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ITEM 50

Handington - Duling

PRELIMINARY REPORT

on

ANTIMONY KING MINE

Austin District

Lander County - Nevada

Prepared for

J. H. Eaton and Associates

Los Angeles - California

July, 1940

by

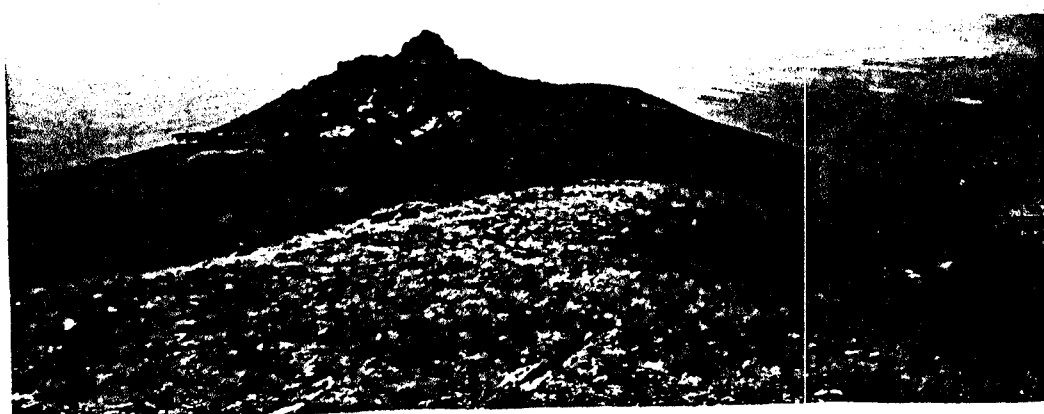
John F. Duling

Consulting Engineer of Mines

Los Angeles - California



CAMP & MAIN TUNNEL  
LOOKING WEST



VEIN CAPPING  
LOOKING NORTH

DUMP  
MAIN SHAFT

**JOHN F. DULING**

1125 CENTRAL BUILDING  
TRINITY 0808  
LOS ANGELES, CALIFORNIA

July 23, 1940

Messrs. J. H. Eaton & Associates  
Los Angeles, California

Gentlemen:

I am submitting herewith my report on the Antimony King Mine located in the vicinity of Austin, Lander County, Nevada.

Considering the geological evidence available as outlined in the accompanying report, I consider this deposit warrants development with the prospect of opening up a commercial tonnage of ore averaging 10% antimony.

In my opinion, by selective mining and with some loss in sorting, it will be practical to step this ore up to a grade of 15% or better without excessive sorting expense.

It seems to me that with a small amount of underground development it would be comparatively easy to take out 10 tons or more of this grade of ore daily.

I have been criticized as being over-optimistic in indicating 4700 tons of probable ore on the 75 foot level. In reply I would say that in no case have I extended the suggested ore reserve more than 45 feet beyond exposed strong mineral indication, which is considered sound engineering practice.

Further, it should be taken into consideration that we have a strong ore face at the collar of the main shaft and in the 25 foot new open cut where I have made no estimate of ore reserve. The indications are

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J. H. Eaton & Associates

also so strong of the occurrence of ore under the main tunnel level as to justify the anticipation of prospective ore at this point.

The ground for 500 feet westerly from the main tunnel and incline shaft is all favorable for ore occurrence and justifies careful exploration.

While every prospect must be viewed by the engineer with conservatism, he must not let this quality blind him to favorable geological evidence of the occurrence of a commercial mineral deposit. Each proven mine has first gone through the prospect stage.

This area is block-faulted and development must be guided by carefully working out the faulting situation as exploration proceeds.

In my limited study of the underground situation, time was not permitted for the locating and platting of any but the major faults as indicated. It is desirable that all minor fault breaks be located and their effect on the ore body studied.

While development has not proceeded to the point to justify classifying this property as a proven mine, I consider it a very attractive prospect and warranting the expenditure of a reasonable amount of capital in its development.

The estimated cost of equipping the property with new machinery is included in this report. Some money may be saved by the use of some second hand equipment, but care must be used in its selection and suitability.

It has been suggested that some exploration be carried on by hand work. I would not recommend this as a company operation, but suggest that certain preliminary development work might be contracted for such as the crosscut and rise to the ore from the 165 foot level and the sinking of a winze to the vein from the tunnel

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J. H. Eaton & Associates

level. The indications are that with a relatively small amount of development work, the present ore reserves can be greatly increased.

Yours sincerely,

---

John F. Duling

JFD/fp

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## ANTIMONY KING MINE

### LOCATION

The Antimony King Mine is located on the western slope of the Toiyable Mountains eight miles in an air line directly south of the town of Austin. This area is known as the Reese River Mining District, Lander Co., Nevada.

The mine is reached by running southwest on the main highway out of Austin and thence southerly along the Big Creek road, a distance of 13.6 miles from town, thence northeasterly over a rough road for some two miles, thence by trail and old wagon road a distance of some two and a quarter miles to the property. See sketch map Plate I.

The elevation at the lower tunnel as determined by aneroid was 8570 feet above sea level and the collar of the incline shaft was 8700 feet above sea level.

### PROPERTIES

The properties include four lode mining claims and one mill site as follows:

Mountain View.....	Min.	Sur.	No.	1938
Mammoth.....	"	"	"	1939
Commodore.....	"	"	"	1940
Confidence.....	"	"	"	1941
Anthony Mill Site.....	"	"	"	1942,

the lode claims being located in Sections 25, 26, 35 and 36 of Township 18 North, Range 43 East, M.D.M., and the mill site being located a little over a mile from the lode claims in Section 1, Township 17 North, Range 43 East, M.D.M.

The Official Survey map shows two springs upon the mill site which is located below the mine and over the ridge in the Big Creek water shed. See Plates I and II.

