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Item 54

EMMET D. BOYLE

Mining Engineer,

Virginia City, Nevada.

Silver Hill Mining Company,
San Francisco, California.

Gentlemen:

Pursuant to your instructions I have made an examination of the accessible workings of your company west of Gold Canyon and have the honor to submit the following report:

GENERAL STATEMENT

The mining ground of your company is situated in Sections 5 and 8 of Township 16 North, Range 21 East, Mount Diablo Base and Meridian, in the Devils Gate or Silver City Mining District, Storey County, Nevada. Your holdings are comprised of two separate parcels of land, the Lucern-Echo Group covering the outcrops of mineral deposits on Hartford Hill and the Holman-Cory Jay Boer Group on the Holman Overland ledge system. Your own and adjacent mining claims are shown on Plate No. 2 appended, the Lucerne Group being colored blue and the Holman group red on this map.

The workings on Hartford Hill only were examined and this report does not concern itself with the Holman workings.

DISTRICT GEOLOGY

Since the Lucerne Group covers a portion of the vein system comprising the Gold Canyon Branch of the Comstock Lode, a brief summary of the generally accepted views of the district geology follows. A clear idea of the relation of the Comstock lode and its branches and the Brunswick lode can be had from Plate No. 1 appended, a general map of the Washoe Mining District prepared from the data of the Becker Survey (Monograph III, U. S. Geological Survey.) Your Company's claims are shown on this plate in red lines.

The Comstock Lode is a mineralized zone with a general northerly and southerly trend, an easterly dip and a length of something over four miles, - extending through Sections 20, 21, 31 and 32 of Township 17 North, and through portions of Sections 5, 6, 7 and 8 of Township 16 North, Range 21 East, M. D. M., in Storey and Lyon Counties, Nevada.

Through Township 17 the lode may be said to occupy a single fissure, the footwall of which is the diorite of Mt. Davidson and the hangingwall diabase and andesite, though this is not entirely true, at least two important cross veins or branches occurring near its north end, one of which is the so-called East vein which has contributed largely to the recent production of the district. The footwall is firm and unbroken, but the hangingwall rocks are more or less shattered and altered as far east as the Brunswick Lode. This portion of the Comstock Lode is covered by the mining claims in Virginia City and Gold Hill which produced the

bulk of the three hundred and fifty million dollars estimated to have been taken from the district.

In Crown Point ground, near the north line of Township 16 North, the lode splits, one branch extending southwest into American Flat and the other following the line of Gold Canyon, southeasterly. The American Flat branch is a fairly clean cut fissure, but the Gold Canyon branch extends as a single vein southwesterly less than half a mile below the point of branching from the main lode. Many splits from the branch occur through Section 5, and southerly from the Alta claim shown on Plate No. 1, the wall rocks are fissured in four general directions for a width of nearly seven thousand (7,000) feet, these fissures having become the seats of four series of veins which constitute the deposits of the Devils Gate or Silver City Mining District.

The eruptive rocks constituting the formation through Virginia City and and Gold Hill are generally basic, and these rocks are found at the greatest depths at which development has been carried in that section. There, also, the ores have carried gold and silver, with the later metal (occurring as sulfides) predominating. South of the main branching in Gold Hill the Gold Canyon fissure extends into acid rocks (large areas of quartz porphyry occurring through the Silver City district) and at moderate depths, into the metamorphic rocks. The gold values predominate over the silver and the ores are, for the most part, oxidized and "free milling".

The numberous veins of the Devils Gate District are, as might be expected, weaker and much narrower than the main lode and their development at lower levels has been generally disappointing, commercial ores apparently being limited to a zone which extends only about five hundred feet on the dip below the surface. The veins continue a depth but are barren in the lower levels.

The network of branching and intersecting veins in the Silver City District have produced a set of conditions very favorable to the deposition of a great number of ore shoots.

