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90 14, Silver
(127)

Item 15

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REPORT
UPON
CROWN MINE

HUMBOLDT COUNTY, NEVADA.

by

R. A. HARDY

January 1934.

REPORT ON CROWN MINE
by
R. A. Hardy.

Summary and Conclusions.

1. A gold-silver mine - Humboldt County, Nevada,
located ten miles south of Golconda.
2. Property, consisting of approximately 280 acres,
contains several veins. The principal one is the Crown,
a fissure vein with widths up to seventy feet.
3. Large tonnage of ore is developed ready for milling,
sufficient to keep a 400 ton plant busy for several years.
Five ore shoots develop large tonnages. They are the
Discovery, Recovery, Knudsen, Crown and Plater ore shoots.
4. The gold and silver values are about even with gold and
silver at their present prices of \$35.00 per ounce for gold
and 64½ cents per ounce for silver. The average values
range between four and five dollars.
5. Property should have a long operating life.
6. Treatment of ores will be by cyanidation. Results show
extraction of approximately 85 percent.
7. A reduction plant of about 400 tons per day capacity
should be erected.
8. Mining costs should amount to approximately seventy-five
per ton of ore mined if 400 tons per day is mined.

9. Milling costs, using leaching and agitating slimes should not exceed from eighty cents to one dollar per ton.
10. Metallurgical losses will amount to about three quarters of an ounce of silver and approximately five percent of the gold totaling about sixty-five cents per ton of ore treated.
11. The overhead and general costs, including depreciation of plant investment and taxes, insurance, office, etc. will come to about twenty-five cents per ton of ore treated.
12. Total of all costs should be less than \$2.00 per ton of ore milled.
13. Net profit from milling operations on a basis of about 400 tons per day will be approximately \$2.00 per ton.
14. Should expect profit of about \$800,000 to the elevation of the tunnel level.
15. The mine has fine possibilities below the tunnel level. The Crown ore shoot is developed 150 feet below the tunnel level and is continuing down strong. The other four ore shoots remain to be developed below the tunnel level.
16. Oxidized ores extend down 420 feet, as far as developed and there should be a zone of enrichment below the oxides.

CROWN MINELocation.

The Crown or Knudsen mining property is located in Humboldt County, Nevada, about ten miles south of the town of Golconda, a station on the main line of the Southern Pacific, also on the Victory Highway.

The property takes in parts of Sections 18 - 19 - 24 and 13 in Township E Range West.

It is easily accessible by a good auto road from Golconda without grades.

History.

The property was first located in the early days of mining in Nevada when values were found in the Crown vein croppings. It was partially developed over a period of years, but not until about 1920 was any extensive development work started. At that time the W. P. Hammond interests undertook to develop not only the oxide zone but had a program to develop the sulphide zone lying below the oxides. These interests developed different ore shoots in the oxidized zone but did not reach the sulphides having sunk to only four hundred and twenty feet in the Crown ore body. Altogether their work and the previous development amounted to about 9,500 feet. This development work indicated and partially developed five ore shoots and showed the vein to be upwards of eighty feet wide in places. There was expended, during this development period, about \$300,000. No attempt was made to mill any of the ore as theirs was a strictly development program.

Topography

The mining claims are located at an elevation of 5,500 ft. in the low rolling hills that rise gradually to make up the Sonoma range of mountains. This range is a prominent north-south mountain range that rises to over 8,500 ft. in its Sonoma peak.

Property.

The property consists of fifteen mining claims containing approximately 280 acres. These claims are: Crown, Producer, Crown X, Margarita, Good Hope No. 1, Good Hope No. 3, Good Hope No. 7, Good Hope No. 8, Blue Bird, Birthday, Dorothy, Geoffrey, Recovery, Alsace and Napoleon.

Title.

The title is now vested in E. F. Knudsen and is entirely clear. A certificate of title being furnished by the Washoe County Abstract and Title Company.

Geology.

The areal geology comprises quartzites, shales and schists believed to be pre-carboniferous. The schists have been intruded by several dikes of diorite. The dikes follow the planes of schistosity striking about fifteen degrees west of north and dip from 65 to 70 degrees westerly. The veins follow in strike and dip the planes of schistosity. The schists were derived from the metamorphism of sedimentaries and are capped by quartzites. The schists do not show much erosion but the quartzites have been eroded to a great extent exposing the schists. The veins intersect the schists. The area shows only a few post mineral faults. The principal fault is found at the Recovery shaft and its displacement of the vein is relatively small.

Veins.

