MR29-2

Report on the B-H. Mining property, which covers the mine, metallurgical methods, mining methods and basis for estimating costs, together with some suggestions as to its future prospects.

In the compilations of the following data, it is based upon facts from the Company's records, the Wyoming State Geological Reports and the United States Geological Survey, and other sources which are considered reliable.

Wages in this general district average the same as in Colorado. Skilled and special classes of labor would have to be brought in from outside sources for a large-scale operation.

HISTORICAL

History of the General District

The history of the field demands a special examination. The original discovery was made here nearly a century ago, yet the district has never come into the prominence its generally rich mineralization would seem to have justified, though it has been intensively prospected and developed at sporadic intervals and with indifferent success. This suggests some untoward circumstances, inefficient and misdirected efforts, attended apparently with more than the usual proportion of intelligent effort, backed up with adequate financing to develop on the comprehensive scale essential to overcoming the technical difficulties peculiar to the district. A clear understanding of these past difficulties requires a more or less detailed examination of its history down to the present time.

An authoritative review of the district from the discovery down to 1915 appears in Bulletin 626 (1916) U. S. Geological Survey, from which the following notes covering the items of importance have been excerpted:

> The discovery of placer gold in the Sweetwater district is said to have been made in 1842. In 1845 a party of 40 men, lead by the original discoverer prospected the region and did some sluicing along Sweetwater River. The leader of the first party returned with eight companions in 1860 and began mining on Strawberry Creek. (page 23).
>
> The Carissa lode was discovered in June of 1867 and nearly $9,000 was extracted from it by crushing the quartz in a hand mortar, and by washing the detritus from the lode.
>
> A six-stamp mill driven by a water wheel was erected on Hermit Gulch in 1868 and crushed 1,040 tons of ore in that year whith an average yield of $36. per ton. The year following, 480 tons was treated, yielding an average of $47 per ton. The second plant was a ten-stamp mill at Miners Delight, which was estimated to have made a recovery of $60,000 from the lode of that same name, the ore averaging about $40 per ton.
>
> The principal veins of the district were nearly all discovered by 1871, by which time 12 mills had been erected with a total of 161 stamps. Up to the end of 1873, the gold production of the district appears to have amounted to about $550,000.
>
> In 1872 South Pass City was nearly deserted. The Caribou and Buckeye Mines near Atlantic City were

Being worked, and three mines were active at Miners Delight, but in 1872, the mines at the Sweetwater district were reported as being essentially idle. (page 24)

In 1884 a French company started development of a hydraulic project, which after many delays and changes in plans finally resulted in a hydraulic elevator being installed on Rock Creek below Atlantic City. This operated three seasons, 1890 to 1892, inclusive, and is said to have receovered about $200,000. This company ran into financial difficulties in 1893 and was taken over by the Dexter Mining & Milling Co.

This last company constructed the Dexter Mill at Atlantic city in 1905 and drove the Rose tunnel 1,100 ft. but no ore bodies were encountered. It is estimated that about 12,000 tons of ore were hauled to this mill from other prospects in the district; this ore averaged $5 to $30 per ton and gave a clean-up of $6,000 off the plates, with absolutely nothing from the cyanide plant.

This administrative and technical failure was followed by bankruptcy and a reorganization as the Timba Bah Mining Co., the affairs of which latter concern were in the hands of a receiver in 1914. (page 25)

Aside from the activities of the two companies mentioned, interest in the Atlantic district has been maintained largely through recurring attempts to reopen certain of the mines that were more productive during the years 1868 to 1872. Individual prospectors and small associations have been continually at work. Up to 1906 one or more stamp mills were kept in shape for the use of miners in the treatment of small lots of ore. Operations receiving the most attention during this period were: The Carissa at South Pass City; The Miners Delight at the east end of the district; and the Garfield near Atlantic City. (page 26).

The Carissa appears to have been idle from 1873 until 1900. In 1901 a shaft was sunk to 300 ft. which was later extended to 387 ft. but the lowest level at present (about 1915) is 360 ft. but the lowest level at present (about 1915) is 360 ft. The production in the period 1902 to 1906 was about 2,800 tons of ore from which there was a return to somewhat more than $25,000 in gold and silver. No mining has been done here since 1906. The workings extend along the vein for about 750 ft. and there are five levels with an aggregate length of nearly 2,600 ft.

The Miners Delight property was worked from the time of discovery in 1868 until 1874, idle for the next six years, then reopened and worked for two years more, and finally sold in 1893 to satisfy a claim for $28,500. It is reported that a large sum os money was spent in an attempted revival of mining here in 1894, which was not successful; similar attempts in

1910 and again in 1913 were likewise failures, though comparatively small amounts were expended on these.

The Garfield mine (Buckeye State?) is said to have been 140 ft. deep in 1870, and that $50,000 a year was being recovered from it at that time. Several efforts were made to rehabilitate this propetty, the most important of which was 1891-1894. Two Tremaine stamps and a small hydroelectric plant were installed and some gold was recovered, tu apparently it was not a commercial success. It is reported that the mine yielded $5,000 to 1,000 tons of ore in 1905.

The Mary Ellen mine has been another occasional producer, though between 1902 and 1915 the property was in litigation. (page 26).

The Wyoming Copper Co. organized about 1909, obtained a group of claims west of Willow Creek about one mile about South Pass City and were active intermittently until the summer of 1914, sinking a shaft to 500 ft. and doing some drifting. Small amounts of rich copper minerals were found near the surface, but nothing of value was discovered in the shaft workings, and the project appears to have been finally abandoned in the fall of 1914. (page 27).

The Beck Mining Co. acquired the Duncan and Mary Ellen group of claims in 1915, and sunk a shaft about 150 ft. with some drifts. A battery of three Nissen stamps and s me cyanide equipment were installed. There was a production of about 2,000 tons of ore in 1915 to 1917, from which about $20,000 in gold and silver was recovered. No mining has been done since that time.

The Golden Gate Mine and Timber Co. took options on the McGrath claims north of Atlantic City in 1924 and worked these until September, 1925, when the shaft house was destroyed by fire, and nothing has been done since.

The B. & H. Gold Mining Co. obtained the Merrin claims in May, 1926, and have been doing development work there since, at the same time conducting test for the best way to treat the ore.

Mr. Thorne and associates took over the Carissa Mine in September 1928, and have been proceeding with development since. They are now installing a modern 100-ton milling plant which should be completed in the fall of this year.

History of the Company's Claims

The claims that make up this company's property were discovered some time previous to 1890 by Martin Collins. They continued in his possession until 1923, during which time there was very little development work done, only about such as was necessary to conform with the legal assessment provisions. It is reported locally that some small mill runs were made with ore taken to neighboring mills in the district, but there is no record of the results obtained with these.

In 1923 the properties were taken over by J. J. Merrin, Sr.

and associates of South Pass City, Wyo. No active development work was done by these owners other than the required assessment work. The properties passed into the hands of the present owners on May 1, 1926, who have done considerable work in sinking shallow shafts with some drifting, putting down test pits and making cuts on the outcrops.

In September, 1928, a mill test of 25 tons of ore taken from the 100-ft. level of the shaft on the Ellen M. C. No. 2 claim, was made at the company's mill on the property under the direction of Guy Lusigan who was formerly the amalgamator of the Homestake Mining Company in South Dakota. The stamps in this mill weight 750 lb. and 90 to 100 6-in. drops per minute were used in this test. A 40-mesh screen, plate and amalgamating trap were used.

The extraction from this 25 tons of ore amounted to $214.72 or an average of $8.58 per ton in gold. This ore assayed $25.80 per ton, showing the extraction to be about 33%. The object of this test was to determinthe economic value of straight amalgamation in milling practive to recover the values.

In March, 1929, 600 lb. of ore from this property was sent to the Golden Cycle Mining & Production Company, Colorado Springs, Colo., for testing purposes, the results of which tests are outlined in the section "Milling Equipment and Operations."

GEOLOGICAL FEATURES

The purpose of this report is economic rather than technical, and the discussion of the geological features is limited to the more purely economic aspects. The general and areal geology of the whole district has been abley treated in the U. S. Geological Survey, Bulletin 626 (1916), from which factors of greater economic significance are excerpted herein, supplemented with more detailed particulars of the company's particular properties.

Mineralogy of the Veins.

The chief characteristics of the gold-bearing veins of this general section are described in the above mentioned bulletin, as follows:

> The veins of the district are composed mainly of quartz. At the surface the quartz is likely to be more of less iron-stained, and some of it is cellular and the cavities usually contain yellow, brown, or red limonite diminishes and it becomes evident that this material is derived from pyrite or arsenopyrite. An intermediate product in the decomposition of arsenopyrite is scorodite ($FeAs_4 \cdot 2H_2O$), which was noted in ore specimens from the Carissa mine.
>
> In addition to common iron sulphide pyrite, the magnetic sulphide pyrrhotite also occurs, but in general both of these minerals are subordinate in

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amount to arsenopyrite. A few veins carry chalcopyrite. Galena was observed by the writer only in quartz from the Marry Ellen mine, which also, carries a little arsenopyrite.

