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REPORT ON PROPERTY OF

WALKER MINING COMPANY

PLUMAS COUNTY, CALIFORNIA.

BY

FLETCHER HAMILTON

Consulting Engineer Mining & Petroleum

San Francisco, California.

JUNE 26th, 1923.

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State Mineralogist of California
1913-1923.

F L E T C H E R H A M I L T O N

Consulting Engineer
Mining and Petroleum

Hobart Building, San Francisco.

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REPORT ON PROPERTY

OF

WALKER MINING COMPANY

Plumas County, California.

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LOCATION.

The property is located in the Genesee Valley Mining District, T.24 N.,R.12 E., M.D.B.& M., and about 22 miles northwest by road from Portola, on the W.P.R.R., at an elevation of 6500 to 8000 feet, and about 2 miles south of Mt.Ingalls.

EXTENT.

The property extends from the top of the ridge, south to Little Grizzly Creek, about two miles in length and about three-quarters of a mile in width, consisting of 50 quartz claims and two placer claims, covering an area of about 1300 acres, all of which is patented.

TOPOGRAPHY.

The topography is characteristic of the higher Sierras and lends itself to the economical development of the property through a main tunnel which cuts the ore at a depth of 1000 feet below the outcrop.

The drainage of Little Grizzly Creek is into Indian Creek and thence into the north fork of the Feather River.

CLIMATE.

The climate is typical of the higher Sierras with its usual winter snows lasting over a period of four to six months.

WATER.

Water is plentiful.

TIMBER.

There is ample timber on the property for all purposes, consisting of fir, yellow pine, sugar pine and some spruce.

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POWER.

Power is obtained from the Great Western Power Company through a high tension line fifteen miles in length connecting through to a point north of Taylorsville.

LABOR.

The property is operated with a crew of about two hundred men, and the supply seems to be satisfactory. The accomodations are such that the crew is well housed, the boarding house is of high standard, and hospital and other facilities are provided.

TRANSPORTATION.

Previous to 1920 hauling was done to Portola by trucks, a distance of 22 miles, at a cost of $10.00 per ton. Since 1920 an aerial tram, 8.2 miles long, delivers the ore and concentrates to Spring Garden on the W.P.R.R. at a cost of about $1.00 per ton. Operated to capacity, which is 250 to 300 tons, this cost will be materially reduced.

GEOLOGY.

The ore mines is copper-gold-silver. The vein is fissure type with diorite walls. Strikes N.W. and S.E. dipping to the East at about 65 degrees.

The vein croppings are very massive and extensive, the whole surface showing evidences of leaching and oxidation. At the point of orriginal attack, where the shaft was sunk, the croppings were not as strong as on the north end of the property, however the large ore body now being developed is directly below that point. The possibilities of developing large ore bodies to the north are practically assured. The vein outcrop is capped on both the north and south extensions by lava which probably came from Mt.Ingalls.

Chalcopyrite is the predominant mineral. The concentrates form about 20 per cent of the weight of the ore. The ore is primary and I see no reason why the values should not continue in depth below present development. There has been some secondary enrichment at local points where high grade ores have been and will be found. The hanging wall

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side of the vein seems to carry the better grade of ore.

DEVELOPMENT.

The ore was originally developed through a vertical shaft sunk to the No.3 level. At a point 25 feet below the surface the sulphide ores were first encountered. From that point on development was opened up and blocked out an ore body 800 feet long, 1,000 feet deep and having an average width of over 25 feet. It is my opinion that the actual mining of the ore will show a stronger width to the ore body.

Development of this ore body below the No.3 level was accomplished by driving a tunnel 4,000 feet in length and by drifting on the ore, raising through to connect with No.3 level and development upon No.4, No.5 and No.6 levels. No.7 level is the tunnel level.

At the south end of the 800 foot ore shoot a dyke four to five feet wide crosses the vein and marks the limit of the ore body blocked out. To the south of this dyke however the vein continues, without apparent displacement, but with lower values.