There has been no such concentration of values in large "bonanzas" as occurred in the Comstock Lode proper and the productive zone has been much shallower, but a compensating feature has been its greater width. The Silver City District has produced not less than fifteen million dollars of the estimated three hundred and fifty millions taken from the entire lode and its branches, this fifteen millions having come from beneath an area approximately a mile square, compares very favorably with the production from any first five hundred feet in depth from any single mile along the main fissure. The ores in both the main lode and its branches have been found both as lenses on the veins and adjacent to the intersections of veins where cross ifssuring or branching occurs. There has been some displacement of fissures by faulting in the main vein and many cases in the Silver City District where one vein is cut and thrown by faults which have since been mineralized and have become veins themselves.

My observations over the entire District, however, have left me firmly convinced that the Washoe ore deposits were formed after all but the most minor faulting action had ceased, and that the great majority of the Silver City ore shoots were formed during the mineralization of the last of the "faults". This largely eliminates the necessity of working out the throw or displacement of ledges on others as an economic problem in the search for ore.

HARTFORD HILL GEOLOGY

Hartford Hill is a local name applied to a ridge bearing northwest and southeast and forming the southwest flank of Gold Canyon through the section occupied by the Lucerne workings. The elevation of the collar of the Silver Hill shaft, referred to Sea Level is 5285 feet, and the highest point on the hill is 5861 feet, making its summit in round numbers six hundred feet higher than the shaft collar. For the main part, it is composed of quartz porphyry though metamorphic diorite shows at its south end, and it is not unreasonable to suppose that it may be largely underlaid by metamorphic rocks.

The Hill is extensively fissured in three general directions, these being:

1st. Northerly and southerly.
2nd. Easterly and westerly.
3rd. Northwest and southeast.

Plate No. III, a topographic plat showing the areal geology of the northeast flank of the hill, may be referred to for an exemplification of the relation of these fissures to one another.

A ledge of northerly and southerly trend (which will be referred to hereafter as the Justice ledge) is exposed in the Robohm shaft, in Tunnels "B" and "D" and in the north end of the Lucerne Cut. This ledge occupies a strong fissure and continues northerly into Justice ground where it was explored through workings from the Woodville, Hill - Benham and Wallers Defeat shafts. Its average width is 50 feet, its dip 40° - 50° from the horizontal and to the east, and the vein filling is crushed and altered quartz porphyry or andesite, - depending on the character of the walls - recemented on the fracture planes with quartz and calcite.

In Justice ground this ledge produced several thousand tons of ore from stopes extending from the surface to the 400 foot level. Its grade could not be positively determined, but miners who worked in the stopes stated that its value per ton was about $8.00. A personal inspection of the upper Justice stopes at the Hill Benham shaft disclosed the fact that the ore formed there just south of the intersection of this vein and an east and west vein, and that the shoot was about 100 feet long. The ore taken from the Wallers Defeat shaft presumably came from the vicinity of a similar intersection with an east and west ledge which is observable on the surface. Small stopes below Tunnel "B" in this vein are directly south of a very clear intersection of this vein with the hanging wall streak of the Silver Hill vein.

The Justice vein was explored on the 159 foot level, 259 foot level, and 334 foot level from your main Silver Hill shaft. None of these workings are at present accessible, as this shaft is completely closed, but your mine maps show square set stopes on the 159 foot level just north of the intersection of this vein and the Succor vein.

The Justice vein was an important factor in the creation of the deposit of low grade ore mined in the Lucerne cut, a detailed description of which will be found further on.

Plate No. IV, a general map of your workings, should be referred to in connection with Plate No. III.

Plate No. V, a section through the Justice vein passing through Tunnel B, shows a transverse section, - the position of the walls in the inaccessible levels being taken from the Becker maps previously referred to.

The Succor vein does not outcrop on the Hartford Hill, but is exposed on the hill forming the other flank of the Canyon where it has been profitably mined by the Succor Company. It is an east and west ledge averaging 8 or 10 feet wide, dipping to the south at an angle of 55° from the horizontal. A transverse section (A -A) is shown on Plate No. VI which includes a longitudinal projection of the other underground workings from the Silver Hill shaft.

The Succor vein, E & W where productive, is in the andesite. It is not actually observable on the southwest side of Gold Canyon though sheeting of the rock north of Tunnel A indicates that the fissure does cross the gulch and into the quartz porphyry, though probably in a poorly defined state.

