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REPORT

SILVER HILL MINE

Tulameen, B.C.

by F.J. HEMSWORTH

SUMMARY

A visit was made to the Silver Hill Mine, Tulameen, B.C. on November 18th, 1951. One day was spent at the property. The No. 2 and No. 3 Levels were examined where accessible. On so short an examination it is not feasible to write a complete report. Therefore, I will give only my opinion of the showings seen and some recommendations re policy and development.

I was favorably impressed with the Silver Hill showing. A strong, continuous fissure has been developed, containing ore shoots of Silver, Lead and Zinc minerals in commercial quantities under present economic conditions.

A considerable tonnage of ore is indicated but further development is necessary before this tonnage can be classified as "assured" or "positive" ore.

Work is now in progress at the property, and the following development is recommended:

1. Drive a raise from No. 3 Level to No. 2 Level, on the Footwall 11 Vein.

2. Drive two sublevels from the raise.

3. Clean-up and re-timber the old workings on No. 3 Level, and drift on the Footwall vein on this level.

Provided the results of this work are favorable, the management should give serious consideration to the construction of a concentrator.

It is estimated this program will take 5 months. Allowing an additional month for unforseen delays, this development work should be completed by June 1, 1952, an ideal time to begin a construction program.

LOCATION AND ACCESS

The Silver Hill Mine is situated in southern British Columbia, 21 miles by good dirt road west of the town of Tulameen. The Kettle Valley Branch of the C.P.R. passes through Tulameen. A 17 mile motor road connects Tulameen with Princeton. Princeton is 180 miles by road from Vancouver.

GEOLOGY

The property lies on the eastern contact of intrusives associated with the Coast Range Batholith.

A strong, feldspar-porphry dyke, up to 20 feet wide, cuts across sedimentary beds of Cretaceous age. Fractures along the footwall and hanging wall have been filled by a quartz-carbonate gangue with wall rock inclusions, and mineralized with bands of sphalerite and galena. The footwall vein, on the north side of the dyke, is the stronger. It shows widths up to 5 feet and is characterized by several inches of gouge on the footwall side. The gouge has resulted from movement along the vein walls and is considered a favorable feature. The ore minerals are generally concentrated in bands along the hanging-wall side of the vein but mineral occurs also disseminated through the gangue and occasionally as stringers on both walls.

Other veins, not associated with the porphyry dyke, are known to occur on the property but were not investigated.

SAMPLES

Three samples were taken from the Footwall vein by the writer. So few samples, taken at irregular intervals, cannot be expected to represent an average value but only an indication of the type of mineralization. Places available for sampling are ends of old stopes and backs of old drifts. No recent development work has been done. Since early operators were interested only in the silver-

lead ore and were penalized for the zinc content, it is natural that the zinc ore would be left, and that any silver-lead showings have been mined. This is verified by my assays. Records of shipments indicate that the lead content is equal to the zinc. Since the silver values are associated with the lead, it is reasonable to expect that ore from any new development will show much higher silver-lead values than those indicated by my sampling.

Description	Width ft.	Silver ozs/ton	Lead %	Zinc %	Cadmium %
No. 2 Level, F.W. vein west drift 50' from crosscut	3.0'	9.2	1.4	9.5	
No. 3 Level west drift F.W. vein 10' from cave	4.0	1.2	0.6	7.5	
No. 3 Level east drift F.W. vein 50' from face	2.5	1.6	0.5	31.0	0.21

PREVIOUS WORK

The company has spent considerable time and money on improvements to the road, rehabilitation of the temporary camp, and on buildings and snow sheds at No. 3 portal. All this work was necessary and has been completed in a satisfactory fashion. Work must now be concentrated

on underground development. No further road work should be done except that necessary to keep the road open for supplies.

WINTER WORK PROGRAM

The following program of work is recommended for the six months from December, 1951 to May 1952:

1. (a) Lay track and pipelines from the portal of No. 3 level, along the crosscut, to the foot of the proposed raise.

   (b) At the same time a survey be made covering No. 2 and No. 3 levels and a mine map be prepared on a scale of 40 feet to the inch. All available maps are diagrammatic. An accurate map is essential to start the raise in the best area for ore development and for efficiency in later mining.

2. (a) Drive the raise, an estimated 450 feet slope distance from No. 3 to No. 2 level. Cut stations at 150 foot and 300 foot distances up the raise. The sublevel drifting should wait until the raise is completed.

   (b) Concurrent with the raise work, employ a miner-timberman cleaning up and retimbering the old drifts on No. 3 level. After this is done, it should be possible to extend No. 3. drift on the footwall vein. However, this work should not be allowed to interfere with advance of the raise, as the rapid completion of the raise is the primary consideration.

3. (a) Drive sublevel drifts east and west from the 150-foot and 300-foot levels off the raise.

   (b) Rehabilitate the mine workings on No. 2 level.

ESTIMATES OF COST OF THE ABOVE PROGRAM

The estimated cost per month of the proposed winter program is $8,000, consisting of $4,600 for wages, and $3,400 for supplies. For the six months the total is $48,000. In addition, there are current liabilities of about $10,000 and necessary equipment purchases of $10,000. Capital required is $20,000 by December, 1951, and $8,000 per month to the end of May, 1952, or a total of $68,000.

A detailed estimate of the monthly costs is appended.

If the above program is successful in developing ore now indicated, funds will be required to finance the construction of a mill and a permanent camp.

REPORTS

The Company has reports on the Silver Hill Mine by the following professional engineers:

W.G. Norrie-(Lowenthal)	December	1925
N.C. Stinnes	July	1929
J.M. Turnbull	September	1929
A.M. Richmond	March	1949
H.L. Hill	December	1949
C. Riley	April	1951

Additional information is contained in Government reports indexed under Summit Camp, Mary E, Silver King and Wm. Dornberg.

The above reports by five prominent mining engineers and one geologist are all optimistic on the ore occurrences and future possibilities of the property. I wish to concur in this general opinion.

CONCLUSION

The Silver Hill Mine has all the indications of developing into a profitable producing property. The structure is strong. The mineralization is principally Lead & Zinc sulphides carrying silver and some cadmium, in a gangue within strong fissure veins. Ore shoots have been opened on three levels over a vertical distance of 900 feet. More than 1500 feet of lateral development has been done and over 50% of the drifts are in ore. I have no hesitation in recommending a vigorous development program to prepare the mine for production.

Signed _____
Fred J. Hemsworth
Consulting Mining Engineer

November 27, 1951.

Appendix

Silver Hill Mine - WORK PROGRAM - Dec/51 to Apr./52.

LABOR

Payroll per Month

Raise Miners - Contract	4 @ 500.00	2000.00
Foreman	1 @ 350.00 plus board	350.00
Cook	1 @ 200.00	200.00
Flunkey-bullcook	1 @ 100.00	100.00
Miner-timberman	1 @ 1.50/hr.	300.00
Mucker - ½ miner helper ½ trammer helper	1 @ 1.25/hr.	250.00
Trammer	1 @ 1.25/hr.	250.00
Catman-mechanic	1 @ 1.50 hr. plus overtime	350.00
Cat-helper	1 @ 1.25 hr. plus overtime	300.00
Geological engineer	1 part time @ 350.00 /month	100.00
Manager	1 @ 400.00	400.00
		$4,600.00

Supplies & Expenses per month

Cookhouse Loss	500.00
Fuel - Oil & Gas	500.00
Timber,-Raise & drifts	500.00
Explosives	300.00
Repair parts	300.00
Steel & Tools	250.00
Other supplies - nails, pipe fittings, wire rope, etc.	200.00
Engineering	200.00
Office & Travelling	200.00
Workmens Compensation & medical aid	400.00
Insurance	50.00
	$3,400.00

Resume Report on the

MARY E. MINING PROPERTY

Tulameen, B. C.

By:-

A. M. Richmond, M.E., P. Eng.,
Consulting Engineer,
475 Howe Street,
Vancouver, B. C.,

March 22, 1949.

APPENDIX No. 1 - MAPS

Map No. 1 - Summit Camp Claim Map

Scale: 1" to 1500 ft.

Map No. 2 - Plan Underground - Mary E. M.C.

Scale: 1" to 200 ft.

Map No. 3 - Cross Section AA' - Mary E.

Scale: 1" to 200 ft.

Map No. 4 - Longitudinal Section BB' - Mary E.

Scale: 1" to 200 ft.

With Report by

A. M. Richmond, M.E., P. Eng.,
475 Howe Street,
Vancouver, B.C.,

March, 1949.

Resume of data in the published references to Mary E. mining property.

Notes by A. M. Richmond, M.E., P. Eng., March, 1949.

B.C. Minister of Mines Report 1899 page 742:- A brief report on the main claims in the camp which mentions specimen assays of "200 oz. silver, from $4 to $6 (0.2 to 0.3 oz.) gold, 60% lead and 3% copper to the ton"

B.C. Minister of Mines Reports from 1900 to 1912, inclusive:- These reports mention various claims in the camp and the fact that they have been kept in good standing in spite of the inaccessibility of the camp. No road had been built. The ground now covered by the Mary E property was bonded in 1912 by a group of men from Spokane who started development work under difficult transport conditions.

B.C. Minister of Mines Report 1913 page 226:- This is a rather long report by J.D. Galloway, then Assistant Provinicial Mineralogist, on the Summit Camp, and it contains on pages following page 226, a description of the Treasure Mt. Mining Company, which had the Mary E area under option. Galloway describes the work at that date (1913) and gives a number of assays. The data is substantially the same as given by Norris in his report of 1925.

B.C. Minister of Mines Reports for 1914 to 1925:- These reports contain brief descriptions of various claims in the Summit Camp by Brewer and Freeland, but very little work was accomplished due to non-completion of the road from the town of Tulameen as at the end of 1925. The 1925 Report contains data on the past history of the Mary E under the name of Mary E. Mining Company, and indicates that more active work is planned for 1926 by the company.