#### HISTORY

The Official Map indicates that these properties were located in January 1897 by John Thorpe, Geo. A. Thorpe and J. G. Phelps Stokes, and surveyed for patent in May 1901; presumably patent was issued soon after this date.

It was at one time known as the Pine Mine. Pine, a druggist in Austin, was said to be a later owner or interested in the property.

James M. Hill of the U. S. Geological Survey visited this property in 1912. His visit is mentioned in U.S.G.S. Bulletin No. 594, page 121. He mentions the



incline shaft as being reported to be 230 feet, or present depth, at that time.

From his short description it seems doubtful that he was underground. It would seem that much of the underground development was done since that date. I am advised that some high grade ore was shipped during the World War period and probably the present developed ore on the 75 ft. level was opened up at that time.

#### GEOLOGY

The Toiyable Range at this point is entirely sedimentary, being made up of shale, slate and some limestone which are according to James M. Hill of Silurian Age. A rhyolite flow occurs about four to five miles to the northeast. Some ten miles to the south granodiorite is exposed as the core of the Toiyable Range. It seems probable that the granodiorite underlies this property in depth and has some relation to the occurrence of these ores.

The main vein strikes northwesterly and southeasterly with a dip of some 55 degrees to the southwest at the surface.

A study of the underground workings indicates that step faulting has occurred probably in connection with the uplift of the Toiyable Range. This is well illustrated in the tunnel section, Plate IV. In this section the vein has been tilted by faulting to much nearer a horizontal position. Apparently secondary enrichment has occurred after the faulting.

The striking feature of the vein is a brecciated quartz capping which forms the hanging wall of the vein proper. This formation rises 15 or 20 feet above the surrounding shales and forms the crest of a ridge along which the claims are located. This capping extends for 500 feet in a northwesterly direction from the incline shaft and is believed to indicate the outcrop of the major ore zone.

The vein proper is a fractured white quartz considerably softer than the hanging wall and quite distinct from it. The footwall is a soft grey shale. The vein varies in thickness from 4 to 5 feet on the surface where exposed to 8 or 9 feet as exposed in the stopes on the 75 foot level.

The predominant ore is stibnite ( $\text{Sb}_2\text{S}_3$ ), which

occurs in the vein croppings as well as in depth. The oxide valentinite ( $\text{Sb}_2\text{O}_3$ ) is also present, particularly at the surface, but not in any considerable amounts. Very little oxide is seen on the 75 foot level.

An interesting feature of the geology is the occurrence of numerous cross fractures along the vein at which points the ore makes in the hanging wall. The incline shaft is sunk on one such fracture which at the surface shows a width of ore of 14 feet. Another such fracture occurs a short distance north of the main shaft. Sample No. 6 is ore from this point, probably already sorted for high grade.

The outcrop of the vein is covered by top soil and can only be exposed by trenching. Practically the only exposure outside of the main shaft is that opened by a new cut some 240 feet northerly from the main shaft from which high grade (estimated 55%) ore is being mined and sorted at present.

#### DEVELOPMENT

The main development on this property comprises an incline shaft 215 feet deep with 180 feet of drifting and crosscutting on the 75 foot level, 90 feet of drift-

ing on the 165 foot level, and 240 feet of crosscutting and drifting on the 215 foot level. Of this work only 70 feet on the 75 foot level was on the vein proper and in ore. Some stoping was done at this point. The 165 foot level is all in the hanging wall formation over the vein proper.

Referring to Plate III, all of the work on the 215 foot level west of the vertical fault is in the hanging wall formation over the ore, and the crosscutting east of the fault is in the foot wall shale below the ore. This condition is well illustrated in the Geological Section shown on Plate IV.

In addition to this there is a 423 foot crosscut tunnel cutting the incline shaft at a point 12 feet above the 215 foot level. At a point 320 feet from the mouth of this tunnel 60 feet of drifting has been done to the south in the hanging wall formation. There is a strong showing of stibnite at the junction of this drift with the tunnel.

It is quite evident from this work that there was no understanding of the faulted position of the vein; otherwise so much dead work would not have been

performed, the true key to the position of the ore being the hanging wall formation, which is very distinct.

### PRODUCTION

I was unable to obtain a record of the production of this property. All ore shipped was sorted to from 45% to 60% grade. The production has been small and the following is merely an estimate:

Surface.....	35 tons
75 foot level.....	25 "
215 " " at vertical fault	
reported.....	<u>40</u> "

Total.....100 tons

All ore was obtained by hand sorting to shipping grade.

### SAMPLING

In order to determine the average grade of the ore the following samples were taken (see Plate III for location):

#### SURFACE

1. New open cut 240 ft. N. of shaft 5' wide.....6.4% sh.
2. " " " " " " " " 4' " .....7.3% "
3. Grab sample main shaft dump, est. 350 tons.....8.5% "
4. Cross fissure top incline shaft 14' wide.....14.8% "
5. 3 reject sorting dumps W. of shaft, est. 100 t. 6.0% "
6. Reject sorting dump W. old open cut N. of shaft, est. 25 tons..... 5.3% "
7. Portion main tunnel dump, est. 30 tons..... 8.4% "
8. 10 sacks sorted shipping ore lower dump.....60.8% "

UNDERGROUND 75 FOOT LEVEL

9.	4'-3"	wide	S. face	from	H.W.	No	ft.	wall											
			exposed.....																
																		6.3%	sb.
10.	6'-6"	wide	from	H.W.	No	ft.	wall	exposed....										5.5%	"
11.	6'-6"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	8.5%	"
12.	6'	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	11.1%	"
13.	7'	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	12.6%	"
14.	8'	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	9.2%	"
15.	4'	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	23.0%	"

Averaging these by the foot per cent method,  
Nos. 9 to 14 inclusive gave 9.03%, and 9 to 15 inclusive  
gave 10.35% antimony.