At a point in the main haulage tunnel, about 400 feet west of the main vein, a parallel vein of considerable width was cross cut but no work done thereon. This same vein was undoubtedly proven upon the south end of the No.3 level where a cross cut was extended and a large body of gossan ore encountered. This is entirely undeveloped but will in all probability prove an important area for development.

To the north of the 800 foot ore shoot, development has been carried on for several hundred feet on the No.3 level which showed a large body of lower grade ore which on the extreme north showed values over 3 per cent copper and gives promise of further extension.

On the No.6 level development is now being prosecuted to the north, over 600 feet beyond the 800 foot ore shoot, with the grade of ore improving. A cross cut at this location shows a width of vein over 75 feet with no wall yet encountered. This is approaching the country underlying the large surface outcrops, and development should be watched with interest.

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BLOCKED ORE.

The main ore body developed - 800 feet long, 1,000 feet deep and 25 feet wide,- would indicate a tonnage of approximately two million tons. From the past performances of the mine, as evidenced by the mill and smelter returns on concentrates and ore shipped, as well as assay plans of the mine and general calculated values, this developed ore will average better than 4 per cent copper with additional values of $2.50 in gold and silver.

The average run of mine ore contains about 20 per cent, by weight, of concentrates. Five tons of ore producing one ton of concentrates. The concentrates, under present milling conditions, will average about 20 per cent copper and $10.00 per ton gold and silver, giving them a value of $70.00 per ton, with copper at 15 cents per pound.

Included within this block and located between the 5th and 6th levels and south of the north raise, a high grade stope is being worked about 175 feet in length and about 40 feet wide which will probably average 8 to 12 per cent copper and $5.00 in gold and silver.

METHOD OF MINING.

The size and dip of the ore body lends itself to an economical method. The filled stope method is being used. Stoping on top of broken ore, drawing the excess, a minimum of timber is necessary.

MINING,EQUIPMENT AND PRODUCTION.

The property is operating at the present time a 250 ton flotation plant which has produced in concentrates during the past eleven months up to May 1st, 1923, as follows:

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	Tons	Company	Smelter	Railroad	Gross
June	1444.23	$62,336.36	$24,832.17	$ 8,424.76	$95,513.75
July	1984.86	87,012.83	37,387.86	11,628.24	134,323.68
Aug.	2307.31	93,805.43	41,795.22	13,475.19	149,098.51
Sept.	2064.27	85,035.47	39,080.29	12,019.93	136,153.29
Oct.	2326.52	92,027.54	43,447.02	13,209.61	148,705.17
Nov.	1905.49	76,223.82	35,832.95	10,492.03	122,565.20
Dec.	1942.50	77,956.58	36,332.02	10,830.31	125,105.91
Jan.	862.97	40,321.28	16,915.82	5,237.52	62,491.62
Feb.	480.18	24,015.18	9,909.21	3,196.97	37,131.86
Mar.	1208.47	61,004.96	24,833.05	8,136.84	97,984.95
Apr.	2000.38	104,983.63	41,219.09	13,358.76	159,786.97
	18527.18	$804,723.08	$351,584.70	$110,010.16	$1,268,860.90
			Total Concentrates		$1,268,860.90

CRUDE ORE PRODUCTION

During the past eleven months up to May 1st, 1923, the mine has shipped crude ore as follows:

Sept.	179.97	$ 2,874.12	$ 2,420.94	$ 579.26	$ 5,877.82
Oct.	405.25	7,010.70	5,726.61	1,452.87	14,197.18
Nov.	1028.35	19,090.04	15,950.78	4,095.91	38,263.08
Dec.	1040.67	19,278.00	15,221.62	4,134.63	38,651.76
Jan.	1268.15	24,524.29	18,609.90	5,105.86	48,251.55
Feb.	1117.01	19,471.16	19,751.39	4,651.53	40,958.46
Mar.	1811.19	38,531.97	26,657.63	7,235.16	72,446.08
Apr.	116.04	2,761.62	1,895.53	457.31	5,017.97
	6966.61	$133,541.90	$105,334.40	$27,712.53	$263,663.90
			Total Crude		$263,663.90

The average grade of ore put through the mill during this period was over 5 per cent copper and $2.50 gold and silver.

