
ore values in excess of 10 oz/Ag. per ton and 60% Pb exist on the St.
Louis No. 2 claim. An estimated 2790 tons of mineable grade ore
exists on the "Jewelry Store" vein, on the St. Louis No. 2 claim
(Appendix B).
4. Work conducted by John D. Warne, P. E. Consulting Mining Engineer,
712 E. Musser Street, Carson City, Nevada 89701

Education: B. S. Mining Engineering, University of Texas, College
of Mines and Metallurgy, 1938.
Professional Engineer (Mining), Certificate No. 2808
Date: May 16, 1969, State of Nevada.
Copy of Resume attached.
5. The above outlined survey work to satisfy required annual assessment
under:

Regulations pertaining to mining claims under General
Mining Laws of 1872, P. L. 85-876, act of September 2,
1958 (72 Stat., 1701 30 U.S.C. 28-1-2) BLM Circular No.
2289, Part 3850, Par. 3851-2 and Circular No. CFR 3833.2.

EMPLOYMENT RECORD AND RESUME

JOHN D. WARNE
Consulting Mining Engineer
712 E. Musser Street
Carson City, Nevada 89701
Telephone: (702) 882-6394

PROFESSIONAL ENGINEER - MINING
NEVADA NO. 2808

GENERAL INFORMATION

BIRTH DATE: 1-25-16; El Paso, Texas.

EDUCATION: 8-38; B.S. Mining Engineering, University of Texas, College of Mines and Metallurgy. Civil Engineering, Mt. San Antonio College, Walnut, California, 1961-1963.

GENERAL: Married, 8-41 to present; four children (married).
Travel status: single. Weight: 195; Height: 6'1";
Health: Good.
Residence: 712 E. Musser St., Carson City, Nevada;
land in Douglas Co., Nevada.

PROFESSION: Mining Engineer. Registered Professional Engineer
No. 2808 Nevada, 1969 (written examination).
SS# 527-05-2637.

EXPERIENCE

1936-37 Miner - A.S. & R. Co., Silver City area, New Mexico.

1937-38 Jr. Mining Engineer - Nevada Cons. Cooper Corp.,
Ray, Arizona.

1938-39 Surveyor - Construction Q.M., U.S.G.S., El Paso,
Texas.

1939-41 Inspector Core Boring - U.S. Engineer Office, Texas,
Arkansas, Missouri.

1941-48 Mining Engineer, and Project Engineer - U.S. Bureau
of Mines. Major exploration projects (with published
Reports of Investigation) under my supervision:

(1) ARKANSAS, Batesville: Manganese - 7000' tunnels,
2500' shafts, 36" bucket drilling, and churn
drilling (Project Foreman and Engineer).

- (2) COLORADO, Boulder: Tungsten - 10,000' core-drilling, trenching, mine rehab., and drifting.
- (3) Silver Plume: Lead, Zinc, Silver - 3000' underground core-drilling, rehab., drifting.
- (4) Northgate: Fluorspar - 3000' core-drilling, trenching, shafts, & drifts.
- (5) UTAH, Moab: Vanadium & Uranium - 5000' core-drilling.
- (6) ALABAMA, Gadsden: Red Iron Ore - 8000' rotary drilling, to 1500' depth.
- (7) FLORIDA, N. Central Portion: Titanium, & heavy minerals in sand, 1200 holes drilled by rotary and drive methods.

My published, Bureau of Mines, REPORTS OF INVESTIGATION Nos. 4106, 4243, 4515, & 4973 describe some of the above projects.

- 1948-51 Shaft and Tunnel Foreman - L.A. Dept. of Water & Power, 11 miles of large bore water power tunnels near Bishop, California.
- 1951-59 Mine Examination & Exploration Engineer - U.S. Bureau of Mines and Office of Mineral Exploration, Nevada, California and Hawaii. Examination of mines and mining areas, planning and supervising exploration projects for many minerals.
- 1959-62 Supervisory Highway Engineer; Valuation Engineer (mining); Department of Interior, Bureau of Indian Affairs & Land Management, Nevada and Wyoming. Supervising surveys, planning and construction of roads; evaluation of mines and minerals on Government lands.
- 1962-74 Civil Engineer - Los Angeles County Regional Engineer - Mapping Division - Detailed surveys, calculations and preparation of accurate coordinate maps of areas, streets, freeways, tracts, flood control, channels, sewers, deeds, etc.
- 1974-Present Consulting Mining Engineer - 712 E. Musser Street, Carson City, Nevada. Examinations, evaluations, mapping and exploration of mines.

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DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine ST. LOUIS

Date December 2, 1942

District Wallapai, Mohave Co., Ariz.

Engineer Elgin B. Holt

Subject:

R E P O R T

OWNER: A. T. Lietzow, Kingman, Arizona.

METALS: Lead, zinc and silver.

AREA & LOCATION:

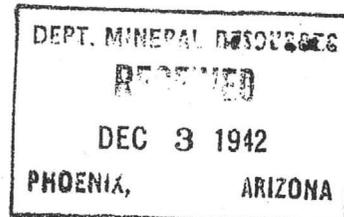
The St. Louis group consists of 10 unpatented mining claims, located near the old town of Cerbat, about 14 miles northeast of Kingman, Arizona, in Secs. 8 & 17, Township 22 North, Range 17 West of the G. & S. R. B. & M. The property is reached from Kingman by following U. S. highway 93 around 9 miles north; thence by a good dirt road around 5 miles to the camp buildings below the mine.

HISTORICAL, VEINS, ETC.:

F. C. Schrader, in U. S. Geological Survey Bulletin No. 397, says in part as follows:

"The ore deposits of this district contain principally gold, silver and lead. They occur in fissure veins, which in general have a northwesterly trend and a steep northeasterly or southwesterly dip. Those situated north of Cerbat Wash are chiefly gold bearing; those to the south contain principally silver and lead. The gangue is mainly quartz and the values usually favor the hanging wall. The principal minerals are pyrite, chalcopyrite, galena, zinc blende, stibnite and native gold.

"The St. Louis mine is about half a mile east of Cerbat and the Gem mine and the same distance southeast of Cerbat Wash and several hundred feet above it. The mine was discovered about 1865.