Several veins are found in this property. The principal vein is the Crown-Recovery vein. It is a strong fissure vein striking a few degrees west of north and dipping about seventy degrees from the horizontal westerly. It has a width varying from about ten feet upwards of eighty feet. The gangue is made up of quartz and little calcite and as far as developed is in the oxidized zone and shows considerable iron and manganese oxides.

Minerals.

The economic minerals are gold and silver in the vein, the gold occurring finely divided and free while the silver occurs as cerargyrite and little argentite while some iron and manganese oxides are also found.

Development.

The property is developed by two shafts and two tunnels with drifts and cross-outs.

The Recovery shaft is a one and one half compartment shaft 150 feet deep with ore pocket at the bottom. A drift was extended on the vein for a distance of about 300 feet. About 25 feet below this level a tunnel was driven to the north on the vein for a distance of over 500 feet to a point nearly directly below the north face of the Recovery shaft drift.

The Crown tunnel was advanced to the vein by cross-cutting the foot-wall for a distance of 600 feet; this tunnel intersected the vein 150 feet below the croppings and a drift was advanced along the vein for about 700 feet and cross-outs varying from forty to seventy feet were driven across the vein at intervals of fifty feet. Near the adit on the foot-wall of the vein a shaft was sunk in the vein from

from the croppings to the 420 ft. horizon. A level, in addition to the tunnel level at 150 feet, was driven on the 300 ft. horizon and the shaft continued to the 420 point where it was discontinued. Its objective was the 450 ft. level.

Sampling Values.

Sampling was done under the direction of the writer by Fred Wise and Al Colyer. Sample cuts were taken in the Crown tunnel and the drift from the Recovery shaft and croppings. The sample cuts were taken at intervals of five feet across the vein to sectionalize it, and averaged fifteen pounds per foot. About 200 samples were taken.

Over the Crown tunnel five cropping trenches were dug. These gave the following average results:

Taking gold at \$34.00 per ounce and silver at 64½ cents per ounce.

Trench No. 1	South of shaft over width of 40 feet - average value	\$8.95
" No. 2.	" " " " " " 50 feet - average value	\$5.98
" No. 3.	" " " " " " 45 feet - " "	\$5.10
" No. 4.	" " " " " " 40 feet - " "	\$5.34
" No. 5	" " " " " " 40 feet - " "	\$3.58
Cross-cut No. 1,	In Crown Tunnel, " " " 30 feet - " "	\$3.50
" " No. 2	" " " " " " 60 feet - " "	\$3.64
" " No. 3	" " " " " " 30 feet- " "	\$6.72
" " No. 4	" " " " " " 35 feet- " "	\$2.93
" " No. 5	" " " " " " 45 feet- " "	\$2.29
" " No. 6	" " " " " " 25 feet- " "	\$3.02
" " No. 7	" " " " " " 55 feet- " "	\$2.86
" " No. 8	" " " " " " 50 feet- " "	\$3.46
" " No. 9	" " " " " " 40 feet- " "	\$5.80

These averages from the Crown ore body give an average value of

\$4.51.

From the Recovery shaft ore body samples were taken at five foot intervals along the drift from a point about fifty feet south of the shaft to the south face. These samples gave an average value of \$4.72.

The Recovery shaft was sampled independently by another engineer and his average value was reported much higher than the \$4.72.

Tonnages.

The Crown ore body as developed to the 150 ft. tunnel level from the croppings is a block over 500 feet long, having an average width of 41 feet gives a block of ore containing 256,250 tons. This same block extends to the 300 ft. level and below, as indicated by the old assay maps, with widths about the same as on the tunnel level. As an examination of the 300 ft. level cannot be made at this time data from the old maps indicate a block of ore in this ore shoot contains approximately 200,000 tons.

The Recovery ore body as shown by the croppings and on the 150 ft. level is a block 300 feet long with an average width of about fifteen feet, containing approximately 56,250 tons of ore. A similar block below the 150 ft. level can be assumed and classed as probable and possible ore.

It is well to indicate at this point that a horse of schist comes into the Recovery vein and the vein on one side only is developed, when this vein on the west side, or hanging wall side of the horse is developed a similar ore body will probably be developed as on the east side.

No attempt has been made to estimate the tonnages in the remaining three ore shoots, ie; the Discovery ore shoot, Knudsen ore shoot

or the Plater ore shoot.

