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R E P O R T
On The
PROPERTY OF THE
COLUMARIO GOLD MINES LIMITED

By
W. G. NORRIE,
Consulting Mining Engineer,
Vancouver, B.C.

July, 1931

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Copy of letter of July 23, 1931, from H.L.Batten,
Consulting Engineer for Columario Gold Mines Limited,
to Major A.Wellesley McConnell, containing comment on
Norrie's Report.

SUMMARY AND CONCLUSIONS.

The Columario system of veins has a possible vertical range of over 4500 feet and a horizontal extent of over 12,000 feet. Within this range concentrated exploration and development has shown up eight ore shoots aggregating 518 feet in length, with an average width of 22 inches and an average value of \$12.30 per ton in Gold, to which should be added about fifty cents per ton for Silver.

This ore has been demonstrated to occur between elevations 1885 feet on the Tenderfoot Tunnel and 2295 feet on the upper No.4 level, a total vertical distance of 410 feet, and a length, along the slope of the veins, of between 500 and 700 feet depending on the dips of individual veins. This ore has been shown up on different veins and at various horizons, and it is therefore impossible to make a definite calculation as to ore tonnage. The best that can be done at this stage is to state that a rough calculation indicated that between the Tenderfoot Tunnel and the No.4 Upper Tunnel it will be possible to develop approximately 75,000 tons of ore from the known ore shoots. In addition to this other ore shoots, at present unknown, may be uncovered.

In view of the exploratory work which has already been done on the property, future work will be carried out to a much greater advantage, and it will not be necessary to have a duplication of tunnels on the different veins. Therefore the immediate work recommended is to drive a series of raises and winzes on each of the different ore shoots outlined at the mine, the object of these being to determine the upward and downward continuations of the ore shoots in each case; this to a limited extent, say about 100 feet upward and fifty feet downward.

The mine should be permanently opened up for production from the Tenderfoot Tunnel, at which point there is an excellent camp site, with a tunnel already driven on ore. This tunnel should be driven ahead about 500 feet following the No. 6 vein, until it intersects the Norman Vein, which vein, if it appears favorable, should be followed South Westerly until it intersects the other veins, Nos. 7, 5 and 4. If the conditions do not appear favourable on the Norman Vein, then the Tenderfoot Tunnel should be extended ahead in any case to a point about 1000 feet from the present face, at which point a crosscut should be run to intersect veins 7, 5 and 4. This crosscut will be about 800 feet long by the time it reaches No. 4 vein at this elevation.

This work will open up the mine and provide transportation facilities for gathering the ore from the different veins and levels to a central point for transportation to the mill.

There is thus indicated about five or six thousand feet of underground work to get the mine into shape for ultimate economical production, which work, together with the necessary plant and equipment required will cost in the neighbourhood of \$100,000.00

To carry on this work economically and to the best advantage will require larger and more economical compressor equipment at the mine and better transportation facilities between the mine and the highway, and it is recommended that after proper surveys have been made, an aerial tram be constructed between the Tenderfoot Tunnel and the lower camp on Gold Creek, a distance of about 6200 feet. This will facilitate the handling of fuel for the engine and other incoming supplies and provide transportation for the ore.

The mine has reached a stage now where it can be definitely stated the prospects for developing a fair tonnage of ore of payable grade are good, and that it shows every evidence of becoming a profitable producer. As to whether the mine should be completely developed first, before the erection of a mill is contemplated, is an open question, but in the writer's opinion the best policy for the Company to pursue now is to acquire the necessary ground for mill construction, to carry out tests to determine the most efficient and economical method of concentration, and as soon as this has been done, to proceed with the erection of the first unit of a mill.

In arriving at this conclusion the writer feels that the heaviest end of the expense to be incurred in the development of the property will be involved in mine and transportation equipment, and when this is covered the further expense necessary for a mill will be proportionately small. Furthermore the actual mining and milling of the ore, particularly from new development will give a more accurate determination of the grade than will be possible with mine sampling.

A most important consideration at this time, however, is that the costs of mining and milling, due to the current depression, will be about 25% less than they were two or three years ago, and than they might be two or three years hence, and full advantage can only be taken of this condition by starting to realize on the ore in sight now, rather than waiting until the mine is fully developed.

After careful consideration therefore, the writer is of the opinion that the company is fully justified in incurring the additional expenditure required for mill construction, and permanent development of the property.

