EXCERPTS FROM REPORT ON NUGGET-MOTHERLODE PROPERTY 82F/3E

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June 29, 1931 002886

CLASS B SECURITIES

"PASSED BY THE PUBLIC SERVICE COMMISSION OF WISCONSIN BUT WITHOUT RECOMMENDATION AS TO VALUE. THIS IS A SPECULATIVE VENTURE."

Introduction.

This report gives conclusions arrived at from a study of the commercial possibilities of the Nugget-Motherlode property near Salmo, British Columbia during the period June 17 - June 23, 1931.

The study included numerous conferences with Messrs. Arthur and Harold Lakes, mining geologist and mining engineer, respectively, formerly in charge of operations at this property. Mr. Arthur Lakes is now a general consulting geologist at Vancouver and consultant for the Reno Mine adjoining the Nugget-Motherlode. Mr. Harold Lakes is associated with the Victoria syndicate in charge of development of the Reeves McDonald zinc and lead mine south of Salmo. The study included study of maps, sections, models, financial statements, mill returns, at the Motherlode office, an inspection of the Motherlode mill, and an examination of the accessible workings of the Nugget and Motherlode mines accompanied by the Lakes brothers. It included also inspection of the adjacent Reno mine and mill and conference with its managing director, superintendent and accountaint for the purpose of determining present day cost data, underground conditions on practically identical veins, and methods of technical and accounting control of operations. It included also inspection of the #3 level of the Queen mine.

I am of the opinion that the work of the Lakes brothers as set forth in their reports herewith transmitted to you are reliable and recommend thoroughgoing study. In view of this it has appeared that the principal service which I can render you is not to duplicate these reports but instead - since I under-

stand that you a[illegible] your directors are not technic[illegible] mining men - to interpret the significant data in non-technical language.

General-Geology and Valuation.

The Nugget-Motherlode is offered for $50,000. Since, as will be set out below following Arthur Lakes, supported by Harold Lakes, and as checked in general both on the ground and in general aspects by the writer, it appears that the combined properties have a conservative potential valuation of $200,000 and potential values to exceed $300,000, it is logical first to anticipate the question as to how such a property could be obtained for $50,000.

I therefore give the statement as given to me by A. and H. Lakes, who were in charge of last operations of the property, and who therefore have the data well in hand. The property goes at a price set low because of the exigencies of liquidation.

Historical Summary.

These properties were located some 25-30 years ago by prospectors. About 1908 Mr. John McMartin, later of the Hollinger Gold Mines and New York City, purchased the properties outright for a reported price of $100,000. Mr. McMartin was originally a railroad contractor and he placed the property in charge of a Mr. Watson as superintendent and manager.

Under Watson the Motherlode property was equipped with a pipe line to bring in water power, a mill, and a tramway by which ore was brought down the mountainside from the mine to the mill. Each of these several installations was made by specialists, respectively the Vancouver Engineering Works and Pacific Coast Pipe Company of Vancouver, Merrill Metallurgical Company of San Francisco, and the A. Leschen & Son Rope Company, St. Louis, Mo.

As carried on the Mine Balance Sheet of the Motherlode Sheep Creek Mining Company, the Capital expenditures for mill and equipment, for pipe line, and for main aerial tramway were as follows:

Milling plant		
Mill building	$38,650.37	
Mill Equipment	92,225.52	
Refining and assay building	4,293.97	
Refining and assay equipment	7,715.21	
		$142,885.07
Water and Air Power Plant		
Pipe line and intakes	56,440.11	
Air compressor	10,966.94	
		67,407.05
Main Aerial Tramway	22,386.30	22,386.30
Total		$232,678.42

Milling commenced about 1913 and continued until some time in 1915 Some 60,500 tons were treated which returned around $700,000.