ST. LOUIS MINE

"Five distinct veins are reported to occur in pre-Cambrian gneiss. Several of the veins are said to converge near the southeast end of the St. Louis claim. Three of the veins trend northwest and dip 80 degrees northeast, and two trend about north and south and dip 85 degrees east. xxxxxxxxx. These veins average about five feet in width and are said to be richer than the northwest-southeast veins and to contain more silver. The richest ore they contain is said to be steel galena. The ore occurs in shoots or bunches varying from 2 to 16 inches in width. It contains about \$3.00 in gold and 12 ounces in silver to the ton and 55 to 75% of lead."

VISIT:

This property was visited by me on November 27, 1942, in company with Mr. A. T. Lietzow, owner of property, who is making arrangements to apply for a preliminary development loan from R. F. C., in the sum of \$5,000.

MINE WORKINGS:

The Lower Tunnel was started at an elevation of 4,500 feet above sea level, and was driven in a meandering southeasterly direction about 840' with about 300 feet of cross-cutting. About 300 feet from the portal of this tunnel, a cross-cut was run south 72 feet, cutting a parallel vein, on which a drift was run 260 feet southeasterly to a point where the main productive ore shoot of property was found, and on which the said drift was continued for a distance of 160 feet. This is the same shoot of high grade lead ore as was found in the Middle Tunnel, as will be described in the next paragraph.

The Middle Tunnel was started at an elevation around 181 feet above the Lower Tunnel referred to, and was driven S. 25 degrees E. a distance of 255 feet, or to a point where the parallel vein mentioned was encountered. At this point there is a raise in ore to the Upper Tunnel and thence on to the surface.

ST LOUIS MINE

From the said raise, the Middle Tunnel was continued southeasterly, to one side of the pay-vein, around 75 feet to a point where the said pay-vein was picked up again. Thence, the said tunnel, or drift, was continued directly on the ore shoot, S. 35 degrees E., around 100 feet, all in ore; the entire vein being 5 to 6 feet wide, with a pay-streak of steel galena on the hanging and another on the foot wall of this vein. The foot wall streak of steel galena is from 2 to 3 inches wide, while the hanging wall streak ranges from one to 3 feet wide. Here both overhand and underhand stoping has been carried out on the said pay-shoot, which as stated is proven for a length of 100 feet. But, if the 75 feet of drift that was run to one side of the ore shoot could be added, that would make the entire length of ore shoot about 175 feet, instead of 100 feet. The underhand stope mentioned is about 75 feet deep, at the deepest point, with three feet of steel galena in the bottom, which is now covered with "gob", per Mr. Lietzow.

PRODUCTION:

Mr. Lietzow stated that around 15 car loads of ore, of 40 tons each, have been shipped from this productive area of the mine, averaging from 35% to 69% lead and about 10 ounces of silver per ton.

The Upper Tunnel was started at an elevation 47 feet above the Middle Tunnel, and was driven on a low grade lead-silver vein about 180 feet. From a point around 75 feet from the portal of this tunnel, a cross-cut was run northeast 70 feet where the said ore shoot was picked up, near the raise mentioned, and 30 feet of drifting was done on ore in a southeasterly direction.

Per Mr. R. C. Jacobson, over 2,000 feet of underground work has been done on this property, the greater portion of which is valueless, from a mining standpoint.

CHARACTER OF ORE:

One shipment of ore from the St. Louis property is set forth below, in order to show the grade and character of ore:

Date of shipment: April 6, 1938.

Tons shipped: 46.8785.

Shipped to: International Sm. & Ref. Co., Salt Lake City, Utah

Assays:

| | |
|---------------|----------|
| Copper ----- | 0.22% |
| Lead ----- | 50.00% |
| Zinc ----- | 2.70% |
| Silver ----- | 8.6 ozs. |
| Gold ----- | 0.02 oz. |
| Insol. ----- | 14.1% |
| Iron ----- | 8.0% |
| Sulphur ----- | 11.8% |
| Lime ----- | Trace. |

OBJECTIVE OF \$5,000 LOAN:

Applicant plans to use the said loan, when and if granted, to clean out and retimber, where necessary, the Lower Tunnel to the productive ore shoot mentioned, in order to make the same accessible for sampling by R. F. C. engineers. Then, in the event the said sampling should prove satisfactory, applicant will then apply for a \$20,000 development loan, from R. F. C., to be used in blocking out an underground supply of shipping and milling ore.

CONCLUSION:

From facts herein set forth, I am of the firm opinion and belief if this mine could be largely developed along intelligent lines, it would, or such work would result in uncovering an underground supply of ore that would warrant the erection at property of a milling plant with a capacity of at least 75 tons of ore per day.

Elgin B. Holt

Elgin B. Holt,
Field Engineer.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine ST. LOUIS Date July 13, 1943
District Wallapai, Mohave County, Arizona Engineer Elgin B. Holt
Subject:

B R I E F R E P O R T

OWNER: A. T. Lietzow, Kingman, Arizona.

METALS: Lead, Zinc, and silver; lead predominating.

AREA & LOCATION: The St. Louis group consists of 10 unpatented claims, located near the old town of Cerbat, about 12 miles north of Kingman, Arizona. The property is reached from Kingman by following U. S. Highway 93 around 9 miles northwesterly; thence 3 miles east to property.

HISTORICAL: This property was discovered about 1865, and has been worked intermittently since that time.

VEINS: Five distinct veins occur in pre-Cambrian gneiss, Several of the veins are said to converge near the southeast end of the St. Louis claim. Three of the veins trend northwest and dip 80 degrees northeast, and two trend about north and south and dip 85 degrees east. The veins average about five feet in width. The richest ore they contain is steel galena, occurring in shoots and bunches, varying from 2 to 16 inches in width.

VISIT: This property was visited by me on November 27, 1942, in company with Lietzow, owner, who at that time had made application for a \$5,000 preliminary development loan, which was later granted. With this money Lietzow is cleaning out the main tunnel, retimbering the same and putting it in shape for examination by RFC engineers, with a view to applying for a development loan from RFC.