Respectfully Submitted,

(signed) W.G. Norrie.

Mining Engineer.

INTRODUCTION

The main objects of the examination described in this report were to determine the present physical condition of the property, check the underground sampling carried out by the management and others, and obtain information necessary for the Company to determine its future policy.

The extent of property, transportation conditions, geology, surface showings, and other matters, have been fully covered in earlier reports, made by competent engineers. However, in order that the reader may obtain a comprehensive idea of the property in its present condition, all of these subjects have been summarized briefly in the body of this report.

The writer's sampling was performed as systematically as possible and confined, in the main, to the Quartz in sight in the underground workings. A very fair check was made with the mine sampling performed by the management, and as the latter was concerned with face values, taken when the ground was freshly broken, due weight must be attached to them. In addition to the mine samples, other samples taken by H.L. Batten and Associates are also noted. All these samples, together with those taken by the present writer, have been placed on a new assay plan, attached to this report, and an average struck from them for each particular ore shoot on the different veins and levels.

REFERENCES

- July 20, 1922 Report by D.C. McKay, Park City, Utah.
- Oct. 30, 1924 " " W.J. Elmendorf, Seattle, Wash.
- Oct. 26, 1925 " " " " " " " "
- 1925 Summary Report on district about Usk, B.C.
by G. Hanson, Canadian Geological Survey.
- Annual Reports of the Honourable the Minister
of Mines, British Columbia.
- Oct., 1928 Report by R.H. Stewart, H.L. Batten, and Associates,
Vancouver, B.C.
- Progress Reports by John Willman, Manager, Usk, B.C.

PROPERTY

The property consists of twenty claims and two fractions located about four miles from the village of Usk, B.C. on the Canadian National Railway, 107 miles east of Prince Rupert.

In addition to the above claims, title to which is invested in the Columario Gold Mines, Ltd., this report also considers the five claims comprising the Golden Crown Group. This group is included as it covers the continuation of the Columario vein system and lies between the Columario holdings and the most favorable mill site on Gold Creek. A tram connecting the Columario workings with this mill site would cross the Golden Crown claims, and the most favorable mill site for the Columario is on the Ruby M.C., the most northerly claim of the Golden Crown Group.

For these reasons it is highly desirable that this group should be included with the Columario holdings.

A list of claims is included in the Appendix to this report and their relative positions are shown on the accompanying plan.

ACCESSIBILITY

The property is reached from Usk by the Provincial highway for a distance of about four miles to Gold Creek. From Gold Creek to the property there is a narrow road up which supplies are hauled on light carts. There are heavy grades on this road which is about two miles in length.

With a mill in operation and a tramway constructed between the mill and the mine workings, the most expensive part of the transportation will be eliminated. With this construction completed operating conditions will be excellent, there being only a four mile truck haul over an excellent road to the mill and supplies to the mine will be transported from the mill over the tram, the ore coming down hauling the loads up, no power being required.

The elevation of Usk is 300 feet above sea-level. The elevation at the proposed mill site on the highway at Gold Creek is approximately the same, there being no heavy grades on the road. The elevation of the present mine workings is from 1885 to 2300 feet above sea-level. The approximate length of the proposed tram will be 6200 feet, with a vertical drop of about 1600 feet between the upper and lower terminals.

The elevation of the Tenderfoot Tunnel is 1885 feet,
No. 6 Lower 2101 feet, No. 6 Middle 2145 feet, No. 5 Lower 2199 feet,
1916 } 1700 }
1960 } 2015 }

No. 4 Lower 2200²⁰¹⁵ feet, No. 7 2263²⁰⁷⁸ feet, Dakota 2241 feet, No. 4 Upper 2293²¹⁰⁸ feet, and the No. 7 Upper 2520²⁰⁵⁹ feet. (Note that elevations previously reported were the same relatively but were reported from a different datum, the elevation of No. 4 Upper Tunnel being reported as 2108 feet. It is considered that the datum used above should be taken to give the elevation above tide water and thus correlate correctly with the elevations of Gold Creek and the railroad at Usk.)

Including the Golden Crown Group the area covered stretches from Gold Creek to near the summit Kleanza Mountain, at an elevation of about 5000 feet. It appears quite definite that veins exposed on the Valhalla No. 6 at the extreme south end of the group, and on the Golden Crown Group at the north end are those of the Columario system. There is thus an ultimate possible vertical range to this system of a little over 4500 feet, and a horizontal extent of slightly over 12,000 feet. Pack horse trails have been constructed to the exposures near the summit of Kleanza Mountain.