The tonnage in the Crown and Recovery ore shoot now developed and indicated amounts to approximately 568,750 tons of an average value of \$4.55 per ton, divided as below:

Tonnage and values to the 300 ft. level in the Recovery and Crown ore shoots:

Developed ore	256,250 tons at \$4.51 per ton
	56,250 " " \$4.72 " "
	<u>312,500</u>
Partially developed ore	200,000 tons at \$4.51 per ton
" " "	56,250 " " \$4.72 " "

Metallurgy

A composite of 220 samples was made on which metallurgical tests have been carried out. These tests indicate the amenability of the ore to cyanidation. Recovery averaging about 85% or better can be obtained. Check tests have also been made in Reno laboratories under my supervision. Check of this metallurgical work was also performed by A. L. McFarland of Virginia City, Nevada.

Mining Methods and Costs.

These two ore bodies should receive different treatment in mining.

The Crown ore body can be mined by an open cut method to the 150 level with power shovels and truck haulage at a cost not to exceed forty cents per ton delivered at the mill bin - the mill being upon the property.

The Recovery ore body should be mined by the shrinkage system and will not exceed seventy - five cents per ton delivered to the mill.

This will make a mining cost of about fifty cents per ton and will allow for incidental expenses and a new development cost of about twenty-five cents making a total of seventy-five cents for mining and development.

Milling Methods and Costs.

Metallurgical results show the amenability of the ores to cyanide extraction. Tests carried on show the ground ore consisting of sand and slime can be handled separately advantageously. The sands when crushing is carried on to sixty five mesh will amount to about seventy percent of the total. These can be leached while the slimes will be agitated. A segregation of the costs of the two processes show the same cost through the grinding circuit of forty cents per ton, when power costs approximated five dollars per horse power month. Leaching can then be carried through to precipitation for another twenty cents. The slimes through agitation to precipitation of the values from the solutions will come to about fifty cents per ton with overhead and incidentals in both bases of about ten cents. This would indicate a total cost per ton of ore milled on a 400 ton per day basis of about eighty-five cents per ton.

Plant Cost.

It is estimated for a plant handling 400 tons per day the cost would be approximately \$150,000. The Diesel power plan would cost about \$25,000 if advantage were taken of used plants that are being offered. The mine would need a compressor plant with mine tools, etc; also electric locomotive with cars. It is estimated the mine plant would cost twenty five thousand dollars. About \$200,000 is needed to make the mine into a going concern.

Total Costs and Profits.

(400 tons per day basis)

Value of ore		\$4.55 per ton
Mining cost per ton	\$0.75 per ton	
Milling cost per ton	0.85 " "	
General Expense (Taxes, etc.)	0.25 " "	
Metallurgical loss	0.65 " "	\$2.50 per ton
Estimated profit per ton		\$2.05

(400 tons per day basis)

Estimated monthly recovery	\$46,800.00
" " cost	22,200.00
Estimated monthly profit	<u>\$24,600.00</u>
Estimated yearly profit	\$295,200.00

General

Power would be developed by Diesel engines at an estimated cost per horse power month of from \$4.00 to \$5.00.

Water is obtainable from the Crown shaft. The estimated flow is about 300 gallons per minute which allows more than four tons of water for each ton of ore treated.

Supplies are readily obtained from Salt Lake City or San Francisco.

The climate is such that work can be carried on the year around, the winters are mildly cold but very little snow falls and that disappears quickly.

Housing facilities are sufficient, except for one house to take care of an additional fifteen men.

R. A. HARDY (Signed)

1-10-34.

Sample Number	Vertical length of Cat	Amt. of Sample	Value per Cu. Yd. Free gold
1	Bedrock	3 lbs	\$ 35.67
2	3 ft	5 "	4.36
3	3 "	10 "	2.61
4	3 "	10 "	2.61
5	3 "	15 "	12.91
6	2 "	5 "	2.61
7	3 "	5 "	5.24
8A	Bedrock	10 ^{cu} "	17.46
8	2 ft.	2 ft	1.89
9	5 "	3 "	5.20
10	6 "	1 "	5.67
11	5 "	1 "	1.89
12	4 "	1 "	0.94
13	5 "	1 "	0.47
14	6 "	1 "	1.89
15	4 "	1 "	0.94
16	4 "	1 "	5.67
17	5 "	1 "	3.78
18	5 "	1 "	3.78
19	5 "	1 "	0.47
20	4 "	1 "	5.67
21	2 "	$\frac{1}{8}$ "	16.66
22	Bedrock	$\frac{1}{8}$ "	16.66
23	8 ft.	1 "	9.45
24	5 "	1 "	0.94
25	5 "	1 "	0.47
26	5 "	1 "	1.41
27	5 "	1 "	0.94
28	5 "	1 "	0.47
29	5 "	1 "	0.47
30	5 "	$\frac{1}{8}$ "	5.67
31	5 "	$\frac{1}{8}$ "	3.78
32	Bedrock	$\frac{1}{8}$ "	30.24
33	4 ft.	$\frac{1}{8}$ "	11.34
34	5 "	$\frac{1}{8}$ "	1.89
35	5 "	$\frac{1}{8}$ "	3.78

Sampled by Free Gold
Determined by
Roy Leach & F. L. Leach
Ely, Nevada.

