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SUMMARY REPORT ON THE OWEN LAKE PROPERTIES.

PROPERTY FILE 97

CONCLUSION.

The Owen Lake operation offers an attractive mining speculation for the following reasons:

1. There are excellent prospects for the operation developing into one of considerable magnitude. The mineral area acquired is of large extent and covers several known deposits of prospective commercial importance as well as a large area of promising prospecting ground.
2. The properties have been acquired at reasonable prices and on suitable terms which allow for development before large payments are called for.
3. Development work already performed strongly indicates that the veins now proven carry ore of economic grade. The known veins and the probabilities for the occurrence of other veins not yet exposed give excellent prospects for large tonnage.
4. Although the ore is complex preliminary mill tests indicate that no great metallurgical difficulties need be expected.
5. Operating conditions at the property are excellent. The properties are located about 25 miles from railroad transportation but a winter road is now completed to the property and this road is to be made into a summer road next season so transportation facilities are provided.
6. Surveys have not been made yet but there is what we are given to understand is a suitable site for development of hydro-electric power near the properties.
7. The operations are being very capably handled. Although the road into the property was completed only about the end of December, camps are already constructed, a saw-mill has been in operation for about two months and all construction work is well advanced. The properties are being well equipped and all equipment and supplies are now moving to the properties. It is to be expected that active mining operations will commence early in the New Year.

PROPERTIES.

The properties under option to the Owen Lake Mining Co., Ltd. are as follows-

1. The Orinch property consisting of five crown granted mineral claims.
2. The Cole property consisting of three full mineral claims and one fraction. These claims are surveyed but are not crown granted.
3. The Chisholm property of fourteen mineral claims that are surveyed but are not crown granted.

CONTINUATION OF LETTER TO Summary report Owen Lake.

4. The Larson property consisting of three claims that are surveyed but are not crown granted.

In addition to the above properties the Company owns about 20 claims that have been staked to round out and fill in the area. These claims have all been surveyed and fractions occurring in the area have been staked, so no difficulties or expense due to foreign ownership of ground within the area are likely to occur.

In addition to the mineral rights the Company owns adequate surface rights and the timber on the properties required for construction and operation.

The recording office for the district is Smithers, B.C.

The writer has not checked titles but these have been reported on by the Company's Solicitor.

The writer has not inspected the agreements for acquisition of the various properties but we have been informed that these, also, have been approved by the Company's Solicitor.

LOCATION AND ACCESSIBILITY.

The properties are located near Owen Lake, about 25 miles south of Houston, a station on the Canadian National Railway, 226 miles east of Prince Rupert, B.C.

For several years there has been a pack trail into the area but late this fall a suitable route for a permanent road into the area was surveyed and this route has been followed by the winter road that has been completed. It is proposed to make this winter road into a good summer road next season.

This road is between 25 and 30 miles in length and there is no heavy grade either way. It is proposed to use a caterpillar to keep the road ploughed out during the winter and operate trucks between the railroad at Houston and the properties.

With truck haulage the cost of transporting supplies from the railroad to the properties should not exceed \$5.00 per ton, as the maximum grade in either direction is only 7% and this grade is for only a short distance.

GEOLOGY AND ORE DEPOSITS.

The ore deposits in this area are mineralized shear zones, the ore minerals being galena, sphalerite and chalcopyrite with low values in gold and good values in silver.

The ore usually occurs as solid sulphides. The gangue material is quartz and altered crushed country. In places the altered

CONTINUATION OF LETTER TO **Summary report Owen Lake.**

country is silicified and the resulting vein filling is very hard.

Usually the vein material is only moderately hard and the ore breaks freely from the waste material.

As far as can be seen from present exposures the veins will average good stoping widths and the walls should stand well, but there will be a tendency to dilution from waste particularly when there is much crushed country in the veins and where the veins are cut by cross faults. There is, however, no reason to suppose that undue difficulties will be encountered in mining these veins, in fact indications are that reasonably cheap mining may be expected.

The ore is complex but examination of hand specimens indicates that the different ore minerals are not very intimately associated and preliminary concentrating tests show that no undue metallurgical difficulties are to be anticipated.

In addition to the ore minerals and gangue the veins carry manganese and all outcrops show pronounced manganese staining.

There are at least two and possibly three systems of shear zones developed.

These zones strike north west-south east, north east-south west and a possible system striking a few degrees west of north. The north west shears dip north east and the north east shears dip north west.