Since the better values seem to occur near the  
foot wall, which in no case was exposed, it is my  
opinion that this ore can be estimated to average 10%  
antimony.

In the new cut, where Samples Nos. 1 and 2 were  
taken, higher grade ore was being mined between these  
sampling points, which would indicate a higher average  
for the entire cut.

Sample No. 4 is probably above average grade.

ORE RESERVES

The present development has not opened up a  
large ore reserve. However, the geological conditions  
are very favorable to ore deposition from the present

working to a distance of 500 feet westward under the prominent brecciated quartz capping as shown by the outcrop.

This area evidently will be block-faulted and a careful geologic study must be made to guide further development as it proceeds.

The following is an estimate of the reasonably proven ore reserves:

75 ft. level as indicated in Plate III, estimated 5' thick.....	4,700 tons
<u>Dumps:</u> Incline shaft main dump, grab sample 8.5% Sb. estimated.....	350 "
Sorting reject W. of main shaft, 3 piles, est. grab sample, 6.0% Sb. estimated.....	100 "
Sorting reject W. of old cut, grab sample, 5.3% Sb. estimated.....	25 "
Lower tunnel dump, grab sample, 8.4% Sb. estimated.....	30 "

#### SUMMARY

Ore in sight, 75 ft. level, estimated 10% Sb.....	4,700 tons
Dump ores, average 7.8% Sb., estimated.....	505 "

It is more than probable that considerable ore

can be developed on or near the surface, but there is insufficient development at the present time to justify the estimation of a definite tonnage here. There is a width of 14 ft. of ore on a cross fracture in the hanging wall. This may extend to a distance of 10 or 20 feet westward into the hanging wall.

The new cut 25 feet in length is all in ore 4 to 5 feet wide, and may extend to 25 ft. or more in depth. It has not been prospected latterly beyond the present length. This ore shoot can be expected to reach beyond the limits of the present cut.

#### CONCLUSION

The only opening on the main vein except the main shaft is the new open cut 240 ft. northerly where there is a good showing of ore exposed for a length of 25 feet. The brecciated quartz vein capping extending from the main shaft to a point 500 feet northwesterly is in my mind a definite indication of the extent of the ore zone. This capping does not extend southeasterly from the shaft, although the vein can still be traced. I do not consider the portion of the vein south of the shaft favorable for ore occurrence.



It is to be noted that the only portion of this property examined was the Mountain View and Mammoth claims. The patent map indicates another strong quartzite capping on the Confidence claim; this should be investigated later.

The ore opened up on the 75 ft. level is cut off by a north and south fault on the east and by a vertical northwest and southeast fault on the west. This is the best showing on the property, and can be expected to extend some distance north of the shaft.

On the main tunnel level the strong showing of stibnite in the hanging wall at tunnel level drift and the reported extraction of 40 tons of high grade at the vertical fault on the 215 ft. level leads one to believe the indicated ore below this level will be comparable in grade to that on the 75 ft. level.

This indicated ore below the tunnel level is nearly flat, with more than 160 feet in depth along the vein. It is cut off on the west by a fault, the position of which has not been determined. It should extend for a considerable distance northerly and southerly from the tunnel.

Further indications are that this ore will extend to greater depth than shown by present workings.

Taking into consideration the foregoing condition, I consider this an attractive prospect and warranting further development under competent geological advice.

#### WATER SUPPLY

Two springs are indicated on the official plat of the millsite.

Water was formerly pumped to the mine through a small pipe line from some spring to the east of the property not visited in this examination.

I understand there is a small water supply in Tank Canyon where the forestry service maintain a public watering trough for sheep and cattle. This appears to be about three quarters of a mile above the mouth of the canyon, and presumably a small supply could be obtained by gravity from this point. This should be taken up with the local forest supervisor.

There is also presumably a moderate supply available from the Big Creek ditch, although this would

(2)



ORE SORTING HOUSE  
MAIN TUNNEL LOOKING SOUTH



OLD CABIN  
VEIN CAPPING IN BACKGROUND

have to be arranged for with the ranchers who own it.

PROPOSED PLAN OF OPERATION

In order to explore this property and open up the present indicated ore reserves, mining operations at three points are indicated as follows:

- (1) To further explore the outcrop of the vein by open cut for the full length of the brecciated quartz capping. This may be done by open cuts, assisted and hastened by the use of a bulldozer to remove top soil.
- (2) To develop the ore shoot the top of which is cut by the 75 ft. level. This can be done most advantageously from the 165 ft. level which is only 55 ft. vertically below the 75 ft. level.

Crosscutting easterly some 20 feet from the angle point on this level past the indicated vertical fault as shown on Plate II, and then raising vertically some 35 feet to the vein, ore should be encountered near the low point in the foot wall. This will make possible the removal of this ore at the lowest cost.

This ore shoot is also dipping to the west, as shown in Section B-B, and a crosscut should be driven northerly from the 165 ft. level station past the vertical fault, then a raise made to the vein for the purpose of developing the ore west of the shaft.

This work would later be extended westward to explore the ore zone under the brecciated quartz capping.

- (3) The third point of operation would be to sink a winze in or near the drift on the main tunnel level to cut the vein in the position indicated on Plate III.

The foot wall of the vein being reached, drifts should be extended both easterly and westerly to the limits of the indicated ore shoot.

#### MACHINERY AND IMPROVEMENTS REQUIRED

The property has camp buildings comprising cook house and two small bunk houses in a poor state of repair. In addition to repairing these it would be advisable to add a two or three room frame cabin to be

used as office and bed room for the superintendent. This would complete a camp for ten men. A water supply must be provided for.

A road must be constructed to the property and the grade should not exceed fifteen per cent, preferably near ten per cent, otherwise much difficulty will be encountered in bad weather.