That the gold contained in the veins is usually associated with the sulphide minerals, including arsenopyrite, is evident from the fact that with increasing depth the ores have proved to be less amenable to amalgamation as a rule.

So-called black quartz, which is of rather common occurence, carries brown or black tourmaline.

The mineralogy of the veins is in accord with the views held by the writer that the veins are of deep-seated origin, and this view is also supported by the fact that none of the veins show layering or banding, as it is commonly called, parallel with the walls.

Probable persistence of the Veins

The persistence and continuity of the veins is a matter of such vital importance that we prefer to quote impartial authority on this. Bulletin 626 (1916) U. S. Geological Survey, reports the results of their studies of the local geology, as follows:

From a practical man's point of view, the first importance attaches to the question of whether or not the veins and other gold-bearing deposits of the district will be found to persist to great depth, and if they will continue to carry about the same amounts of gold as near the surface. (page 33).

All the evidence indicates that on the whole, the deposits must be as abundant at any depth that might be chosen for consideration, as they are at the suface. Although these general conclusions are fully warranted by the geologic features of the district, they should not be taken as a guaranty that all the veins of the district will be found to be c ntinuous to indefinite depths. It is probable that the lodes showing long outcrops, like the Carissa and Miners Delight, will persist to great depths, whereas it would not be surprising if the lodes that are found to pinch out at correspondingly moderate depths. On the whole, the writer is inclined to believe that in this district strike veins, if well defined, are likely to prove more persistent than cross veins. (pages 33 and 34.)

As to the downward continuance of gold content, though it is likely there has been some enrichment through solution and redeposition in the oxidized portions of the lodes, it is not believed that any really large proportion of the gold in the upper parts of the veins can be secondarily precipitated from

surface solutions; and no hesitation is felt in stating the conclusion that the occurrence of valuable ores is not limited to a shallow zone. It may be expected that here as is the rule in other districts, different parts of the smae lode will be found to carry varying amounts of gold, or, in other words, that in any vein the best ore will be found in the form of shoots. The foregoing conclusions and suggestions indicate the wrinter's belief that the district is worthy of further development. (page 34.)

The writer shares the opinion which has been expressed by several geologists who have made reports on this district, that the early promise of the region may yet be fulfilled. This opinion rests on the belief that the stronger gold-bearing veins of the district persist in depth, with about the same characteristics as they show near the surface. (page 34).

Veins on the Company's Property

The gold-bearing veins on the compnay property are almost vertical in many instances, varying from this to a pitch of 80 deg. to the Northwest. The prevailing strike of the formation locally is N. 60 deg. E. with one cross vein at approximately right angles to this on the Ellen M. C. No. 1. The veins do not always follow the formation, occasionally crossing it at a slight angle to the north, and the strike of the veins is more to the north, averaging about N. 40 deg. E.

The veins usually have one well defined wall and sometimes both, the ore consisting of mineralized zones along these fissues. The adjacent slates have been silicified and carry small disseminated crystals and arsenical pyrites and free gold. There are numerous thin veins of quartz which are an integral part of the slates and conformable with them. Crystalline quartz and calcite are also found in strata and pockets along these zones; the calcite diminishes with depth, and it is eveident that this is dervied from pyrite or arsenopyrite. The mineralization extends well out beyond the walls proper, and small values in gold are found at quite a distance on both sides of the vein.

The Emma, Caroline No. 1, Ellen MC Nos. 1 and 2, and the Gold Nugget have three to four distinct veins separated by intervals of 10 to 30 ft. and all within the same shear zone. Some of these have been opened separately with test pits. The length of these veins along the strike is not known, but they have been proved up for considerable distances with test pits and shallow shafts. They have been traced for a distance of 2,00 ft. where they are better exposed on the west end of theproperty, or about half its length. And the same, or very similar veins, have been discoveredand proved up on the eastern end of the property. The prbability of their continuing in depth has been touched upon in the quotation of the U. S. Geological Survey, given on page 27.

The ore from these claims is mainly quartz, in which oxide and silicate of iron are finely divided. Some of the quarz,' however, is white and transulcent, similar to that found in California; this is found mostly on the Gold Nugget and Emma claims. The dark quartz

is the most common, and the yellow and red varities are frequently so decomposed that they can be crushed in the fingers. Base metals such as lead, zinc, antimony, tellurium, copper, mangenese, etc., do not occur in the veins filling, or within the walls.

All the veins that have been opened up show greater or less gold values, but as is always the case the best grade is found in shoots. The gold occurs free, both coase and fine, and also in finely disseminated arsenical pyrites. An it is sometimes found without the customary vein accompaniments in hard, barren slates.

Gold Recovery in the District.

An authoritative receord of the early gold recovery for this whole general district appears in the U. S. Geological Survey, Bulletin 626 (1916), from which the following is excerpted:

> The value of the gold produced in the Atlantic district from 1867 to 1875 is estimated at $736,100. From 1876 to 1895, the output of the State was estimated at $165,000, this including some gold produced in other sections. The State output from 1896 to 1913 is placed at $290,000; it is known that a large proportion of the gold produced in 1899 came from copper ores. (page 27.)
>
> On the basis of these fingures, it would appear that the Atlantic district must have produced less than $1,000,000, though an unofficial estimate back in 1893, placed the amount at $5,050,000. The writer is inclined to believe that the gold production of the district may have been greater than the U. S. Geological Survey figures, though it can hardly have been as great as the unofficial estimate given above. Possibly the lode mines and placers may have produced as much gold since 1875 as before that year, in which event a fairly reasonalbe guess would place the total output at $1,500,000.
>
> The following is an estimate of the gold output of the Atlantic district as given in a report of Freemont County published in 1911:

Lode Mines		Placers	
Miners Delight . . .	$1,200,000.	Meadow Gulch. . .	$1,000,000.
Carissa	1,000,000.	Yankee Gulch. . .	500,000.
Caribou	500,000.	Spring Gulch. . .	30,000.
Garfield.	400,000.	Promise Gulch . .	30,000.
Victoria Regina . . .	350,000.	Smith Gulch . . .	20,000.
Franklin	300,000.	Red Canyon . . .	20,000.
Mary Ellen	125,000.	Atlantic Gulch. .	15,000.
Lone Star.	40,000.	Beaver Creek. . .	10,000.
Carrie Shields	35,000.	Others.	150,000.
Other quartz mines . .	187,000.		
	$4,137,000.		$1,725,000.
	1725		$5,862,000.
	5862		5,862.000
	4,137		or 5,912.000
	1770		
	5912		

Gold Content of the Ores.

An estimate of the gold values in the ores of this district generally is given in the U. S. Geological Servey, Bulletin 626 (1916) from which is quoted, in substance, the following:

> Reports of the Survey indicate that the ore mined in thes district prior to 1872 retuned $20 to $20 per ton under treatment by stamp milling and simple amalgamation. Some ores were worked that yielded only $15,00 per ton, and occasional lots yielded as high as $200.00 a ton. (page 32).
>
> The original Hermit Gulch mill treated 1,040 tons July to November, 1868, which yielded an average of $36 per ton. The following year, April to July, 480 tons were crushed averaging $47 per ton. Ore from the Miners Delight vein is said to have yielded from $16 to $200, the average being about $40.
>
> Old reports of the district indicate that many of the lodes may be expected to average $20 gold to the ton. It is believed, however, that as a general rule, theis expectation will not be realized, though with little doubt, shoots of rich ore will be found. It is more likely that assays will show averages of $6 to say $15 a ton.
>
> Confidential production records of the Survey indicate an average yield of $8.15 per ton from 11,105 tons of ore produced by eight companies since 1902. If the few tons of exceptionally high grade ore are omitted from this computation, the yield appears to have ranged from $5 to $9.18. This is, of course, based on the metal recovered, and is no index to the actual gold content of the ores.

The gold on the properties of this company is generally found along the cleverage planes, particularly the coarse gold. For this reason, there is doubltless a considerable loss in the fine dirt values which are difficult to save, and it is believed that the following assays are consistently less than what will be obtained under conditions of practical operation:

Veins	No. of smaples	Average Gold per ton	Width of Vein	Remarks
Ellen M. C. No. 2	15	$22.52	3 ft.	12 smaples on the 100 ft. level and 3 above
Ellen M. C. No. 1	4	6.80	4 ft.	Surface prospects
Ellen M. C. No. 3	3	7.00	6 ft.	Surface prospects
Caroline No. 1	5	5.77	8 ft.	Surface prospect
Emma	7	15.60	3 ft.	Shafts near center of claim.
Gold Nugget	2	16.98	6 ft.	At discovery shaft
Total smaples	36 Average	$12.45	5 ft.	

gold price $ 20.63/oz in 1929

Sampling is accordance with accepted standars, taking uniform section of the vein. Numerous samples can be found running 20 to 30 oz of gold, but these were rejected. Assayes by competent authorities.

