HISTORY OF THE GOLD BELT MINE, SHEEP CREEK, BRITISH COLUMBIA

An Essay Submitted in Partial Fulfilment of the Requirements of the Course in Applied Science, Third Year, at the University of British Columbia.

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Gentlemen:

In compliance with the requirements set down in the University calendar 1948-1949, I am submitting a report entitled "History of the Gold Belt Mine, Sheep Creek, British Columbia".

The information was obtained during my employment by the British Columbia Department of Mines as a field assistant to Dr. W.H. Mathews, who did geological work in the Sheep Creek Area during the summer of 1948.

Yours truly,

J.A. Gower

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HISTORY OF THE GOLD BELT MINE,

SHEEP CREEK,

BRITISH COLUMBIA

Introduction

This report outlines the complete history of the Gold Belt Mine. The main sources of material were the records of the Gold Belt Mining Company, Limited, Sheep Creek, use of which was granted by the mine superintendent, F.W. Reger. Data was also obtained from various geological reports on the Sheep Creek Camp, and the annual reports of the Minister of Mines, Province of British Columbia, from 1905 to 1911 and from 1931 to date. Some geological work was done in the summer of 1948 by Dr. W.H. Mathews of the British Columbia Department of Mines, assisted by the writer. The nature of the work was to check existing data and complete geological surface and underground mapping.

Location and Access

Seventeen claims, thirteen of which are crown-granted, comprise the property owned or controlled by the Gold Belt Mining Company,

Limited. They lie on the south slope of Reno (Dominion) mountain on the north bank of Sheep Creek. Salmo, the nearest shipping point, is 12 miles by gravel road from the mine. From Salmo there is rail connection to Trail, 30 miles distant.

Geology

strike & dip
Degree of folding
Lithologic character

The ore bodies lie within the western anticline of the Sheep Creek structure, a complex highly-folded series of sediments (Figure 1) of Cambrian Age.[1] The most favourable host-rock is the Nugget Quartzite and at the north end of the property the overlying Reno Argillaceous-Quartzite.

Thirty shear fractures striking approximately N 80° E have been discovered in the camp. Fourteen of them are in Gold Belt property. The north wall has moved east an average of 50 feet and there has been some vertical movement. In quartzite, the fractures are sharp, clean, and wide. In argillite and limestone, they are tight cracks and are not vein filled.

The first minerals introduced were quartz and pyrite, then pyrrhotite (erratically) and later sphalerite and galena which were followed very closely by the gold bearing solutions.[2]

The ore shoots have been found generally to rake upwards to the west. Their size varies but they are generally some 200 feet

[1] Collections of Cambrian fossils, notably Archeocyathus, by Dr. H. Little of the Geological Survey of Canada, have definitely placed these beds in the Cambrian.

[2] McGuire, R.A., Transactions of the Canadian Institute of Mining and Metallurgy 1942, Montreal, pp. 169-190. Sheep Creek Mining Camp.

Not enough general Geology!

long and 400 feet deep. Their elevations according to McGuire are governed by two factors - "namely, the contour of the underlying granite and the amount of uplift of the anticlinal structure and it would appear to be closely related to both."

McGuire based his theory regarding the underlying granite on one intersection with granite, by a diamond drill hole at the Queen Mine. It is not known how deep the top of the granite lies below the Gold Belt Mine. There may even be ore bodies at lower elevations such as have been found in the Motherlode Mine on the eastern boundary of the Gold Belt.[3]

A large aplite sill intrudes the Sheep Creek structure. Little is known of its relations to ore deposition. It is post vein but whether or not it is post mineral is not known. Values are high near the intrusive but this may be a coincidence and not due directly to the presence of the sill. The sill has now been traced for the entire length of the camp from south of Mt. Waldie to the north slope of Reno mountain. It varies in width from 40 - 90 feet.

Lamprophyre dykes and sills, most of which are post mineral, occur along vein fractures and in bedding planes but have not had much effect on ore values. What sort of effect?

Early History of the Property

The thirteen crown-granted claims comprising the main part

[3] Private communication, A. Endersby, owner Reno and Motherlode Mines.

of the present property were originally staked between 1900 and 1912. Four others staked in 1932 are held by location.