A three-drill compress (2-drill capacity at this altitude) should be added. This should set at near the mouth of the tunnel and be properly housed against the weather.

The cost of fuel for a gasoline operated compressor is four times higher than for diesel engines in this section; therefore it would be desirable to use diesel power.

The estimated cost of these improvements based upon new equipment is as follows:

For road construction with bulldozer..... \$ 500.00

Camp:

Repair of present houses.....	250.00
New 2-room cabin.....	350.00
Camp furnishings.....	400.00
Water supply - estimated.....	500.00

Machinery:

Diesel operated compressor, 315 cu. ft. capacity, belt driven, non-portable.. (portable \$6,000.00)	5,000.00
Erecting and housing.....	400.00
2 jackhammers complete with mountings, columns, water tanks and hose and spare parts.....	1,000.00
4 sets of steel.....	80.00
Replaceable bits.....	60.00
500 ft. of 2 $\frac{1}{2}$ " air pipe.....	135.00
200 ft. of 1 $\frac{1}{2}$ " air pipe.....	25.00
Air-hoist, 750 lbs. capacity.....	350.00
1 mine car.....	100.00
200 ft. 16# mine rail.....	80.00
Tools and equipment, including blacksmith shop equipment.....	500.00
Freight and hauling.....	350.00
Truck.....	1,000.00

Underground Development:

Chute and lader way tunnel level to 165 ft. level.....	100.00
Cross cut and raise to ore 165 ft. level 65 ft. of work at \$10.....	650.00
Chute and ladderway to stope.....	150.00

TOTAL.....	<u><u>\$11,980.00</u></u>
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#### OPERATING COST

With the property equipped as outlined above, the cost of mining this ore, including a reasonable percentage for development, should not exceed \$2.50 to \$3.00 per ton ore.

#### MARKET CONDITION

Normally the United States imports practically all the antimony used domestically. Present war conditions throughout the world have greatly restricted this supply. The metal has thus become a strategic war material, being extensively used in the war industries. The re-armament program in the United States, together with supplies of war materials for Europe, insures a heavy demand from domestic producers for some time to come.

The present price of antimony and indicated future demand justify the expenditure necessary to develop and equip this property for production.

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Los Angeles, Calif.

July, 1940.



SPECTROGRAPHIC QUALITATIVE ANALYSIS

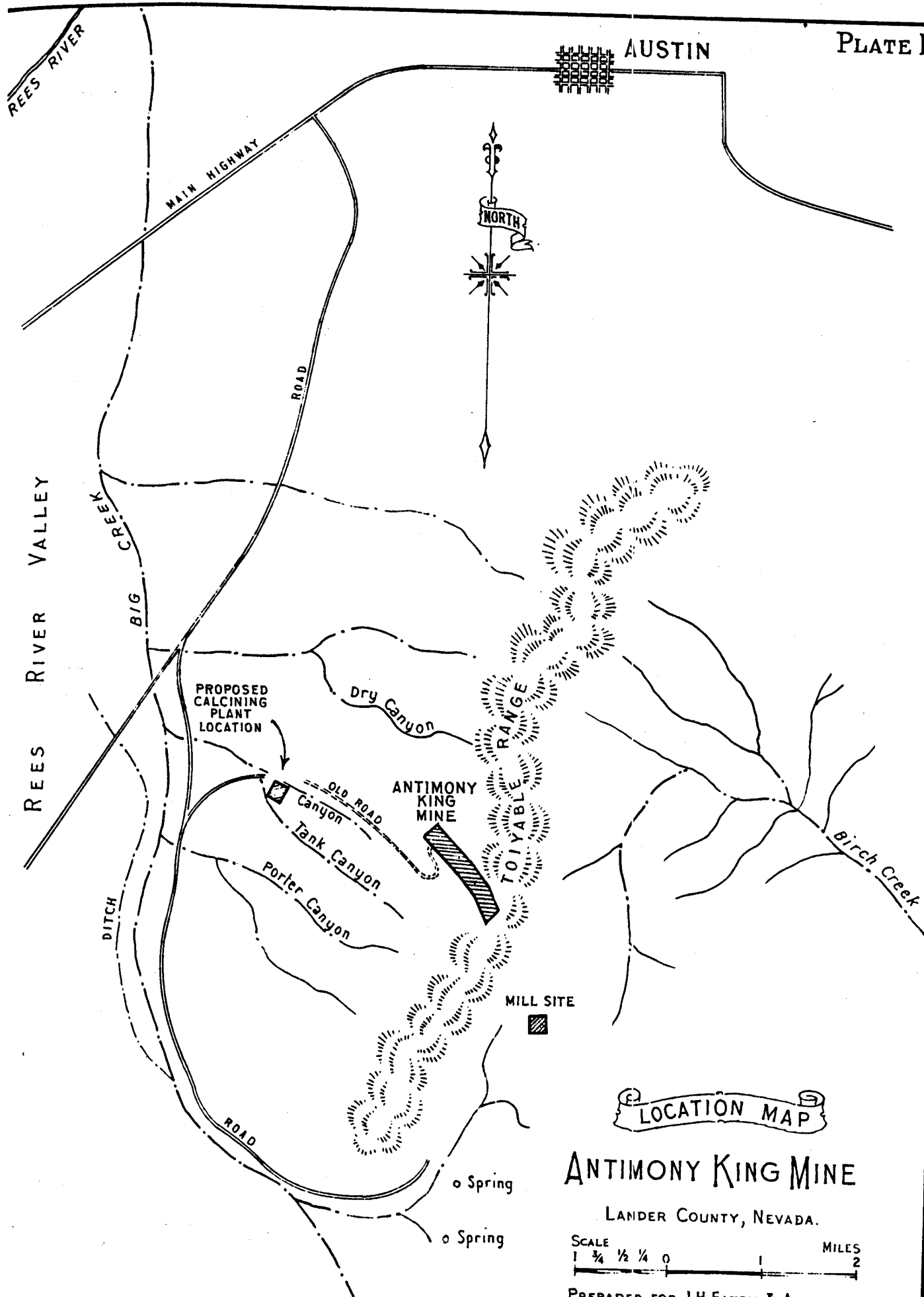
ANTIMONY KING ORE

Composite of Samples  
#9 to #15 Inclusive,  
75 Foot Level.