MINE WORKINGS: This property has been developed by over 2000 feet of tunnels, raises, cross-cuts and winzes, the greater portion of which work is valueless, from a mining standpoint; but no attempt will be made to describe this work in detail, except to say that the productive ore shoot found in the Lower Tunnel workings has a length of approximately 175 feet, a width of 2 feet and a depth of 200 feet more or less, and containing about 7,000 tons of milling ore, estimated by Lietzow to run: Zinc, 2.0%; lead, 15%; and silver about 3.0 ounces per ton.

PRODUCTION: Lietzow states that around 15 car loads of ore have been shipped, from the productive area of the mine, each car containing about 40 tons of ore averaging from 35% to 69% lead and about 10 ounces silver per ton. One shipment of ore from this property is set forth below:

TONS SHIPPED: 46.8785. Date: April 6, 1938

SHIPPED TO: International Smelting & Refining Co., Salt Lake City, Utah.

ASSAYS:

| | |
|--------------|------------|
| Copper ----- | 0.22% |
| Lead----- | 50.00% . |
| Zinc----- | 2.70% |
| Silver----- | 8.6 ounces |
| Gold----- | 0.02 oz. |
| Insol.----- | 14.10% |
| Iron----- | 8.00% |
| Sulphur----- | 11.80% |
| Lime----- | trace |

ST. LOUIS MINE

ESTIMATED DAILY PRODUCTION: In the event Lietzow succeeds in raising adequate development money from RFC, or from some other source, it is believed that St. Louis mine could produce daily. while development work proceeds, around 25 tons of ore averaging: Lead, 15%; zinc, 2.0%; and silver 3.0 ounces per ton.

/s/ Elgin B. Holt
Elgin B. Holt
Field Engineer

NAME OF MINE: ST. LOUIS

OWNER: A. T. Lietzow

COUNTY: MOHAVE

DISTRICT: CERBAT

METALS: PB

OPERATOR AND ADDRESS:

MINE STATUS

DATE:

DATE:

5/1/44

A. T. Lietzow, Kingman Ariz.

5/1/44

2/46

Developing
& shipping

ST. LOUIS

Pb, Zn, Ag

Mohave

8 - 10

T 22 N, R 17 W

A. T. Lietzow, Kingman

'43

5-6-42

Lietzow, A. T.
Kingman, Arizona

See L File

Re - ASMOA and Pay Dirt Publication - also kind of loans

See ST. LOUIS - Re Field Engineer's Report

12-2-42

See ST. LOUIS - Re "C" loan application

1-4-43

See L file - Re request for bulletins

1-28-43

ST. LOUIS

MOHAVE COUNTY

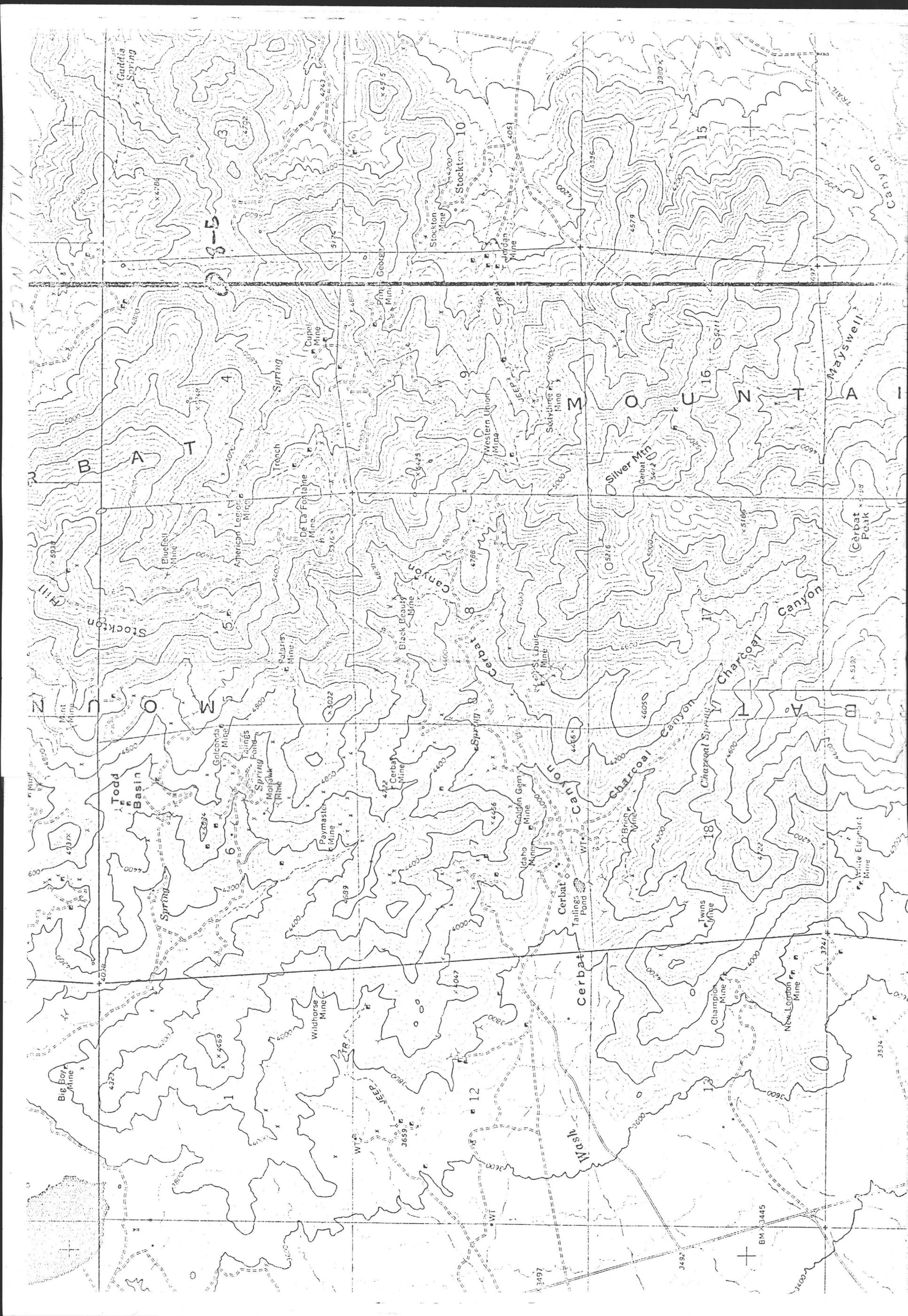
AT Report - Mr. Nicholas Hughes was in and said that he and Mr. Virgil Keever own the St. Louis Mine, Mohave County, Berbat Dist. They bought the mine January 15, 1980. He will send information to start the file. 3/3/80

CJH WR 4/9/80: Walter Heinrich of Henrich Geophysical, Tucson, stated that the St. Louis Mine (Pb-Ag) in the Cerbats is being opened and operated by the Pan-A-Mint Mining Co.