The Motherlode property was closed some time in 1915 for a variety of reasons. The principal reason was said to have been the general conditions consequent upon the fact that the World War was affecting economic status of gold mining. There were local reasons, however, such as the mining of ore well down to the lowest tunnel level necessitating opening of new ground. Also, it is reported that Mr. McMartin desired to consolidate his property with others in the vicinity and had made proposals to their owners, which, however, were declined. It is reported that in view of other circumstances he decided to close his property thinking to bring them into line with his ideas. He later died, but prior to death had disposed of the property to other parties.

The Nugget Gold Mines, Ltd., a Vancouver Syndicate, procured the property from McMartin and in 1918 under direction of R. H. Stewart the plant was reno-

vated, the tunnel was driven connecting the Nugget vein with the Motherlode. It tapped the Nugget 640' below the lowest workings up to that time and 1000' below the surface outcrop. The original Nugget operators had pursued selective mining methods, drawing only upon the richer shoots. Under Stewart considerable stoping was done on the Nugget, and the Motherlode ground down to this tunnel level was more or less mined out. All ore was milled.

Mr. Harold Lakes was superintendent under Stewart from 1918 on, and in 1921 Mr. Arthur Lakes on return from war service in France joined the staff as geologist.

Some time in 1921 the Stewart direction of the property ceased on accounts of the reported reason that his directors would not follow his recommendations fro development. Stewart joined the Victoria Syndicate and later Mr. Harold Lakes joined with him.

In 1921, when stewart left the property, Mr. Allester Forbes became financial manager. He was not a technical mining man but was a heavy stockholder. Also, because of his interest he was instrumental in interesting others. Harold Lakes remained as superintendent. Mr. Forbes is said to have formed a company to take over other prospects in the vicinity, such as Kootenay Bell, Golden Bell, and the Queen. In this he was unsuccessful.

Some time in 1924 with the drain on known reserves and failure of the company to do development work in advance, the Motherlode ore reserves became insufficient to maintain the mill economically. Hence the Nugget vein was called upon to supply the bulk of the ore. This vein had been operating by a shrinkage method under which broken ore was withdrawn at a rate allowing for overhead stoping of the broken ore on the top. The situation demanded drawing ore too rapidly to permit shrinkage methods. It was necessary to put in timber floors, which were expensive. Incidentally, the values in the vein are not uniformly distributed, and when the number of working places was reduced,

it became necessary to draw ore without regard for balanced values in the mill feed. The conditions thus encountered resulted finally in the closing of the property.

Some time early in 1927 representatives of Stobie, Furlong, of Toronto, a brokerage house, came into British Columbia, looking for mines. They formed the Enterprise Consolidated Mining Company, with 12,000,000 shares at 25 cents, taking the Yankee Girl mine at Ymir and five other mines nearby on bond and leases. To get a listing on the exchange they had to own one property outright. They therefore made a deal with the owners of the Nugget-Motherlode. The consideration was $76,000 cash plus the equivalent of $100,000 in stock in the enterprise Consolidated Mining Company. The right to list the stock was, however, never exercised.

The Stobie Furlong people, according to Lakes, planned to open the Yankee Girl to greater depth and to do this brought power from Nelson 18 miles away and planned to take it to the Nugget-Motherlode, another 12 miles. They also planned to open the latter mine to an additional 500 feet in depth, which was the recommendation of Harold Lakes, as set out in his report which is supplied herewith.

The sale of the 12,000,000 shares of Enterprise Consolidated was to have provided funds to develop the Yankee Girl and the others of the group. The Yankee Girl received first attention but was expensive and plans were elaborate. The upshot of the matter was that all cash was spent there. Payments on the Yankee Girl never were completed. The Nugget-Motherlode was never gotten to, the 12,000,000 shares were never fully sold, and with slump in the stock market in 1929, the company ultimately went into bankruptcy and receivership.

We come then to the question of whether the property is worth $50,000 and what a reasonable valuation might be. Ultimately this depends upon the mineral resources on the property, their tonnages and values per ton, or total

prospective value. The next step will be to determine whether operations of development, and mining on the one hand, and milling on the other can be accomplished at a cost such that there will remain a profit on net operations.