The north west striking shears have been opened up to a limited extent on the Wrinch property. The north east striking shears have not been opened up but they show as outcrops. The system striking a few degrees west of north was noted only on the Cole property and these may be the same system as the north west shears.

The north east and north west shears are well developed and these two systems result in a network of veins. Definite information about the north east shears is not yet available but they appear to carry similar mineralization to those of the north west series.

There has been post-mineral faulting but until more work has been done it is impossible to say to what extent this faulting will affect mining .

In the tunnels on the Wrinch property these faults are to be noted but faulting here may be only local, the faults in these tunnels being subsidiary to a main fault to which Wrinch canyon is due.

The structural and areal geology of the district have not been worked out and this matter should receive attention next season.

CONTINUATION OF LETTER TO Summary Report Owen Lake.

Rocks noted consist of andesites, rhyolites, probably tuffs and volcanic breccias and a rock that is probably a silicified tuff and has the characteristics of quartzite.

There is noticeable granitic intrusion of the district, the granite mass of Madina mountain being a prominent landmark in the district.

Further work and study are required to determine the relation of the deposits to the geology. All that can be stated at the present time is that the deposits are strong shears in the rock and that the mineralization is due to the Coast Range granitic intrusion, the intrusive granite masses being outliers of the main Coast Range batholith. Careful study should be given to the possible effects of the lithology on the shear zones and on the mineral contents thereof.

It is to be expected that these deposits will show similar characteristics to the other better known deposits of the Interior Contact.

Judging from the strength of the shear zones marked continuity of the fractures is to be expected and as the mineralization is essentially high temperature mineralization values may be expected to extend to depth. It is already shown that the mineralization extends down to a horizon below the level of Owens Lake with no apparent change. This gives a proven vertical range of over 600 feet.

Cole Property.

The main showing on the Cole property is a well defined vein or shear zone striking north west-south east and dipping, probably, very steeply to the north east or the dip may be vertical.

This deposit has been stripped for about 125 feet and continuity has been demonstrated for about 220 feet.

The ore in the vein is fairly solid sulphides, consisting of a somewhat intimate mixture of galena and sphalerite with some chalcopyrite. This ore is persistent wherever the vein is exposed and will average between three and four feet in width.

Intersecting this vein near the south east end of the exposure is a cross vein striking 10 degrees west of north. The ore in this cross vein is narrow in the pit in which it is exposed, but the shear is about 10 feet in width.

The intersection of this cross vein and the main vein is not exposed and this intersection should be prospected as soon as possible as there appears to be good structure at such a point for the development of an important ore body.

About 500 feet west of the above described showing a

CONTINUATION OF LETTER TO Summary Report Owen Lake.

similar but wider vein has been exposed in several pits and a small shaft. Several cross veins also occur but they have not been opened up at all. These cross veins appear to be smaller than the main shears but the mineralization is similar and there are good prospects that both systems will prove productive and there are particularly interesting possibilities at the intersections of the two systems.

The writer has had no opportunity to sample the main showing systematically and the other veins are not opened up sufficiently to allow determination of average values. The mineralization in all the exposed veins is similar and is similar to that in the veins on the Wrinch property and an average grade of ore of about \$20.00 per ton in total values may be expected.

The main vein that has been stripped is being opened up by sinking a shaft to a depth of not less than 100 feet and by driving both ways on the vein at this depth.

The machinery is now being installed for the performance of this work and sinking operations will commence before the end of the year.

Sinking to (say) 120 feet, allowing 20 feet for a sump and driving 200 feet should block out about 6000 tons of ore if the ore is continuous. That the ore will be continuous is indicated by the surface exposure.

Wrinch Property.

Most of the work on this property has been done on north westerly striking veins exposed by erosion in the canyon of Wrinch Creek.

The location of these workings is about one mile west of the exposed veins on the Cole Property.

Four veins have been shown to exist and there may be others of the same series that have not been opened up to date.

The work on these veins was performed by the Federal M. and S. Co., when they had the property under bond. The presence of cross veins is strongly indicated by some exposures but these showings have not been opened up.

The veins that are partially developed all carry similar mineralization. These veins have not been sampled by the writer but sampling by competent observers indicates that an average value of from \$15 to \$20 per ton in total values may be expected over a stoping width of from 2½ to 4 feet.

These veins are cut up somewhat by post-mineral faulting but the displacement, as far as is observable, is not more than a few feet, and it appears likely that this faulting will be found

CONTINUATION OF LETTER TO Summary Report Owen Lake.

to be local, these faults being subsidiaries of a main fault plane down Wrinch Canyon. One of the veins (No.4) was supposed to have been cut off by a rhyolite sill but the opinion of later observers, including the writer, is that this interpretation of conditions is incorrect and that further work will show continuity of this vein.