B.C. Minister of Mines Report for 1926 page 223:- In this year's report P. B. Freeland, Resident Mining Engineer for the B.C. Government, describes the Mary E property under the name of Cascade Consolidated Silver Mining Company, and gives its past history, description of the workings, and data on ore grade and occurrences. The report is a long one and the essential information it contains has been incorporated in my own resume. Freeland gives a copy of C. E. Cairnes geology of the Summit Camp, with notes on the significance of the distribution of the sediments and intrusives occurring in the camp.

B.C. Minister of Mines Report for 1927, page 254:- Report outlines the work done in development of the Mary E property, under the name of the Cascade Consolidated Silver Mining Company. No. 3 level had been completed at this time but no mill had as yet been built.

B.C. Minister of Mines Report for 1928, page 265:- Property was idle this year due to re-financing. Report contains description of work up to time of closing in the fall of 1927.

B.C. Minister of Mines Report for 1929 to 1934:- Reports describe the building of an abortive milling plant, and the small production from the same, with poor savings, the final collapse of the operation on the death of Wm. Dornberg in August of 1932. The mill was apparently sold to pay debts, and the last note is about a small clean up around the plant with a few tons of ore shipped. It should be noted that the mill was unsuited to the ore, mill losses were high, no recovery of zincy ores was made, and generally during this period of operation which coincided with the General Depression, metal prices were very low. The remarks at the end of J. M. Turnbull's report (see above) are very pertinent.

APPENDIX NO. 2 - REPORTS & REFERENCES

Report by W. G. Norrie on the Mary E Mine dated December, 1925.

Report by Norman C. Stinnes on the Silver King Mining Company (Mary E property), dated July 11, 1929.

Report by J. M. Turnbull on the Silver King Mine - Tulameen (Mary E property), dated September 29, 1929.

Footnote by J. M. Turnbull on the same property, dated September 20th, 1948.

References to the Summit Camp, and with special reference to the Mary E property, are contained in the Geological Survey of Canada Summary Reports for 1910 and 1922, and in the B.C. Minister of Mines Reports for the following years on the pages noted:-

1899 page 742; 1900 page 1088; 1901 page 1088; 1902 page 196; 1903 page 186; 1904 page 236; 1905 page 207; 1908 page 132; 1911 page 186; 1912 page 190; 1913 page 226 by J.D. galloway; 1913 page 245; 1914 page 367; 1915 page 234; 1915 page 250 by W.E. Brewer; 1916 page 261; 1917 page 208 by P.B. Freeland as all reports which follow; 1919 page 172; 1920 page 160; 1921 page 180; 1922 page 166; 1923 page 188; 1924 page 170; 1925 page 210; 1926 page 223; 1927 page 254; 1928 page 265; 1929 page 278; 1930 page 214; 1931 page 129; 1932 page 139; 1934 page A25. No further references in reports to the end of 1947 report.

With Report by

A. M. Richmond, M.E., P.Eng.,
475 Howe Street,
Vancouver, B.C.,
March 1949.

A Brief Resume Report on the Mary E. Mining Property, Tulameen, B. C.

By

A. M. Richmond, M.E., P. Eng., Vancouver, B.C.

March 22, 1949

C O N T E N T S

475 Howe Street,
Vancouver, B.C.,
March 22nd, 1949.

Edward G. Brown, Esq.,
508 Metropolitan Building,
Vancouver, B.C.

Dear Sir:

Re: Mary E. Mining Property,
Tulameen Area of B. C.

You have asked me to prepare a summary and give you an opinion on the above group of four mineral claims, all situated about 27 miles by road, south and west of the town of Tulameen, B.C., a station on the Kettle Valley Railway some 167 miles by rail east of Vancouver, B.C.

While the data as given herein is principally from the published and private reports which are attached or referred to in Appendix No. 2 with this letter report, I have had an opportunity of inspecting this property on three or four occasions between the years 1929 and 1941, and also of sampling an adjoining property, the Eureka, during the spring of 1941. My letter to you is therefore written with a factual knowledge of local conditions, and I am able to advise you that the three reports, by Norris, Stinnes, and Turnbull, are in accordance with the facts as I have them recorded in my previous notes on the property.

Rather than repeat much data that is included in the attached reports just referred to, I shall confine my observations to points of critical economic significance. The four maps which I have prepared from the available data are self explanatory. I believe that a brief review of past history at the property, the ore situation respecting tonnage and ore values, and the propererties

possibilities under existing conditions of good metal prices, modern mining and metallurgical methods, will shorten my report and give you the proper perspective as to the value of the mineral showings at the Mary E. mining property.

History.

Summit Camp, in which the Mary E. property is situated, was first discovered about 1895, but due to the distance from either Hope or Princeton, the two nearest centers of population and supplies, the camp was inactive, save for annual assessment work, until 1923 when Wm. Dornberg and associates, of Spokane, took an option on several properties in the camp and started underground development work.

The Kettle Valley Railway was built from Hope through to Midway about 1912, and while Tulameen was thereby connected with outside points, it was not until 1926 that a road was completed between Tulameen and Summit Camp.

Once road transportation was available a more serious development program was undertaken by the Dornberg group at the Mary E, and most of the work shown on Map No. 2 was completed by the end of 1930. As Turnbull states in the footnote to his report, Dornberg endeavored to turn ore into cash by the building of an inefficient jig and table concentrator and the shipment of lead-silver concentrates to Trail Smelter. The mill was poorly designed, the operating results were poor, and being operated at a time of extremely low metal prices for silver, lead and zinc, the entire operation was badly handicapped by lack of funds. No further work was done after about 1934 when the mill was dismantled and sold to pay part of the debts.

A study of metal prices for 1930 through 1932 shows that silver varied in price between 29 and 40 cents per ounce, lead varied between 3.4 and 5.0 cents per pound, and zinc varied between 2.8 and 4.0 cents per pound. The same prices today are respectively 71.5 cents for silver, 18.0 cents for lead and 17.5 cents for zinc, and the indications are that prices should remain in this higher range for some time to come.

Therefore, the mill products shipped from the Mary E operation, mainly from 1930 to 1932, returned almost the lowest revenue for the metals as it has ever been possible to get.

The past history of the milling operation shows that no zinc was saved and shipped, except that which drew a penalty from the smelter for being sent with the lead-silver concentrates. Turnbull pointed out that as the ore was quite friable at least a unit flotation cell should have been included in the mill flow-sheet. Today the differential flotation of lead and zinc ores is much improved in technique as compared with 1930-1932 practice, and the recent advances in sink-float technique provides for the rejection of barren gangue and the recovery of heavy sulphides with a minimum of crushing, thus offering attractive possibilities for the treatment of larger daily tonnages with comparatively small capital expenditures for milling plant. While tests will be required on ore from the Mary E. to determine the best flow sheet to use in milling the ores, the available data suggests that sink-float followed by differential flotation plant should be the best treatment method to adopt.

Geological Data

The geology of the deposit is relatively simple. Cretaceous sediments, mainly slates, argillites, tuffs, and arkose rocks, after tilting and fracturing were intruded by feldspar-porphyry dykes, and at a subsequent date the mineralizing solutions from nearby quartz-diorite stocks, or possibly from the granodiorite batholith to the east of the Camp, were intruded along the dyke walls, forming mineralized veins on both foot and hanging walls of the dykes.

The sediments strike 20 degrees northwest, the dykes strike north 70 degrees east and dip at angles varying from 64 to 75 degrees to the southeast. The veins following the walls of the dyke have similar strikes and dips to the dyke walls.

Development work to date has shown the continuity of the veins on the Mary E. claim through a vertical distance of about 1,000 feet, and along a horizontal length of between 900 and 1,000 feet. The best ore-shoots have been found where the dyke cuts across a 380 to 400 foot bed of arkose sediments (see Maps No. 2 and 4), the veins being mineralized more or less continuously in the arkose area. In the slates to the east and west of the arkose area the veins are continuous but mineralization occurs in shorter and narrower shoots.

Most of the useful development work has been confined to the No. 2 level, at 4733 feet elevation, and it was mostly done on the footwall side of the dyke. This side is called the footwall vein. Map No. 4 shows that only a short section of the favorable arkose area has been drifted on at the No. 1 and No. 3

levels. The exploration of the remaining portion of the arkose area is strongly recommended, with work being done on the No. 1 level, then on a new Intermediate level (already in about 50 feet at 4940 feet elevation, with further work at a later date from the No. 2 and No. 3 levels. Crosscuts from ore-shoot areas should be driven from the footwall to hanging wall veins at numerous points as the hanging wall vein, while somewhat lower grade than the footwall vein, where exposed, has received very little development and offers excellent prospects for rapidly increasing the ore position with a minimum of development work.

The mineralization in the mine workings varies from a lead-zinc-silver ore in the No. 1 and No. 2 levels, to a zincy-silver ore in the No. 3, or lowest, level, at 4330 feet elevation. Both footwall and hangingwall veins will average approximately 4 feet in thickness as exposed, with a band of heavy sulphides of lead and zinc, which varies in width from 1 to 24 inches in width, occurring generally near the hanging wall of the vein. The heavy band of sulphides averages about 9 inches in thickness in the ore shoot sections. The rest of the vein filling is largely barren and crushed wall and dyke rock save for small stringers and disseminations of lead and zinc sulphides that are scattered irregularly through the otherwise barren filling. The whole vein width would have to be mined and would be largely recoverable in the milling process.

Ore Tonnage and Grade

Inasmuch as the area of the property is limited a study of Maps No. 2, 3 and 4 is important as indicating that both ends of

the vein seem to be well protected to the east and west of the favorable arkose rock area, while there is room for a further 1,000 feet of vein depth below the No. 3 level before any encroachment on adjoining property need be considered. There is, therefore, plenty of room on the Mary E. claim for development and mining for several years to come.