After making due allowance for the losses in treatment under the former crude methods that have been used in this district, it will be oberved that these results are quite comparable with estimates of the U. S. Geological Survey. It is believed they are a representative and conservative estimate of the results to be anticipated.

MINE DEVELOPMENT AND PROSPECTS

Extent of Development on Claims

Ellen M. C. No. 2 - - This is the only claim that has mining operations, in the strict sense of the word. A double compartment shaft has been sunk on the main vein here about 110 ft. south of the cross-vein. This shaft is 105 ft. deep and an aggregate amount of 135 ft. of drifting has been done along the vein on both sides of the shaft at the 100-ft. level. The vein here has approximately the same strike as the zone of shearing, and is almost vertical, it being almost impossible to distinguish between the hanging wall and the foot wall.

The ore in this operation has the characteristic features of deep-seated gold-quartz veins, and the amount of silver is negligible. In the highly oxidized zones the gold is found usually in a free state, and the best ore is in distinctive shoots. At the junction of the main vein with the corss-vein of Ellen M. C. No. 1 on the surface, a very rich ore shoot occurred containing numerous free pelets of gold; this was stopped out to a depth of 20 ft. It is estimated that the north drift from the shaft on the 100 ft. level is within 20 ft. of this junction and it is expect that another rich deposit witll be found there.

The continuation of this vein to the south boundary of the claim has been definite y proved up with shafts and test pits.

Ellen M. C. No. 1 - -This vein is sometimes referred to as the cross-vein, and has been proved up with shafts and test pits from the southern boundary north a distance of more than 1,000 ft. to its junction with the Caroline No. 1. As may be inferred, this vein is about at right angles with the prevailing formations; the strike of the vein is about N. 42 deg. W., and it dips to the north-east at about 80 deg. The walls of this vein are imperfectly defined, and about 50 ft. wide. As already noted, enlargements of the ore bodies with distinctive high-grade shoots are to be anticipated at these intersections.

Ellen M. C. No. 3 --This vein is an extension of that on the Ellen M. C., No. 2, and has been proved up with shafts and test pits over a distance of about 500 ft. near the center of the claim. The east and west ends are under a heavy wash material and have not been opened up.

Caroline No. 1 -- The vein has been proved up throughout the length of this claim and about 500 ft. further to the north on the Ellen M. C. No. 1, with numerous test pits and shafts, one of the latter being 40 ft. deep. The southern extension of the outcrop can be readily traced on the surface for a distance of 1,00 ft. beyond the limits of the claim.

Emma -- The vein here has been proved for approximately 800 ft. on the west end of the claim with test pits and shafts, two of the later being over 30 ft. deep. The remainder of the claim is under a heavy drift material, but an opening further east on the B. & H. claim shows a similarity in the strike and formation that justifies correlating it with the vein on the Emma, indicating that it is persistent over considerable length.

B & H --The opening on this claim above mentioned is a discovery shaft, and represents all the work that has been done on it.

Caroline No. 2 --The vein on this claim is under considerable drift material, and has been proved up on the west end only with a discovery shaft and some test pits.

Gold Nuggett --The vein on this claim has been opened up a distance of 1,000 ft. on the west end with pits and shafts, two of the latter being 20 and 40 ft. deep, respectively. The remainder of the vein is under a heavy wash material and has not been prospected, though its eastward extension is believed to have been opened up on the Carpenter claim, which adjoins on that side.

Ore Reserves

With the exception of the shaft and drift operation on the Ellen M. C. No. 2, there is no ore blocked out and "in sight" within the strict interpretation of the word. On the other hand, the extensive surface openings on the different veins throughout the area, indicate large potential reserves, if the opinion of the U. S. Geological Survey previously quoted as to the persistence of the veins in depth is accepted. This view appears to be concensus of opinion of all the geologists who have studied this district.

If the present shaft is sunk to the 500-ft level, about 60,000 to 70,000 tons of ore can be readily blocked out with drifts 600 ft. long.

Mining Methods.

The condition of the hanging and foot walls whereever developed in this section are favorable to economical mining. Little or no timbering will be required except for stulls and lagging for ore shoots and raises, if the proper system of mining be adopted. The existing surface equipment is adequate for development purposes, with some minor improvements.

Development costs are difficult to estimate, but when the mine is on a settled large-scale production, with a well equipped plant embodying the usual labor saving devices, the costs should be low, as compared with other mines handicapped with technical difficulties in the shape of large volumes of water, adverse roof conditions, et. When properly equipped and on a settled production basis,

the costs at this mine are estimated at 75¢ to $1.25 per ton.

MILLING EQUIPMENT AND OPERATIONS

There is at the present time a ten-stamp mill on the propetty, each stamp of 750 lb. This is in good condition and can be used for large mill runs and tests necessary to work out the details for designing the permanent mill. The absense of any base metals in these ores should not make it difficult to develop a process that will recover 95% of the values. Careful tests at the nearby Duncan mine having identically the same ore, have proved that these, or better results can be obtained with a combined amalgamation-cyanidation process.

Concentration alone will not suffice, as is indicated by a test conducted by the Golden Cycle Mining and Reduction Co. The report of this company on these tests reads under date of May 4, 1929, as follows:

> Concentration tests were made to ascertain whether or not it would be possible to make a clean tailing by flotation or talbe concentration, or a combination of the two processes. It was thought that if this were possible, the use of the cyanide process could be materially reduced, thus effecting a large saving in the milling operations.
>
> From these tests, it is apparnet that it is not practicalbe to attempt to obtain the values from this particular ore by flotation or talbe concentration.

Other tests made by this same company, indicate that the ore responds readily to a combined amalgamation cyanidation treatment, yielding excellent recoveries. The results of these tests are summarized in a report of the company, under date of April 15, 1929, as follows:

> Herewith are results of test work done on various samples of ore received from the B. & H. Gold Mining Company. The purpose of the work was to determine a suitable method, or methods, to economically win the gold from the ore.
>
> Test No. 1 --Made on sample No. 1, with a head assay of 0.70 oz., gold and 0.20 oz., silver. Was ground to practically pass 100 mesh laboratory screen. In order to remove any free gold of appreciable size, the cyanide pulp was passed over an ordinary blanket before going to agitation. Under these conditions, twelve hours agitation seemed to be ample. Extraction was very good, and chemical consumption low.
>
> Test No. 2 --Lot No. 2, head assay 1.30 oz., gold and 4.0 oz., silver. Fine grinding as in test No. 1, done in cyanide solution, run over blanket to remove coarse gold and then agitated in cyanide solution. This lot seemed to require a slightly longer time of

agitation than Lot.1. It was also a better grade. Again extraction good, chemical consumption low.

Test No. 3 --Lot No. 3, head assay 1.36 oz., gold, and 2.0 oz., silver. Same general conditions as in two previous tests. Again extraction good and chemical consumption satisfactory, but cyanide used somewhat greater than in either of the two former tests.

Test No. 4 -- Lot No. 4, head 0.40 oz., gold and 1.7 oz., silver. This had been through a stamp mill and had been amalgamated. Additional grinding and cyaniding led to very good results all around on this amalgamation tail.

The foregoing shows that in all cases, grinding to 100 mesh, blanketing and cyaniding, gave very good results.

Test No. 6 -- A mechanical analysis and assays of different sizes of sample No. 4, the stamp mill amalgamation tail shows that the values are quite evenly distributed through the ore and are not all released unless ground finer than a 40 mesh.

Grinding practially to pass a sixty mesh laboratory screen seems to be nearly fine enough. The grinding needs to be about sixty mesh in order to agitat for 48 hours. All intermediate and fine amalgamate grinding to be done in cyanide solution.

The concentrated caught on blanket to be amalgamated in a small arrasta pan and then returned to ball mill for regrinding.

To do this, a ball mill, classifier, thickener, agitator, and precipitation facilities will have to be provided.

The ore is a very easy ore to cyanide, and consumption of chemicals will be very reasonable, probably considerably less in a mill than these tests indicate. It is possible that by little finer grinding that lanketing and amalgamation might be omitted. This would probably necessitate a longer agitation period.