These showings are attractive as, though they are not large veins, the continuity of the mineralization is marked and the fractures show persistence.

In addition to the partially developed veins described above there are surface indications of other parallel fissures some of which appear to be larger than those partially developed. That they carry similar mineralization is indicated by the manganese stained outcrops and by the occurrence of float.

That shear zones striking north east-south west (approximately at right angles to the above described shear zones) occur on this property is strongly indicated by surface exposures and these shears appear also to be mineralized. It is the writer's opinion that work on the north-east shears will show them to be quite as important or even more important than the north west shears. This is merely an opinion as work has been done only on the north west striking veins exposed in Wrinch Canyon. This was the logical place for preliminary work as here the veins are exposed by erosion and sections up to 150 feet vertically are exposed in the walls of the canyon. The north east shear zones are only indicated by croppings and a very little stripping, and further work is required to prove their size, continuity and mineral contents.

The writer has recommended and the management are now preparing to drive a cross-cut tunnel from the Owen Lake slope to intersect the veins exposed in Wrinch Canyon at a depth of about 500 feet below the present tunnels. The objective will be the veins exposed in Wrinch Canyon but the cross-cut, which will be from 1000 to 1500 feet in length, will also intersect any other parallel veins that may lie between the portal and the Wrinch Canyon veins. It is considered that this work is justified by the possibilities of tonnage in the Wrinch Canyon veins and by, what the writer considers, the likelihood of cutting in this cross-cut other ore-bearing veins. If the property proves up satisfactorily this cross-cut will provide a main haulage tunnel for all operations until the time arrives that sinking below the level of this tunnel is necessary. Sinking below the level of this tunnel is an eventuality that need not be considered at the present time.

The above described workings, granting successful development, will eventually be connected up with the Cole Property workings and there are certainly excellent prospects that productive sections of the property will be opened up between the Wrinch Property workings and the Cole Property workings.

CONTINUATION OF LETTER TO **Summary Report Owen Lake.**

Competent engineering and careful planning and exactitude in execution of all mining operations will be required from the start. It is the writer's recommendation and, we understand, the policy of the management, that all workings are to be planned not only to prospect the property but also to serve as openings for development and production if the properties prove commercial. This policy will avoid duplication of workings and save expense if properly carried out, but it is necessary that all openings should be carefully planned so that they will serve their purposes of not only prospecting but will also provide for the utmost economy in extraction of ore.

We recommend that the Main Cross-cut tunnel should be six feet by eight in the clear, carefully graded and be driven on line. Doing good work should not interfere with the speed of driving and the slight increase in cost due to insistence on exactitude of operation and slight increase in size of cross-section of workings will be more than offset by the advantages to be derived from having workings of suitable size accurately planned and executed.

It should be noted that the above tunnel is described as a cross-cut. It is a cross-cut as far as the north west veins are concerned but it will be roughly parallel to the probable north east shear zones. It is possible that this tunnel will run into north east shear zones at an acute angle. If such shears are encountered it is likely that soft broken ground will have to be contended with, when timbering will be required. As there is a saw-mill in operation on the property drift sets can be provided ready for use at a reasonable cost and encountering broken ground should be no cause for throwing the tunnel off line or interfering with accepted design.

To perform the above work the property has been equipped with an 100 H.P. semi-diesel engine and five drill compressor. This machinery is now being installed and should be ready to operate by January 1929. Equipment also includes a steel sharpener, ventilating equipment, rock drills, and all tools and equipment required to operate the plant to capacity.

It is proposed to drive the tunnel three shifts, which should result in a monthly advance in excess of 300 feet.

Chisholm Property.

This property is important as it may be expected to contain the continuations of veins strongly indicated on the Wrinch Property.

A north easterly striking vein is exposed in a 35 foot shaft on this property. This shear is similar to others in the area but chalcopyrite is absent, as far as we could see, the ore minerals being galena and sphalerite.

About 60 feet south of this shaft is a pit exposing a

CONTINUATION OF LETTER TO Summary Report Owen Lake.

north westerly striking shear zone. This zone is about 10 feet in width but carries only a narrow streak of clean galena ore on the footwall.

We were informed that some years ago a shipment of relatively high-grade silver lead ore was produced from these workings. We have no definite information on this shipment. There is no indication at the present time that clean lead ore could be obtained economically from these workings but they certainly warrant prospecting.