I have taken no samples from the veins on the Mary E. property, but the data provided by Norrie, Stinnes, Turnbull and various Government mining engineers, is sufficient to draw fairly definite conclusions as to the tenor of the ore. The values given by the above men agree with my notes as to ore values, which I obtained from my visual inspections of the ore sections. The values are also substantiated by past shipment records, when giving proper consideration to milling losses made in the very poor milling plant formerly on the property.

Three cars of ore totalling about 120 tons were shipped as sorted ore in 1929 from No. 2 level, the shipments averaging an assay of 110 ounces silver per ton and 40% lead with 19% zinc.

Three or four lots of jig and table concentrates were shipped in 1930, totalling some 80 to 90 tons, and the shipments averaged about 90-95 ounces silver per ton, 53% lead, and 5% zinc. A further 130 tons of concentrates shipped in 1932 averaged about the same, according to report.

Using the data given by Turnbull, as his report was the last written and he had the use of all available sample records, it would appear there is a reasonable chance of obtaining 65,000 tons of ore averaging 11.3 ounces silver per ton, 5.4% lead, and

5.0% zinc, from the footwall vein alone from the surface down to a depth of 200 feet below the No. 2 level, all within the arkose rock area. Further tonnage would be available from the smaller ore shoots in the slate areas while, as previously suggested, the tonnage could be possibly doubled by the development of the hangingwall vein area in the rocks of the arkose bed area.

This 65,000 tons is based on mining 4 feet of vein width containing but 6 inches average width of heavy sulphides of lead and zinc. Stinnes has given an average width of sulphides in ore shoot lengths of 9 inches, and this could add considerably to the grade of the ore, but not to the tonnage used. Turnbull allowed one-third of the possible stope area for narrow parts of the vein and for pillars to be left in mining. This is accounted for in the 65,000 tons given above. No tonnage has been allowed for in what may be a third vein located about 200 feet to the north of the hangingwall vein and where but a small amount of shaft sinking was done many years ago. No ore has been counted on from the No. 3 level, though there is a considerable tonnage of zincy-silver ore on this level which would undoubtedly be mined. I am of the opinion the above estimate is quite in order with the available facts, and I would expect to find considerably more tonnage during the course of mining and development.

An average of all figures by Norrie, Stinnes, Turnbull and Freeland indicates an average grade of 13.2 ounces silver per ton, 6.9% lead and 5.7% zinc, when applied to the same tonnage

figure as given above. It would appear that the grade used is quite in order from the data available.

For purposes of making an estimate of the economic possibilities of the property I have predicated recoveries on the basis of treating 200 tons per day of ore of the given grade, passing the ore through a sink-float plant with a metallurgical recovery of 90% and at the same time discarding 75% of the waste material. The 50 tons of resulting concentrate would then be treated in a differential flotation plant of sufficient capacity, making a recovery of 90% of the metals in the form of a lead concentrate containing the silver values, and a zinc concentrate. Approximately 12.5 tons of lead silver concentrate and 16.7 tons of zinc concentrate should be recovered daily. Shipping this to Trail smelter and allowing truck haulage from the mill to railway at Tulameen, and all rail freight, smelter charges and deductions, the ore would have a net recoverable value at the mill concentrate bins, with present metal prices of $23.85 per ton. In other words this $23.85 would be available in money to pay for mining, milling, overhead and capital cost of the plant. The 65,000 tons would therefore have a net recoverable value at the mill concentrate bins of just over $1,550,000.

Mining, development, milling, overhead on 200 tons per day would cost approximately $9.50 per ton with present costs. The capital costs for complete plant, adequate development prior to mining, and working capital would be between $225,000 and $250,000, say $3.85 per ton on the 65,000 tons. Total costs be-

fore taxes, which would be nil for the first 3½ years, would be $13.35 per ton of mine ore, leaving an operating profit possibility of $10.50 per ton of mine ore, or about $680,000 on the 65,000 tons of ore that it is indicated will be mined. Ore treated beyond the 65,000 tons would not have to be charged the capital costs of $3.85 per ton, and could return somewhat better operating profits under the existing metal price structure.

The property, on the available data, is small but quite an attractive mining venture.

As an alternative to complete equipment of the property, and it is here stressed the ore indicated above still requires considerable mine development before it is ready for mining at the rate of 200 tons per day, a smaller scale of equipment and development, with the shipment of sorted ore extracted in the course of development drifting could be used to advantage at the property. This work would consist of establishing camp at the mine, installing diesel or gas driven portable compressor, mine rails, pipe, machine drills, steel, etc., and driving the Intermediate level crosscut to tap the vein at the 4940 foot elevation, then drifting on both foot and hangingwall veins at this level in an easterly direction on and through the arkose beds. At the same time the No. 1 level should be cleaned out (I would expect some caved ground after the number of years the property has been idle) and drifting on the footwall vein through the arkose bed should be completed, with several crosscuts therefrom to the hanging wall vein. The No. 3 level should also be cleaned out and some further drifting should be done on the hangingwall

vein opposit the position of the footwall ore shoots in the arkose bed.

I believe that from 4 to 5 tons of ore averaging 80 to 100 ounces silver and 40 to 50% lead could be sorted daily from the above development. This ore if shipped at present prices under existing costs should net at the mine between $145 and $187 per ton, before mining and sorting costs. As most of the costs would be in development, the sorting charge would be relatively small, but the returns at 4 tons per day, would be from $580 to $750 per day, while even 20 feet of development per day should not cost more than $250 to $300 per day once plant has been provided. Plant, camp, equipment, etc., for such a development program should cost not more than $20,000 to $25,000 installed at the property. The program would place further ore in reserve and would also provide further funds against the day for installation of the milling facilities.

Conclusions

The data provided, plus my own knowledge of the property, would indicate the Mary E property as having considerable merit as a mining venture. I am of the opinion that considerably more than 65,000 tons of ore averaging 11.3 ounces silver per ton, 5.4% lead, and 5.0% zinc, will be found in the further development of the property.

I believe that approximately $50,000 should be used for the scheme of development outlined above prior to installation of milling facilities.

The indicated operating profit under present price conditions

has been estimated at $10.50 per ton, or approximately $680,000, after all costs, including cost of plant etc. This could be substantially increased by the finding of further ore during the initial program of development suggested.

I have no hesitation in recommending the property to capital. The data submitted is by well known and reliable engineers and it agrees in fact and detail with visual inspections I have made of the property. Access and operating conditions would be good.

Yours very truly,

A.M. Richmond, M.E., P. Eng.,
Consulting Mining Engineer,
475 Howe Street,
Vancouver, B.C.

March 22, 1949.

Copy of Report on the Mary E Mine, Written By W. G. Norrie, December 1925

Situation

The property is situated on Treasure Mountain near the headwaters of Amberty and Sutter creeks, which are tributaries of the Tulameen river. The claims are in the C.P.R. railway belt and have not been surveyed but are held by possessory title. The camp is at an elevation of 4600 feet and is about 22 miles west of the village of Tulameen by road and trail. Tulameen is a station on the Kettle Valley Railway 167 miles east of the City of Vancouver, B.C., from which point there is a daily train service.

Geology

The Mary E. and adjoining properties are situated close to the eastern contact of the Coast Range batholith and the eastern sedimentary rocks. This batholith extends in a general northwesterly direction from the southern to the northern boundary of British Columbia and forms the backbone of what is known as the Coast Range, of which the Hope Mountains, just west of the Mary E., form the southern portion.

This contact between the intrusive rocks and the sedimentaries has long been recognised as being exceptionally favorable for the occurrence of economic minerals, particularly lead, zinc and silver, and wherever it has been possible to prospect this belt, ores of economic value have been found. The rocks in the immediate vicinity of the property are principally of sedimentary origin, very much altered at the present time on account of their close proximity to the intrusive rocks to the west and east. These rocks consist of conglomerate, argillites, shales, tuffs and breccias, the latter two generally being referred to locally, as greenstones.

The ore occurs in a fissure vein which appears to have remarkable persistency in length and depth. On the Mary E. claim this vein has been exposed by two tunnels over a vertical depth of 417 feet and along an indicated length of about 500 feet. It is probable that this vein extends considerably further towards the northeast and southwest, possibly through the Eureka and on to the Blue Bell claims and beyond.

The vein as exposed in the Mary E. workings follows a feldspar-porphyry dyke which occurs between beds of greenstones and argillites. The general strike of the vein is N. 70 degrees E. and the dip is 68 degrees towards the S.W., or with the slope of the hill. As to whether this dyke has had any influence on the ore deposition is problematical, but on the lower tunnel it has possibly been responsible for the apparent splitting of the vein into two parts.

The vein averages 4 feet in width over the exposed portions of the Mary E. mine and carries an average of two feet of mineralized material on its hanging wall side. This material consists of a mixture of lead and zinc sulphides, the latter predominating. The ore is coarsely crystalline and very brittle, and the gangue material is soft, and consists generally of highly altered country rock, either greenstones or argillites, with some quartz. There is generally a well defined clayey gouge a few inches wide on the footwall side of the vein.

The silver values in the ore are roughly proportionate to the lead content, the silver mineral being finely disseminated argentite. The ore has been formed along the fissure mainly by replacement of the country rock along the hanging wall side, and it occurs in the form of lenses in the vein. The size of these lenses apparently depends on the nature of the rock traversed by the vein, and on local changes of dip and strike, also on cross fracturing.

Workings

The property has been explored to date by two crosscut tunnels with accompanying drifts. Inasmuch as there will probably be an intermediate level run between these two tunnels at some later date I would suggest that the upper tunnel be called No. 1, the intermediate when run, No. 2, and the lower tunnel No. 3.