OPERATING COSTS

Labor and Official Personnel

The following are particulars of the estimated payroll of the company, number of men required, scale of wages and salaries, when the company is on settle production, mining 8,640 tons per month, milling 7,500 tons and driving 333 ft. of new development work:

No. of Men		Rate per Day	Total
	General Underground		
5	Machinemen (on development)	$6.00	$30.00
5	Muckers " "	5.00	25.00
12	Stoppers (On production)	5.50	66.00
1	Timberman	6.50	6.50
3	Laborers	4.50	13.50
2	Shiftbosses	7.00	14.00
	Milling Crew		
3	Mill Foremen	7.00	21.00
6	Mill Laborers	5.00	30.00
	Outside Men		
2	Hoistmen	6.00	12.00
2	Blacksmiths	6.50	13.00
2	Blacksmith helpers (compressors, also)	5.00	10.00
1	Electrician and mechanic	6.66	6.66
6	Topmen for mine and mill	4.50	27.00
1	Teamster	5.00	5.00
1	Carpenter	6.66	6.66
1	Storeman	5.00	5.00
1	Assayer and Surveyor	6.66	6.66
		Total per day	$297.98

	Monthly Men	Per Month
1	Manager	$750.00
1	Superintendent	500.00
1	Assistant Superintendent	250.00
1	Bookkeeper	150.00
1	Stenographer	125.00
3	Watchmen @ $100. each	300.00
	Total per month	$2,075.00

Cost of Supplies

Monthly supply expense, in the operations above outlined, is estimated as follows:

Item	Amount	Unit Cost	Total Cost
Mine Supplies			
G-Powder, 60% N.G.B.	13,320 lb.	$0.20	$2,631.00
Blasting caps	9M	15.50	139.50
Fuse	56M	9.00	504.00

(Table continued)

Item	Amount	Unit Cost	Total Cost
Mine Supplies			
Rail, etc.	2,333 lb.	$ 0.04	$ 93.33
Drill steel	4,000 lb.	0.20	800.00
Hose and connections	400 ft.	0.30	120.00
Carbide	300 lb.	0.07½	22.50
Mine timbers	8M	30.00	240.00
Mill Supplies			
Mill and crushing steel	5 ton	$300.00	$1,500.00
Lime	14,000 lb.	0.03	420.00
Cyanide	3,000 lb.	0.25	750.00
Zinc Shavings	1,000 lb.	0.14	140.00
Miscellaneous			
Power for mine and mill	1,000 H.p.	$3.75	$3,750.00
Pipe	500 ft.	0.30	150.00
Hard Oil	50 lb.	0.15	7.50
Lubricating oil	100 gal.	0.70	70.00
Blacksmith Coal	2 ton	50.00	100.00
Nails, bolts, etc.	1,000 lb.	0.07	70.00
			$11,540.83

General Expense -- Items of general expense per month are estimated as follows:

Item	Amount
Supplies, maintenance and depreciation	$1,500.00
General traveling expense	300.00
Office expenses, telegraph, telephone, etc.	250.00
Miscellaneous expenses at mine	450.00
Total	$2,500.00

In addition to the above general expenses, which together with labor and mill supplies costs are distributed hereafter to Costs of Development, Mining and Milling, an allowance for taxes, insurance (compensation and other) and other general expenses, has been made in the amount of $3,750.00 a month.

Development, Mining, Milling Costs per month

Development Costs -- New development costs on the basis of 333 ft. of new drifting per month, excluding operations on settled production, are estimated at a total of $6,33821, or $19.03 per foot as follows:

Item	Amount	Unit Cost	Total Cost
G-Powder, 60% N.G.B.	4,320 lb.	$0.20	$864.00
Caps	2 1/2 M	15.50	38.75

(Table continued)

Item	Amount	Unit Cost	Total Cost
Fuse	15M	9.00	135.00
Power (one-half total for mine)			937.50
Rail, carbide, steel, hose, pipe, timber, oil, and blacksmith coal			627.71
General overhead			1,143.75
Labor (10 machinemen and muckers, and one-half general mine force)			2,591.50
		Total	$6,338.21

Mining Costs--Production costs on the basis of an output of 9,000 tons per month, excluding new development owrk, are estimated at a total of $8,120.62, or a cost of 70.42¢ per ton, as follows:

Item	Amount	Unit Cost	Total Cost
G-Powder, 60% N. G. B.	9,000 lb.	$0.20	$1,800.00
Caps	6 1/2 M.	15.50	100.75
Fuse	41M	9.00	369.00
Power (one-half total for mine)			937.50
Rail, carbide, steel, hose, pipe, timber, oil and blacksmith coal			903.12
General overhead			1,143.75
Labor (12 stoppers and one-half general mine force)			2,866.50
		Total	$8,120.62

Milling Costs -- Monthly milling costs are estimated at $9,106.50, for treating 7500 tons of ore, or $1.26 per ton. The detailed figures follows:

Item	Amount	Unit Cost	Total Cost
Power (one-half total consumption)			$1,875.00
General overhead (one-half total)			2,287.50
Labor (9 men and one-half the general)			1,991.50
Mill and crushing steel	5 ton	$300.00	1,500.00
Pipe	100 ft.	0.30	30.00
Nails, bolts, washers, etc.	1,000 lb.	0.07	70.00
Lubricating and hard oil			42.50
Zinc shavings	1,000 lb.	0.14	140.00
Cyanide	3,000 lb.	0.25	750.00
Lime	14,000 lb.	0.03	420.00
		Total	$9,106.50

RECAPITULATION AND SUMMARY

ANTICIPATED EARNINGS AND ESTIMATED COSTS

PARTICULARS			AMOUNT	PER TON
Gross Recovery	90,000 tons per year		$720,000.00	$8.00
Estimated Costs - Monthly basis				
Development	(9,000 tons)	$6,338.21		.7042
Mining	(9,000 tons)	8,120.62		.9023
Total	9,000 tons	$14,458.83		1.6065
Less Unmilled Ore	1,500 "	2,409.75		
Net Development and Mining Cost of 7500 Tons Milled		$12,049.08		1.6065
Milling	7,500 tons	9,106.50		1.2142
Overhead		3,750.00		.50
Total Estimated Cost		$24,905.58		3.3207
Per Annum			$298,866.96	
Recovery Balance Per Annum			$421,133.04	$4.6793
Deduct Ore Value-Above (12x$2409.75)			28,917.00	
Balance available (Before Taxes)			$392.216.04	

(For Corporate Reserves and Dividends)

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All of which is respectfully submitted.

John R. Bass

President

B. & H. Gold Mining Company
Rock Springs, Wyoming

A. E. Carlton, President E. P. Shove, Vice-President.
L. S. Harner, Mgr. & Supt.

The Golden Cycle Mining and Reduction Company

Mill Department

Colorado Springs, Colorado
April 15, 1929

The B. & H. Gold Mining Co.
Mr. J. R. Bane, President
324½ Front Street
Rock Springs, Wyoming

Gentlemen:

Herewith are results of test work done on various samples of ore received from the B. & H. Gold Mining Company.

Also see tables for details, etc.

The purpose of the work was to determine a suitable method or methods to economically win the gold from the ore.

Test 1. Made on sample No. 1 with a head assay of 0.70 oz. gold and 0.20 oz. silver. Was ground to practially pass 100 mesh laboratory screen. In order to remove any free gold of appreciable size, the cyanide pulp was passed over an ordinary blanket before going to agitation. Under these conditions twelve hours agitation seemed to be ample. Extraction was very good and chemical consumption low.

Test 2. Lot No. 2, head assay 1.30 oz. gold and 4.0 oz. silver. Fine grinding as in test No. 1 was done in cyanide solution, run over blanket to remove coarse gold and then agitated in cyanide solution. This lot seemed to require a slightly longer time of agitation than Lot. 1. It was also a better grade. Again extraction good, chemical consumption low.

Test 3. Lot 3. Head 1.06 oz. gold and 2.0 oz. silver. Same general conditions as in two previous tests. Again extraction good and chemical consumption satisfactory, but cyanide used somewhat greater than in either of the two former.

Test 4. Lot 4. Head 0.40 oz. gold and 1.7 oz. silver. This had been through a stamp mill and had been amalgamated. Additional grinding and cyaniding let to very good results all round on this amalgamation tail.

The goregoing shows that in all cases, grinding to 100 mesh, blanketing and cyaniding gave very good results.

Test 6. A mechanical analysis and assays of different sizes of sample No. 4, the stamp mill amalgamation tail shows that the values are quite evenly distributed through the ore and are not all released unless ground finer than a 40 mesh.

Coarser Gringing. Grinding practically to pass a sixty mesh laboratory screen seems to be nearly fine enough. The grinding needs to be about sixty mesh in order to agitate freely.

The test work seems to indicate good recovery is to be had by grinding practically to a sixty mesh product, pass over blankets and then agitate for 48 hours. All intermediate and fine grinding to be done in cyanide solution.

The concentrated caught on blanket to be amalgamated in a small arrasta pan and then returned to ball mill for regrinding.

To do this, a ball mill, classifier, thickener, agitator and precipitation facilites will have to be provided.

The ore is a very easy ore to cyanide and consumption of chemicals will be very reasonable, probably considerably less in a mill than these tests indicate. It is possible that by a little finer grinding that blanketing and amalgamation might be omitted. This would probably necessitate a longer agitation period.

Yours very truly,

By L. S. Harmer
Manager

LSH : GH

The B-H Gold Mining Company
Rock Springs, Wyoming

Head Samples:

Our No.		Oz. Au	Oz. Ag
1	General run from Emma, Gold Nugget and Caroline Mines	0.70	0.20
2	General run from ine E11 E17 MC2 claim	1.30	4.00
3	General run of leads from mine E11 E17MC2 claim	1.36	2.00
4	Amalgamation tails	0.40	1.70
5	Ore from B-H property	0.04	none

Here is analysis of ores recently tested for cyaniding.