DEVELOPMENT AND EQUIPMENT

The underground workings are described in more detail under DEPOSITS AND SAMPLING.

The total drifting and cross-cutting amount to about 3550 feet with about 150 feet of raising. This underground work has explored, to a limited extent, veins known as Nos. 1 to 7. Ten veins have been explored by underground work or surface cuts. Complete coordination of these exposures has not been made and it is possible somewhat widely spaced exposures on the same vein have been given different numbers or names. Similarly some exposures, supposed to be on the same vein may be on different veins. While further work is required to determine details, in several cases there has been sufficient work done to establish the fact that there is a system of eight to ten veins in a zone of fracturing about 1500 feet in width and over 12,000 feet in length.

The present manager, Mr. John Willman, has been in charge of the operation since the start and has carried out the work with marked efficiency and economy. Comfortable camps have been constructed at the workings and a small compressor plant installed. At Gold Creek there is an excellent small camp with stabling for about six horses.

GEOLOGY AND SURFACE EXPOSURES

The deposits are pyritic quartz veins with principal values in gold and low values in silver. These veins are roughly

parallel, striking from N 30 degrees west to north (ast.) most of the veins ~~strike~~ striking about N 20 ~~degrees~~ to 30 degrees W. The dip is always N.E. to E. varying from 50 to 70 degrees.

A microscoping examination of ~~x~~ polished sections of samples of ore from No.4 vein, made by Ellis Thompson of the University of Toronto, shows that the quartz was deposited by hydrothermal solutions in two stages. The first stage of deposition was barren, while the second stage appears to be contemporaneous with the deposition of the sulphides. The ~~xx~~ chief sulphide present is pyrite, which is auriferous, and there are minor quantities of chalcopyrite and tetrahedrite present. Visible gold has been observed in oxidized material but not in the fresh ore.

On account of heavy vegetation over most of the claims close observation of the areal geology is impossible. The veins occur in volcanic rocks consisting mainly of andesite which has been changed to greenstone by introduction of chlorite. The andesite has been fractured in a north-south direction, and it is this fracturing that has permitted ~~by~~ the circulation of the ore-bearing solutions. Nearby are granite outcrops, satellites of the main Coast Range, which intrusions are probably responsible for the mineralization.

Several dykes of felsite porphyry occur, which are older than the veins. these dykes are extremely irregular and appear to have stopped their way up through the enclosing rocks. The veins continue through this material but pinch badly in these dykes. They are ~~uncommon~~ uncommon, however, and are not a serious detriment to the deposits, the most noticeable being the one exposed in the tunnel on No.4 vein.

There are a few lamprophyre dykes, which are younger than, and cut the veins, but have no economic significance.

There are two major systems of faulting, in a north-south direction and in a east-west direction. There has been some local movement along the walls of the veins which has, in places, caused a pinching out of the vein material. Displacement by cross faulting is unimportant as far as work has shown to date.

Eight veins have been prospected and work has been confined, principally, to these veins on account of their regularity, persistence, and accessibility.

NO. 1 VEIN.

is exposed between the 1850 and 2100 elevations over a length of 500 feet. On the Valhalla No.2 M.C. this vein is exposed in cuts and underground workings. The strike is N 20 to 30 degrees W and the dip 50 to 60 degrees N.E. The ~~width~~ width varies from 6 inches to three feet. At a distance of 1300 feet along the strike

there is an outcrop which may be the continuation of this vein. About 900 feet further south there is another outcrop which ~~may be the continuation of~~ is considered also to be on this vein, giving a total probable length exposed of a little over 2700 feet.

No. 2 VEIN/

lies about 450 feet east of No.1. It has been traced over a horizontal distance of 400 feet.

NO. 3 VEIN

lies 100 feet east of No. 2 vein and is exposed in 5 cuts over a horizontal distance of 400 feet. The strike is North-Westerly, and the dip is about 65 degrees east. This vein is narrow and irregular consisting of a few quartz veinlets with disseminated pyrite. It has been cut in the underground workings but has not been explored to any extent.