No. 1 Tunnel:-

This is at an elevation of 5150 feet above sea-level and has been run through the argillites in a No. 26 degree E. direction for a distance of 85 feet, cutting the hanging wall of the vein at 56 feet. The face of the crosscut is in dyke material. At the point of intersection the vein is well defined and strikes N. 70 degrees E. and dips between 65 and 74 degrees to the S.E.,- this direction is followed for a distance of 44 feet, showing some scattered zinc ore and a lot of decomposed talcy material. The drift then turns about 50 degrees further to the north, following this direction for 39 feet, about 27 feet of which shows clean zinc-lead ore over a width of 9 inches. At the point where the drift turns northerly, a vein is shown extending into the hanging wall, and it is possible that this is the main vein and the other a branch.

The drift makes another turn of 35 degrees easterly at 53 feet back from the face of the drift and follows lower grade ore, mainly in the form of zinc stringers. At the face of the drift the vein is well defined and shows 13 inches of zinc ore in three streaks, the largest one of which is 6 inches wide. A sample taken here over 13 inches width assayed, 13.1 oz. silver per ton and 28% zinc. The dip of the hanging wall is S.E. 73 degrees.

This tunnel is only a short distance from the surface and the rocks and vein material are hard to recognize. The footwall, generally speaking, appears to be feldspar-porphyry and the hanging wall argillite, but some greenstone and dyke material also occur in the latter.

No. 3 Tunnel:-

This is at an elevation of 4733 feet, or about 417 feet vertically below No. 1 Tunnel. A tunnel has been run here in a direction N. 33 degrees E. for 595 feet to where it intersects the upper (hanging wall) vein and the dyke. The tunnel is then deflected about 18 degrees to the left, crosscutting the dyke, which is here 27 feet wide, and intersecting the lower (footwall) vein just below the dyke. The remaining 73 feet of the crosscut is in greenstone, which constitutes the footwall of the vein. The first 595 feet of crosscut is in argillite formation, the bedding planes of which strike S. 40 degrees W. and dip N.W. at 74 degrees.

Two drifts have been run from this crosscut. The first at 595 feet from the portal, follows the hanging wall of the dyke in a direction N. 66 degrees E. for 103 feet. A lens of silver-zinc-lead ore has been exposed from the intersection of the crosscut to the raise and for a short distance westerly. This lens is about 30 feet long and 2.5 feet wide. The section of drift beyond the raise for a distance of 70 feet follows a vein, but there is no ore showing and the present face is barren.

A raise has been extended from a point 24 feet from the crosscut, but the upper portion of this was inaccessible. The vein is well defined in this raise for 30 feet above the drift, over a width of 3.5 feet - the ore, however, seems to be disappearing beyond this point.

On the footwall, or the underside of the dyke, drifts have been extended east and west for distances of 55 and 50 feet respectively. These drifts follow the vein, which is well defined and shows some ore over the entire distance. The best ore, however, is shown at the two ends, the east and west section in between showing a narrow streak of zinc ore. A study of the assay plan will illustrate this point.

The two veins, viz;, the upper and the lower (hanging wall and footwall) are converging, and it seems probable that they will intersect a short distance east of the present face of the drift.

Shaft:-

At an elevation of 5300 feet a shaft was sunk on a fissure running east and west and dipping south at 64 degrees. It is reported that this shaft was sunk in ore but owing to the depth of snow this could not be checked by the writer. From the position of this shaft with reference to the No. 1 and No. 3 tunnels, it seems improbable that there is any relationship between the vein in this shaft and the tunnels, unless the former might be a branch vein running into the main one.

Ore Values and Tonnage Possibilities

The vein is exposed on two horizons, viz: the No. 1 and the No. 3 tunnels, separated from one another by a section 440 feet along the vein dip, which has not been explored. Until this section has been opened up it is not possible to calculat the average value or the amount of ore with any degree of certainty, consequently, for the present, this question has to be considered from the standpoint of possibilities.

The deposit being a fissure vein, well defined over a considerable area with good walls and having a regular strike and dip, the two sections of the vein exposed by the No. 1 and No. 3 tunnels are more likely to be representative of the whole deposit than would be possible in some other types of deposits. It is quite probable, therefore, that the values and widths in a general way shown by my sampling are fairly representative of what might be anticipated by a more detailed exploration of the vein. In spite of this I would suggest considerably more development before any large capital expenditure is undertaken for concentrator or other purposes. This is not only essential for the purpose of sampling and estimating the ore values, but from the point of view of the actual extraction of the ore, as it is quite apparent that no appreciable tonnage can be taken out until there are more underground openings to permit of attacking the ore at a number of different points. Bearing the above considerations in mind the following can be more readily appreciated.

No. 1 Tunnel:-

Nine samples, #1 to #9, were taken here over widths varying from 9 inches up to 48 inches. All of these except one (#3) show lead, zinc and silver, in varying amounts, the whole 140 feet averaging 9.3 oz. silver per ton, 3.0% lead, and 8.25% zinc, over a width of 2.13 feet. Included in this are two sections of higher grade ore in the east portion of the drift, aggregating 47 feet in length. These are represented by samples #5, #8 and #9, which average 32.7 oz. silver per ton, 9.6% lead, and 25.0% zinc, over a width of 12 inches. This is representative of the shipping ore in sight on this level.

No. 3 Tunnel:-

On the upper, or hangingwall vein, three samples #20, #21 and #22, taken to represent 30 feet along the strike and 16 feet on the dip, give an average width of 2.8 feet and assay 8.45 oz. silver per ton, 4.12% lead and 15.5% zinc.

On the footwall side, or lower vein, eleven samples, #9A to #19, taken over a length of 105 feet average 27.8 oz. silver per ton, 9.9% lead and 13.3% zinc, over a width of 1.52 feet. Included in this are two sections of higher grade material, namely,

the west and east ends of the drift. These are represented by samples #11, #12, #13, #18 and #19 and average 2.15 feet in width, 33.0 oz. silver per ton, 15.0% lead and 15.0% zinc, over an aggregate length of 50 feet.

The average of all samples taken on the two levels is 14.8 oz. silver per ton, 5.85% lead and 11.5% zinc. The average width of samples is just under 2 feet and is fairly representative of the mineral content. The vein itself is wider than this and will average around 4 feet, the balance of the material being mainly waste. In estimating the average value of the ore it will be necessary to take this barren material into account, as in stoping the ore out it will be difficult to avoid breaking all the material included between the two walls. The barren material will therefore cause a dilution of the mineral content.

With an average width of 4 feet assumed, the ore will average 7.4 oz. silver per ton, 2.92% lead and 5.74% zinc. The gross value of this ore at present metal prices - 1925 average prices were 69¢ per ounce for silver, 7.85¢ per pound for lead and 7.89¢ per pound for zinc - is about $20.00 per ton and the net smelter value about $10.00 per ton.

Assuming a width of 4 feet, a length of 140 feet and a depth of 440 feet, there is a possibility of 18,000 tons of ore indicated between the two levels.

Figuring the total cost of mining and milling this ore at $8.00 and the net value at $10.00, there should be a profit of $2.00 per ton, or $36,000 on the tonnage estimated. It is apparent therefore that even if this tonnage of ore were actually blocked out, the profit would be insufficient to justify any large capital expenditure on equipment at present.

Shipping Ore

The average of the two blocks of higher grade ore on the two levels is, in round figures, width 1.75 feet, silver 34.0 oz. per ton, lead 14.0% and zinc 17.0%. The average length being about 50 feet this would indicate about 4,000 tons of this class of ore between the two levels.

By careful hand sorting the grade of this ore can probably be improved 25% but the quantity available for shipment will be correspondingly reduced. Therefore, it may be possible to obtain 3,000 tons of shipping ore having the following assay: silver 42.5 oz. per ton, lead 17.5% and zinc 21.0%.

The Consolidated Mining and Smelting Company of Canada, operating the lead and zinc treatment plants at Tadanac will now concentrate as well as smelt custom ores, so that it will be a good policy, at any rate during the development period, to ship an ore such as this and pay the small amount required for extra

transportation and treatment, rather than let the ore remain in the mine until a mill is built. An approximate idea of the value of this class of ore shipped to Tadanac can be worked out in the following manner:-

1. Allow 85% recovery in milling for all metals,
2. Assume a ratio of concentration 4:1 for lead and 3:1 for zinc.
3. Assume all the silver remains with the lead concentrates.
4. Take the metal prices at 70¢ per oz. for silver, lead 9½¢ lb., zinc 8½¢ lb.

Recommendations

The writer is convinced that the showing on the property is sufficiently encouraging to justify a moderate expenditure for further exploration. The basic idea of this exploration should be to place the mine in such a condition that it may finally be operated in the most economical manner possible and become a profitable operation.

The work at the mine is now being conducted by hand and I suggest that this be continued throughout the winter and until such time as the road is completed. If it is possible to carry on in this way for, say the next six months, the east and west drifts on the No. 3 level will probably be extended an aggregate distance of about 400 feet during this period, and will add considerably to the possible ore now indicated, providing favorable results are met with. The great advantage of being able to carry on through the winter will be that when spring arrives you will be in a better position to consider the advisability of completing the road and to determine the nature of the equipment for more extended development. It is therefore extremely desirable to continue operations throughout the winter and I suggest that a special effort be made to do so. This portion of the exploration will involve an outlay of about $12,000.00.

If conditions appear favorable for further investment on the completion of the winter's work, I suggest the following sequence of operations:- (A) - complete the road for wagon haulage. This means building three miles of new road and widening of some portions of the road already completed. You have estimated that this work will cost about $20,000.00 which in my opinion is a conservative figure. This cost will most probably be borne by the British Columbia Government, particularly if the results of the winter's work are favorable. (B) - Instal a 12 x 10 -325 c.f.m. air compressor, to be driven by a 60 HP semi-diesel oil engine. Provide the necessary equipment along with this power plant, such as machine drills, steel, air-pipe, drill sharpener, etc. The total cost of this equipment works out at $12,500.00 to which will have to be added the cost of installation, powerhouse, camp, etc., which will probably cost an additional $15,000.00,

bringing the total expenditure for equipment to, say $30,000.00. (C) - With this equipment installed you will be in a position to carry out continuous development in an economical manner, and at the same time mine ore for shipment.