B. & H Heads:	Insol.	S.	CaO	Ign. loss
No. 1	95.7%	Trace	Trace	None
No. 2	90.4%	0.05%	0.10%	0.70%
No. 3	91.6%	Trace	0.20%	1.00%

Test #1 -- 2000 grams of head ore #1 ground dry to about 8 mesh. Reground in a tube mill 1.25 hours at a dilution of 1 to 1 in 2.0 lbs. NaCN solution and 20 grams Ca). Enough fresh 2.0 lb. NaCN solution added to bring dilution to 6 to 1 and passed over a blanket, after which, product was allowed to settle and 3 parts clear solution syphoned off, leaving a dilution of 3 to 1 for agitation in an air agitator.

A mesh analysis on the final ground product showed the following:

On 100 mesh	2.00%
" 150 "	8.25%
" 200 "	10.50%
Thru 200 "	79.25%
	100.00%

Cyanide Agitation Test

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Au. Res.	Ag. Res.	Au% Ext.	Ag.% Ext.	Added Lbs. per ton sol.
1	0	2.0	2.0	0.0	0.08	0.00	88.6	100.0	
	4	2.0	1.9	0.0	0.03	0.00	95.7	100.0	
	8	2.0	1.9	0.0	0.02	0.00	97.1	100.0	
	12	2.0	1.7	0.2	0.02	0.00	97.1	100.0	
	-22	2.0	1.2	0.3	0.02	0.00	97.1	100.0	2.0 CaO
	36	2.0	1.7	0.3	0.02	0.00	97.1	100.0	
	56	2.0	1.2	0.3	0.02	0.00	97.1	100.0	

-After 22 hours agitation product was allowed to settle, 2800 cc clear solution syphoned off and replaced with fress 2.0 lb. NaCN solution plus 2.0 lbs. CaO per ton of solution.

Test #2 -- 2000 grams of head ore #2 ground dry to about 8 mesh. Reground in a tube mill 1.25 hours at a dilution of 1 to 1 in 2.0 lb. NaCN solution plus 20 grams CaO. Enough mesh 2.0 lb. NaCN Solution added to bring dilution to 6 to 1 and passed over a blanket, after which, product was allowed to settle and 3 parts clean solution syphoned off, leaving a dilution of 3 to 1 for agitation.

Final ground product meshed as follows:

On 100 mesh	1.00%
" 150 "	5.75%
" 200 "	8.25%
Thru 200 "	85.00%
	100.00%

Cyanide Agitation Test

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs NaCN Comsumed	Au %Ext.	Ag %ext.	Au Res.	Ag Res.	Added lbs. Per ton sol.
2	0	2.0	0.8	0.0	86..2	50.00	0.18	2.00	3.3 CaO
	4	2.0	1.9	0.0	96.2	60.00	0.05	1.60	
	8	2.0	1.7	0.0	96.9	62.5	0.04	1.50	
	12	2.0	1.7	0.2	96.9	72.5	0.04	1.10	
	-22	2.0	1.0	0.3	97.7	67.5	0.03	1.30	2.0 CaO
	36	2.0	1.3	0.3	96.9	72.5	0.04	1.10	
	50	2.0	0.9	0.3	98.5	75.0	0.02	1.00	
	72	1.9	0.8	0.3	97.7	80.0	0.03	0.80	

(next sheet)

(Cyanide Agitation Test continued)

-After 22 hours agitation product was allowed to settle, 2700 cc. clear solution syphoned off and replaced with fresh 2.0 lb. NaCN solution.

Test #3. --2000 grams of head ore #3 ground dry to about 8 mesh. Reground in a tube mill 1.25 hours at a dilution of 1 to 1 in 2.0 lb. NaCN solution, plus 20 grams CaO. Enough fresh 2.0 leb. NaCN solution added to bring dilution to t to 1 and passed over a blanket, after which, product was allowed to settle and three parts clear solutionsyphoned off, leaving a dilution of 3 to 1 for agitation in an air agitator.

Final ground product meshed as follows:

On	100	mesh	0.5%
"	150	"	6.0%
"	200	"	7.5%
Thru	200	"	86.0%
			100.0%

Cyanide Agitation Test.

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Comsumed	Au Res.	Ag Res.	Au %Ext.	Ag %Ext	Added lbs. Per ton sol.
3	0	1.9	0.9	0.6	0.15	0.90	89.0	55.0	3.3 CaO
	4	1.7	2.8	1.2	0.05	0.80	96.3	60.0	
	8	1.7	2.3	1.2	0.03	0.73	97.8	63.5	
	12	1.7	2.3	1.2	0.04	0.70	97.1	65.0	
	-22	1.7	1.5	1.2	0.04	0.70	97.1	65.0	2.0 CaO
	36	1.8	1.9	1.3	0.03	0.60	97.8	70.0	
	50	1.8	1.4	1.3	0.03	0.53	97.8	73.5	
	72	1.8	0.9	1.3	0.03	0.40	97.8	80.0	

-After 22 hours agitation product was allowed to settle, 2900 cc. clear solution syphoned off and replaced with fresh 2.0 lb NaCN solution, plus 2.0 lbs. CaO per ton of solution.

Test #4. -- 2000 grams of head ore #4 ground in a tube mill one hour at a dilution of 1 to 1 in 2.0 lb. NaCN solution, plus 20 grams CaO. Enough fresh 2.0 lb. NaCN solution added to bring dilution to 3 to 1 and agitation started in an air agitator.

Final Ground product meshed as follows:

On	100	mesh	2.25%
"	150	"	7.50%
"	200	"	10.75%
Thru	200	"	79.50%
			100.00%

Cyanide Agitation Test.

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Au Res.	Ag. Res.	Au. % Ext.	Ag. % Ext.	Added lbs. per ton sol.
4	0	2.0	2.9	0.0	0.12	1.00	70.0	41.25	
	4	2.0	2.1	0.0	0.06	0.80	85.0	52.9	
	8	2.0	1.9	0.0	0.04	0.80	90.0	52.9	
	12	2.0	2.1	0.0	0.04	0.70	90.0	64.7	
	22	2.0	1.5	0.2	0.04	0.60	90.0	64.7	
	36	2.0	1.3	0.3	0.03	0.60	92.5	64.7	
	50	2.0	0.9	0.3	0.03	0.60	92.5	64.7	
	72	1.9	0.7	0.3	0.02	0.40	95.0	76.5	

Test #6 -- A mesh analysis, with assays on the various sizes, was made on the amalgamation tail sample (our head #4) with the following results:

On	40	mesh	15.4%	0.44	oz.	Au	0.70	oz. Ag
"	60	"	29.8%	0.33	"	"	0.86	" "
"	100	"	13.6%	0.32	"	"	0.92	" "
"	150	"	13.9%	0.36	"	"	1.44	" "
"	200	"	7.7%	0.38	"	"	1.75	" "
Thru	200	"	19.6%	0.75	"	"	4.05	" "
Average (Calc)			100.0%	9.427	"	"	1.607	" "

Test #7--2000 Grams of head ore #1 ground dry to about 8 mesh. Reground in a tube mill 45 minutes at a dilution of 1 to 1 in 2.0 lb. NaCN solution plus 20 grams CaO. Enough fresh 2.0 lb. NcCn solution added to bring dilution to 6 to 1 and passed over a blanket, after which, product was allowed to settle and 3 parts clear solution syphoned off leaving a dilution of 3 to 1 for agitation in an air agitator.

Final ground product meshed as follows:

On	60	mesh	2.0%
"	100	"	6.0%
"	150	"	12.0%
"	200	"	13.5%
Thru	200	"	66.5%
			100.0%

Cyanide Agitation Test.

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Comsumed	Au Res.	Ag. Res.	Au % Ext.	Ag % Ext.	Per ton sol.
1	0	1.9	1.4	0.6	0.11	0.00	84.3	100.0	
	4	1.9	1.3	0.6	0.04	0.00	94.3	100.0	
	12	1.9	1.1	0.6	0.03	0.00	95.7	100.0	
	20	1.9	0.8	0.6	0.03	0.00	95.7	100.0	3.3 CaO
	36	1.9	1.7	0.6	0.02	0.00	97.1	100.0	
	48	1.9	1.5	0.6	0.02	0.00	97.1	100.0	

Test #8 -- 2000 frams of head ore #2 ground dry to about 8 mesh. Reground in a tube mill 45 minutes at a dilution of 1 to 1 in 2.0 lb. NaCN solution and 20 grams CaO. Enough fresh 2.0 lb. NaCN solution added to bring dilution to 6 to 1 and passed over a blanket, after which, product was allowed to settle and 3 parts clear solution syphoned off, leaving a dilution of 3 to 1 for agitation in an air agitator.