CJH WR 5/14/80: Geoge McDvitt, Kingman, Arizona, stated the St. Louis Mine, near the ghost town of Cerbat, is tied up in court actions. It had been reported as being opened by the Pan-A-Mint Mining Co., by Walter Heinrich.

CJH WR 7/18/80: Lwttter from George McDivitt, 712 E. Beale St., Kingman, Arizona 86401. The St. Louis Mine north of Kingman, is still tied up in litigation although Mr. McDivitt reports activity and equipment being moved in.

CJH WR 7/29/80: SWAT (?) either owns or has leased the St. Louis Mine in the Cerbat Mountains just north of Kingman. The company attorney is a William Porter, 809 E. Beale Street, Kingman, Arizona 86401. There is a watchman at the mine. No work being done.



St. Louis

USBM RI 4101

USGS Bul. 978E, p. 147

USGS Bull 397, p. 105

USAEC Prelim. Recc Rep # 73

Malach R. Mahone County, Miss 1977, p. 59

Mills shed/segment # 0040150766

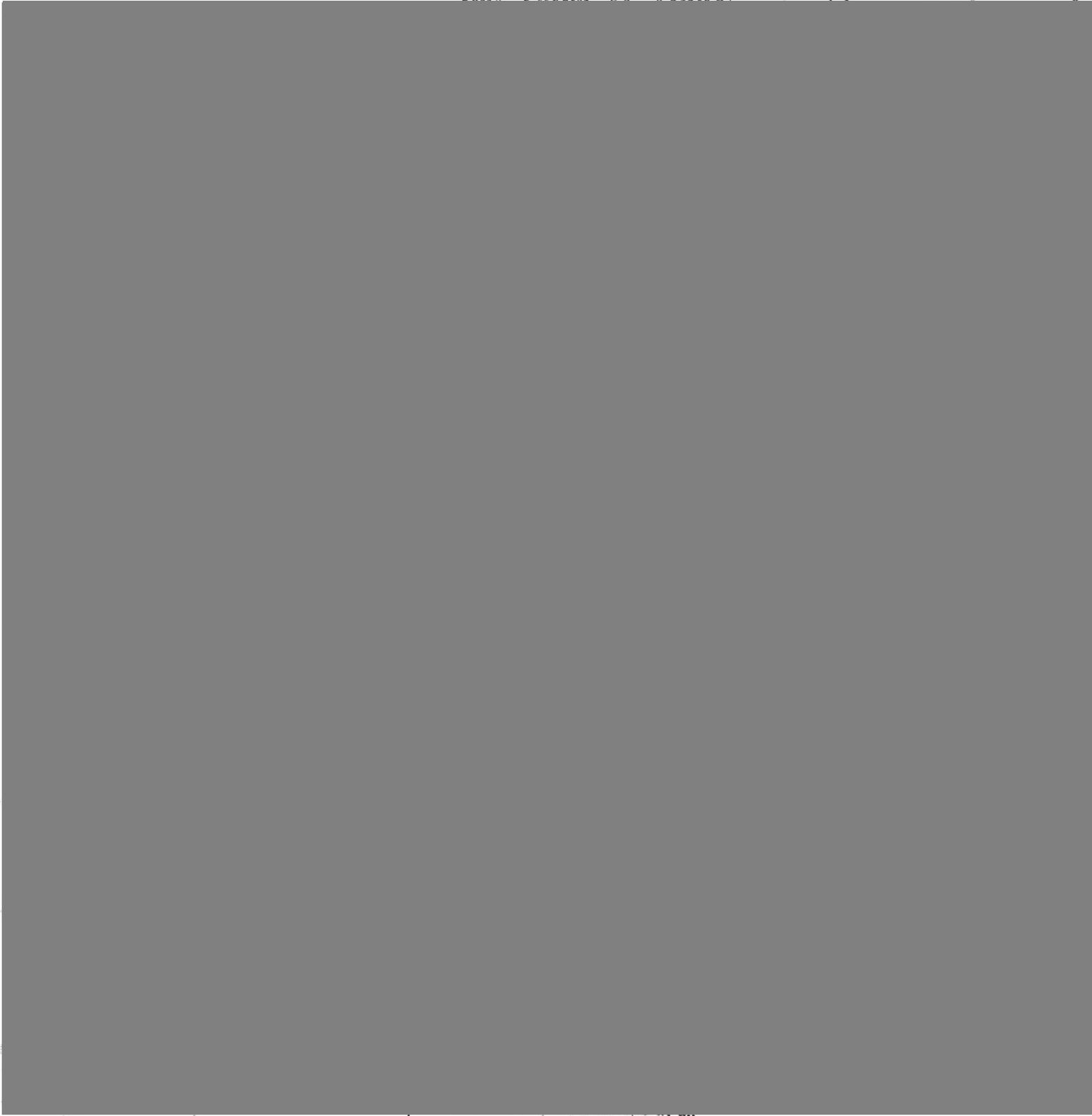
| Year | Mine | Saint Louis | | pb lbs | Zn lbs | Short Tons |
|------|--------------|---------------------|---------------------|----------------------|-----------|------------|
| | cu lbs. | Ag oz | Au oz | | | |
| 1900 | | | | | | |
| 1901 | | | | | | |
| 1902 | | | | | | |
| 1903 | | | | | | |
| 1904 | | | | | | |
| 1905 | | | | | | |
| 1906 | 0 | 736 | 2 | 69000 | 0 | 9.2 |
| 1907 | 0 | 481 | 2 | 6168 | 0 | 17 |
| 1908 | 0 | 1004 | 3 | 109768 | 0 | 91 |
| 1909 | | | | | | |
| 1910 | 0 | 0 | 0 | 22910 | 0 | 17 |
| 1911 | 0 | 179 | 850 | 18258 | 0 | 15 |
| 1912 | | | | | | |
| 1913 | | | | | | |
| 1914 | | | | | | |
| 1915 | | | | | | |
| 1916 | | | | | | |
| 1917 | | | | | | |
| 1918 | | | | | | |
| 1919 | | | | | | |
| 1920 | | | | | | |
| 1921 | | | | | | |
| 1922 | 0 | 1124 | 2 | 49410 | 0 | 51 |
| 1923 | | | | | | |
| 1924 | 0 | 0 722 | 0 | 69340 | 0 | 61 |
| 1925 | | | | | | |
| 1926 | 334 | 46 1383 | 5 | 66932 | 0 | 15 |
| 1927 | 408 | 601 | 1 | 50942 | 0 | 120 |
| 1928 | 54 | 836 | 1 | 18298 | 0 | 45 |
| 1929 | 0 | 332 | 3 | 7874 | 0 | 17 |
| 1930 | 0 | 110 | 0 | 10170 | 0 | 16 |