Here we encounter two considerations (1) possible profits if it were necessary to provide preliminary development workings, (2) the profits if plant and preliminary equipment and workings were already available. The actual condition is that the property has a mill already in place, as indicated above, a tram, and the development workings. These are in purchase price but renovation is required. So that the cost of starting operations, the initial investment necessary, will be in excess of purchase price by not less than $50,000.

Ore Reserves.

Ore reserves are to a mine what timber reserves are to a sawmill operator or what milk supply is to a cheese factory operator. They cannot be estimated with the same degree of accuracy, however, for the principal reason that they cannot be determined by walking over an area, sizing up the average run of trees and their board feet content, or by driving about a farming community, counting the farmers, their average size of herd and the average milk yield. Ore reserves can be estimated accurately only after the ground is opened up. No timber cruiser would be honored who would walk one side of a tract, scale the possibilities on that one side, and then report that the stand seen would be considered to hold back of that line for an indefinite distance. No prospective cheese factory purchaser would risk capital in a factory after driving along one road, counting farmers and their cattle, estimating average milk yield and then risking it that there would be the same conditions on all roads in the area from which he was to draw his milk supply. And similarly, no mining man would in his right mind walk along a vein on the surface, measure the total length, measure the average width, take a square foot of the vein, determine amount of gold, silver or copper or whatever metal was concerned and figure that length,

that width and the metal content could be expected to be found to indefinite depths. This is a matter to be pondered over by anyone not experienced in mining and before investing money. It cannot be overemphasised that this matter of estimating reserve is extremely difficult. To add emphasis, it is perhaps well to dwell somewhat at length upon the factors involved.

1. In the first place, metals do not occur everywhere. This needs no citation of evidence. It is a common fact that we all recognize. Metals or their ores are either introduced into rocks from a source independent of the rocks themselves or they are there in minor and non-commercial amounts and are concentrated either by movement of themselves if they are soluble in ground solutions, or, if they are insoluble they are concentrated relatively due to the removal of other material which is soluble. Furthermore, when introduced, as in the case of the property now under consideration, they are injected into already existing cracks, or crevices, or "fissures", that is, crakes along which there has been more or less ground movement. The "veins" on the Nugget-Motherlode property are nothing but cracks or fissures in some very old bedded rocks or quartzite, into which there has been introduced or injected quartz- a comon example of which is ordinary sand - with gold, some iron sulphide, some copper, some lead and some zinc compounds or sulphides. Therefore there is nothing of mineral value in the property excepting in these veins.

2. The next point to put across is that these cracks or fissures were not like the grooves on the edge of matched lumber. They were not like the trench cut by a ditching machine, with straight and true sides giving a constant and uniform width. They more nearly are like what one would get - on a large scale to be sure - if he took two pieces of corregated iron, or washboards, and placed them in such a position that the ridges were all but in contact and the troughs were also practically opposite one another. It should not be understood that this means that things are as regular as the corrugated iron or washboards.

But the point should be gotten that as one walks along the vein on surface, the walls of that vein or of the original fissure made an opening which was here narrow, there wider, then again narrow. The walls pinched together or swelled apart continuously. Consequently, when the fissure was filled by the quarts, gold, etc. which was introduced in hot waters from great depths where hot molten rock abounded, the fissure filling, or vein, also pinched and swelled. Here the vein may be but a few inches wide, there it may be 16 or even 20 feet. The point is that the width varies and hence the amount of ore varies because of it.

3. The next point I wish to impress upon you is that the material injected to fill the fissure and to form the vein <u>was not an intimate mixture of gold,</u> quarts, pyrite and the other sulphides. That is, it is not as if the fissure had been filled by say a material that had been mixed thoroughly like in a concrete mixer. Instead, there would be more gold in one place than another, rich quantities in one place and absolutely no trace perhaps even within 10 feet. This is a notorious fact often never known, sometimes overlooked, and at all events sometimes not given sufficient attention. In some mining districts the distribution of values is extremely erratic, in others the mixture was apparently more intimate and hence distribution more nearly uniform. In the Nugget-Motherlode there is no question about it; the values are irregularly distributed and values at the rate of over $100 per ton will occur within a few feet of values at the rate of a very few dollars per ton. Obviously one cannot bank on the wonderfully rich values, cannot bank on their extension over great tonnages, that; and on the other hand only a fool pessimist would give his thoughts wholly upon the extemely low values. The point is that values are erratically or irregularly distributed thoughout a vein whose width we have seen also varies. I cannot emphasize too strongly that the reader, presumably one contemplating or considering part purchase of the