Bedrock indicates
sample taken
on the Bedrock
only. (no cut)
Roy Leach

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Samples and Free Gold Recovery by:

Roy Leach and W.R. Price
Ely, Nevada

Assays by:

E.S. May, Laboratory
2312 E. 52nd St.
Los Angeles, Calif.

Sample Number	Length of Cut	Amt. of Sample	Value Per Cu. Yd. Free Gold	Assay Heads	Assay Tails
P1	7 ft.	10 ^{cu.} ft.	\$0.75	\$1.05	Trace
P2	11 "			Trace	Tr.
P3	12 "	10 "	0.25	0.25	Tr.
P6	50 "	12 "	0.09	0.52	0.25
P8	8 "	10 "	1.52	1.57	0.52
P10	8 "	10 "	0.06	2.10	0.52
P12	8 "	1 "	7.47	11.02	3.15
P14	46 "	15 "	0.82	1.23	Tr.
P16	15 "	23 ¹ / ₄ "	0.72	Tr.	Tr.
P18	5 "	1 "	1.26	1.05	0.52
P20	4 "	1 "	4.20	1.05	0.52
P22	5 "	1 "	7.77	0.52	0.52
P24	5 "	1 "	1.05	2.10	1.05
P26	50 "	10 "	0.20	Tr.	Tr.
P28	28 "	5 "	0.22	Tr.	Tr.
P30	7 "	2 "	0.03	1.57	Tr.
P32	15 "	4 ¹ / ₂ "	0.01	0.52	0.52
P34	23 "	7 ¹ / ₂ "	0.02	1.05	0.52
P36	17 "	6 "	0.44	1.05	Tr.
P38	44 "	10 "	0.70	Tr.	Tr.
P48	72 "	9 "	0.25	0.25	Tr.
P50	S-33'	4 "	0.55	Tr.	Tr.
P52	33'-50'	6 "	0.10		
P54	S-30'	4 "	0.31		
P54	36'-51'	6 "	0.05		
P55	2 ¹ / ₂ "	1 ¹ / ₂ "	3.60		

Head Assay
taken before
Processing
for free Gold.Tail assay
taken after
Processing
for free Gold
Roy Leach.

Sampled and Free Gold Recovery determined by:
 Roy Leach & W.R. Price
 Ely, Nevada.

Sample Number	Length of Cut	Amt of Sample	Value Per Cu. yd. Free Gold
C 1	8 ft.	1 Cu. ft.	\$ 0.03
C 2	8 "	1 "	0.03
C 3	8 "	1 "	0.03
C 4	6 "	1 "	0.06
C 5	6 "	1 "	0.02
C 6	6 "	1 "	0.20
C 7	6 "	1 "	0.06
C 8	6 "	1 "	0.03
C 9	6 "	1 "	0.06
C 10	6 "	1 "	0.90
L 1	17 "	2 1/2 "	0.50
L 2	S-15'	1 1/2 "	0.70
L 2	15'-30'	2 "	0.15
L 3	S-13'	2 "	0.06
L 3	13'-27'	2 1/2 "	0.04
L 3	Bottom	1/2 "	0.06
L 4	S-13'	2 "	0.15
L 4	13'-25'	2 "	0.15
L 4	Bottom	1/2 "	0.18
L 5	S-21'	2 "	Tr.
L 6	S-20'	2 "	0.05
S 3	S-16'	3 "	0.15
S 3	16'-25'	2 "	0.12
S 3	Bottom	2/3 "	0.09
S 4	10'	2/3 "	Tr.
S 5	S-15'	2 "	0.10
S 5	15'-25'	2 "	0.15
S 5	Bottom	1/2 "	0.12

These shafts cut in sections: e.g. L₃
 means 1 cut, Surface to 13' in depth, 13'-27' means cut from 13' in depth to 27' in depth. Bottom means a sample taken from the bottom of the shaft.