Most of the early work, aside from surface trenching was done by the Britannia Mining and Smelting Company who drove crosscuts on two levels to a vein on the Clyde-Belt Group and drifted for some distance on it. About 500 feet of tunnelling was done with no success. The Navada was worked from 1905 until 1909 and a little ore was shipped.

No further work was done until 1932. By this time the Reno Mine to the north was producing $500,000 worth of gold annually and the Queen Mine (Sheep Creek Gold Mines, Limited) to the south about $200,000. This fact plus the similarity of structure led the Lakes brothers of Nelson to form a syndicate to explore the property. The syndicate acquired crown-granted claims by purchase, an option on five more, and staked or restaked an additional five.

Tunnelling began on the 200 and 600 levels at elevations of 5288 and 4943 feet respectively. Three veins were intersected and drifted upon. Values were non-commercial on the 200 level but were higher on the 600 although the veins were narrow. A program of diamond drilling was undertaken to test the veins at depth. The results enabled the syndicate to interest North American Mines Incorporated of Boston in financing a large scale development program at greater depth.

In August, 1935 the 1850 crosscut, elevation 3692 feet, was started. It entailed previous surveying, building construction and bringing in of power. By July 1936 it had been driven 3150 feet and had intersected two veins in quartzite and several faults and tight

cracks in the softer unfavourable argillite and limestone.

Low grade assays resulted in every case, and the company seriously considered closing the mine. About 1500 feet from the 1850 portal, however, two cracks had been intersected which were believed, from results of surface work, to be worth following to the favourable quartzite bed. It was calculated that the contact lay 300 feet to the west and the company decided, because of the short distance, to continue work until the quartzite had been reached. However, a miscalculation had been made and 900 feet of tunnelling was done before the quartzite was finally encountered. The cracks had been lost and it was necessary to crosscut about 25 feet south to reach the first, now called the 8000 vein. (This vein proved to be the making of the mine. Subsequent exploitation not only paid all the costs and yielded a good profit but also paid for further development work.)

As drifting on the vein progressed, several splits joined it, and the vein eventually attained an average width of 3.8 feet with assays of 0.73 oz. over three ore shoots having an aggregate of 450 feet of length. A raise was immediately started on the 8000 vein to determine the upward extent of these ore shoots. The results were very encouraging and the company began making plans for the construction of a mill. Additional funds were required and the North American Mines Incorporated was the logical source.

The Company, upon approval by the shareholders, increased the authorized capital from two million shares to three million, and in consideration of a loan of $200,000 at 6% granted the North American Mines Incorporated an option on the purchase of 200,000 shares at 20¢

a share and 600,000 shares at 30¢, in both instances without commission. This was increased by another 500,000 shares in May, 1938.

Construction of a 150-ton cyanide mill was started in June, 1938 under supervision of L.J. Fogle, the designer. The construction was delayed slightly because of heavy excavation for the crusher and cyanide buildings. Over 5900 cubic yards of earth were removed for the mill and roads to it. To lower costs of transporting ore, a crosscut was driven from the mill (2100 level) to intersect the 8000 vein at the base of the ore shoot. The mill was completed in October at a total cost of $69,476.35. Details are given in Table II.

Development of Veins

8000 Vein

The 8000 vein on the 2100 level was found to be rather spotty. In 1939, 1158 feet of drifting on the 2100 level developed three small ore-shoots of a total length of 210 feet and averaging 0.40 ounces, over stoping width. Vein width and value increased upwards. At the 1850 level the central ore-shoot was the largest. The 8000 vein was stoped from the 2100 level up to 175 feet above the 1725 level on the east contact of the quartzite. It could not be located west of the 2100 crosscut on the upper levels, and is believed to pinch out or branch off into the bedding planes.

Stoping was complete by the end of 1940. During the year, a drift was run west on the 1400 level, in an effort to find the bottom of an ore-shoot which had been exposed on the surface by trenching.

8200 Vein

The 8200 vein was explored by means of the Columbia Workings in 1936, and 1937. Some fair assays were obtained but the vein was narrow and somewhat spotty. In the 1850 level crosscut, the 8200 was a tight crack. It was intersected in the quartzite bed by the driving of a 275-foot crosscut north from the eastern end of the quartzite in the 8000 vein. Here the vein was wide. Assays averaged 0.35 ounces per ton and a large tonnage of ore was blocked out. The values were lower than those of the 8000 vein because of frequent branching and consequent dilution. The ore bottomed at the 2100 level where the vein was followed for 916 feet without a favourable assay. In 1939, the upper limit of the ore body was established about 75 feet above the 1400 level where the top of the quartzite bed was reached, above which the vein pinched out in schistose argillite and argillaceous limestone. Stoping was completed from the 1975 level to the top of the quartzite but the western end of the vein has yet to be explored above the 1400 level where the quartzite rises still higher.