Your underground maps show developments on this vein on the Succor Tunnel level, and on the 159 and 259 foot levels from the Silver Hill shaft, with minor intermediate workings between the 159 and 259 foot levels.

Its presumable influence on the production of ore on the 159 foot level in the Justice vein has been mentioned, and it is interesting from this standpoint, though, apexing as it does wholly without your surface boundaries, it cannot be considered as a part of your holdings.

A second east and west vein, parallel in strike with the Succor vein, but dipping steeply to the north, is exposed in the Hamilton Cut, and appears as a feeder of indeterminate dimensions on the andesite hill forming the southwest flank of Gold Canyon where it is locally called the "Lynch Vein".

The veins of the northwest and southeast series appear as a wide fracture zone extending from the Justice vein southwesterly.

The hangingwall of this formation is approximately in the road between your shaft-house and the buildings opposite, shown on Plate No. IV.- this wall appearing to be on the contact with the quartz prophyry and the andesite shown approximately on Plate No. III.

Plate No. VI shows a transverse section of this vein trhough Tunnel A. Its underground development cannot be accurately deduced from your mine maps. It is probable that the incline from your main shaft followed a parallel vein apexing entirely west of your property.

The workings in the Hickey shaft and other openings on the road expose the timbering of old stopes which followed the hangingwall, and present workings in the Hickey shaft are in this same hangingwall streak. The vein matter on the hangingwall is much crushed and contains a very high percentage of "brown manganese". Southwesterly from the hangingwall the "vein" is, for the most part, a fracture zone, the quartz porphyry being crushed and sheeted and recemented with seams of calcite and quartz. No true footwall is observable within the limits of your Lucerne claim and the ground is apparently crushed and altered for several hundred feet to the southwest of your side lines. It was at the intersection of this formation with the Justice vein that the deposit mined in the Lucerne Cut was formed and at its intersection with the east and west vein in the Hamilton Cut that the ores on which Hamilton and Pollard are now working were deposited.

UNDERGROUND DEVELOPMENT.

As stated in the foregoing, all of the ledges on your property have been explored at a depth from the Silver Hill shaft, but an earnest search for precise records of what was exposed in the lower workings failed to procure much real information, beyond the general statements of miners formerly employed in the work that these veins below the 259 foot level were mostly clay and crushed rock and that the lower works were unproductive.

The Becker maps, prepared prior to 1881, show stopes on your 159 foot level and an open cut in the approximate position of the Lucerne Cut. Later explorations conducted by your Company, under the direction of Mr. Wm. Donovan, Sr. disclosed the fact that the hangingwall streak of the Silver Hill vein had been stoped from below the 50 foot level to the surface, and that crosscuts had been run westerly from your main shaft under the Lucerne Cut which exposed a vein of too low a grade to be profitably worked.

Mr. Donovan reports having also reopened the 159 foot, 259 foot and 334 foot levels, northerly from the shaft, and having extracted from the Justice vein, just north of its intersection with the Succor vein on the 159 foot level, one hundred and fifty (150) tons of $6.00 ore, which was all that remained of an ore shoot mined in early days. He did no stoping on the 259 foot level, though some favorable assays were obtained in the north drift near the two east crosscuts shown on Plate No. IV, or at the junction of the Succor and Justice veins.

No ore was found on the 334 foot level and he reports the general appearance of the ledge at that depth unsatisfactory.

I am informed that the Succor vein yielded some ore below the 159 foot level during operations conducted by the Silver Hill Company in 1890, but that the Succor Company compelled your Company to settle for it, - the apex of the Succor vein, as stated, being off your property. It is apparent that the production of your underground workings since 1880, the date of the Becker report, has been very small, and the Government statistics of production prior to 1879 credits the Silver Hill with $140,657, gained from 13,346 tons of ore of an average value of $10.53 per ton. The comparatively small tonnage of ore produced and its low tenor, taken in connection with later developments, indicate conclusively that the large amount of exploration through the Silver Hill shaft did not disclose anything which even to-day might be of any considerable commercial value. (Has been mined continuously since date of this report, 20 years.) AWS

The most important surface deposit opened on the property was a shallow shoot of ore at the intersection of the Justice vein and the "footwall" of the Silver Hill vein, which was mined in the Lucerne cut. A portion of this deposit was extracted prior to 1880, and contributed to the production of the $140,657 above mentioned. The bulk of the deposit however was mined by Captain Herman Davis and his associates in the Nevada Reduction Works under lease from your Company between the years 1899 and 1906 or 1907, approximately 60,000 tons of ore having been taken from the cut under this lease and mined in Dayton, which, I was informed by Captain Davis, averaged $4.68 per ton.