NO. 4 VEIN

is situated 50 feet East of No. 3 vein, and is exposed in No.4 Tunnel and on the surface, by a number of cuts and outcrops, over a vertical distance ~~of 200 feet, and a horizontal~~ in excess of 500 feet, and a horizontal distance over 1200 feet. The strike is 15 to 35 degrees west of north and the dip is 45 to 69 degrees north-east. This a very strong persistent vein. There has been some movement along the walls and the width of quartz varies from 2 inches ~~to~~ up to 60 inches. Systematic samples underground are shown on the assay plan accompanying. Very high assays have been obtained from material in some of the cuts, one sample assaying 12.12 ozs. gold per ton.

No. 5 VEIN

is from 100 to 150 feet east of No.4 and has been exposed on the surface and in the underground workings over a distance of 550 feet horizontally and 300 feet vertically. It is exposed on the surface in all cuts, the width being never less than 14 inches and frequently up to 60 inches. The strike is north to north 15 degrees west, and the dip is 45 to 60 degrees north-east. ~~This vein is exposed underground in a drift off~~ Going south this vein should intersect with No.4. This vein is exposed underground in a drift off a crosscut from No.4 Upper Tunnel.

No.6 VEIN

is exposed in the Dakota Tunnel, 125 feet east of No.5 vein, and has been traced 1200 feet north to the Tenderfoot Tunnel. The strike is 10 degrees west of north, and the dip is 35 to 60 degrees north east. The Dakota Tunnel is on 6 vein and a description of this working is given elsewhere. The Tenderfoot Tunnel is also on No.6 vein and is described elsewhere.

No. 7 VEIN

The showings described as No. 7 vein are probably on two veins, as there are two sections varying markedly in strike, dip and mineralization. The upper portion is a pyrite-chalcopyrite gold vein similar in character to Nos. 1 to 6 veins. This section has been traced ~~known~~ for a distance of 200 feet. The strike is south 30 degrees east and the dip is 60 to 65 degrees north east. At its northern end the vein comes to within 100 feet of No. 6 vein and it is possible that there is a junction of these two veins near the Tenderfoot Tunnel.

The other section (or what is, more probably another vein) is a silver-lead vein striking south 30 degrees west, and dipping flatly to the southeast. Galena and Sphalerite are present, in addition to pyrite. This vein is probably younger than the pyrite quartz veins which are characteristic of this property.

ORE DEPOSITS AND SAMPLING.

The underground workings are sampled as systematically as possible, channel cuts being taken across the back, in most ~~places~~ places, or in the bottom where adviseable. Previous sampling, by the management, consisted almost entirely of face samples. A very fair ~~check~~ check was made with the mine sampling, particularly in the new work in No. 4, Dakota, and No. 7 Tunnel, and as the writer is satisfied that the mine samples were well and consistently taken and represent a ~~sincere~~ sincere endeavour to arrive at a correct results, these samples have been embodied in the assay plan.

NO. 4 UPPER TUNNEL

shows three ore shoots totalling 168 feet in length, with an average width of 2.5 feet and an average assay value of \$12.70. No. 1 ore shoot, near the portal, is exposed for 30 feet in length, averages 32 inches in width and \$12.60 in gold. As this ore extends beyond the portal it is possible that it continues north, and that the full length is not shown in the tunnel. Going south from the South end of this shoot there are low values to a point 63 from the portal where a value of \$10.80 across 36 inches was obtained.

No. 2 ore shoot starts at about 125 feet from the portal and is 78 feet in length, averages 30 inches in width and carries an average value of \$11.20 in gold. The values that occur between No. 1 and No. 2 ore shoots indicate the possibility that, at a slightly different horizon, these shoots may join. Such a condition would be shown by stopping operations, or a raise and winze between the shoots would test out this possibility.

No. 3 ore shoot starts at about 320 feet from the portal, is 60 feet in length, averages 30 inches in width, and carries an average value of \$ 14.30 in gold. Between No. 2 and No. 3 ore shoots there is an intrusion of felsite porphyry which is responsible for the disturbance of the vein.

Near the face of the main drift the management reports values, which are shown on the plan. As these represents prospects only, and not ore, they were not checked.

At 190 feet from the portal a crosscut has been driven east to intersect No. 5 vein, which was encountered at 210 feet from No. 4 drift

No.5 vein, at this section, is 15 to 24 inches ~~wide~~ in width, but the best assay obtained by the writer in the drift on this vein was \$ 2.80 across 24 inches. In the north side of the crosscut the vein assayed \$ 4.00 across 9 inches. One assay of \$ 44.80 across 12 inches is reported (H.L.Batten). It would appear advisable to do some drifting north on this vein, as a drift in this direction would get away from the disturbing influence of the felsite dyke.