Final ground product meshed as follows:

On	60	Mesh	0.5%.
"	100	"	3.5%
"	150	"	7.5%
"	200	"	19.0%
Thru	200	"	69.5%
			100.0%

(Cyanide Agitation test, next sheet.)

Cyanide Agitation Test. Test #8

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Aug Res.	Ag. Rs.	Au. %Ext	Ag. %Ext	Added Lbs. Per ton sol.
2	0	1.0	0.9	0.6	0.18	2.30	86.2	42.5	3.3 CaO
	4	1.9	2.0	0.6	0.05	1.60	96.2	60.0	
	12	1.9	1.4	0.6	0.04	1.04	96.9	74.0	
	20	1.9	1.1	0.6	0.03	1.25	97.7	68.8	
	36	1.9	0.8	0.6	0.03	1.00	97.7	75.0	3.3 CaO
	48	1.9	1.9	0.6	0.02	1.06	98.5	73.5	

Test #9 -- 2000 grams of head ore #3 ground dry to about 8 mesh. Reground in a tube mill 45 minutes at a dilution of 1 to 1 in 2.0 lb. NaCN solution and 20 grams CaO. Enough fresh 2.0 lb. NaCN solution added to bring dilution to 6 to 1 and passed over a blanket, after which, product was allowed to settle and 3 parts clear solution syphoned off, leaving a dilution of 3 to 1 for agitation in an air agitator.

Final ground product meshed as follows:

On	60 mesh	0.5%
"	100 "	3.0%
"	150 "	7.0%
"	200 "	18.0%
Thru	200 "	71.5%
		100.0%

Cyanide Agitation Test

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Comsumed	Au. Res.	Ag. Res.	Au % Ext.	Ag %Ext.	Added Lbs. per ton sol.
3	0	1.9	0.9	0.6	0.18	1.02	86.8	49.0	3.3 CaO
	4	1.9	1.7	0.6	0.04	0.70	97.1	65.0	
	12	1.9	1.4	0.6	0.03	0.65	97.8	67.5	
	20	1.8	1.1	0.9	0.04	0.60	97.1	70.0	
	36	1.8	0.8	0.9	0.02	0.69	98.5	70.0	3.3 CaO
	48	1.8	2.1	0.9	0.03	0.53	97.8	73.5	

Test #10 -- 2000 grams of head ore #4 ground in tube mill 45 minutes at a dilution of 1 to 1 in 2.0 lb. NaCN solution, plus 20 grams CaO. Enough fresh 2.0 lbe. NaCN solution then added to bring dilution to 3 to 1 and agitation started in an air agitator.

Final gound product meshed as follows:

On	60 mesh	0.5%.
"	100 "	3.0%
"	150 "	22.0%.
"	200 "	13.0%.
Thru	200 "	61.5%.
		100.0%.

(Cyanide Agitation test on nest sheet.)

Cyanide Agitation Test. Test #10.

Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Au Res.	Ag Res.	Au %Ext.	Ag %Ext.	Added Lbs. per ton sol
4	0	1.9	1.9	0.3	0.16	1.00	60.00	41.2	
	4	1.9	2.1	0.3	0.04	0.80	90.0	52.9	
	12	1.9	1.8	0.3	0.02	0.70	95.0	58.8	
	20	1.9	1.5	0.3	0.03	0.53	92.5	68.9	
	36	1.9	1.0	0.3	0.03	0.57	92.5	66.5	3.3 CaO
	48	1.9	2.7	0.3	0.02	0.58	95.0	65.9	

Test #11 -- 3000 Grams of head ore #1 ground dry to pass a 20 mesh screen. Passed over a blanket at a dilution of 6 to 1 in water and screened, wet, on 100 mesh screen.

On	100 mesh	69.8%	0.44 oz. Au	0.00 oz. Ag
Thru	100 mesh	30.2%	1.22 oz. Au	0.54 oz. Ag.

(a) The coarse material (on 100 mesh) was placed in a percolator and leached with 2.0 lb. NaCN solution for 120 hours, after which it was washed with water for another 24 hours. A mesh analysis, with assays on the various sizes, was then made with the following results:

On	30 mesh	20.0%	0.08 oz. Au.	0.00 oz. Ag.
"	40 "	17.0%	0.06 oz. Au.	0.00 " "
"	60 "	34.0%	0.02 " "	0.00 " "
"	100 "	13.0%	0.04 " "	0.00 " "
Thru	100 "	16.0%	0.08 " "	0.00 " "
Average	(calc.)	100.0%	0.0484 " "	0.00 " "

(b) The fine material (thru 100 mesh) was filtered and dried. Agitation started in an air agitator at a dilution of 3 to 1 in 2.0 lb. NaCN Solution, plus 20 lbs. CaO per ton of ore.

A mesh analysis on this material follows:

On	150 mesh	14.0%.
"	200 "	20.0%
Thru	200 "	66.0%.

Cyanide Agitation Test.

Test No.	Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. NaCN Consumed	Au Res.	Ag. Res.	Added Lbs. Per ton sol.	Lbs. CaO
11	1	24	2.0	0.0	0.05	0.00	2.0 CaO	0.4
		72	1.8	0.6	0.06	0.00		1.5
		120	1.8	0.6	0.04	0.00		0.2

The average (coarse and fine) final gold trailing contained 0459 oz. per ton. This would make an extraction of 93.44%.

Test #12 -- 3000 grams of head ore #2 ground dry to pass a 20 mesh screen. Passed over a blanket at a dilution of 6 to 1 in water and screened wet on a 100 mesh screen.

On	100 Mesh	61.1%	0.90 oz. Au.	2.90oz. Ag.
Thru	100 mesh	39.9%	1.20 oz. Au.	7.10 " "

(a) The coarse material (on 100 mesh) was leached 120 hours in 2.0 lb. NaCN solution and wash d 24 hours more with water. A mesh analysis with assays on the various sizes, was then made with the following results:

On	30	mesh	22.0%	0.12 oz. Au	0.68 oz. Ag.
"	40	"	19.0%	0.12 " "	0.60 " "
"	60	"	26.0%	0.06 " "	0.58 " "
"	100	"	12.0%	0.04 " "	0.72 " "
Thru	100	"	21.0%	0.06 " "	1.44 " "
Average (calc.)			100.0%	0.0822	0.8022

(b) The fine material (thru 100 mesh was filtered and dried. Agitation started in an air agitator at a dilution of 3 to 1 in 2.0 lb. NaCN solution and 20 lbs. CaO per ton of ore.

A mesh analysis of this material follows:

On	150	mesh	8.0%
"	200	"	20.0%
Thru	200	"	72.0%
			100.0%

Cyanide Agitation Test

Test No.	Head No.	Hrs. Agit	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Au Res.	Ag Res.	Added Lbs. per ton sol.
12	2	24	1.9	0.3	0.6	0.07	1.37	2.0 CaO
		72	1.7	0.6	0.9	0.08	1.00	
		120	1.4	0.2	1.9	0.04	0.84	

The average (coarse and fine) final gold tailing contained 0.0662 oz. per ton, making an extraction of 94.9%.

The average silver tailing contained 0.825 oz. per ton, making an extraction of 79.4%.

Test #13 -- 300 grams of head ore #3 groun dry to pass a 20 mesh screen. Passed over a blanket at a dilution of 6 to 1 in water, and screened, wet, on a 100 mesh screen.

On	100 mesh	67.5%	0.96 oz. Au	1.64 oz. Ag.
Thru	100 "	32.4%	1.24 " "	4.60 " "

(a) The coarse material (on 100 mesh) was leached 120 hours in 2.0 lb. NaCN solution and washd 24 hours in water. A dry mesh analysis was then made, for assay, with the following results:

On	30	mesh	13.0%	0.24 oz. Au	0.00 oz. Ag.
"	40	"	16.0%	0.12 " "	0.28 " "
"	60	"	30.0%	0.14 " "	0.18 " "
"	100	"	10.0%	0.10 " "	0.00 " "
Thru	100	"	31.0%	0.06 " "	0.54 " "
Average (calc.)			100.0%	0.111 " "	0.266 " "

Test #13--continued.

(b) The fine material (thru 100 mesh) was filtered and dried. Agitation started in an air agitator at a dilution of 3 to 1 in 2.0 lb. NaCN solution and 20 lbs. CaO per ton of ore. A mesh analysis on ths material follows:

On	150	mesh	5.0%
"	200	"	9.0%
Thru	200	"	86.0%
			100.0%

Cyanide Agitation Test.

Test No.	Head No.	Hrs. Agit.	Lbs. NaCN	Lbs. CaO	Lbs. NaCN Consumed	Au Res.	Ag Res.	Added Lbs. Per ton sol.
13	3	24	1.9	tr.	0.3	0.06	0.66	2.0 CaO
		72	1.5	0.4	1.5	0.06	0.70	
		120	1.0	0.3	3.0	0.04	0.46	

The average (coarse and fine) final gold tailing contained 0.0879 oz. per ton, making an extraction of 93.5%.