Tunnel "A" driven about forty (40) feet below the floor level of the cut disclosed the fact that the values did not extend downward, and this deposit is, in my judgment, fully worked out. Numerous large samples of the walls of the cut and in Tunnel "A" were taken by me, for the purpose of this report, and the low returns obtained are shown on the assay plan appended (Plate No. VIII.)

(Wm. Donovan now mining ore from beneath Lucerne Cut. May, 1932. AWS)

Tending to confirm the assays is the fact that numerous leasers have, since the abandonment of the cut by Captain Davis, attempted to extract ore from it but have in every case discontinued work after the first mill run.

Second in point of importance to the Lucerne Cut deposit is the "Hamilton" deposit, now being mined under a privilege from your Company by Messrs. Hamilton and Pollard.

This deposit is formed at the intersection of the Silver Hill vein and a fracture zone, which crosses it and which I have shown on Plate No. III as the "Hamilton vein". On the plate it is shown as a wide vein crossing into the andesite, but this is largely conjectural, the outcrop east of the Silver Hill vein being completely obscured for some distance by roads and dumps. East of the dumps, however, the Lynch vein, mentioned in the foregoing, is found in the proper position for a continuance of the Hamilton vein.

In the altered quartz porphyry of the Silver Hill vein the Hamilton deposit occurs as a crushed and altered porphyry lying in a sheeted zone, the planes of which are east and west and dipping steeply to the north.

Reference to Plate No. VIII, the assay plan, should be made. It will be found that the south drift from Tunnel "A" shows fair values on the strike of this zone and on this, taken in connection with the present form of the cut as shown on Plate No. IV, I assume that the ore will continue to an intersection with the Lucerne workings, though decreasing in width as it goes west from the present face in the same manner as it has narrowed in the portion of the cut already opened.

The tonnage and bullion production of this deposit to date was obtained from Mr. Donovan's records and is given in detail in the appendix. Summarizing,- the deposit has been operated since the spring of 1912 and is at present producing about 1,000 tons of ore per month. The total production to December 1st, 1913, has been 12,248 tons of ore, 1,000 tons of which are still unmilled. From the tonnage milled or 11,248 tons, - has been produced in the mill 2505 ounces of bullion of an average value of $11.95 per ounce, and containing $29,349.25 in gold and $587.21 in silver, the mill production per ton of ore being $2.66.

The tailings, after leaving the mill, have been sold to Mr. Donovan, and have netted the leasers $2256.35. The monthly samples on which the tails were sold are not obtainable, but the basis of the sales is as follows:

on tailings

The payments represent 60% of all the value over $1.75 per ton and the tonnage settled for is 90% of the tonnage run through the mill, 10% being deducted for moisture and losses in slime. The total tonnage of tailings sold was therefore 10,123, which was paid for at the rate of 22.2 cents per ton, which represents 60% of their value in excess of $1.75.

The assay value of the tails thus figures to have been, on an average, $2.12 and the total value of all ore mined, $4.78 per ton. Apart from the slight error growing out of the "averaging" process, a further consideration tending to reduce the average of the ore mined is the fact that Mr. Donovan has paid 10¢ per ton for all ores which were below $1.75 per ton in value. I am using the figure $4.78, however, as representing the assay value of the ore extracted.