Appended is a plan of proposed development which appears desirable now, but which may be changed later depending on circumstances, the general idea being to develop a sufficient tonnage of ore to justify a mill of, say 50 tons per day capacity, and to render this ore available for extraction at the lowest possible cost. It is probable that about 3,000 feet of underground work will be required altogether, and with two machines on development and one machine breaking ore, with a two shift operation, the progress will be about 12 feet per day and about 4 tons of shipping ore should be produced.

The cost will be about $170.00 per day, which will be offset in whole or part by the ore receipts. Allowing four months for road completion and machinery installation, development operations should start some time in September 1926 and the program should be completed about May 1927. If a mill is then deemed necessary this will be the right time of year for its construction.

Summarizing, the costs will be as follows:-

Preliminary hand exploration Dec. 1925 to May 1926, 400' @ $30 - - - - - -	$12,000
Road construction May and June 1926 - - - - - - - - -	20,000
Camp construction and equipment Jul. & Aug. 1926 - - -	30,000
Development, September 1926 to May 1927 - - - - - -	46,000
	$108,000

less

Credit from B.C. Gov't for road construction - - - - - - -	$20,000	
Credit from 1100 tons of ore @ $43 per ton - - - - - - - -	47,000	
NET CAPITAL EXPENDITURE - - - - - - - - - - - -		$41,000

Adjoining Properties

Eureka:

This property adjoins the Mary E. Mine on the west and there seems to be some question of an over-lapping of claims between the two properties. The property has been explored by two large open cuts and a tunnel, over a vertical range of about 150 feet, and along a horizontal extent of about 300 feet. Particular attention has been devoted to a vein or stringer running in a north south direction and dipping towards the east, and a small bunch of ore has been opened up near the face of the lower tunnel. A feldspar-porphyry dyke has been cut near the same point, and while there is probably here the same dyke as occurs on the Mary E. workings, it does not appear to bear the same relationship to the vein at the Eureka as it does on the Mary E. property. A vein having the same characteristics as the Mary E. vein is showing in the top cut and again in the lower tunnel at a point 110 feet in from the portal. This vein strikes N. 70 degrees E. and dips S.E. at 68 degrees. It shows about six inches of zinc ore. Inasmuch as this occurs at an elevation of 4600 feet, its position is nearly on the line of strike of the Mary E. vein and it probably is the same vein. The Eureka tunnel is about 1400 feet west of the portal of the Mary E. No.3 tunnel. It has been driven mainly through argillites. The open cuts show conglomerates and greenstone rocks, and the vein occurs near the contact of these two rocks. The ground in between the Eureka and the Mary E. showings has not been prospected to any extent. The conditions on this property are promising, and if the first vein opened up in the tunnel proves to be the same as the Mary E. vein, this property justifies some exploration work.

Blue Bell Fraction:

The workings on this property are about 4000 feet west of the Mary E. tunnels. A vein about 24 inches wide is shown up for a length of 200 feet and over a vertical range of 100 feet by three opencuts and a tunnel. The vein strikes N. 80 degrees E. and dips S. at 72 degrees. All of the cuts and a portion of the tunnel show ore over a width of 24 inches in a vein cutting across the argillite formation. The physical appearance of the vein is good, but an assay of the best ore gave the following result:- Sample #B1, Silver 5.1 oz. per ton, lead 6.0% and zinc 8.0%. This is not as encouraging as the appearance of the ore would indicate; however, the showing looks good and the property undoubtedly merits further attention. There is a fair possibility that the vein shown is the same as that on the Mary E. and Eureka properties. With a mill established on the Mary E. ground it will be quite possible to mill the ore from this and the Eureka properties at one plant.

I suggest that options be taken on these two properties if they can be secured at reasonable figures.

Conclusions

The present showings on the Mary E. mine are sufficiently encouraging to warrant further exploration, and I have no hesitation in recommending the expenditure of at least $12,000.00 for this purpose, with a further outlay if the preliminary work meets with satisfactory results.

Respectfully submitted,

"W. G. Norrie"

Mining Engineer.

Vancouver, B. .,
December 1925.

Copy of Report on the Mary E Property by Norman C. Stinnes, July 11, 1929

DUTCHER, STINNES & CO.,
Metropolitan Bldg.,
Vancouver, B.C.
Canada.

July 11, 1929.

Mr. H. C. Stephenson,
Silver King Mining Co. Ltd.,
519 Rogers Building,
Vancouver, B.C.

Dear Sir:

Pursuant to your instructions I visited and examined the properties of the Silver King Mining Company, Limited, and herewith submit my report based on the results of that examination. In order to enable you to see in a moment the main conclusions in my report I summarize them herewith.

I found your property as fully equipped as a going mine of its size requires and sufficient exploration and development work completed to enable you to commence stoping ore as soon as currently required supplies and a crew of men are on the ground. In this respect the mine is unique as you have already for use what would cost now, to install and do, something over $175,000.

The development work along the vein bearing zones has been sufficient to expose several ore shoots on both sides of a feldspar-porphyry dyke which seems to control the location of the ore shoots. This dyke strikes about N. 70 degrees E. and dips about 65 degrees S.E.

The ore, a solid sulphide from 4 to 14 inches wide, is composed of an intergrowth of galena, sphalerite and argentite. On the upper (No. 1) and middle (No. 3) levels it forms in continuous shoots of varying length. The most valuable one of these is developed on the footwall side of the dyke on the middle level and is continuous for 160 feet. Others of 30 and 40 feet are also exposed on both this and the upper level.

The lowest level is about 400 feet below the intermediate level and 800 feet below the upper level. Up to the present time development work on the lowest level has not opened any long continuous shoot.

Considering only that block of ground between the middle and upper levels and that 160 feet of exposed ore west of the crosscut on the middle level there are "reasonably assured"

12,500 tons of ore which will average about 63 oz. silver per ton, 38% lead and 20% zinc. Stopes can be opened on this ore immediately.

In addition to this "reasonably assured" ore there are about 10,000 tons of "probable ore". This is in those short shoots exposed in the upper and lower levels and in the long shoot below the middle level and above the lower level.

All the ore occurs in such a way that it can be mined clean. This will require careful work and is expensive, but will give a high-grade product, the greater part of which can be shipped direct and the balance milled.

The mine is fully equipped for the extraction of ore and needs only a small expenditure to allow 20 tons of high grade and concentrate to be produced with the coarse high grade it is necessary to erect on the property the mill now stored at Tulameen. To do these things your Mr. Wm. Dornberg has estimated that $30,000 are required. This would seem to be ample.

With the mine and mill operating there should be produced annually about 5,000 tons of this high grade material. Thus there are reasonably assured 2½ years operation and a probable 2 years beyond that.

Ore of the average grade given above should have a settlement basis at Trail of $70 per ton. The mining, milling, haulage, freight and treatment costs will aggregate $45 per ton, leaving a profit of $25 per ton. On a yearly basis of production of 5,000 tons this means a net annual revenue of about $125,000.

Considering all factors, I consider that you are fully justified in re-opening this property, erecting the mill thereon and initiating production, and with the proper attention and management, your shareholders should receive returns commensurate with the risk involved.

Yours very truly,

"Norman C. Stinnes."

Assay Certificates

#10913/925

J. R. WILLIAMS, Provincial Assayer & Chemist

I hereby certify that the following are the results of assays made by me upon samples of ores herein described and received from N. C. Stinnes, Esq., M.E., Vancouver, B.C., July 3rd, 1929.

Marked #	Silver oz.	Lead %	Zinc %	Copper %	Gold Oz.
1.	14.0	3.3	29.1		
2.	95.0	42.1	13.0		
3.	82.0	37.5	25.2		
4.	73.6	36.0	15.2		
5.	50.0	27.1	22.2		
6.	88.4	48.1	17.7		
7.	64.2	36.5	23.1		
8.	29.1	20.2	29.3		
9.	70.2	47.1	14.5		
10.	64.0	48.4	22.0		
11.	46.4	26.7	16.1		
12.	26.8	13.3	41.5		
13.	62.2	32.3	28.0		
	13)765.9	13)418.6	13)296.9		
Avge.	58.9	32.2	22.7		

Note: As widths of the samples are not available the average shown is an arithmetic average only.

10743/44 Samples assayed by J. R. WILLIAMS, and submitted by N. C. Stinnes on June 10, 1929 - galena ore sample.

A.		256.0	74.5	-	-	0.01
	$	$133.12	$104.30	-	-	$9.20 (?)
B.		68.0	48.4	-	1.64	Trace
	$	$35.36	$67.76	-	$5.90	-

Gold calculated @ $20.00 per ounce, silver @ 52¢ per ounce, copper @ 18¢ per pound, lead @ 7¢ per pound, and zinc @ 6.5¢ per pound.

"J. R. Williams"

Provincial Assayer.

Copy of Report by J. M. Turnbull, M.E., on the Mary E Property, September 1929.

JOHN M. TURNBULL,
Mining Engineer
736 Granville Street,
Vancouver, B.C.

Sept. 29th, 1929.

Wm. Dornberg, Esq.,
470 Granville Street,
Vancouver, B.C.

Dear Sir:

Re: SILVER KING MINE - TULAMEEN

My visit to the above property on September 26th and 29th was too short to allow of sampling or of accurate measurements, but your conditions are unusually distinct and well defined, combined with sufficient development, to permit the drawing of general conclusions with a large degree of certainty.