property as a stockholder in the company, should get the idea that the possible reserves of ore, upon which fundamentally his chances to earn dividends and to regain his investment depend, cannot be accurately summed up in advance of actual mining and milling. I shall introduce evidence to show how the tons of ore actually mined and milled returned values far below the richest sample assay results, and considerably above the lowest figures gained from samples. You should notes also that in estimating ore available we have rather generously discounted the estimated average width and consequently the possible tonnages.

There have been appended herewith maps showing results of sampling in various workings on these properties. It will be learned on analysis that the assays from these samples show great range in values. There is no decided agreement between the work of the several samplers. This may be difficult to understand in spite of what has already been said. However, if it will be recalled that the values are erratically distributed, it cannot be expected that identical results can be forthcoming from any but identical samples. A shift in position of the sample location but a few feet will produce radically different results.

During 1913, as shown in the appended report for the year by the General Manager, the average grade of 24,266 tons treated was $14,407 per ton. The operating efficiency of the mill was 96.7%.

On December 22, 1923 Supt. Harold Lakes reports "Records show the original cost of equipment was in excess of $300,000.00 and that 97,989 tons of ore have been mined from the properties from which has been recovered bullion to the value of $1,216,738.00 or an average value of $12.40 per ton".

At the Queen, a very similar vein, although in large part operating on unoxidised sulphide ore, according to Mr. Buckley, his government returns show that from May 1908 through to the middle of 1916 he had crushed and milled 84,285 tons to recover in concentrates and bullion $718,236.41 gross

or $8.52 per ton. The Queen mill is of a type noted for inefficient operation particularly on sulphide ore. The efficiency is estimated to be not over 70% from which it appears that the general grade of ore mined and milled was $12.17 per ton.

At the Reno the general average of ore is slightly higher than that quoted above.

The gist of the matter is that the mill average is an integration of the various grades occurring in the vein and a $12.00 per ton average is considered to be a fair estimate for values yet remaining.

4. We come now to an attempt to answer the question as to how deep we can expect that the vein will extend and also how the proportions of gold per ton of vein filling will vary with depth. There is no good reason to doubt that the veins will extend to depths far beyond our consideration. We need have no worries on that score. It has little to do with our deliberations. The veins will go down to thousands of feet of depth beyond a doubt. But - we are concerned with the proportion of gold we may expect as we go down on the veins. It might well be that whereas at the surface today we could develop and mine and mill 100,000 tons of vein filling and find after all was done that each ton averaged say $20.00 worth of gold or $12.00 worth of gold, and that 2,000 feet down the average ton would contain $50.00 worth of gold. On the other hand, the chances are equally good, and for our purposes we should be safer if we considered that at 2000 feet one average ton would give as lower figure, say $6.00 in gold. In the latter case, obviously we could not operate successfully. What we would like to know, then, is how these values will change with depth. Since we cannot at present go down to these depths from the surface on any vein in this district, we must attempt to produce whatever evidence, circumstantial or otherwise, or at the worst mere indication or suggestion, may bear upon the questions.