The surface of the hill in advance of the face of the Hamilton Cut is covered with dumps and cannot be sampled. I have, however, indicated in green lines on Plate No. VIII, the probable limits of the Hamilton ore shoot, and its probable ore contents above the present level of the cut bottom is computed at 15,000 tons of ore of the same grade as that already extracted from the deposit, or $4.78 per ton. This assumes the continuance of the shoot to the Lucerne Cut and the figures are arrived at without the aid of actual development in advance of the face of the cut. It is believe, however, that this estimate may be taken as fairly representing your probable reserve above the level of the cut floor. The ore doubtless continues below the floor of the cut and it would be possible to take a ten foot bench below the present floor, which might be assumed to be ore of the same grade as that already extracted, adding about 4500 tons to the reserve as figured above. It would not be safe to speculate on further reserves in advance of development, and it is quite safe to predict that 20,000 tons will be the extreme limit of the ore which may be mined by open cut methods, not supplemented by hoisting, from the Hamilton Cut.

The only other producing lease on your property is one operated by Hickey and Hardwick on the hangingwall streak of the Silver Hill vein. These leasers are extracting a small block of ore at the south end of old stopes from the Silver Hill shaft workings. The data regarding their production for the past two years was obtained from Mr. Donovan and is appended.

A summary of these figures is as follows: The total tonnage mined from January 1st, 1912, to November 1st, 1913, has been 2301 tons which yielded in the mill 1232 ounces of bullion containing $14,598.98 in gold, and $277.01 in silver, - a total of $14,875.99 or $6.46 per ton.

The tailings purchased on the same basis as those of the Hamilton lease, except that a 15% deduction from the mill tonnage was made to cover larger slime losses, growing out of the heavy manganese contents of the ore, were sold for a net sum of $5485.50. The total tonnage paid for was 1956, (85% of 2301 tons), and the average price paid was $2.80 per ton. This being 60% of the difference between the assay value of the tails and $1.75, the former is computed to be $6.19 per ton and the original assay value of the ore $12.65 per ton.

The Hickey-Hardwick workings are shown on Plate No. IV. The block of ground in which they are mining is small and it seems unsafe to predict the extent of their reserve, owing to the proximity of old workings, though in the conclusion to this report, I have recommended certain development on the hangingwall streak.

Panning tests were conducted on the other openings on your property, most of which are in the Justice vein, but none of them were found to expose ore of commercial grade.

METALLURGY

The metallurgy of the Hamilton Cut ores is simple. The present leasers are crushing in stamp batteries through thirty-five (35) mesh screens, amalgamating inside the mortars and passing the pulp over copper plates. The process apparently extracts 56% of the gross value of the ore. The tailings treated at the Silver City custom plants will yield between 80% and 85% of their values after seven to ten days percolation, making the total extraction by both processes about 92% of the assay value of the ore.

The high percentage of manganese in the ore of the hangingwall streak and its "mucky" character makes it more difficult to handle than the hard ore of the cut, but it appears to yield 51% of its value in the mill. What it does in the cyanide plant is conjectural, as it is run mixed with a large proportion of sands from other works.

METHODS AND COSTS

The ores of the Hamilton, workings are broken down in an open cut, the floor of which is level with a portion of the main Gold Canyon road. The cut may be likened to a "glory hole" in that the face is kept on about the angle of repose of the broken rock which is blasted by shallow hand holes to slide down to the floor level where it is shoveled into the quartz wagons in which it is hauled to the mill. The breaking and shovelling of the ore is performed by the leasers and the mining cost per ton is made up of the following items of expense:

Labor:		
1 man at $4.00 per day	$ 4.00	
3 men at $3.50 per day	10.50	$ 14.50
Supplies:		
Powder per day	$ 2.00	
Tools and incidentals per day	2.00	$ 4.00
Total daily mining cost		$ 18.50

Mining cost per ton on 33 tons per day production $.56.
The hauling cost is $.30 per ton.

The ore is crushed in the Hamilton-Pollard Mill, an 18 stamp mill in Silver City, though the mill does not run continuously on Silver Hill rock but handles a considerable tonnage of custom rock from other properties as well. I was unable to get actual milling costs but estimate them to be in the neighborhood of $1.25 per ton, on a 1,000 ton per month basis. The mill, if worked exclusively on cut ore, would crush about 50 tons per day and the working costs might be lowered to $1.00 per ton, divided as follows:

Labor	$ .43 per ton,
Power	$ .27 per ton,
Replacements & Incidentals	$ .20
Water	$ .10 per ton.
TOTAL COST	$1.00 per ton.