In general, development has opened up a very straight and strong true fissure vein, whose width is from 15 to 25 feet, striking about northeasterly and dipping about 60 degrees to the southeast. This vein cuts cleanly across a series of sedimentary bedded rocks, consisting of blocky arkose rocks alternating with slaty beds. Most of the vein occurs on both sides of this dyke, forming what practically amounts to two parallel veins, 15 to 25 feet apart. The chief development is on the footwall side of the dyke, which appears to carry the larger part of the ore. An examination of the occurrence indicates that commercial ore occurs where the fissure crosses the blocky arkose beds principally, though smaller amounts of ore also occur in the slates.

The principal development is on the No. 2 tunnel level (middle level), where the footwall vein has been drifted on for about 800 feet, parts of the drift having been drifted off the vein. 380 feet of this distance is through one large arkose bed and for 300 feet of this distance ore is practically continuous, though pinching and swelling occurs. The remaining 80 feet is almost certainly ore-bearing, but is not exposed in full, due to the old drift being off the vein in this section. The remaining 420 feet in length is largely in slates, and may not be of any commercial value, though it shows one or two short stretches of ore. A raise of 150 feet from this level shows ore to continue upwards and there is little doubt but that the ore continues up to the surface, within the limits of the arkose bed, a maximum distance of about 600 feet or more. This is confirmed by the short drift on the No. 1 tunnel level, 400 feet vertically above No. 2 level, which, while short, exposes similar ore and conditions. No. 3 tunnel, about 400 feet below No. 2 level, shows similar conditions

(though not fully drifted on yet, except that the ore here is zincy and possibly not of commercial value.

Allowing 200 feet below No. 2 level, we have a length of 380 feet and a depth of about 800 feet on the vein, which, while not fully blocked out, has an unusual degree of geological certainty as being ore bearing. This gives an area of about 300,000 square feet of stoping ground on the vein. From this about one-third should be deducted for pillars, due to the pinching and swelling character of the vein, leaving about 200,000 square feet of stope as reasonably assured.

In character the vein consists of a well defined paystreak of heavy sulphides, chiefly galena and zinc blende, with a little grey copper, with low-grade disseminated ore alongside of it. The paystreak pinches and swells. Mr. Stinnes' report gives it an average width of 9 inches, which seems to correspond to its appearance. I had not the time to measure this but think that, over the 200,000 square feet mentioned above, an average of 6 inches would be fairly conservative, which, at 7 cubic feet per ton, would give a tonnage of some 14,000 tons. This should yield, if concentrated, from 5,000 to 6,000 tons of good grade lead concentrates, the silver content of which should exceed 2 ounces for each per cent, or unit of lead. The low-grade disseminated ore varies from 1 to 3 feet wide, but would probably add little to the net profits, though, as it has to be broken in any case, it might easily pay to mill and may be considered as a possibility to be decided later on.

In addition to the above there are other possibilities, which consist of possible production from the hanging-wall part of the vein, and the possibility of finding other ore-bearing sections of the vein by extending your drifts. The former is probable, but may involve too much development cost. The latter is favorable and may be assisted by a geological study to see if other large arkose beds occur along the line of the vein; if they do they would probably be productive. The possibilities in depth are excellent in regard to tonnage, but doubtful in regard to values, that is they may prove to be too zincy. While hopeful, these possibilities may be left for the future, as little new development is required to work out your present ore areas.

The method of mining is important. I think you will have to work out the best stoping scheme by trial. The paystreak is friable and cannot readily be stripped. Whether to sort out coarse waste underground and use it for stope filling, breaking on plates, or whether it will be better to do all the sorting on the surface remains to be seen. In any case the broken material should be easy to sort, and as large an amount of sorting as possible should be done so as to keep the grade of mill feed as high as possible. The character of the ground and the dip of the vein lend themselves to easy breaking and handling, so that this

operation should not involve any unusual expense or difficulty in itself, apart from the sorting problem, and should be cheap.

In regard to treatment, a complete milling operation, including flotation, or all flotation, would give you the highest returns, if the first cost is not prohibitive for you. Your simple jigging operation would be cheap to install but would involve losses of 40% or more probably, with a low grade product, which would also suffer further losses in re-treatment at Trail. In any case, if fine grinding plant cannot be installed, I think that tables below the jigs would be advisable and there will also be enough slimes, even without fine-crushing, to justify the installation of a small flotation unit, as these slimes, if stored on a dump, would oxidize and make subsequent recovery very difficult or impossible; that is they would constitute a total loss. Your ore is so coarse and clearly separated in the mine that it does not seem likely that extremely fine crushing would be required for a good separation, so that you should get very good capacity from fine crusher mill if installed. Tests would of course be advisable prior to actual installation of a plant.

For immediate development it would be advisable to drive a tunnel from a point about 200 feet vertically below No. 2, starting in the gulch and driving parallel to the gulch line, which should strike the vein in something over 200 feet. Then 400 feet of drifting on the vein and 50 feet of raising to connect the raise from No. 2 to the new level would be required. This raise connection may actually require about 80 or 90 feet and needs to be figured out by measurement. It would be 230 feet on the vein from No. 2 to the new level, if driven 200 feet higher.

In general the financial aspect is about as follows. This includes stoping out the above block of ground, milling and necessary development for stoping purposes only:-

Stoping 65,000 tons @ $3.00 per ton	$195.000
Allow for plant, construction, etc.	50,000
2,000 feet of development @ $12.50	25,000
	$270,000

Net return at mine on concentrating ore on a concentrate running 60% lead and 125 oz. silver per ton @ $80 per ton would mean that concentrates needed to pay expenses, say 3,500 tons.

That is you have a margin of safety of 1,500 tons, on my estimate of 5,000 tons. I believe that the probability of exceeding 5,000 tons is greater than that of getting less, so that, while risk of loss is not entirely absent, it is not very great, with a fair chance to get up to 7,000 tons or more.

You have therefore an excellent mining venture apart from future possibilities. These figures are of course rough, but I think represent the situation reasonably closely.

Yours very truly,

"J. M. Turnbull"

Notes Added to Above Report by J. M. Turnbull, M.E., Sept. 20th, 1948

The Silver King (the Mary E) Tulameen mine is located near the head of the Tulameen River, some 27 miles from the nearest railway point. In 1929 there was a fair road and a car could be driven into the mine. The vein dips with the steep hillside, so that No. 2 level cut the vein in about 400 feet of crosscutting from the surface, at a depth of 600 feet or so on the vein. No. 3 level crosscuts about 1000 feet to cut the vein at about 900 to 1,000 feet depth. No lower tunnel site is available. If I remember correctly there was only 150 feet or so of drifting on the vein on No. 3 level and the ore was too zincy for 1929 conditions there.

In September 1929 Mr. Dornberg's company, Tulameen Silver King, had the property and a lot of old milling machinery, mostly jigs and tables. His objective was to try and set up this old plant, since he was short of cash, and make some cash out of high grade concentrates to carry on with, even if not a very efficient operation. There was no prospect in those days, in that location, of saving any zinc at a profit. The above letter was my answer to Mr. Dornberg's many questions and was of course based on conditions at that date. Under present (1948) conditions and metal prices, the gross value of the ore is much greater, including zinc, and the efficiency of modern milling makes higher recoveries and lower grade feed probable, revising the tonnage estimates upward, against which modern costs must be considered. It looks like a good bet.

"J. M. Turnbull" M.E., P.Eng.

REPORT

SILVER HILL MINES INCORPORATED

TULAMEEN, B. C.

This report covers the results of the writer's examination of the Silver Hill Mines on November 11th and 12th, 1949. All available reports and old records have been carefully studied. A composite map, compiled from information considered reliable, accompanies this report.

SUMMARY AND CONCLUSIONS

The Silver Hill Mines Incorporated holdings, consisting of a consolidation of the Jensen and Dornberg groups and also recently staked ground, are located 21 miles by road due west of Tulameen, a Station on the C.P.R., 167 miles east of Vancouver.

Rich silver-lead-zinc ore was discovered on the Dornberg property in 1895. Development work was carried on intermittently until 1934, when due to low metal prices and the subsequent death of Mr. Dornberg work was discontinued. During 1949 the properties were acquired and consolidated by Mr. E. Borup, the President of Silver Hill Mines Incorporated.

The general geology of the deposit is considered excellent and is relatively simple. Mineralized veins occur on the footwall and hanging wall of a 20' wide porphyry dyke. This dyke which dips at an angle of 65o to the south cuts nearly at ninety degrees across the slatey and tuffaceaous sidements.

The following tabulation shows the ore shoots which are developed on the property.

Location	Length Ft.	Width Ft.	Ag Oz/T.	Pb %/T.	Zn %/T.	Cd %/T.	Gross Value /T.
No. 1 Level	140'	2.13	9.3	3.0	8.2		$ 31.64
No. 2 Level	380'	0.75	63.0	38.0	20.0		169.20
No. 3 Level	70'	1.50	6.14	1.2	23.68	.21	63.79
Jensen Tunnel	85'	0.8'	29.25	18.2	15.40		101.52

The above ore shoots, when expanded to a mining width of 2.5 feet, have an average gross value of $36.10 per ton. Silver has been calculated at 80¢ per oz., lead at 13¢ per lb., zinc at 10¢ per lb, cadmium at $2.00 per lb.

RECOMMENDATIONS

An extensive development programme to block out the ore reserves indicated by the above shoots, is strongly recommended.

A maximum capital expenditure of $250,000 will be required for the development as outlined in this report and also for the construction of a selective flotation mill if justified by the results of development work.

In event shipping operations are considered advisable the capital outlay will be considerably reduced.

LOCATION

The Silver Hill Mine is located at an elevation of about 4000 feet on the southern slope of Treasure Mountain, 10 miles due east of the town of Hope. Amberty and Sutter Creek, tributaries of the Tulameen River, drain the area.