NO. 4 LOWER TUNNEL

shows only one short shoot of ore at 180 to 195 feet from the portal and a single assay running \$ 4.00 across 12 inches at 260 feet from the portal. While there is no definite ore shoot exposed in this tunnel the occurrence of these values is important as they represent, possibly, the downward continuation of one of the shoots exposed in the Upper Tunnel. Raising is required to correlate the values in the Lower Tunnel with the ore shoots in the Upper Tunnel, and to determine the habits of these shoots, their rake (if any), vertical continuity and tonnage. Another possibility, indicated by the cross-section, is that No.4 Lower Tunnel is not on the same vein as the Upper Tunnel, but may be on a parallel vein that does not outcrop. It is possible that the vein described as No.3, in the crosscut West, at about 60 feet from the portal, is the downward continuation of the vein exposed in No.4 Upper Tunnel. If the same vein is exposed in the Upper and Lower Tunnels there must be a reverse curve in the dip between the tunnels. These points could be determined by the vertical work suggested.

NO. 5 LOWER TUNNEL

is new work and may be considered to have been quite successful, as an ore shoot has been exposed 100 feet in length, averaging 15 inches in width and \$9.60 per ton in gold. This ore shoot starts at 385 feet from the portal.

From the portal, for 60 feet, there are low values. At 150 feet from the portal a short crosscut east encountered a blind vein that assayed \$2.00 across 12 inches, the management reporting \$3.60. Another crosscut at 195 feet from the portal cut two veins, one assaying \$2.80 across 36 inches, and the other \$1.60 across 24 inches. These veins cross the drift diagonally at about 250 feet from the portal where assays of \$11.20 and \$1.20 were obtained. Between this drift point and the start of the ore shoot the management report values which are shown on the plan.

It would be advisable to raise from this tunnel to No.5 vein, drift off the No.4 Upper Tunnel before driving on No.5 vein at Upper No.4 horizon. Muck could then be dropped to No.5 Lower tunnel and the long haul on No.4 Upper Tunnel avoided.

DAKOTA TUNNEL

In this tunnel an ore shoot 40 feet long, averaging \$14.60 across 21 inches is exposed at 215 to 245 feet from the portal. Previous observers report \$10.40 across 12 inches at 20 feet from the portal and \$10.00 across 24 inches at 43 feet from the portal. The writer obtained a value of \$3.20 across 24 inches, near the face

of this tunnel, and, when opportunity offers this tunnel should be driven further south.

NO. 7 TUNNEL

which is new work, exposes a very nice ore shoot 90 feet in length, averaging \$18.30 across a width of 21 inches. On both ends of this ore shoot low values occur and it is quite likely that further work will show a greater length of ore than is exposed in the tunnel.

NO. 6 MIDDLE AND LOWER TUNNELS

which are short gave no assays of economic interest.

TENDERFOOT TUNNEL

This tunnel is at the lowest horizon of all present underground workings. From the portal to 100 feet from the portal an ore shoot is exposed averaging \$7.35 per ton across 17 inches. About 20 feet South of the South end of this shoot an assay of \$4.80 per ton across 4" was obtained. As this ore shoot extends to the portal it is possible that it continues further North and is not completely exposed in the tunnel. The present face of the tunnel is on the vein, but there is no Quartz.

SUMMARY OF ORE SHOOTS

	<u>Length</u>	<u>Width</u>	<u>Value Per Ton</u>
No.4 Upper Tunnel	30 feet	32 inches.	\$12.60
	78 "	30 "	\$11.20
	60 "	30 "	\$14.30
No.4 Lower Tunnel	20 "	18 "	\$ 7.15
No.5 Lower Tunnel	100 "	16 "	\$ 9.60
Dakota Tunnel	40 "	21 "	\$14.60
No.7 Tunnel	90 "	21 "	\$18.30
Tenderfoot Tunnel	100 "	17 "	\$ 7.35
<u>Total</u>	<u>518 "</u>	<u>22 "</u>	<u>\$12.30</u>

In addition to the above Gold values numerous assays for Silver on the mine samples, indicate that a further fifty cents per ton can be added for this metal.