We do know t. , there are a great many veins the district and there is no reason to doubt that they are of same age. From south to north these are Queen,——Motherlode, Nugget,————Reno. In this same order the veinsare at increasing elevation from (3200') for the Queen to (7000') fro the Reno. If we could safely assume that at the time that these veins were injected into their fissures the surface of the ground was horisontal and that the tops of the veins were at a uniform depth below that surface, but that erosion had decapitated to an extent indicated by a difference in elevation, then we might assume that the conditions observed at one elevation on any one of the veins. We could go then to the Reno and get our data for that elevation, to the Nugget for another, to Motherlode for another, and finally down to the Queen, which is the lowest mine in the camp, 4200' below Reno, for data on the elevation. Unfortunately we cannot safely make this assumption. The facts, for what they are worth, are that there was no significant diminution in average per ton values between those gotten in the Reno (being obtained today) and those gotten in the Queen. Unlike some minerals which are found only in limited zones of depth, gold is persistent with depth.

We can, however, make use of the fact that the Nugget vein has been opened up for a vertical distance of 1000 feet. The operations show that there was no essential diminution in values through this range. If then the rate of change is uniform, and if that rate of change of values with depth is negligible within 1000 foot intervals, the question seemingly could be dismissed. This assumption is not safe, however. In spite of the Nugget vein evidence it is safer to expect that where the change in the gold content does take place it will occur rather rapidly or abruptly with depth. This introduces another matter and it is well perhaps to diverge for the moment to give it consideration.

Ordinary weathering processes are as unfailing as the law of gravity. They may and do have different effects due to difference in climate, difference in altitude, and difference in the composition of rocks. But the agencies of the atmosphere and weather are attacking rocks universally and continuously tending to change them. The different chemical elements enter into different minerals, the minerals into different rocks. The different elements respond in their own characteristic way to the different factors of weathering; the different minerals respond in their way; and rocks in turn react in characteristic ways. The principal factors to think about are the oxygen of the air, the water, and carbon-dioxide which is also in the air. These attack the rocks. Some elements can oxidise; for example, iron can rust. Iron minerals are therefore subject to oxidation. Because of this, in some places we get iron oxide ores. Furthermore, iron ordinarily can be considered as not soluble in water. It stays put when oxidised. Other elements are soluble and are dissolved and carried away in streams to the sea.

With this preliminary consideration, let us consider the veins. Their minerals have to combat the agencies of weathering just as much as any other mineral aggregates, just as much as the wall rocks. The plain evidence of this combat can be seen in the outcroppings of the veins. They are porous because certain things have been dissolved. They are rusty red or earthy red because the iron of some former mineral has been oxidised or rusted. They are weaker or crumbly because of the solution of some minerals and the oxidation of iron. Furthermore, there are green and blue stains due to presence of copper carbonates which prove conclusively that copper minerals have been oxidised and carbonated by the atmosphere. What we conclude from these observations is that there had originally been some other copper and iron minerals which have been altered to oxide and carbonate. We can very easily trace back from these

oxides and carbonates to identify the original minerals because there still remain small amounts of iron and copper sulphides even in the midst of the weathered vein. Furthermore, as we get deeper from surface in either the Reno, where we have to go only 400-500 feet deep, in the Nugget, where it is perhaps 1000 feet, or a few tens or hundreds of feet in the Queen, the proportions of these iron and copper sulphides increase. These sulphides are commonly referred to as "primary sulphides" or "primary ore".

The point to all this is that in many mines it has been found that the oxidation of sulphides in the upper levels has formed not only iron oxide from the iron but sulphuric oxide from the sulphur, and this when dissolved in water forms sulphuric acid. This dissolves copper and as this copper sulphate is soluble it percolates with ground water down through the vein, and when below the zone of oxidation the copper once more is deposited, thereby enriching in copper the primary sulphides. If we were involved with a copper mine, then we should be all means be forced to study intently the question whether or not the ground from which production had come to date was not a zone of secondary enrichment, below which in primary sulphides values would be much lower. It so happens that gold is a noble metal, not readily compounded, and practically insoluble excepting in the case of chloride waters when manganese dioxide is present. If we had such a set up, we might expect to find a zone of secondary gold enrichment. So far as I have been able to find out, there are no chloride waters here, and although there is a manganese staining, it is associated with weathering, and in my opinion the transfer of gold in solution is negligible. There evidently is a slight mechanical transfer of gold, however, as surface waters percolate downward, but on account of the fineness of the pore spaces it does not seem reasonable to assign any importance to this. Certain vugs or small cavities have been found (Harold Lakes' personal statement) which are partially filled with slime and carry rich values.