Mine Saint Louis

| Year | As ^{Fe} lbs | As ^{As} oz | As ^{As} oz | As ^{Pb} lbs | As ^{Zn} lbs | Short tons |
|------|---------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|------------|
| 1931 | | | | | | |
| 1932 | | | | | | |
| 1933 | | | | | | |
| 1934 | | | | | | |
| 1935 | 0 | 365 | 0 | 36186 | 0 | 39 |
| 1936 | 0 | 361 | 0 | 35280 | 0 | 34 |
| 1937 | 0 | 320 | 0 | 37340 | 0 | 52 |
| 1938 | 0 | 514 | 1 | 57576 | 0 | 60 |
| 1939 | | | | | | |
| 1940 | | | | | | |
| 1941 | | | | | | |
| 1942 | | | | | | |
| 1943 | | | | | | |
| 1944 | | | | | | |
| 1945 | 35 | 108 74 | 0 | 7424 | 0 | 8 |
| 1946 | | 108 | | | 0 | |
| 1947 | | | | | | |
| 1948 | 98 | 108 | 0 | 6132 | 1496 | 36 |
| 1949 | | | | | | |
| 1950 | 150 | 255 | 0 | 22312 | 0 | 45 |
| 1951 | | | | | | |
| 1952 | 293 | 556 | 1 | 54938 | 7468 | 92 |
| 1953 | | | | | | |
| 1954 | | | | | | |
| 1955 | | | | | | |
| 1956 | | | | | | |
| 1957 | | | | | | |
| 1958 | | | | | | |
| 1959 | | | | | | |
| 1960 | | | | | | |
| 1961 | | | | | | |

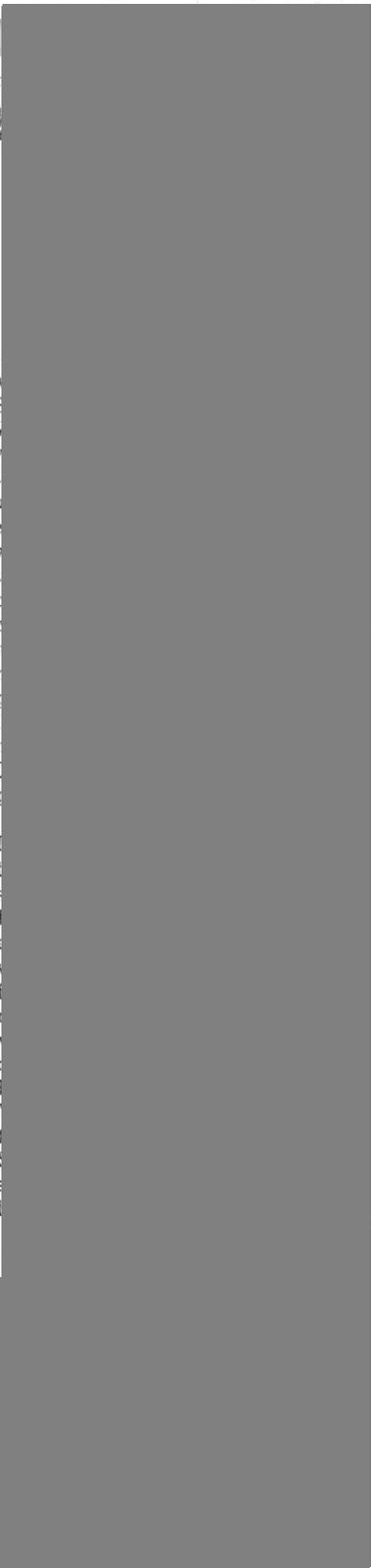
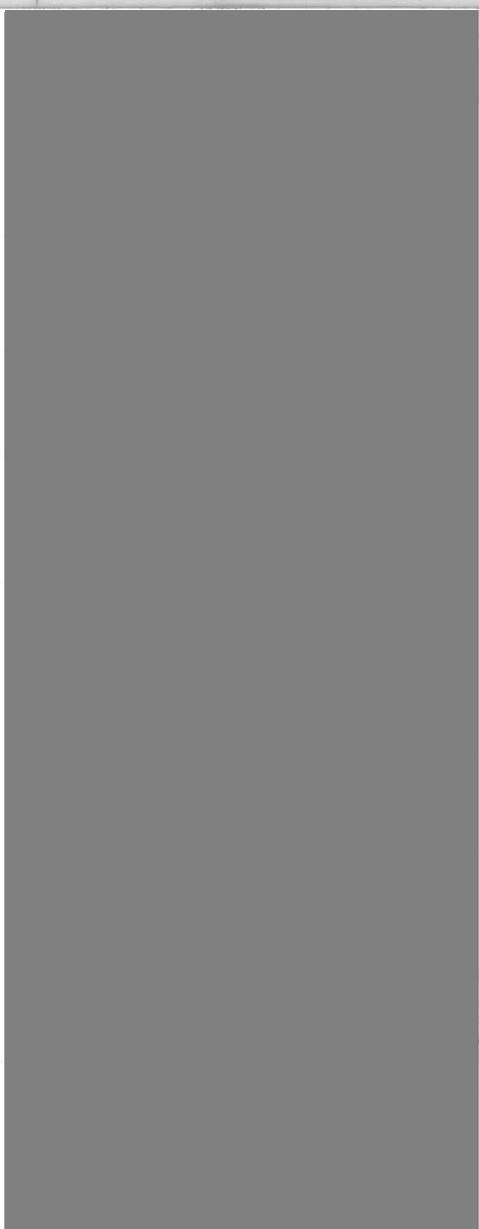
WILL SHIP CAR OF ^{7/21/22}
ORE FROM ST. LOUIS