The average grade of shipping ore was 11½ per cent copper and about $5.00 in gold and silver.

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PRESENT COSTS

With the present mill capacity of about 250 tons per day.

Milling costs per ton for March,1923.....	$2.17
Mining " " "	2.07
Tramming " " "	1.00

A considerable portion of ore milled is taken from development work. When ore is taken from stoping operations the mining costs will be lowered.

SURFACE DEVELOPMENT

The property is fully equipped with water system, bunkhouses, boarding house, cabins, machine shop, warehouses and all necessary adjuncts to complete mining and milling operations.

TAILING DAM

A dam has been constructed to impound the tailings from the mill operations in order to prevent contamination of streams

NEW CONSTRUCTION

In order to increase the milling capacity of the property, the following plan is now under way which will bring the tonnage treated to 900 tons daily:

Crushing and concentration Plant.....	$268,942.00
Moving boilers, heating plant.....	6,000.00
Compressor Plant.....	35,000.00
Transformers and housing.....	10,000.00
New Shop Equipment.....	25,000.00
Warehouse and oil tanks.....	8,000.00
New Bunk House.....	12,000.00
12 Three Room Cottages.....	12,000.00
New fire installation.....	6,000.00
Total.....	$382,942.00

This construction is going forward according to schedule and should be completed in October, 1923. The new mill is to be of all steel construction equipped with modern fire protection sprinkler. The new mill is to be constructed in three units, each with a No.75 Marcy Ball mill, Rock Breakers, Rolls Flotation Cells and a unit capacity of 250 tons.

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TONNAGE RESUME

Considering only the 800 foot block of ore developed. The tonnage proven at the present time, allowing a generous reduction of 20 per cent for ores already mined and taken out in development, is 1,600,000 tons which will average 4 per cent copper and $2.50 in gold and silver values.

PERFORMANCE

The present mill is obtaining an extraction of over 95 per cent of the concentrates.

Concentrates average about 20 per cent copper and about $10.00 in gold and silver giving them a value of about $70.00 per ton.

With improvements in flotation methods already tried, the anticipated grade of concentrates in the new plant will be better by 2 to 5 per cent.

The blocked tonnage will produce 320,000 tons of concentrates.

After paying freight and smelter costs, the mine receives about 63 to 65 per cent of the gross, a minimum of $44.00 per ton, with which to pay mining, milling, tramming and other costs and profits.

Gross value per ton of concentrates	$70.00
Freight and smelter (35 to 37 per cent)	24.50 - 26.00
Mining, milling, tramming on 900 ton per day capacity	17.50
Minimum net after all ordinary costs	26.50

This would show a net return of $8,480,000 in the blocked ore body.

This body of ore mined at the rate of 900 tons per day would be exhausted in six years.

CONCLUSIONS

The Walker Copper Mine is one of the few important developed copper mines of the State of California.

The economic conditions are such that copper can be produced at an unusually low cost, probably seven cents.

The ability to carry on mining operations through a main haulage, with the resultant elimination of pumping and hoisting will

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reduce mining costs.

The ore bodies will lend themselves to cheap extraction.

The ore is an ideal concentrating ore, amenable to flotation with high recovery.

Tonnage can be extracted with a minimum of labor.

A lower grade ore than that now developed and blocked out can be treated at a profit.

A very large tonnage of ore which will go over two percent copper is now developed in the mine and with future development a much larger plant would unquestionably be justified.

The ore body at present developed shows some irregular extensions in width at various points and care should be exercised in stoping operations that the ore is mined to its full width.

The geological conditions are favorable to the discovery of ore bodies in virgin territory not yet prospected.

The development work and mining methods used as well as the construction work under way has been and is being carried on efficiently and economically which undoubtedly means much to the enlarged success of the operation.

Respectfully submitted,

(Signed) Fletcher Hamilton
Consulting Engineer

June 26, 1923.

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