Prepared by

THE JOHN HERMAN LABORATORIES

ELEMENT	ESTIMATED QUANTITY
Silicon.....	Over 10.0%
Iron.....	10.0% or over.
Antimony.....	10.0% or over.
Calcium.....	0.1%
Barium.....	0.1%
Magnesium.....	0.01 to 0.1%
Copper.....	0.01 to 0.1%
Nickel.....	0.01 to 0.1%
Aluminum.....	0.01 to 0.1%
Manganese.....	0.01 to 0.1%
Chromium.....	0.01 to 0.1%
Zinc.....	0.01%
Silver.....	0.01%
Lead.....	0.01%
Titanium.....	0.001 to 0.01%
Boron.....	0.001%



LOCATION MAP  
ANTIMONY KING MINE

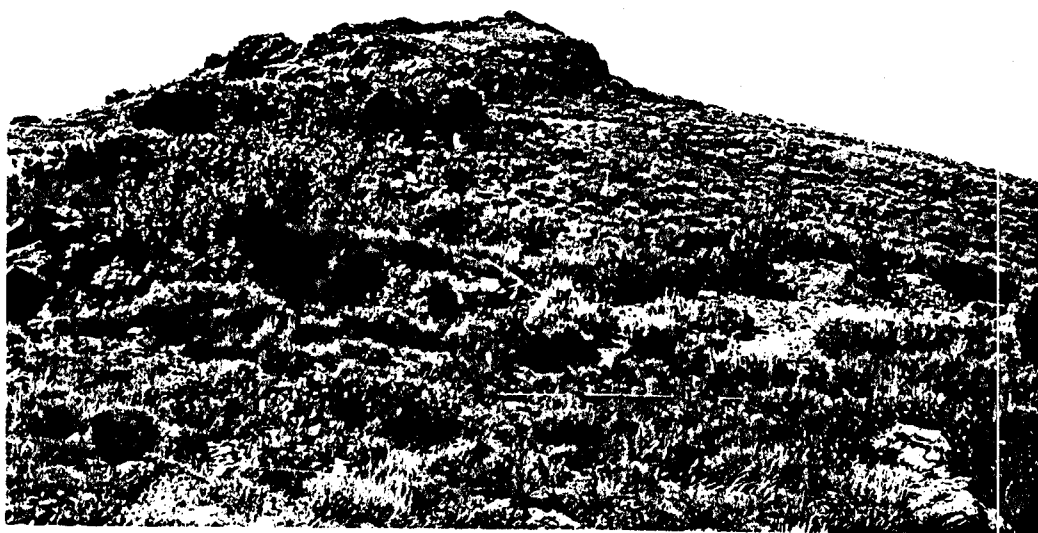
LANDER COUNTY, NEVADA.

SCALE  
1 1/4 1/2 3/4 0 1 2  
MILES

PREPARED FOR J.H. EATON & ASSOCIATES

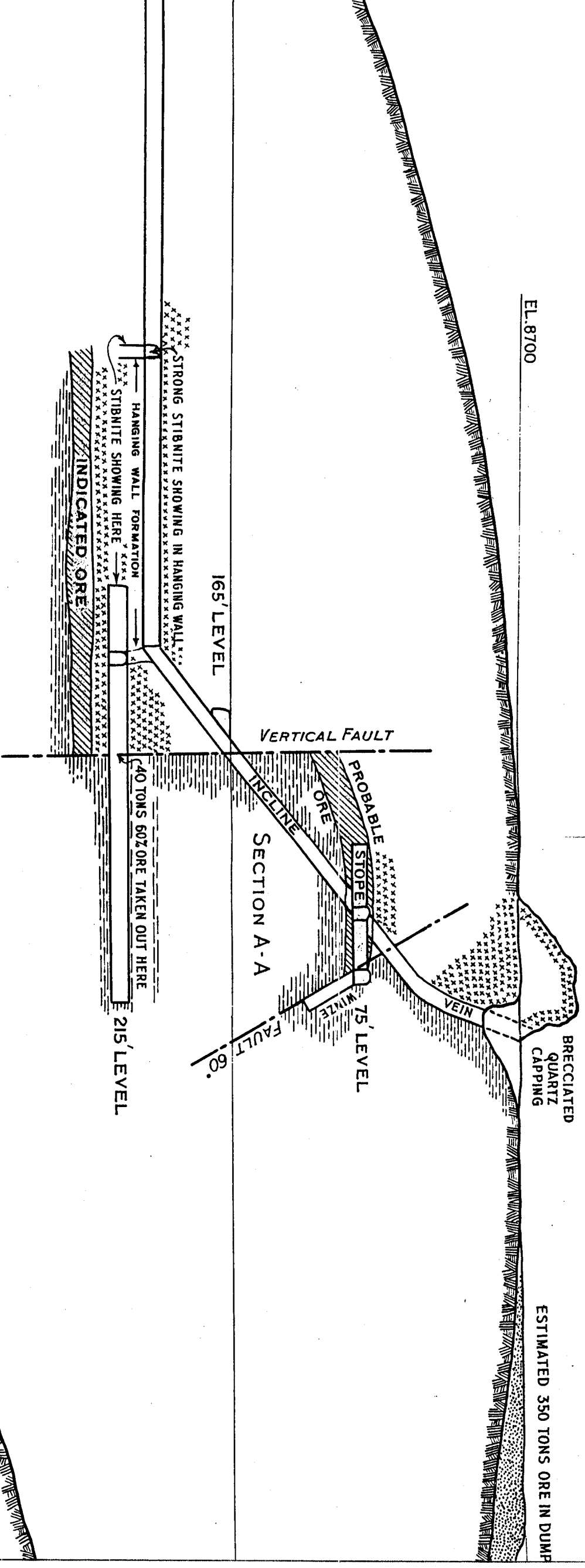
John F. Duling  
Consulting Engr. of Mines  
Los Angeles, Calif.