The average silver tailing contained 0.329 oz. per ton, making an extraction of 83.5%.

Test #14 --3000 grams of head ore #4 leached in 2.0 lb. NaCN solution 120 hours and washed 24 hours with water. Product was then dried and a mesh analysis, with assays on the various sizes, made with the following results.

On	30	mesh	4.0%	0.20	oz.	Au	0.44	oz. Ag.
"	40	"	11.0%	0.06	"	"	0.22	" "
"	60	"	32.0%	0.08	"	"	0.28	" "
"	100	"	11.0%	0.02	"	"	0.38	" "
"	150	"	16.0%	0.04	"	"	0.60	" "
"	200	"	9.0%	0.04	"	"	1.00	" "
Thru	200	"	17.0%	1.08	"	"	1.40	" "
Average (calc.)			100.0%	0.66	"	"	0.5972	" "

Gold Extraction 83.5% Silver Extraction 64.9%

Mr. J. R. Bane, Pres. & Manager,
B. & H. Gold Mining Company,
324½ S. Front St.,
Rock Springs, Wyo.

Dear Sir:

A concentration test on B. & H. Gold Mining ores did not result in a good enough saving of values to warrant their use. Cyaniding will give the mose profit.

Details of reults are enclosed.

Yours very truly,

THE GOLDEN CYCLE MINING & REDUCTION COMPANY

LSH : DE
Enc.

By L. S. Harner
Manager.

Concentration Test
B-H Gold Mining
Company Ore

5/4/29

The following concentration tests were made to ascertain whether or not it would be possible to make a clean tailing by flotation or table concentration or by a combination of the two processes. It was thought that if this were possible, the tonnage to be cyanided could thereby be materially reduced, thus reducing the cost of milling operations. Results of tests given below.

Test No. 14. This test made on our Sample No. 1 - General run from Emma-Gold Nugget and Caroline Mines. The test is a combination of lotation followed by table concentration.

Grinding:

Ore ground dry t all pass 8 mesh screen, then ground in ball mill 1 hour to all pass 100 mesh screen; dilution of 1 to 1; fresh water used in grinding.

Flotation:

First Froth: (Neutral Circuit)	Reagents:	Yarmor Pine Oil	0.1 #/ton ore.
		Tarol	0.04
		Denver #4 (Creosote)	0.04
		Amyl Xanthate	0.10

Pulp conditioned with the above reagents 15 minutes, then pulled off all froth possible.

Second Froth: (sulfidizing)	Reagents:	Sodium Sulfide	5.0 #/ton ore
		Sulfurized Pine	0.10
		Amyl Xanthate	0.2
		Tarol	0.04

Pulp conditioned with the above reagents 15 minutes then pulled off all froth possible.

Third Froth:	Reagents:	Sulfuric Acid	10.0 #/ton ore (Excess)
		Yarmor Pine Oil	0.2
		Amyl Xanthate	0.2
		Tarol	0.04

All froths very dirty as no attempt was made to obtain a high concentrate, but rather to take off all values possible regardless of grade.
After flotation, the flotation tailings were run over a Wilfley Laboratory concentrating table, making four products, table concentrate, middlings, sands and slimes. Results as follows:

				Recovery	
Product	%	Au Oz.	Ag. Oz	Au.	Ag.
1st Froth	8.5	4.80	0.79	59.8%	35.3%
2nd "	1.5	0.38	0.40	0.8%	5.3
3rd "	1.5	1.24	0.63	2.7	4.8
Table Conc.	5.0	1.05	0.70	7.7	18.3
" Mids	18.6	0.20	--	5.5	---
" Sands	22.7	0.11	--	3.6	---
" Slimes	42.2	0.32	0.17	19.9	36.3
	100.0			100.0	100.0

All recoveries based on total values in various products and not on head and tail assay.

Heads	Au	Ag.
	0.70 oz.	0.20 oz.

Test No. 15. This test made on our Sample No. 2--General run from Mine E11B17 MC2 Claim. Straight Table concentration test.

Grinding:
Ore ground dry to all pass 40 mesh screen, then run over table, making four products, table concentrate, middlings, sands and slimes.

				Recovery	
Product.	%	Au oz.	Ag. oz.	Au	Ag
Table Conc.	7.8	9.42	10.84	58.0%	21.4%
" Mids	14.8	0.35	1.60	4.2	5.9
" Sands	36.6	0.34	1.33	9.9	12.1
" Slimes	40.8	0.86	5.90	27.9	60.6
	100.0			100.0	100.0
Heads	Au--	1.30 oz	Ag.	4.00 oz.	

From the above tests it is apparent that it is not practical to attempt to obtain the values from this particular ore by flotation or table concentration.

INTRODUCTION

The past decade has brought a general expansion in the metal mining industry locally, nationally and internationally, due primarily to a gradual and sustained increase in metal values that has stimulated greater activity throughout the industry. This general improvement is evidenced by a substantial accretion in the value of the securities of all the old line companies; nearly all of these have been liquidating their funded debts, and are in a stronger financial position now than at any time in their previous history. Numerous new speculative enterprieses have been launched, and many of these under conservative administration have been unusually successful and brought large returns. These developments are being followed with interest in banking circles and sound mining projects under competent management are perhaps in greater favor with the investing public than ever before.

A further contributing factor in the general improvement in the industry, is certain fundamental improvements in mining and milling technique that has given an economic justification to the revival of operations in districts that were not commercially successful under the former methods. This has been a characteristic phenomenon in the industry since the beginning of mining, and the efficiency of the methods today are in marked contrast to those of even a decade or two ago. This, together with the general enchancement in the value of all metals has resulted in a revival of operations in many older districts and in initiating new development in others not heretofore workable.

These general conditions in the industry have lead to the conclusion that this is a propitious time to undertake a comprehensive development program of the properties owned by this company. Though this general district has been worked sporadically for nearly a century, these efforts have been confined more or less exculusively to bonanza discoveries. There is a concensus of opinion among the authorities quoted in this report that there are sufficient reserves of average ore in this general district to insure profitable large-scale operations at favorable locations. It is expected that there will be occasional discoveries of high-grade shoots in the development work incident to opening up the average ores. But the company's entire program is predicated solely upon ores of average grade. The existence of these on the surface is generally well established and the prospects of their persistence in depth are favorable, according to competent geological opinion. With the evidence in hand this seems to be sufficient to assure a substantial return on the investment.

It is believed that the conclusions upon which the company's policy is predicated are supported by competent authority, and that the proposed method of procedure is along sound and conservative lines.

LOCATION, TRANSPORTATION AND RESOURCES

Location of Properties

The properties of the B. & H. Gold Mining Company lie in a highly mineralized zone in south-central Wyoming, known as both the Freemont and the Sweetwater mining district. Mining activities in this field have centered around three principal points: (1) South Pass City, including the upper reaches of Willow Creek and the operations on Hermit Gulch, in the extreme southwestern part of the field. (2) The Atlantic City district embracing the general territory tributary to the Rock Creek and Big Atlantic Gulch, in the south-center of the district. (3) The Miners Delight district on the eastern border of the field where the mineralized zone disappears under overlying sedimentary deposits of the Cambrain period.

The Company's property is in the South Pass City district, centering about one mile northeast of the town from which the district takes its name. It consists of eight lode and one placer claims, all located in Section 22, Township 29 North, Range 100 West, with the exception of one which extends across into Section 21 of the same township and range. The claims cover a compact area of about 160 acres, well consolidated so as to eliminate any technical difficulties in mining operations. The placer claim is known as the Palmetto, and the lode claims are:

Ellen MC No. 1	Caroline No. 2
Ellen MC " 2	Emma
Ellen MC " 3	B & H
Caroline " 1	Gold Nugget

Abstract of title to these claims prepared by the Central Trust Co., bonded abstracteres (attested by E. E. Miley, Assistant Secretary-Manager) of Lander, Wyo. has been examined and found in order.

Transportation Facilities.

Development of this whole general district has been seriously handicapped by inadequate transportation facilities, the nearest rail connection being the western terminus of the Chicago & North Western Ry. at Lander, Wyo., 35 miles north of the properties of the B. & H., Gold Mining Company. The connecting roadway is well maintained and generally open to auto traffic six months in the year, from the first of May to last of October. The Government maintains a regular mail service over this road three times a week the year through.

There is also an outlet from the district to the south on the Union Pacific R. R. at Rock Springs, Wyo., a distance of 90 miles from the mine. This road is generally open to automobiles eight months in the year, and could probably be kept open the year round with little expense. It is well maintained and has easy grades that would make it possible to handle heavy freight in quantity over this route during theopen season at a cost of 1¢ per pound.