Three illustrations can be given of the point that the sulphide ores carry gold values on a par, at least, with the oxidised ores. These are (1) ore at the Reno in oxidized ground averaged $16 per ton and in the #4 level where sulphide ore specimens were taken assays of the day had shown up to $44 per ton in gold or 2.2 ounces; (2) in the 1000' level of the Nugget, assays on only partially oxidised ore ran as high in gold as in oxidised ground; (3) the Queen ore containing sulphide assays as rich as the more perfectly oxidised ore. Moreover, the country wall rocks as well as the barren vein matter are siliceous. The effect of this in any case would be to spread the zone of enrichment over relatively greater depth.

While I would strongly urge therefore that the question of downward secondary gold enrichment be carefully investigated on the Nugget-Motherlode property and checked constantly with developments in the Reno and elsewhere, in my opinion there is nokyet any evidence pointing in that direction. In this both Arthur Lakes and Harold Lakes confirm my opinion.

In drawing up estimates of tonnages directly tributary to the Motherlode mill, upon veins now known within the property, we have, as you are urged to note, discounted the average figures of width, per ton values, and depth. In fact, estimates are of two classifications, namely those tonnages above the present bottom levels of the two properties and those that may be anticipated at greater depth.

One additional line of consideration concerns the localisation of gold within the vein where it crosses the quartzites. The fissures traverse not along the quartzites. Within the mines they can be observed to cut the interbedded schists. They undoubtedly carry on across country even beyond the confines of the explored ground. Since ore deposition depended upon the presence of openings into which the solutions could make their way, it follows that a formation competent to maintain an opening such as these fissures, would be more hospitable and more conducive to deposition than a formation less

competent. The fact of observation is that the schists do not maintain openings. Instead of forming sharp, clean cut fractures, like the quartzites, they produce a soft badly broken zone. The actual fissure, in other words, reduces to a mere stripe on the roof of the tunnel or its face. In logical consequence of these facts of observation therefore, the whole group of three quartzites are potential makers of ore wherever the fissures may cut them. It is to be noted that the Nugget vein has been explored only in the central of the three quartzites. It has not been explored in the easternmost quartzite. The Motherlode vein has been explored and has been productive where it cuts the easternmost or Motherlode quartzite belt. Consequently, the Nugget vein on the Motherlode quartzite is a very strong potential ore body. The estimate of possible tonnage there is included in the following table. Finally, neither the Nugget vein or the Motherlode vein has been explored within the western or Queen quartzite. This belt contains the new Reno property and the Queen vein. There is no good geological reason why the Nugget and Motherlode veins should not make ore there, although there is no good information either way and the table below makes no allowance for those possibilities. If the properties were to resume active exploitation of Nugget and Motherlode veins, I recommend that those in charge hold these possibilities in mind for investigation at the proper time. No doubt a small prospecting drill of the Mitchell type would be suitable for use in this connection.

Plant - Mill - Tramway - Bldgs., etc.

It has been estimated that 60,000 tons of ore containing values estimated at $12.00 per ton may reasonably be expected and that an additional 85,000 tons are not beyond reasonable possibility. This ore will have tobe crushed, of course, and the values extracted. This requires a mill with various pieces of machinery each to do a certain kind of work and each set in proper sequence so that as the ore is delivered at one end of the mill it will find its way

more or less automatically by gravity flow in launders, or by means of pumps, through the series of machines until at the extreme end of the mill there will be discharged all of the barren and there will have been saved all of the values.

The mill on the Motherlode property is reported to be one of the finest in the province of British Columbia. From personal inspection it is my opinion that it is at least very complete in its equipment and in shape to operate with but minor repairs and renovations, and additional power, which is allowed for in Mr. Lakes' estimate of capital requirements. It is not at all incidental that this mill was designed for the original owners to suit the requirements of the ore after some had been determined by testing. The designers and builders were the Merrill Metallurgical Company of San Francisco. It has a rated capacity of 80 tons daily and as shown on p. 3 of the supt. report for 1913, it extracted 96.733%, on the average, of the gold in the ore fed to it through the year.