10/24/28



important point. Will call for it

7/21/22



Kingsman 8/27/26

tunnel. *Kingsman 8/27/26*

*Kingsman
2-19-26*



*



2-13-25

The Mining Journal
January 15, 1946

According to reports, a shipment of high grade lead-silver ore was made recently to the Salt Lake City smelter from the St. Louis mine in the Cerbat district about 14 miles northeast of Kingman, Arizona. The property is understood to be operated by the owner, A. R. Lietzow of Kingman,

May 27, 1957

ST. LOUIS GROUP

MOHAVE CO.
CERBAT DIST.

This property idle.

MARK GEMMILL

See: "USBM - RI - 4101, p 40, Aug. 1947"

USGS Bul. 978-E, p. 147

USGS Bul. 397, p. 105

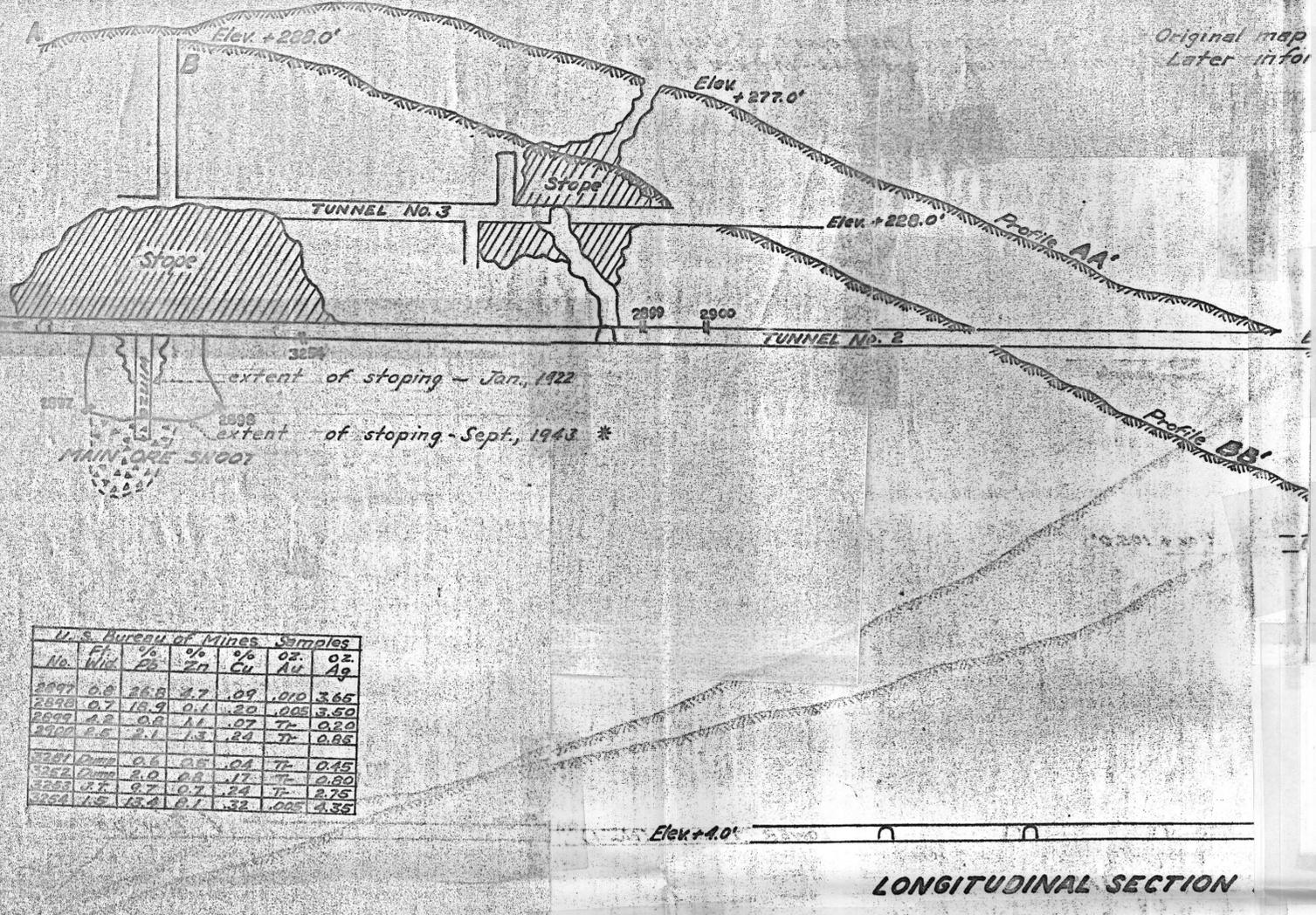
USAEC Prelim. Recon. Report, p. 73

Malach R. Mohave County Mines, 1977, p. 59

MILS Sheet sequence number 0040150766

MAP - Upstairs in flat file - Drawer 6

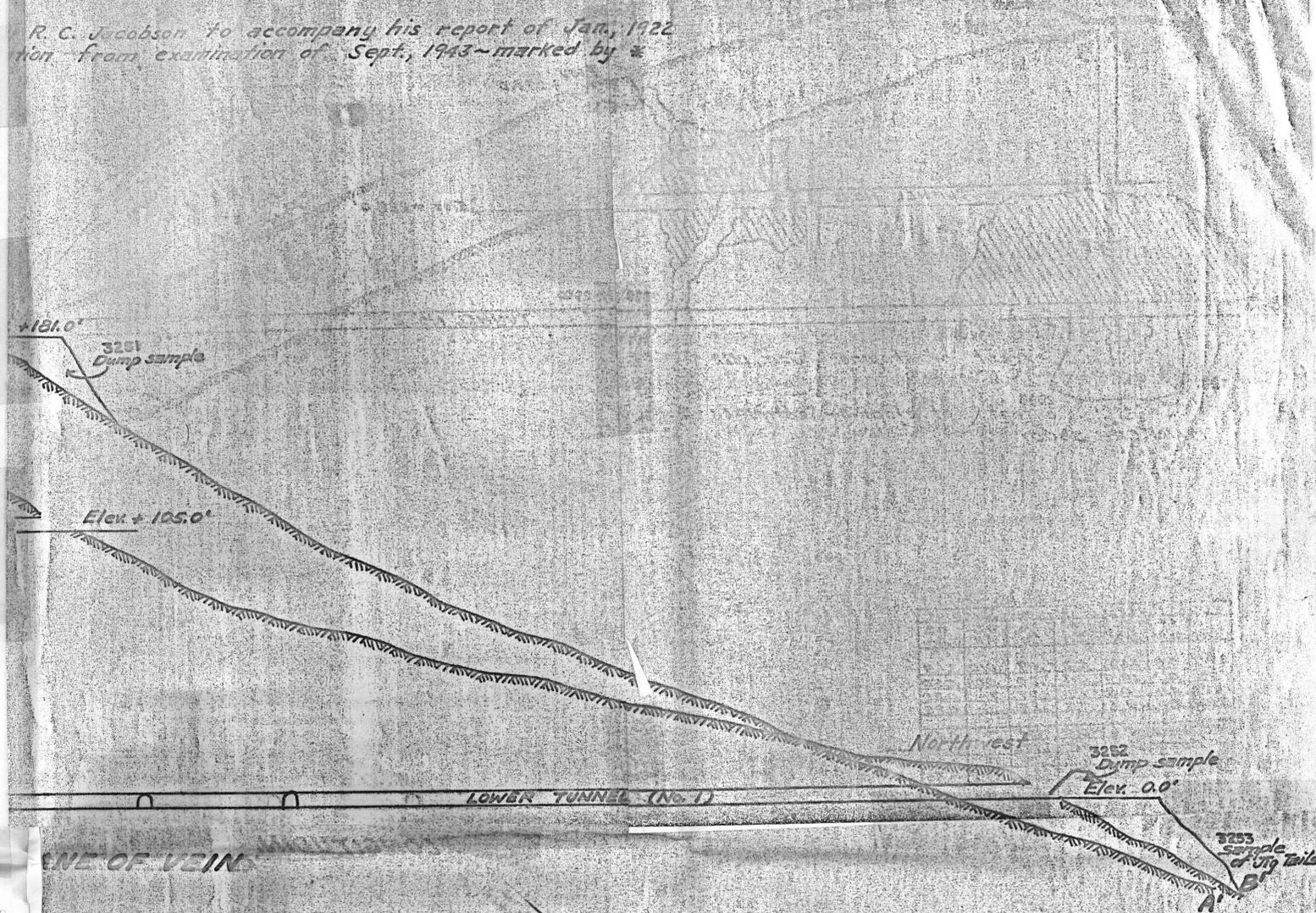
Original map R. C. Jacobson to accompany his report of Jan., 1922
 Later information from examination of Sept., 1943 - marked by *