The present mining, milling and hauling costs, however, are not far from the figures given, or as follows:

Mining	per ton	$ .56
Hauling	" "	.30
Milling	" "	1.25
Total		$ 2.11

In addition to this figure, the leasers have paid a royalty of $.26.6 per ton as an average, making their gross estimates costs $2.38 per ton.

Their gross recovery, including returns on tailings, has been $2.88 per ton, and their apparent net profit has been $.50 per ton.

The production cost from the Hickey lease where the work is in the nature of "gouging" or "coyote mining" I cannot estimate with any approach to accuracy.

Of interest in connection with the estimated cost figures given in the foregoing is the following cost data taken from a report of the Nevada Reduction Works published in 1904, covering the expense of mining, hauling and milling the ore of the Lucerne Cut:

Mining and milling, per ton.....	$ 1.457
Hauling..... " "	.608
Total.....	$ 2.065
Cyaniding	1.350
Total.....	$ 3.415

The hauling charge in this case was for carrying the ore to Dayton, a distance of 5.2 miles, and is $.30.8 higher than the cost of hauling the Hamilton Cut ore. To offset this, however, water and power cost the Nevada Reduction Works nothing as their mill was run by water from the Carson River, and their milling costs were about $.37 per ton lower than the Silver City cost. These actual cost figures closely check my estimates.

The cost of cyaniding in Dayton was probably somewhat lower than Silver City costs as the Nevada Reduction Works plant was of 100 tons daily capacity and treated large quantities of custom tailings in connection with the Silver Hill ores.

Custom milling in Silver City runs from $2.00 to $2.50 per ton, dependent on the gonnage and the character of the ore.

SUMMARY.

For convenience of reference the principal figures deduced in the foregoing are shown here in condensed form.

PRODUCTION STATISTICS.

Note

Column 1 Tonnage produced.
Column 2 Assay value of ore.
Column 3 Extraction per ton.
Column 4 Total production.

Working	Col. 1	Col. 2	Col. 3	Col.4.
Old works, prior to 1879 (1)	13,346		$10.53	$ 140,657
1879 to 1899 (2)	3,000		8.00	24,000
Lucerne Cut (3)	60,000	4.68	4.30	258,336
Hamilton Cut (4)	11,248	4.78	2.87	32,193
Hickey Lease (5)	2,301	12.65	8.85	20,361
Small production 1899 to date (2)	500		6.00	3,000
	90,345			$ 478,577

(1) Mon. III U.S.G.S.

(2) Estimate from best information obtainable.
(3) Report of Nevada Reduction Works.
(4) Tons milled. Tons mined to December 1st, 1913, 12,248. The figures in Col. 4 represent gross recovery by leasers. The total recovery was probably 92% of the assay value.
(5) Tons milled. The total proceeds is estimated at 85% of the assay value.

METALLURGICAL DATA:

Hamilton Cut:

Mill recovery per ton of ore	$ 2.66
Sales of Tailings per ton	.22
Percentage of recovery in mill	56%

Hickey-Hardwick Lease

Mill recovery per ton of ore	$ 6.46
Sales of tailings per ton	2.80
Percentage of recovery in mill	51%

Ore Reserves

Probable ore above present floor of Hamilton Cut (tons)	15,000
Probable available ore (open cut stoping) below floor (tons)	4,500

CONCLUSION.

The natural inference both from a study of the geology of your mining ground and from such records as are available is that development below your 269 foot level should be confined to certain zones in the vicinity of the various vein intersections.

Mr. Donovan's explorations on the 159 foot level indicate that the ores at the Succor-Justice intersection have been mined out above that level, and perhaps below it through old stopes on the 259 foot level. The indeterminate "prospect" which he reports as having found on the 259 foot level is not sufficient to justify you in equipping to develop it further. The Succor vein, as stated in the body of the report, does not belong to your Company and is not to be considered.

The Lucerne Cut, as far as surface showing is concerned, is worked out and the intersection of the Silver Hill and Justice veins appears to have been developed on the 50 foot level from your shaft, where Mr. Donovan reports that he found no commercial values when these works were reopened by him.

This eliminates everything except the Hamilton vein intersections and a block of unprospected ground on Hartford Hill between the Hamilton vein and the section line "C -C" on Plate No. IV.