CLAIMS

The company has options on the Dornberg and Jensen groups which consist of the following 12 mineral claims.

Lakeview	Mc-Cg		
Why not	#2FR-MC-CG	Why not N°3	MC-CG
Jim	MC	Why not N°3 FR	MC/CG
Allen	MC	Tamarack N°2	MC-CG
Mary E	MC	Tamarack	MC-CG
Gobe	MC	Eureka FR	MC-CG
		Eureka	

Four claims the Silver King No. 1, #2, #2 FR and #1 FR have been recently staked and are held by right of location.

A belt of ground 1-1/2 miles long by 3/4 of a mile or a total area of about 480 acres is covered by the above claims.

HISTORY

The initial discovery was made in 1895 but due to the inaccessible location development work was not started until 1923. The 21 mile road from Tulameen to the property was completed in 1926. A very poorly designed mill consisting of rolls, a jig and tables was built in 1930. Due to the low recovery and metal prices work was discontinued in 1934. After acquiring the property the Silver Hill Mines have partly rehabilated the road in preparation for an extensive development programme to start as soon as weather permits in the spring of 1950.

TRANSPORTATION

The property is situated 21 miles by fair motor road west

of Tulameen, a small settlement on the C.P.R., 167 miles east of Vancouver. The recently constructed Hope-Princeton Highway makes it possible to reach Tulameen by motor car in six hours.

Branch roads, which need only minor repairs, extend from the main road on the property to all the levels of the Dornberg and Jensen properties.

GEOLOGY

The Silver Hill Mine is situated in sedimentary rock, a distance of one mile from the eastern contact of the Coast Range betholith. This contact extends in a north westerly direction and most of the important mines in British Columbia occur within a few miles of the sedimentary-granitic contact.

The sedimentary rocks underlaying the Silver Hill Mines consist mainly of slates, argillites, tuffs and arkose rocks. They strike N 20° west and dip 70° to the east. The sediments have been intruded by a strong porphyry dyke. Mineralizing solutions from a quartz diorite stock on the eastern portion of the property have intruded along both walls of the porphyry forming mineralized veins on both the foot and hanging wall of the dyke. The dyke and the veins strip N 70° and at 65° to the south.

The ore occurring in a fissure vein as described above has remarkable persistence in length, depth and width. The best ore sections are found in beds of Arkose rocks up to 380' in length. These Arkose rocks are intercalated with the slates and four known favorable beds are located on the property.

ORE OCCURRENCES

(1) Mary E mineral claim (Dornberg)

(a) No. level (elev. 5150') - 40' of cross cutting and 140 feet of drifting have exposed, an ore shoot 140 feet long which averages 2.13' wide, 9.3 oz. Ag per ton, 3.0% Pb and 26% Zn. 30 tons of sorted ore from this ore shoot averaged 96 oz. Silver, 30% lead and 26% zinc.

This information was obtained from a report by W. Morie and government engineers reports. Tunnel mouth was caved at the time of the writer's examination.

(b) No. 2 Level (elev. 4733'). This level, located 417 vertically below #1 level encountered the vein after crosscutting for 580 feet. On the footwall vein 380 feet of ore have been developed which averaged as follows: width 0.75, Ag 63 oz., Pb 38.0% and Zn 20.0%.

120 tons of sorted ore averaged 110 oz. Ag, 40% Pb and 40% Zn.

A 30' length of ore has been exposed on the hanging wall of side of the dyke. This shoot averages 8.45 oz. Ag, 41% Pb and 15.5% Zn.

This level was also caved and the back of a stope was inaccessible. The above assays have been taken from reports by Norrie, Stines, Turnbull and the B. C. Government resident engineers and are considered reliable.

(c) No. 3 Level (elev. 4330'). A 1200 foot cross-cut encountered veins on both the hanging wall and footwall of the porphyry dyke.

A length of 85' of ore has been exposed on the footwall of the dyke which averaged 1.5' wide, 6.14 oz. Ag, 1.19% Pb, 23.68% Zn and .21% Cd. The cadmium in this ore shoot has a gross value of $8.40 p.t., sufficient to pay a good portion of the expense of mining and milling this ore shoot.

(2) Eureka M.C. (Jensen Group)

100' of cross-cutting has exposed two veins. The first vein encountered occurs some 30 feet from the porphyry dyke and is considerably lower in grade than the vein on the hanging wall side of the dyke. This porphyry dyke is apparently a continuation of the dyke on the Mary E. M.C.

An 85 foot ore shoot on the second vein encountered averages 0.8' wide, 29.25 oz. Ag, 18.2% Pb and 15.4% Zn. One sample in the floor of the tunnel assayed over a width of 0.6 feet, 68.4 oz. Ag, 48.3% Pb and 13.4% Zn.

ORE RESERVE

65,000 tons of ore averaging 13.26 oz. Ag, 6.9% Pb and 6.4% Zn has been indicated by lateral development work on the main vein on the Mary E. M.C. between the surface and 150 feet below the No. 2 level.

The gross value of the ore reserves is estimated at $2,746,000.

Additional ore has been indicated above and below the #3 level and the Mary E. M.C. and also above and below the Jensen tunnel on the Eureka M.C.

PAST PRODUCTION

Trail smelter statements show that 92 dry tons of ore were shipped from the Eureka and Dornberg properties which averaged

silver 75 oz., lead 40.8% and zinc 16.6%.

263 tons of concentrates were also received by Trail from the Dornberg Mill from 1930 to 1934. The concentrates assayed silver 113.4 oz., lead 55.9% and zinc 8.7%.

Total tonnage mined is reported to be 1607 tons, thus the grade of ore mined using a ratio of concentrates of 6.1 to 1 was silver 18.5 oz., lead 9.2%. The zinc value cannot be calculated as no attempt was made to save zinc on the mill. Value of the 1607 tons mined at present metal prices is calculated at $38.72 without calculating any value for the zinc. With a modern mill zinc values as well as cadmium would be saved by selective flotation. Value of concentrates and ore received by Trail from the 1607 tons mined amounted to $85,000.

The following is a list of the actual shipments as reported by Consolidated Mining and Smelting Company at Trail, B. C.

ORE	Tons	Ag	Pb	Zn
	31	51.3	30.2	21.2
	29	49.4	27.6	22.6
	29	117.1	56.2	11.0
	3	155.6	48.8	11.5
Average -	92	75 oz.	40.8	16.6
		74.6	38.2	18.0
CONC.	Tons	Ag	Pb	Zn
	79	93.1	53.9	6.4
	27	97.4	53.3	7.5
	15	139.3	61.6	8.2
	22	114.8	57.2	8.2
	44	109.6	52.4	10.9
	33	120.9	57.0	10.3
	43	119.3	56.0	9.3
Average -	263	113.4	55.9	8.7
		108.5	55.0	8.5

CLIMATE

The climate at the mine is moderate. Precipitation averages 160" per year. Weather conditions permit a year round operation.

TIMBER

A plentiful supply of timber for all mining and camp purposes is available within 3 mines of the company's holding. A sawmill at Tulameen can supply all construction lumber for the mill and accessory buildings.

WATER

An ample supply of water for mill, mining and domestic purposes occurs adjacent to #2 level tunnel mouth.

POWER

Power will be supplied by Diesel; fuel oil will be hauled from the rail at Tulameen, a distance of 21 miles. Water power is available for development at a later date on Amberty Creek about 2-1/2 miles east of the mine near the Tulameen-Silver Hill road.

RECOMMENDATIONS

Stage 1 - Total cost $100,000

(a) Improve 21 miles road to Tulameen,

(b) Repairs to existing buildings to provide facilities for a crew of 15 men,

(c) Purchase of about 500 cu. ft. Diesel-driven compressor and accessory equipment,

(d) Clean out #1 and #2 levels,

(e) Continue #2 raise from #2 level to #1 level and establish sub-levels,

(f) Continue #1 level to connect with #2 raise and continue drift to develop ore on this level.

(g) Continue Jensen and #3 levels.

Stage 11 - Total cost $150,000.

(a) Prepare mine for production,

(b) Construct selective flotation mill with provision in the design for additional of sink and float section.

CONCLUSIONS

The reward available from the ore indicated by lateral exploration work is sufficient to justify an extensive development programme to:-

(1) Block out by raising the ore developed on the No. 1 and No. 2 levels.

(2) Develop additional ore reserves above and below both the No. 3 level on the main vein and the Jensen tunnel.

(3) The results from the above work will determine the economical size and type of mill required.

(Sgd.) H. L. Hill

November 30th, 1949.

PRELIMINARY REPORT ON THE SILVER HILL MINE

TULAMEEN

SUMMARY

A short and preliminary examination of the Silver Hill Mine was made from April 19th to 22nd. The old workings are largely caved. The only available report of the early operation which contains any significant data, was made in 1925, four or five years prior to the closing of the mine. Nevertheless, the values as shown in this 1925 report, together with present sampling of available workings and the character of the vein as may be seen there, indicate this to be a prospect with good mine-making potentialities with present metal prices.

A program of work is suggested. A sum of money of not less than $100,000.00 should be provided as early as possible so that the work may proceed while the prices of base metals are still high.

INTRODUCTION

A number of reports have been made on the Silver Hill property. It is not necessary, therefore, to consider here in detail such matters as water supply, timber, climate and other factors usually dealt with in reports of this nature.

Four days were taken in the examination, three of which were in travel. This was not anticipated and as it was not possible to extend the time away from Vancouver, the examination was made in less time than desirable for so important an assignment. The slowness of the journey from Tulameen to the mine was caused by break-up conditions. It should be possible to make the trip in two hours when the road has dried.