JULY, 1940.



EL. 8700

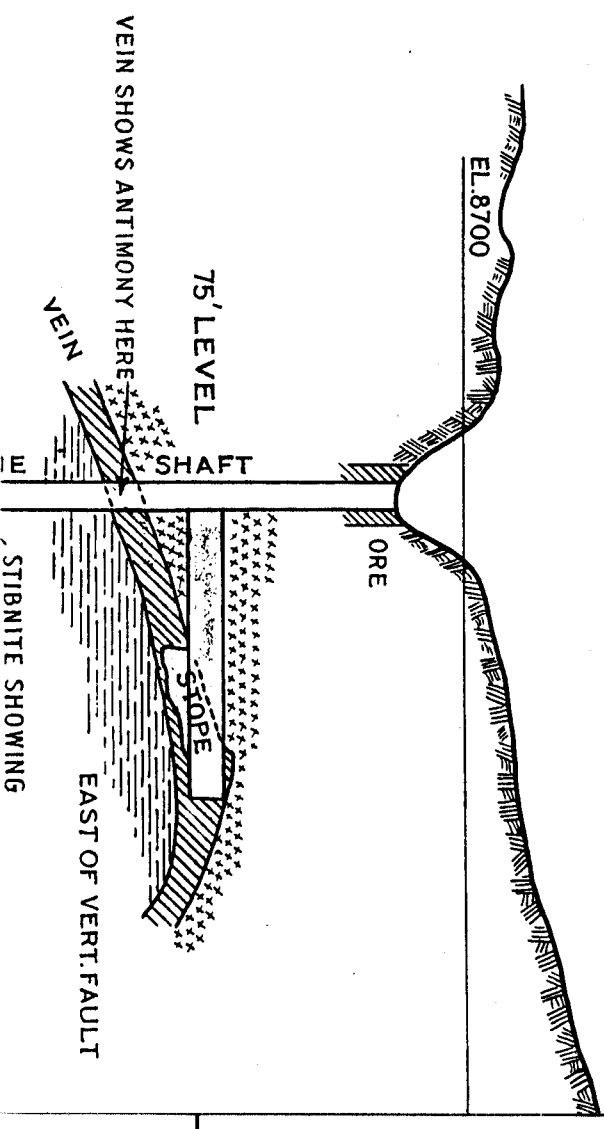
ESTIMATED 350 TONS ORE IN DUMP







TUNNEL SECTION  
LOOKING NORTH

GEOLOGICAL SECTIONS

ANTIMONY KING MINE



—LEGEND—

- |   |                   |
|---|-------------------|
|  | BRECCIATED QUARTZ |
|  | GREY SHALE        |
|  | ORE ZONE          |
|  | SAMPLE NO.        |

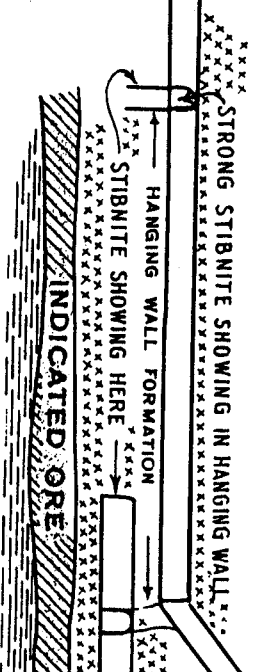
EL. 8700

EL. 8600

EL. 8570

EL. 8500

165' LEVEL



TUNNEL SECTION  
LOOKING NORTH

GEOLOGICAL SECTIONS

T.18 N., R.43 E.  
M.D.M.

S.48°20'E  
1500'

MAMMOTH

SUR. NO. 1939  
20.626 AC.

16 45  
1500' N.48°20'W

OPEN CUT  
MAIN TUNNEL  
INCLINE  
SHAFT  
CAMP

S.41°30'E  
1500'

COMMODORE  
SUR. NO. 1940  
20.622 AC.

1500' N.41°30'W

S.19°00'E  
1500'

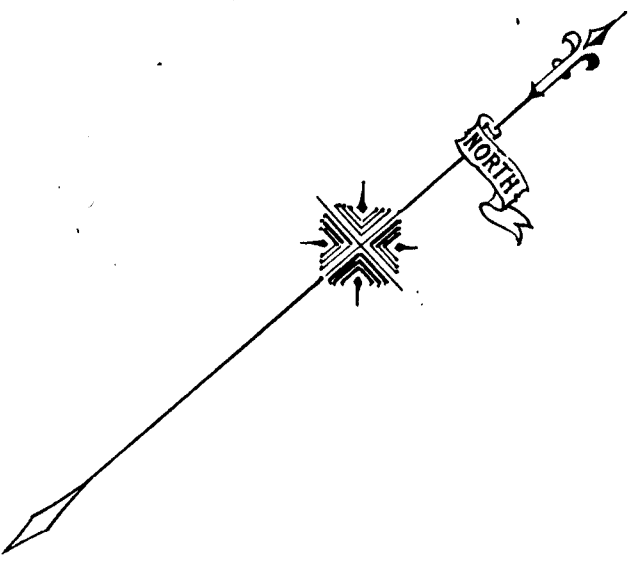
CONFIDENCE  
SUR. NO. 1941  
18.570 AC.