In the event that the future ore bodies carry greater proportions of sulphides, it may be necessary to modify the mill to adapt it to this different kind of feed. It is not apparent that the change needed be made for some time to come and it appears that the change will be of minor character.

The original cost of the mill and accessory equipment is given on Schedule C of Mine Balance Sheet of Motherlode Sheep Creek Mining Company as of December 31, 1913 herewith attached. This statement was furnished by Harold Lakes as we ran through the old records at the office of the property June 19, 1931. The cost was $142,885.07.

The ore is delivered from underground high on the mountain above the mill. It is therefore apparent that the same may be transported to the mill by gravity. This is taken care of by an aerial tramway. Again it is to be noted that this special construction was taken care of expert manufacturers, the H. Leschen & Son Rope Company, St. Louis, Mo. Supplies are carried up the mountain on the same tramway. When there are no loaded buckets to propel the tram, use is

made of a small e ine at the upper terminal, whic is operated by compressed air.

The cost of building repair will be but slight, at least for the start. Lumber can be sawed on the property for rough purposes and at relatively small cost.

Costs.

The cost of operations at the property, both for extracting the ore from the ground and for extracting the gold values from the ore in the mill can only be estimated. We have, however, the records of the former superintendents as appended hereto and they show in brief:

1. Actual experience through 1913 cost per ton, total $6.868.

Tons milled	24,533 tons	per ton
Ore extraction	$80,930.22	$3.299)
Dev. & Expl.	29,908.23	1.214)
Milling	50,253.91	2.048
Marketing	5,901.68	.240
General	26,141.85	1.066
	$193,029.96	$7.868

2. Estimate by Harold Lakes, November 1923.

	Cost per ton
Mining	$3.86
Milling	1.90
	$5.75

On account of the condition of the labor market, it is stated hereabouts (Salmo) that the labor efficiency is much higher than for some time. Lakes' figures can be taken for present purposes, although they are based on a scale of $5.00 per day for miners. These figures are inclusive of development in ore but they are exclusive of development work in rock.

Underground Problems.

The geology of the vein system is simple. Veins are essentially vertical and cut the formation at ne rly right angles. The formations are interbedded quartzites and schists which dip steeply to the east and strike nearly north and south. As stated above, while the veins cut through quartzites and schists

alike, because of failure of the softer schists maintain well defined openings, only the quartzites have made merchantable ore. In them the fissures held the openings.

The only complications met with to date are due to a second set of cracks or fissures not far from parallel to the veins. They do not carry values but they have been filled with quartz and look like veins. On these there was also movement. Consequently, where the veins have been cut by these "faults" they have been dislocated. The broken ends have been shoved past one another. It is therefore necessary to be on the alert when driving tunnels in order to detect the presence of these faults, to know in which direction the vein has moved, so as to be able to go to it by shortest route, and also in order not to wast effort, time and money in continuing operation on what is merely one of these barren fissure faults.

During the operations of the Nugget-Motherlode under direction of the Lakes Brothers, these faults were discovered and the direction of movement determined. It is highly probable that if they are maintained as consultants, there will be a minimum of waste of motion and of money on account of these faults. Incidentally, a more recent examination of the Queen prior to its filling with water showed the probability of similar faults here, and at the Reno property, also, similar fault movement has been discovered and worked out by Mr. Lakes.

Concerning Valuation.

Computation of valuation of this property has followed the method wherein reserves of ores and values per ton are estimated. The mill capacity is the logical rate at which these ore reserves may be brought through to production. Knowing the daily capacity of the mill and estimating the number of days of operation reasonably to be expected per year, we have a figure representing the annual production. Dividing the estimated reserve tonnage by this figure gives an estimated life in years.

If we can then estimate the total cost of mining and milling, having an estimate of the average values in a ton of mill feed, we can compute the estimated profit per ton and the annual profit.