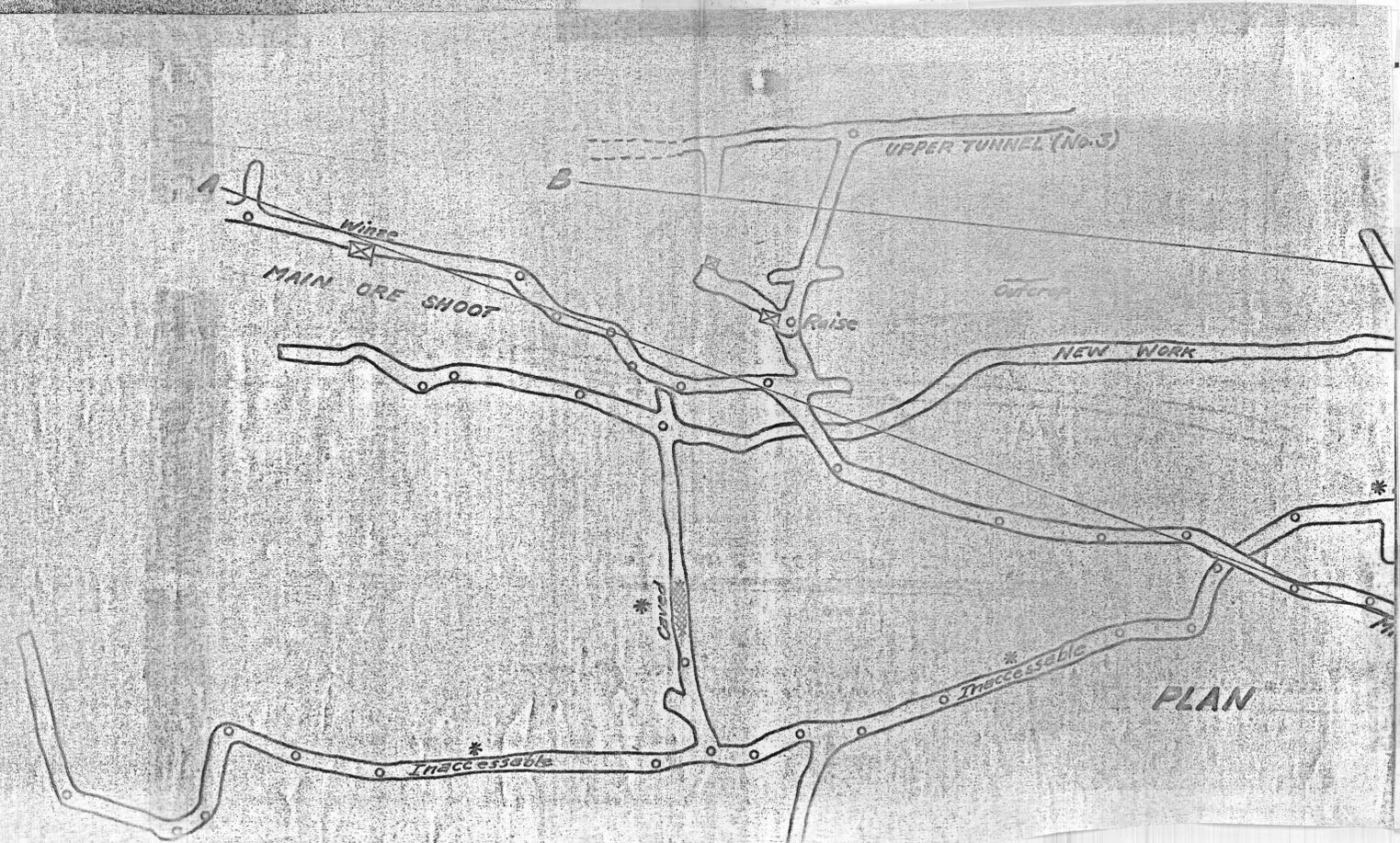
U. S. Bureau of Mines Samples

| Sample No. | Wt. (lb) | % Fe | % Zn | % Cu | oz. Au | oz. Ag |
|------------|----------|------|------|------|--------|--------|
| 2897 | 0.8 | 26.8 | 2.7 | .29 | .010 | 3.65 |
| 2898 | 0.7 | 18.9 | 0.1 | .20 | .005 | 3.50 |
| 2899 | 4.2 | 0.0 | 1.1 | .07 | 7- | 0.20 |
| 2900 | 6.5 | 2.1 | 1.3 | .24 | 7- | 0.88 |