1500' N.19°00'W

600' S.45°00'W

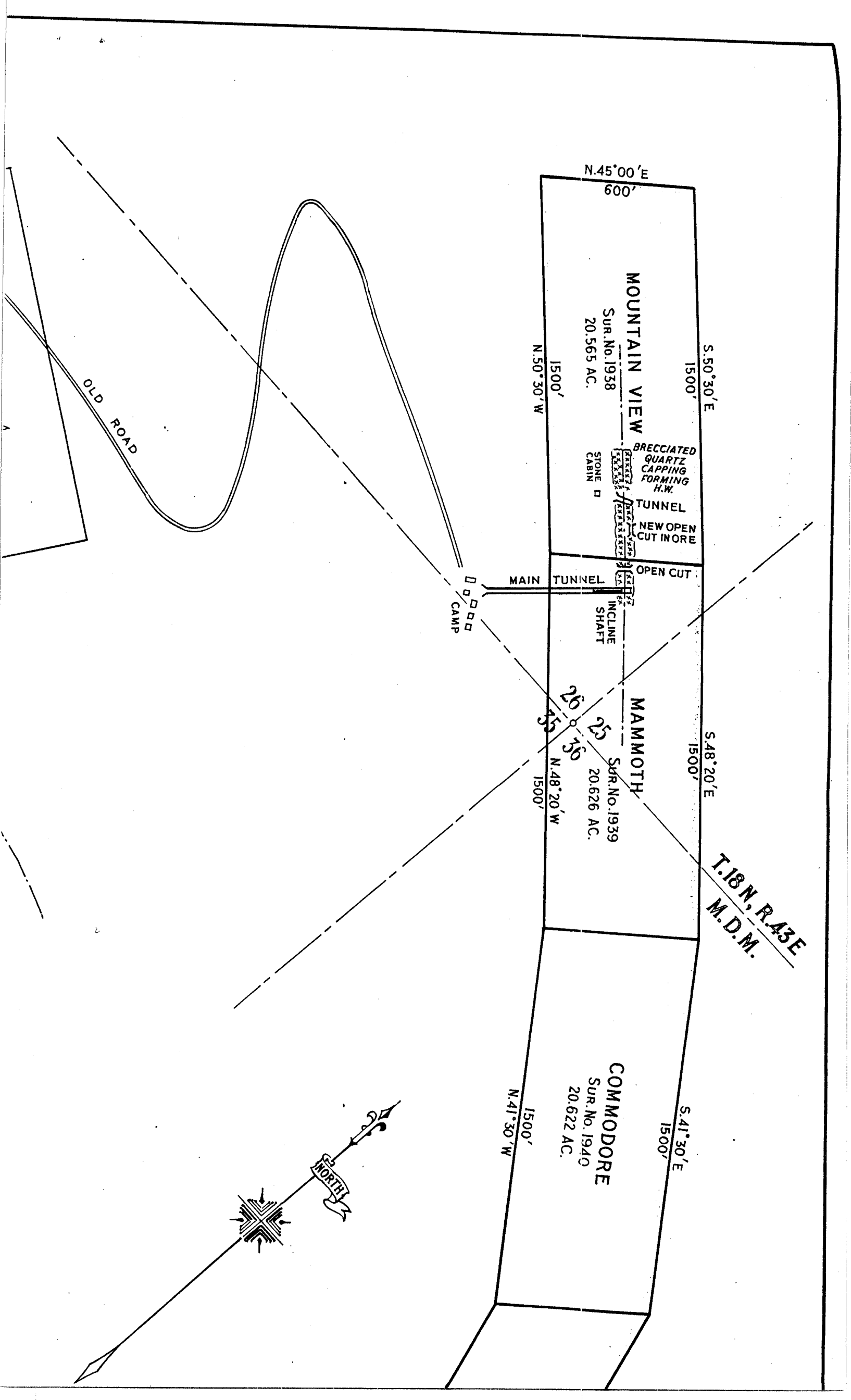
S.17°24'E  
5748'

ANTHONY  
SUR. NO. 1942  
SPRING  
S.20°00'W - 400'  
N.20°00'E - 400'  
N.70°00'W - 5344'  
S.70°00'E - 5344'