PROPOSED FUTURE WORK

Further drifting, raising and sinking are necessary on some, if not all of the ore shoots so far uncovered in the mine, in order to determine their downward and upward continuity. Raising should extend wherever possible on individual ore shoots, to a height of 100 feet above the levels, and sinking should be done to about fifty feet below the levels. The main development work

underground should consist of driving ahead the Tenderfoot Tunnel a distance of about 500 feet to intersect the Norman vein. This is the Silver-Lead vein that has been considered with No. 7 vein. If the Norman vein appeared promising at the point of intersection with the Tenderfoot drift, it could be followed in a South West direction until it in turn intersects the other veins, and drifts deflected from it on these other veins towards the present known crossoots. If the Norman vein does not appear to be promising, then the Tenderfoot drift should be extended ahead in any case, until it reaches a point opposite the known ore shoots on the other veins, a main crosscut should then be deflected from the Tenderfoot drift and this should be extended South-Westerly to intersect veins 7, 5 and 4. This work would provide a main haulage for ore obtained from all the different veins on different levels. Further work such as raising, drifting etc. would be performed from this lower level as circumstances dictate. The total amount of raising, sinking, drifting and cross-cutting required for the permanent development of the mine down to the Tenderfoot level, is estimated at between five and six thousand feet.

GENERAL

Operating conditions are excellent. Plenty of timber is available on the claims. There is a good campsite at the level of the Tenderfoot tunnel, and an exceptionally good one at the proposed mill-site at Gold Creek. In fact at the latter place there is already ample camp accomodation for the mill crew.

A few hundred feet above the Gold Creek camp there exists a canyon where the creek waters could be impounded for power development should this be considered advisable at any time. The question of using Diesel engines for developing this power should receive very careful consideration. At first glance it would appear that the initial cost of Diesel power development would be less than a Hydro-Electric installation, but without a detailed investigation this cannot be possitively stated.

Climatic conditions ~~xx~~ for economic operation are good. The summers are pleasant, and the winters are not unduly severe. The new highway, recently completed between Usk and Terrace is first class in every respect, and could be kept open the year round. Incoming supplies could come over this highway either by way of Terrace, where there is a bridge over the river, or from Usk, where there is a ferry service, possibly at certain times of the year when the ferry cannot be run, it would be best to use Terrace as the shipping point. The snow fall is not excessive, averaging probably, about four feet ~~x~~ at the mine, and two or three feet at Gold Creek.

LIST OF MINERAL CLAIMS

TENDERFOOT GROUP

	<u>Date of Record</u>
Tenderfoot M.C. (surveyed)	Sep. 24, 1930
Dakota M.C. (Surveyed)	" " "
Vimy M.C. (surveyed)	" " "
Tomboy M.C.	July 28, 1925
Ballarat M.C.	" " "
Vindicator M.C.	" " "
Valhalla No.7 M.C.	Nov. 14, 1925
L.C.Fractional M.C. (Crown-Granted)	May 27, 1923

VALHALLA GROUP

Valhalla M.C.	May 29, 1919
Valhalla No.1 M.C.	" " "
Valhalla No.2 M.C. (Crown-granted)	" " "
Valhalla No.3 M.C. (Crown-granted)	" " "
Valhalla No.4 M.C. (Surveyed)	" " "
Valhalla No.8 M.C.	Aug.12, 1927
Kleanza No.4 M.C.	Nov.14, 1927
Norman Fractional M.C.(Crown-granted)	May 27, 1923

KLEANZA GROUP

Valhalla No.5 M.C.	Aug.8, 1919
Valhalla No.6 M.C.	Sep.16, 1919
Kleanza No.2 M.C.	Sep.1, 1928
Kleanza No.3 M.C.	" " "
Kleanza No.1 M.C.	" " "
Kleanza M.C.	July 28, 1925

GOLDEN CROWN GROUP

Ruby M.C. (surveyed)	Oct. 30, 1918
Golden Crown M.C. (")	July 16, 1900
Granite M.C. (")	" " "
Lucky Jim m.c. (")	June 13, 1903
Noble Five M.C. (")	June 15, 1903

The Government Recording Office for the district is at Smithers, B.C., with a sub-office at Usk, B.C.

All claims are in good standing and the most important key claims have been surveyed.

COPY.