| 3281 | Dump | 0.6 | 0.5 | .04 | 7- | 0.45 |
| 3282 | Dump | 2.0 | 0.8 | .17 | 7- | 0.80 |
| 3283 | U.T. | 0.7 | 0.7 | .24 | 7- | 2.75 |
| 3284 | U.T. | 13.4 | 0.1 | .32 | .005 | 4.35 |

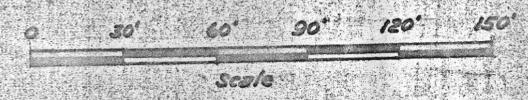
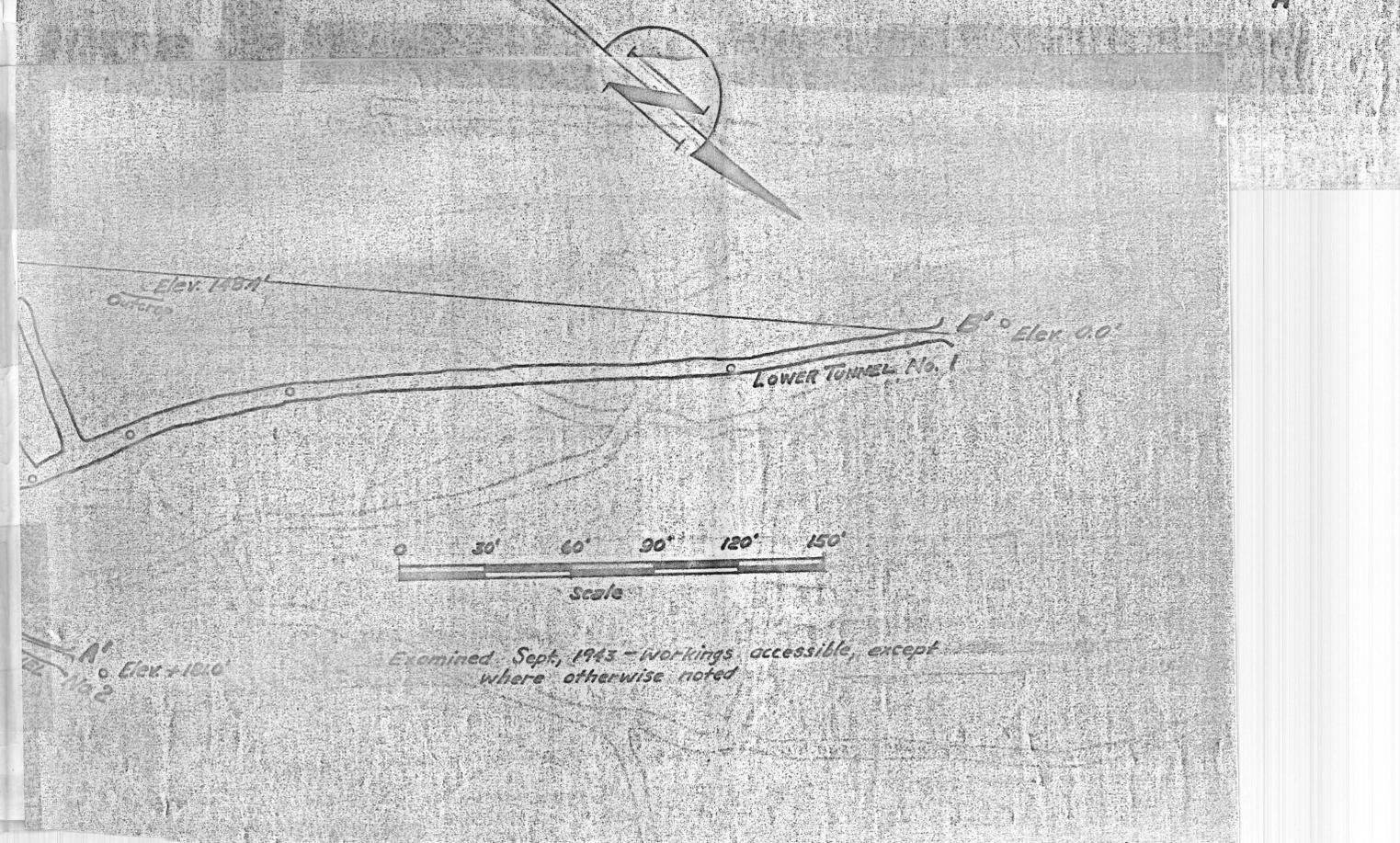
LONGITUDINAL SECTION



LINE OF VEIN



PLAN



Examined Sept., 1943 - workings accessible, except where otherwise noted