-MAP-

OF

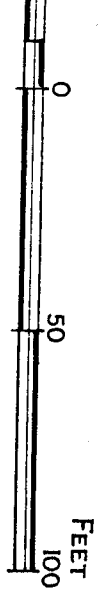


PLAN  
OF

UNDERGROUND WORKINGS

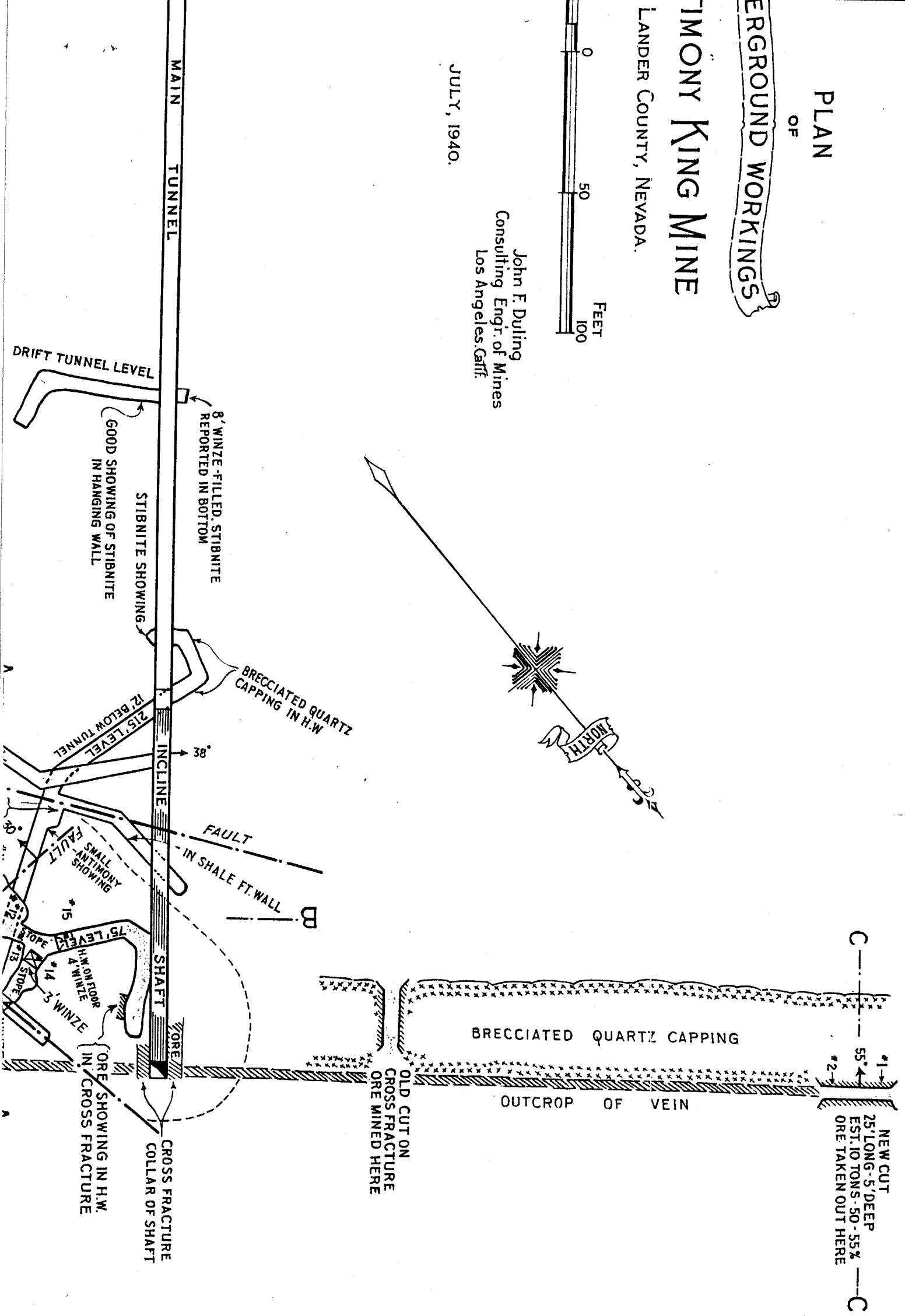
TIMONY KING MINE

BLANDER COUNTY, NEVADA.



John F. Dujling  
Consulting Engr. of Mines  
Los Angeles Calif.

JULY, 1940.





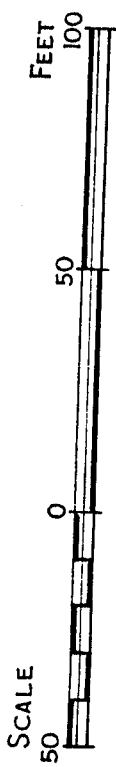
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PLAN  
OF

UNDERGROUND WORKINGS

ANTIMONY KING MINE

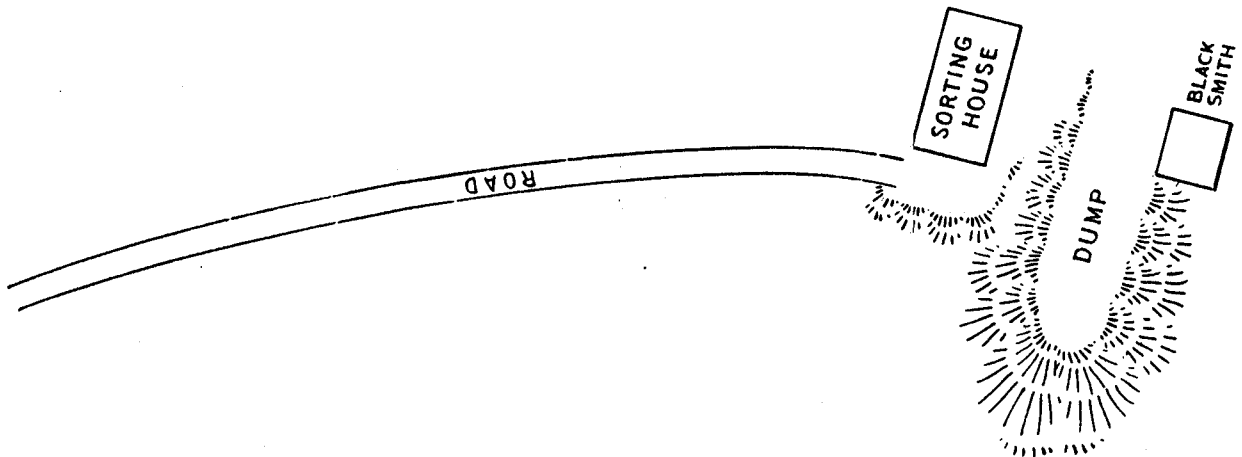
LANDER COUNTY, NEVADA.



Prepared for  
J.H. EATON  
& ASSOCIATES

John F. Duling  
Consulting Engr. of Mines  
Los Angeles, Calif.

JULY, 1940.



8' WINZE-FILLED. STIBNITE  
REPORTED IN BOTTOM

MAIN TUNNEL

TUNNEL LEVEL

STIBNITE SHOWING  
GOOD SHOWING OF STIBNITE  
IN HANGING WALL