The possibilities of a rail connection directly into this general district are commented upon in Bulletin 626 (1916) of the U. S. Geological servey, page 35, from thich the following is abstracted:

When the Union Pacific R. R. was built through to the Pacific Coast, many engineers regarded the Sweetwater route as more favorable than the more southerly route that was adopted, and it is probable that within ten years, either the Northwestern or the Burlington system will seek an entrance to the Green River Basin by the way of South Pass. With the extension of either of these lines, the situation of the Atlantic and Lewiston districts with respect to transportation will be greatly improved. Atlantic City and South Pass City will then be within 12 miles and possibly within six miles of the railroad, depending on whether the location is north or south of Sweetwater River. Whatever alignment is chosen for the railroad, good connecting wagon roads with easily and favorably distributed grades can be cheaply constructed and maintained.

Power Facilities.

An adequate and economical source of power is an essential prerequisite to a commercially successful mining operation on any comprehensive scale. The three logical power sources for this company, in order of their respective economy and importance, are: oil, gas and water-power, to which might be added coal, in event of a railroad building into the district as above indicated. But at the present time the cost of coal at the company's mine is around $25 per ton, which is entirely out of line with the cost from other sources.

Under existing conditions, the Diesel oil engine offers the best solution to this problem, considering the initial expenditure involved, cost of operation and reliability and economy of source of supply. Manufacturers of this type of equipment have submitted estimates showing power costs of $40 to $50 per horsepower, depending on the price of the oil laid down at the mine. Crude oil is available in any quantities desired at the Dallas oil field, 20 miles distant; this is an old established field, apparently on a settled production basis. Specially prepared Deisel oil can be obtained at Lander for 3½¢ per gallon, which would be equivalent to about 5¢ per gallon laid down at the mine.

Commenting upon the possibilities of oil as a source of power in this secion, Bulletin 626 (1916) page 36 of the U. S. Geological Survey, say, in part:

With little doubt engines of the Diesel type could be adapted to use the crude oil produced in the Dallas field, which is about 16 miles north of Atlantic City. This oil has been going to Lander since about 1911, but probably its value for developing power in the Atlantic district would be greater than its value for locomotive fuel, which is reported to be 75¢ a barrel. The possibilities of oil are suggested by a rough calculation which indicates that, allowing for a cost of $1.40 a barrel at the well and a charge of $1 a barrel for transportation, the cost of crude oil power would correspond approximately with the cost of steam power if coal could be laid down at the mine at a cost of $5 per long ton. This calculation

is based upon 50-hp units. (Page 36).

> The erection of an electric power plant in the Dallas oil field has been proposed. This project is technically feasible, and the cost would be less than that of a hydro plant on Little Pope Agie River. The transmission line to Atlantic City would be about 17 miles long. (Page 38).

Another economical source of power supply would be natural gas from the Buffalo Basin oil and gas field, located about 30 miles southeast of this sompany's property. No data is available as to the probably life of this field, but it is known that large volumes of gas are going to waste there at the present time, and it is believed that this can be purchased at 4¢ to 5¢ per thousand feet.

Several economical water-power sites are available that offer possibilities for cheap power, particularly as some of these have been partially developed. On the whole, hydro developments contemplate a substantially heavier initial expenditure, and it is doubtful if this company would undertake anything of this description until a more advanced stage in its operations, especially as there would be some question as to a continuous year around service. The possibility of cooperation with other companies in the field in an effort of this description, as well as in the construction of a gas line from the Buffalo Basin, and in the construction of a central power plant in the Dallas oil field, would be studied to determine the most desirable and economical method of procedure.

The hydro power sources of this district have been reviewed in some detail in the U. S. Geological Survey Bulletin 626, page 38, which summarizes the possibilities in this direction as follows:

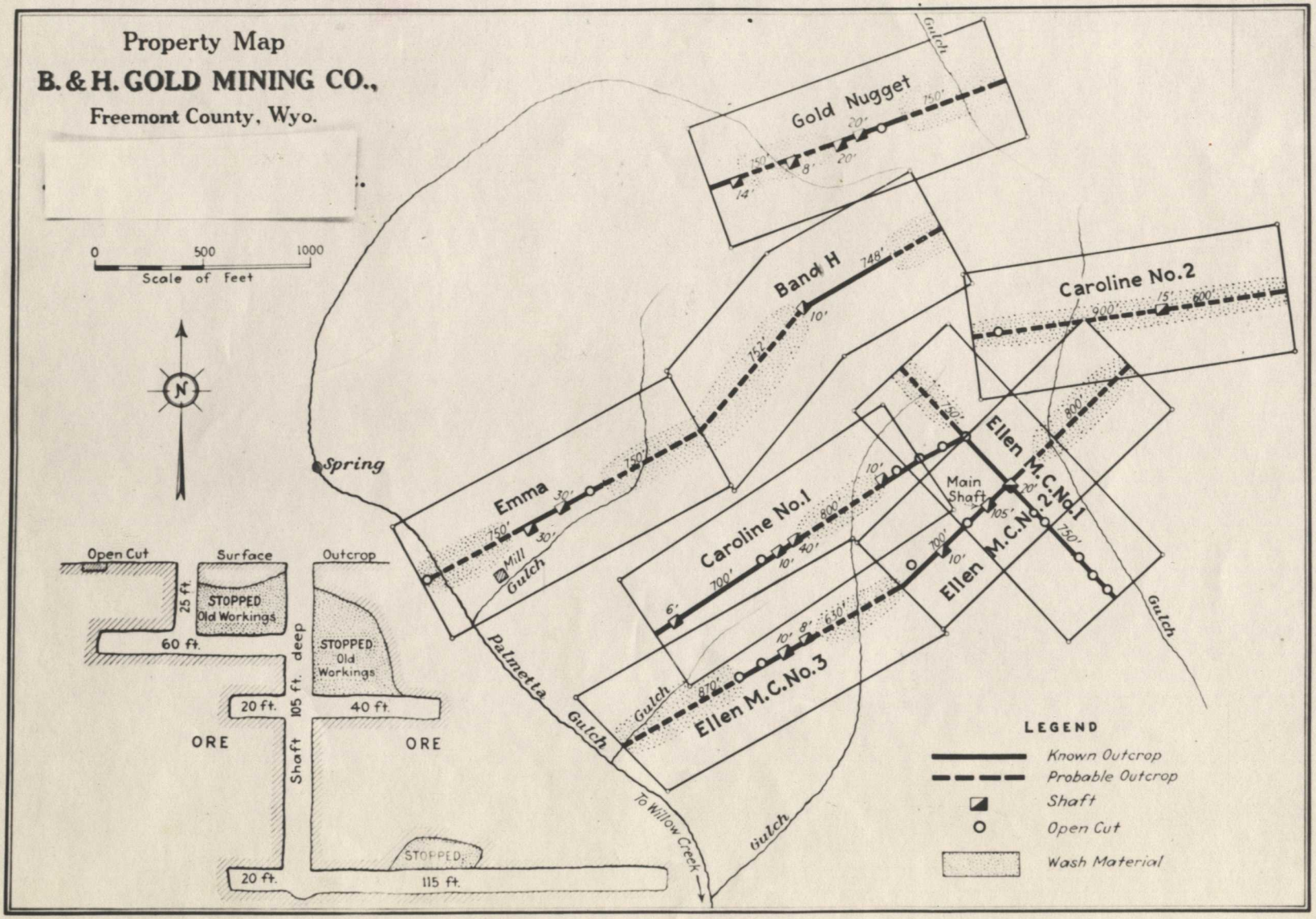
> It is not likely that continuous power could be provided from this source throughout the year, but the fact that no expense would be incurred for diversion canals in the two larger projects discussed, may make them worthy of consideration in the planning of the exploration work that must be done if the mines of the district are to be put upon a producing basis.

Water, Timber and Other Resources

There is an adequate water supply available at the claims of this company to serve for all ordinary purposes. Palmetto Creek adjoins the property on the southwest side and has sufficient water for domestic uses and a small milling plant. Willow Creek within 1,500 ft. of the southwest corner of the propetty has an ample supply of water for mining and milling operations on a large scale.

Timber for all purposes is available at points five to ten miles distant from the mine on the National Forest Reserve. By installing a small mill at the mine, it is estimated that all the rough dimension timber required can be obtained at $20.00 per thousand.

There are large supplies of limestone on the Lander road 12 to 15 miles from the mine, surrounded by abundant timber suitable for burning. This will be of material help in event a cyanide mill is installed.


Property Map
B. & H. GOLD MINING CO.,
Freemont County, Wyo.
0
500
1000
Scale of Feet
N
Spring
Gold Nugget
Band H
Caroline No.2
Emma
Caroline No.1
Ellen M.C.No.1
Ellen M.C.No.2
Ellen M.C.No.3
Main Shaft
Mill Gulch
Palmetta Gulch
To Willow Creek
Gulch
Open Cut
Surface
Outcrop
25 ft.
STOPPED
Old Workings
60 ft.
105 ft. deep
STOPPED
Old Workings
20 ft.
40 ft.
ORE
Shaft
ORE
STOPPED
20 ft.
115 ft.
LEGEND
Known Outcrop
Probable Outcrop
Shaft
Open Cut
Wash Material