It is recommended that work should be performed on this property next season, consisting principally of surface prospecting, test-pitting etc. This work is advisable not on account of the desirability of immediate expenditure to bring this property into production quickly but to determine its possibilities before payments fall due and also as part of a general plan of studying the areal geology and the geologic structure. This study, combined with a study of the commercial possibilities of the area as a whole, is of extreme importance as unless the management understand geologic and commercial conditions over the area as a whole costly mistakes in planning work and equipment are bound to ensue. The time to study such matters is from the start of operations not after the wasted expenditure due to lack of study occurs.

Other Properties.

The above described properties constitute only about half the area under consideration. On the remainder of the area, however, very little work has been done and as most of the area is covered by soil little can be learnt from a surface examination.

There is no question that the whole area has commercial possibilities and areal prospecting over the whole area should be carried on as soon as climatic conditions permit in the spring.

This work should consist of ordinary surface prospecting probably supplemented next season or in 1930 by electrical prospecting.

If electrical prospecting be employed results should be checked by pitting as while electrical prospecting will show the presence of and locate the mineralized shear zones it will give very little idea of their commercial possibilities.

GENERAL.

Apart from the fact that these properties are about 25 miles from the railroad operating conditions are excellent.

The Owen Lake area is a pleasant rolling country and much of the area is, we are informed, good farming land. Probably many crops would suffer from early and late frosts but the land is splendid grazing land, as far as an uninformed observer can tell, there should be no difficulty in growing, locally, all vegetables,

CONTINUATION OF LETTER TO **Summary Report Owen Lake.**

meat, dairy produce etc. required for a large camp or small town. With the development of an industry in this area it is to be expected that more settlement will result and an agricultural community will be built up. At the present time there are a few settlers in the district but these do not appear, to date, to have developed the agricultural possibilities very aggressively.

Living conditions will be excellent. If the success of the operation warrants employees will be able to establish themselves in pleasant permanent homes. The camp site is near Owen Lake and there is no doubt that, with building sites and agricultural land available, many employees will settle permanently and will provide the nucleus of a steady crew with consequent low labour turnover.

A good supply of water for domestic purposes is available from a small lake at the head of Wrinch Creek. For preliminary operations it will not be necessary to tap this supply as sufficient good water for domestic and engine cooling purposes can be obtained near the camp site.

There is a supply of timber near the workings for several years operation and timber for many year's operations can be obtained nearby. All necessary surface and timber rights have been purchased or are under option.

A saw-mill was taken in to the properties at start of operations and is in use providing lumber for all construction and other purposes. This mill is portable type and produces about 4000 feet of lumber per day.

Transportation conditions are not good on account of the distance of the properties from the railroad or tidewater.

The difficulties of transportation are being overcome as far as is possible by the construction of a good road and the provision of suitable haulage equipment.

A winter road, about 28 miles in length, has been completed from Houston, B.C. to the properties. This road is well located with only a short stretch of 7% grade. The greater part of this road is almost level. The road will be kept ploughed out during the winter and trucks will be operated over it.

This road was built with the assistance of the Provincial Government and we are informed that it is the intention of the Provincial Government to improve this road and make it the trunk road into this area.

Climatic conditions are pleasant though low temperatures occur for short times in winter. The snowfall is not excessive, as it seldom exceeds about 3 feet on the level. The area is in the semi-arid belt and the summers and falls are extremely pleasant. Apart from freezing of pipe-lines, etc. in very cold weather, which can be guarded against, climatic conditions are very suitable for operation.

CONTINUATION OF LETTER TO **Summary Report Owen Lake.**POWER.

For preliminary operations power will be supplied by semi-diesel oil burning engines. This is a temporary arrangement for testing the commercial possibilities of the properties. As soon as such an installation is justified by results it is proposed to install an hydro-electric power plant on the Morice River about 8 or 10 miles from the property.

The writer has not had an opportunity to examine the proposed power site nor are we informed as to what quantity of power can be developed economically. The proposed site has been examined by Government engineers and surveys and flow measurements will be carried out this coming winter by the Company.

If development of the properties is favourable and the development of power from Morice River is shown to be economic it is proposed to put in the necessary power plant, or a first unit of the power plant, next fall and do away with the expense of hauling fuel.

The use of wood for fuel for preliminary operations was considered but it was decided that, considering all points, it would be advisable to equip the property with oil engines to take care of the first year's work.

The plant now being installed will have good salvage value if and when replaced by an hydro-electric installation.