506 Vancouver Block,
Vancouver, B.C.
July 23rd, 1931.

Major A. Wellesley McConnell,
King Edward Hotel,
Toronto, Ont.

Dear Major McConnell, Re Columario Gold Mines, Ltd.

In accordance with your instructions I have gone over Mr. W.G. Norrie's report on the Columario carefully and have discussed the situation fully with Mr. Norrie.

I should say that I have known Mr. Norrie for a number of years. He has had broad mining experience and is a very capable engineer in excellent standing, in fact, he has been a member of the Council of the Association of Professional Engineers of British Columbia for several years and is at this time a member of this Council.

His report has been carefully prepared after a very thorough investigation of the property. His report is essentially engineering in character and is based on a very thorough, careful and systematic sampling of the workings. This is in accordance with the instructions he received from the Company which were to concentrate his efforts on the determination of the amount of ore available and to check carefully the values to be expected. The immediately important determinations were the amount of ore presently available, its average grade and the future policy of the Company. I think ~~the~~ these points have been most competently covered and you may be assured that the report is entirely unprejudiced as Mr. Norrie, until he arrived at the property and met Mr. Willman, did not know any person directly connected with the Company or the operation and had never been, in any way, connected with the operation.

I agree fully with Mr. Norrie's findings.
The following appear, to me, to be the most important points:-

1. THE POSSIBILITIES OF THE PROPERTY ARE SUCH THAT THOROUGH DEVELOPMENT IS WARRANTED.

This has been realized for some time and Mr. Norrie's opinion is confirmatory. The vein system has a vertical extent of 4500 feet and a horizontal extent of 12,000 feet. There are not less than seven similar veins in this system and mineable shoots of ore have been shown to occur in four of these veins. There is no reason to suppose that ore shoots do not occur in the other veins and I think that further work on these other veins will show up ore shoots. There is, therefore, a high ~~probability~~ probability factor that the property, with adequate development, will ultimately produce an important tonnage of ore.

2. SYSTEMATIC SAMPLING SHOWS THAT ORE SHOOTS OF MINEABLE WIDTH AND GRADE OCCUR IN THE SECTIONS OF THE VEINS EXPLORED BY UNDERGROUND WORK AND THAT THESE ORE SHOOTS ARE SUFFICIENTLY CLOSELY SPACED TO ALLOW OF ECONOMIC EXTRACTION.

The mine manager, Mr. Willman, has reported these ore shoots and his opinion is fully confirmed. That ore shoots occurred in these veins has been known for some time but we always had the fear that they might be too low grade and too widely spaced to be worked economically. Mr. Willman is to be congratulated on the work he has done in the last year and a half as this work has not only shown up new ore bodies but it has confirmed his opinion that they would be of good enough grade and of sufficiently frequent occurrence for profitable mining. There is no geological or other reason, that the writer knows of, to suggest that similar conditions will not exist in the portions of the veins not yet explored.

3. THERE IS SUFFICIENT ORE IMMEDIATELY AVAILABLE TO JUSTIFY CONSTRUCTION OF A TRAMWAY AND THE FIRST UNIT OF A CONCENTRATOR.

I quite agree with this conclusion. This ore is not actually blocked out and it is impossible, at the present time, to estimate positive tonnage but I consider that this recommendation is fully justified by conditions. It is not sound practice to delay production till the ultimate possibilities of the operation are realized. Interest charges become prohibitive and shareholders, naturally, refuse to wait so long for returns. It is sound practice to get a property into production as soon as there is justification for the capital expenditure required. The construction work underground, required to open up the ore bodies for stoping, can be performed while the mill and tram are being constructed.

A very important point in this consideration is the fact that a tram will not only supply ore to the mill but its operation will cut the cost of transporting supplies to the mine very substantially. The vertical drop in the length of the proposed tram is sufficient for the down-coming ore to pull up all supplies to the mine and a Diesel plant can be operated very economically at the mine all fuel and supplies being hauled up on the tram with no power consumption. On a amount of development warranted by the prospects of the property this saving should almost pay for the tram.

4. THERE IS AN EXCELLENT MILL SITE ON GOLD CREEK WITH A SUPPLY OF WATER ADEQUATE FOR ALL PURPOSES, EVEN FOR THE DEVELOPMENT OF POWER FOR A BIG TONNAGE OPERATION.