Our figures then give us a picture of the possible annual average profit and the life or number of years over which we might expect these annual profits. The value of the mine would be the present value of these annual profits, properly discounted over the life period.

We should expect that with all the risks involved that we should want to be assured of 10% on the investment. We also should want to allow for a return of the original invested principal, whatever that may be. For this a sinking fund provision must be provided for in the calculations.

Following through with this scheme then, we reach first a reasonably conservative valuation based alone on the ore above the present 1000' level of the Nugget or the #5 level of the Motherlode.

Estimated Conservative Valuation.

Estimated tonnage above 1000' level Nugget Vein as per p. 19		60,000 tons
Mill operation at 100 tons per day 300 days per year Annual tonnage treated		50,000 "
Life		2 years
Profit per ton		
Est. average grade of ore	$12.00 per ton	
Est cost est. at	7.00 per ton	
Est. profit per ton	5.00 per ton	
Annual profit estimated		$150,000
Profit factor, present value of $1.00 earning 10% and allowing for sinking fund to accumulate at 4% to return capital at end of 2 years		$1.69
Present value of property as a going concern		$253,500
Less $50,000 necessary minimum initial working capital		50,000
		$203,500

Possible Val for Extension of Nugget Vein
500 feet below 1000' level Nugget Vein

Estimated tonnage above 1500' level as per p. 19	112,000 tons
Mill at 100 tons per day 300 days per year Annual treatment	30,000 tons
Life	3.73 years
Profit per ton $5.00	
Annual profit $150,000	$150,000
Profit factor similar to above	$2.818
Present value as going concern	$422,700
Less $50,000 necessary minimum working capital	150,000
	$272,700

Possible value for Extension Veins.
500 feet below 1000' level Nugget Vein workings

Estimated tonnage above 1500' level as per p. 20	145,000 tons
Annual output as above	30,000 tons
Life	4.83 years
Profit per ton $5.00 (Est)	
Annual profit, estimated	$150,000
Profit factor as above	$3.42
Present value as going concern	$513,000
Less working capital	200,000
	$313,000

These three examples of possible valuations are indicators of what additional exploration and development within reasonable distance from known ore faces might reveal. They should not be taken as predictions of true values. It is indicated, however, that the purchase price of $50,000 is justified. In the calculations various assumptions are made, although there are legitimate bases for each. Because these are assumptions, however, it is necessary

to emphasise the fact that the indicated conservative valuation of $203,500 could be at bestrealised only with strict engineering and accounting control. The margin between gross ore value and costs of development, mining, and milling is so narrow that but few missteps in underground operations or in cost accounting could be endured.

Recommendations.

In conclusion, I recommend purchase of the property at $50,000, which, it is understood is at terms of $5,000 per month for 10 months. The cost of renovating equipment and allowing for initial working capital requires that an additional $3000 per month be provided for at least a year.

Furthermore, I recommend that the order of development work suggested by Arthur Lakes in his Summary Report herewith be followed religiously until such time as a better sequence has been revealed. To insure this I recommend the retention of Mr. Lakes on such a basis that he will be continuously in touch and informed by visitation and correspondence, and in further assurance of this I recommend the engagement of a reliable foreman, preferably one in whom Mr. Lakes has full confidence and upon whom he can rely for the carrying out of instructions.

Finally, I recommend the engagement of Mr. C. P. Perry, accountant for the Reno Mine nearby. Mr. Perry is an exceedingly capable mine accountant, having specialized in this field for many years. In addition to his duties at Reno he has a private accounting practice. I append hereto an outline of the set of books he has designed for the Reno operation. This is a copy of a monthly report gotten up by Mr. Perry for his board of directors. I urge you to note the comprehensive coverage afforded by such an accounting system. With it in operation the situation at the Motherlode Property could be seen month by month. With monthly reports from Mr. Lakes and Mr. Perry, I feel certain that this company at headquarters would be well informed and have a much better chance for success than could otherwise be the case.