PRODUCTION POSSIBILITIES.

The development done so far on these properties is totally inadequate to permit estimates of probable tonnage to be expected. The most that can be done is to put the operation into a certain category and even then estimates can be made only within very wide limits and are dependent on successful development.

It may be stated as a fact that the properties are definitely in the prospect stage and their commercial value is not proven.

As a speculative venture the operation is one of undoubted merit with a probability factor considerably above the average in operations of this class.

It must be distinctly stated that the following figures are purely tentative and are only those that are, in the writer's opinion, reasonable expectations.

Costs.

We estimate the cost of mining, milling and development will be from \$8.00 to \$10.00 per ton. If development shows that shrinkage stoping can be used, with no sorting in the stopes, the cost will be less, if the walls are soft or the dip too flat to

CONTINUATION OF LETTER TO

Summary Report Owen Lake.

allow shrinking the cost will be higher. We think a cost of say, \$9.00 per ton may be expected in deposits of this type.

Grade. The writer has not sampled these deposits but takes the liberty of using the sampling results of previous observers in whose work we have complete confidence.

The results of checked sampling of the Wrinch veins Nos. 3 and 4 indicate that total values in gold, silver, copper, lead and zinc will amount to not less than from \$15.00 to \$20.00 per ton. The grade will be dependent whether or not there is dilution from the wall and barren gangue. The grade to be produced is a factor of mining cost and it will be necessary to determine the correct relation for maximum profit. Assuming our figure \$9.00 as mining, milling and development cost we think a grade of \$17.50 per ton is a justifiable expectation giving an operating profit of \$8.00 per ton.

Tonnage. The tonnage it may be expected to develop in these properties cannot be estimated at the present time. There is no positive tonnage developed.

The work planned on the Cole Property should prove up about 6000 tons and indicate a further tonnage of probable ore.

On the Wrinch Property there are good probabilities of proving up moderate tonnage and good possibilities for proving up large tonnage, especially if there are two series of veins that are economic.

Considering the type of these deposits there appear to be good chances of developing an operation that will supply a mill of 200 tons daily capacity and possibilities for increased capacity, when the area is well developed. It is highly probable, however, that the first concentrating unit should not be expected to exceed 100 tons per day capacity.

If good success is met with during the first nine to twelve months' operation there should be justification then to build an 100 ton daily capacity concentrating unit and the hydro-electric plant required for operation.

With a 100-ton mill in operation there is to be expected an operating profit of \$275,000.00 to \$300,000.00 per year available for amortization, interest charges and profit. This operating profit would return an investment of \$1,000,000.00 in about four years. To return this investment would mean the production of about 140,000 tons, at the grade of ore and costs we consider may reasonably be expected.

We consider that there are very good prospects of these properties developing a tonnage in excess of 140,000 tons.

POLICY AND FINANCE.

The Owen Lake Mining Co., Ltd. is capitalized at 4,000,000

CONTINUATION OF LETTER TO Summary report Owen Lake.

shares of a par value of fifty cents per share and the nominal capital is thus \$2,000,000.00.

No shares, to date, have been sold to any interests except to F.H. Taylor who has undertaken to meet, personally, all preliminary charges including cost of plant and equipment, charges for road construction, payments required to obtain options and bonds and, in some cases, to exercise options and acquire ownership for the Company.

For the above purposes \$75,000.00 was provided and we understand that cost of plant and equipment and all operating charges have been paid up to date and that there remains money in the Treasury for some further period of operation.

It is estimated that the following total expenditures will be required to put these properties on a producing basis at 100 tons per day capacity-

Cost of camps, plant and installation required to carry development through the preliminary period of operation.....	\$50,000.00
Cost of Mine Development to the stage when mill, Hydro-electric Plant etc. are warranted.....	225,000.00
Property account, surface rights, etc.....	175,000.00
Cost of Mill, Plant and Equipment for production at 100 tons per day.....	250,000.00
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TOTAL.....	\$700,000.00

The above total expenditures would be incurred only if the properties responded favourably to development. The management, however, should be prepared to expend at least \$200,000.00 on testing out these properties as it will cost not less than this amount to show that the probability factor is too low to warrant further expenditure.

Of the above total sum \$450,000.00 should be available to assure that the operation can be carried to the stage when provision of a mill and hydro-electric plant is justified. If and when this stage is reached there will be little difficulty in further financing, and this further financing can be done more favourably for the Company at that time than it can be done while the properties are in their present prospective phase of development.

Respectfully submitted,

Consulting Mining Engineer.