There is already a good camp at Gold Creek and only very limited expenditure will be required to make it suitable for use by the mill crew. Construction materials can be landed at this site very cheaply as there is only a four mile haul, over a good truck road, from the railway. The operation of a Diesel power plant at this site will be very economical and the cost of shipping concentrates will be low. There will be a load both ways and there are no grades on this road to prevent hauling maximum loads.

The power possibilities on Gold Creek should be investigated. I think it will be found advisable, for the present, to develop power by a Diesel plant on account of the lower capital cost but the development of hydro-electric power should be investigated, particularly as it is highly probable that the Company will wish to develop this power

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~~scheme~~ scheme at a later date when the property has been completely developed and power is required for maximum production. The main advantage of developing hydro-electric power would be to eliminate the cost of fuel. An important factor in this cost is transportation. If concentrates have to be hauled out fuel can be hauled to the plant with little additional cost. If no concentrates were to be hauled this would be an additional factor in favour of the hydro-electric development. With a tram in operation the cost of fuel and other supplies at the mine may, for practical purposes, be considered the same as the cost laid down at Gold Creek.

The matter of mine costs has not been gone into by Mr. Norrie, though we have discussed the matter, and Mr. Willman is best able to suggest what costs may be expected on account of his long experience in operating the property. It is the writer's opinion that, assuming continuance of the efficiency that has characterized the operation to date and the operation of a concentrating unit of between 25 and 50 tons per day capacity, the total costs should not exceed \$10.00 per ton milled. This is allowing for about ~~50%~~ 50% of the mine capacity being employed on development work. It is our opinion that not less than 50% of the mine capacity should be employed on development work as development of the property, at this stage, is more important than production in order that the ultimate possibilities of the property may be realized as quickly as is economic.

The capacity of the mill to be constructed must be decided on matters of policy rather than on engineering basis. As stated, ore tonnages are not proven and in considering the mill capacity to be installed the variables to be considered are the capital expenditure to be incurred, the rate at which it is desired to develop the property, whether the production is to take care completely of development or whether it is desired to show a nett operating profit rather than push development. The writer's suggestion would be to construct a mill with a capacity of not less than 35 tons per day nor more than 50 tons per day capacity, with a five drill compressor at the mine, the mine capacity being employed about 50% on production and about 50% on development. This scale of operation would allow reasonable elasticity, would give about minimum capital expenditure per ton milled and would, I think, give satisfactory operating costs. This scale of operation should provide ~~adequate~~ for an adequate development programme and give a small nett operating profit, using selective mining methods.

Capital expenditure required cannot be estimated with any degree of accuracy until at least preliminary surveys and plans are prepared. Basing an estimate on only general knowledge of conditions we think that Mr. Norrie's estimate of a total of \$100,000 being required is about correct. The cost of surveys, clearing tram right of way, mill and camp sites etc., mill and mine investigations, plans and surveys will cost about \$15,000, tram and mill will cost about \$35,000, power plants, \$15,000, mine construction about \$10,000 and \$25,000 should be provided for operating capital. It should be noted that very substantial savings in cost can be made by taking advantage of present buying and labour conditions.

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It is extremely desirable that the construction should be completed and the mill in production before climatic conditions become sever next winter. If it is impossible to make financial arrangements to complete the work before winter then all surveys, plans etc. should be made this fall and the sites cleared and foundations determined before the snow falls, otherwise this preliminary work will be delayed until the snow has gone next summer and there will be a year's delay in getting the operation into production. Also, in a year's time, buying and labour conditions will probably not be as favourable for low costs as at present.

Re Golden Crown Group. The writer has never examined this group. Mr. Norrbe's sampling did not indicate that there was any ore available in the workings but some values have been reported by various observers. In any case, the group covers the northerly extention of the Columario vein system and is therefore of some prospective interest from a mineral-bearing point of view. A more important consideration at present, however, is that a mill site is required on the Ruby M.C. off this group. Also the tram will pass over this group and it is possible that, at a later date, the Company will require a tunnel site on one of the claims of this group to tap the Columario workings at depth. For these reasons it would be advisable to acquire this group if it can be obtained very reasonably. Unless the east of the group is slight it would be advisable merely to arrange to obtain the desired mill site and right of way for the proposed tram. As the Golden Crown owners probably have not acquired surface rights there will be no trouble in making these arrangements.

Respectfully submitted

(signed) H.L. Batten.

Consulting Mining Engineer.