Concerning the reserve in the Hamilton vein, my estimate of 15,000 tons of probable ore above the cut floor and the 4,500 tons below it is as liberal to the property as the present development on this vein will justify. I am free to say that the actual tonnage which will ultimately come from this open cut will more likely fall short of the estimated figures than exceed them. It is equally true that the estimate of the assay value of this ore per ton, which I have placed at the same figure as the average of that ore already taken from the cut, is more likely to be less than $4.78 per ton than it is to exceed that value, as the ores thus far mined may have been "sweetened" by better grade ores occurring right at the intersection of the Hamilton vein and the hangingwall streak of the Silver Hill vein.

Using the estimates, however, as given, it is possible to arrive at figures which may be accepted at this time as your guide in formulating your future policy.

The profits to be anticipated from a continuance of your leasing system on this cut would be approximately 28.7 cents per ton (10% of the estimated total recovery by the leasers) or in round numbers, $6,600.

Should you undertake to work the property yourselves treating the product in the Silver City custom mills, you would operate without loss or profit unless better rates than the minimum custom rates for milling and cyaniding could be obtained, this statement being based on the assumption that your mining and hauling costs would be the same as those of the leasers, i. e. 56 cents for mining and 30 cents for milling, and that your milling would be done at the minimum rate of $2.00 per ton, a total of $2.86, or just what could be recovered from the ore.

Should you plan to erect your own reduction works at the mine, the following estimate of the cost of the plant, the probable recovery and the operating expense are as follows:

PLANT INVESTMENT

Estimated cost of a 50 ton per day capacity mill of the cheapest possible construction;

20 stamps, with copper plates and settlers, figuring on second hand equipment not less than.....	$ 15,000,
50 ton cyanide leaching plant including necessary reservoirs and appurtenances not less than	$ 8,000
Estimated total plant investment	$ 23,000

If this plant were constructed at your works, your operating expenses per ton would be:

Mining.....	per ton	$ .56
Milling.....	" "	1.00
Cyaniding.....	" "	1.40
Estimated total operating expense.....		$ 2.96

The recovery may be estimated at 92% of the assay value, or $4.40 per ton, showing a net profit of $1.44 per ton or a gross profit on your probable reserve of $28,000, sufficient to redeem your plant investment and allow a profit of $5,000. Bearing in mind, however, the fact that your reserve cannot

be figured as blocked ore or a proven tonnage and value, it will be apparent that you should not consider the erection of a plant until the limits of the deposit had been determined by development, and the cost of such development would probably be not less than $2,000.

It is obvious that the present policy of the Company will exhaust all its known ore deposits in less than two years, and it is urgently recommended that some work looking to the opening of other deposits or extensions of the known ones be inaugurated while your property is producing revenue.

In my judgment ore, which can be profitable mined, may exist in any one of the following places on your property.

(1) In east and west zones in the Silver Hill vein similar to the Hamilton vein between the Hamilton Cut and the section line "C - C" shown on Plate No. IV. A few surface trenches running north and south in the area named will determine this.

(2) In the hangingwall streak of the Silver Hill vein, either as old fills of workable grade or as pillars of low grade ore left by the early miners on the property.

(3) In the downward continuance of the Hamilton ore shoot.

(4) In the west crosscut from the Robohm shaft, which has entered the Justice vein a few feet north of its intersection with the hangingwall vein.

A short drift southerly from this intersection should reach the intersection where a small ore body might exist.

The first and fourth possibilities mentioned in the preceeding paragraphs are not, in my judgment important, but the development of the hangingwall streak and the Hamilton shoot might be undertaken with a reasonable certainty of uncovering some ore.

In my opinion, a small incline shaft, to be started just back of the barn shown on Plate No. IV would afford the best means of feneral development. Such a shaft could be sunk to a depth of 100 feet economically with a horse whim and at a cost, including equipment, of about $20 per foot. A few hundred feet of drifting in the ore zones named would put you in possession of the facts as to the extent and value of the deposits in this portion of your property.

Respectfully Submitted,

(SIGNED) EMMET D. BOYLE.
MINING EINGINEER.

December 16 - 1913.