REPORTS

There are several reports on the property. The recent ones are based mostly on those written earlier. One early report on which the later ones are largely based has led to misconceptions by its over-simplification and general assumptions, particularly in regard to the geology of the mine. These have, therefore, been perpetuated. The plans and sections that are available are not based on surveys and are diagrammatic only. They serve, however, to show the general location of veins and workings. Morrie's report of 1925 is factual but much work was done in the following years. Unfortunately, the maps that accompanied his report are lost. The 1929 reports are as noted above, and apparently were made as general statements only.

TRANSPORTATION

The mine is about 21 miles from Tulameen. The route lies on the north side of the Tulameen River, has a gentle grade, can be made into a good road and should be easily maintained. The mine lies only 12 miles from Aurum Station on the Kettle Valley line. It is also only 15 or 16 miles from the Hope Princeton Highway. These routes should be investigated if the mine becomes a producer.

RECENT WORK

The work done during the present operation has been largely confined to preparation for underground operation. The bulk of the work has been done on the road and in the repair and equipping of the old camps. This work has suffered under the handicap of insufficient funds available in a lump sum. This has resulted in more costly work than if the money had been available at one time. Also, in order to assist in the financing, the mine was kept open all winter with very little accomplishment mine-wise. This meant that the road had to be kept open continually with all the attendant expense to such maintenance.

GEOLOGY

The geology of the property and the veins has been described in the reports and in the prospectus, and it will be unnecessary to repeat much of it here. However, the descriptions are of value in a general way only, as there is no record of a detailed mapping of the property.

This would be particularly valuable on this property, as old reports suggest that ore shoots have a geological control occurring where the vein crosses arkose bands. Our own examination suggested that this may be an over-simplification. The geology of the property should therefore be mapped at an early date.

WORKINGS

No. 1 tunnel is inaccessible. Most of the drifts and the raise on the vein in Nos. 2 and 3 tunnels have caved. However, enough of the workings are still open to give an idea of the character of the vein and its general structure. The Jensen tunnel and drift is open. In view of the fact that all present plans and sections are diagrammatic rather than exact, a complete survey of all workings should shortly be made.

ORE OCCURRENCES

No. 1 Level - Norrie reports 140 feet of ore averaging 9.3

ounces silver per ton, 3.0% lead and 8.25% zinc, over a width of 2.13 feet in No. 1 tunnel. This tunnel is not far below the surface.

No. 2 Level - Norrie reports 105 feet averaging 27.8 oz. silver per ton, 9.9% lead and 13.3% zinc over a width of 1.52 feet. He also reports a 30-foot length of ore on the hanging wall with an average width of 2.8 feet assaying 8.45 oz. silver per ton, 4.12% lead and 15.5% zinc. These statements are definite and may be considered authentic.

Turnbull reports 300 feet of continuous ore on No. 2 level with a possible extra 80 feet. He gives no values. Stinnes, on the other hand, reports continuous ore for only 160 feet with other shorter ore shoots. He states that there are "reasonably assured" 12,500 tons of ore that will average 63 oz. of silver per ton, 38% lead and 20% zinc. However, there are no plans available to show what sampling he did to arrive at these figures.

There is no present means of checking tonnage estimates i in earlier reports. In view of the lack of a raise between levels, even then, ore estimates should come from work that should be advanced now rather than counting on earlier estimates.

Our own examination of No. 2 level showed the vein was a strong structure. We were able, at some personal hazard, to get into one of the old stopes where a part of the vein remained unmined. A 38-inch sample of this gave 8.25 oz. silver, 4.3% lead and 13.8% zinc. A 36-inch sample from an unmined pillar in the main drift gave 8.05 oz. silver, 2.3% lead and 3.8% zinc.

No. 3 Level - Hill sampled an 85-foot section in the east part of the drift which averaged 1.5 feet wide, 6.14 oz. silver, 1.19% lead, 23.68% zinc and 0.21% cadmium.

Our examination of No. 3 level found the vein strong but more irregular in character than in No. 2. The tunnel had apparently crosscut it in a disturbed section. The vein in the section of the drift east of the crosscut had an argillite footwall whereas the footwall in the west side of the crosscut was somewhat offset and had a different footwall rock, possibly an arkose.

A series of irregularly spaced character samples of the vein were taken and are shown in samples 13413-13418. These were from a section which was open at the west end of the drift but the vein pinches out 45 feet eastward. This sampling suggests the whole vein may make ore rather than the narrow high grade section on the hanging wall. This could put a totally different aspect on the property, as it indicates that there is a good possibility of the property being a rather large tonnage operation rather than solely a small tonnage, high grade one.

Jensen Tunnel

A vein similar to the main vein has been opened in the Jensen tunnel. So far, a short shoot has been found on this vein, as described by Hill. This vein appears to be a parallel one to the main vein. During the winter a stope was opened and about 25 tons of high grade galena ore was hauled to Tulameen. Our sampling of this stope gave an average of 20.8 oz. of silver, 12.33% lead and 15.8% zinc over 10 inches for a length of 25 feet.

NATURE OF THE VEIN

The vein varies in character a good deal from place to place. The footwall is commonly characterized by 2 or 3 inches of gouge together with 1 to 3 feet of highly altered clay-like rock above that. The greater part of the vein consists of silicified rock carrying a manganese mineral in considerable amounts, together with some pyrite and minor amounts of zinc. The ore minerals are commonly concentrated on the hanging wall of the vein in single narrow veins or in stringers. The whole vein is, therefore, much wider than the ore-bearing part. The walls of the vein are generally clear and well defined. The entire vein may have to be mined rather than just the ore section, because the silicified part may be of milling grade. Whether the whole vein makes ore or not can be determined when more of it is available for study.

MINE MAKING POSSIBILITIES

A good feature of the vein is that it occurs in a strong, well-defined structure. This suggests that it could be both long and deep. The old reports suggest that the ore shoots in the vein tend to pinch and swell in short distances, indicating a lensey character for the narrow, high grade shoots. Norrie reports lengths up to 140 feet in individual shoots. The shoots are found on both sides of the dyke and it is likely that they will be frequent enough to make a small mine, at least. There is also a possibility that several parallel veins may make ore. Small parallel veins were found by the crosscuts of the Jensen tunnel and the No. 3 tunnel. Also it is quite possible the Jensen vein is a separate vein rather than an extension of the main zone. All this suggests that the deposit is one with mine-making possibilities.

DEVELOPMENT

In view of the fact that crosscuts are already in to the vein, development should be rapid and cheap. All the old workings should be cleared out and rehabilitated. Further drifting should be carried out on Nos. 2 and 3 levels to be followed by one or more raises. If such work confirms the statements in the old reports, production could then be quickly attained.

MANAGEMENT

Management to date has been in the hands of Mr. Ed. Borup, who has handled the general management, and particularly the business end. The mining work has been under the supervision of Mr. Ed. Kinder. Kinder is a practical man of middle age who has spent his entire life in mining and in development of prospects.

Considering the weakness inherent in the type of financing that appeared necessary, the money spent to date appears generally to have been well spent. However, finances seem to have been available only in dribs and drabs, with all the attendant costly features. Only a few men could be employed at a time and, in order to keep up interest, the operation apparently had to be continuous. This resulted in the necessity of keeping the mine open all winter, with very little actually being accomplished except the unproductive and costly business of keeping the road open in a deep snow area and of hauling in supplies. This work must have required the same overhead for a small crew as would have taken care of one much larger.

Kinder is a first-class foreman and his relationships with, and handling of men are good, as well as his practical ability. However, the next stages of development should be in charge of a capable and experienced mining engineer, to whom Kinder would be invaluable.

In addition, if a reliable consultant could be employed at a moderage figure, he could provide good advice and a link with the directors.

RECOMMENDATIONS

The sum of not less than $100,000 should be provided to open up the mine, to explore the property and to prove up ore, if such is to be found. I am not itemizing costs of each individual development as these will depend on current results. Work may start immediately the funds are available. It should include, in order of importance, (1) a survey of the workings, (2) geological mapping, (3) cleaning out all old workings in Nos. 2 and 3, (4) sampling, (5) drifting out these levels and (6) the necessary raising after more drifting has been done. I believe this work could be done from the present camp site. If sufficient ore is found thus to justify a mill, an enlarged program, including re-location of camp, should be undertaken.

(Sgd.) Christopher Riley,

C. Riley, Mining Geologist
April 25, 1951.

SAMPLING RESULTS

No.	Place	Width Inches	Au Oz.	Ag Oz.	Pb %	Zn %
	Jensen Tunnel (high grade stope)					
13405	E. end of stope	10	Tr.	6.95	6.00	8.7
13406	38" up 70° wall	9	Tr.	9.75	7.80	18.0
13407	" " " "	9	Tr.	12.55	9.80	33.0
13408	5.4' west of 13407	10	.02	42.55	32.50	16.0
13409	7.6' " " 13408	10	.02	40.00	11.20	10.3
13410	4.5' " " 13409	11	Tr.	8.70	6.80	8.7
	No. 2 Level					
13411	Sample from old stope west side drift	38	Tr.	8.25	4.3	13.8
13412	Sample from pillar in main drift	36	.01	8.05	2.3	3.8
	No. 3 Level					
13413	West end drift H.W.	14	Tr.	1.85	0.7	27.0
13414	Continues 13413 in silicified part of vein	23	Tr.	0.55	0.15	4.4
13415	Continues 13414 to foot wall	10	Tr.	8.15	1.0	38.0
		47	Tr	2.55	.49	18.3
13416	18' E. of 13414-16 carries 3 stringers of zinc	61	Tr.	7.9	1.0	10.5
13417	12' E. of 13416 mostly silicified, a few zinc stringers 8" gouge	58	Tr.	0.65	0.2	5.5
13418	10' E. of 13417, some galena, considerable zinc	15	Tr.	2.9	1.5	8.7
13419	50' E. of crosscut in E. drift	36	Tr.	1.6	0.15	12.3