6600 Vein

The 6600 vein was discovered by the driving of the 2100 crosscut in 1938. The vein waa wide and a large but rather spotty ore-shoot was discovered. It was followed for 254 feet on the 2100 level and subsequently stoped up to the surface, leaving only one pillar at the 1900 level untouched. There is believed to be a little ore below the 2100 level.

2360 Vein

The 2360 vein, intersected by the 1850 crosscut, was explored in 1939 by means of a raise from the 1850 level and a drift on the

1600 level where two small ore-shoots were discovered. Late in the year a crosscut south from the 2590 on the 1400 level intersected the 2360 and a fair-sized orebody was opened up.

In 1940 the 2360 was stoped above the 1400 level and a large tonnage of low grade ore drawn. The ore is believed to be exhausted in the 2360 vein.

2590 Vein

The 2590 vein was also cut by the 1850 crosscut. It did not respond to development however. In 1939, a raise was driven from the 1850 level to the 1400 with short drifts on the 1600 and 1400 levels. Assays were low and the vein became very narrow above the 1400 level. Work was abandoned at the end of 1939. Further exploration on the 1600 level is indicated.

3040 Vein

The 3040 vein was the last vein intersected by the 1850 crosscut. Subsequent development indicated better values at higher elevation. It was intersected in 1939 by a crosscut on the 1600 level from the 2360 vein. It was followed for 585 feet and an ore shoot 100 feet long, 1.75 feet wide, assaying 0.714 ounces per ton was developed and stoped up to the 1400 level. The vein became narrow but continued high grade. Further work above the 1400 level showed that the vein pinched out in the overlying thin-bedded argillaceous quartzite. The 1600 drift both east and west is the only possibility for ore.

3500 Vein

It is believed that the 3500 vein is the "A" vein of the 600 crosscut from which a carload of ore was shipped in 1934.[4]

[4]Minister of Mines Annual Report, 1934, Page E17.

It was intersected by crosscutting north from the 3040 vein on 1600 level but it was there found to be a little too deep for commercial ore except for two short shoots at the eastern side of the quartzite band.

The 1400 level proved more successful and a large ore-shoot was opened up which extended ultimately from the 1400 level to the 1100 level. It was completely stoped out and proved to be the best in the mine. A smaller shoot in the east end of the 1100 level was also stoped about 30 feet up at which point the overlying argillite was encountered.

3900 Vein

The 3900 vein was discovered in 1940 by crosscutting 400 feet north of the 3500 on the 1400 level. It was spotty and very narrow at this level but as it was mined the grade and length of the ore-shoot increased with higher elevation. It was stoped to the 1100 level and 50 feet higher to the overlying argillite beds. The grade increased from 0.205 on the 1400 level to 0.95 on the 1100.

Further work on the 1100 level is indicated.

4100 Vein

The 4100 vein was cut by the 1400 crosscut in 1941 but was intersected below the now well-determined commercial horizon. In 1942, a crosscut was driven on the 1100 level but no drifting could be done because of the shortage of labour. The vein merits further development on the 1100 and higher levels.

4500 and 4600 Veins

The 4500 and 4600 veins were also intersected by the 1400 crosscut but shortage of labour prevented their development on higher levels.

Production

A table of production of each vein was compiled and is included in the report (Table 1). Production costs are given in Table 3. These costs were very low and permitted mining of very low grade ore (notably the 8200 vein) at a profit. Costs rose steadily from the beginning of the war however.

In 1942 the labour situation became very difficult. Because of a continued labour shortage and restrictions in employing, very little development work could be done. The mill was closed at the end January, 1943, and the mine was closed in June, 1943 after a few cross-cuts had been driven for ventilation.

Recent Events

North American Mines Incorporated, the principal shareholders, considered disposing of the property. They submitted a proposal to the shareholders, the main substance of which was a reasonable cash offer for the remainder of the stock. At an extraordinary general meeting of the shareholders, the offer was accepted and North American Mines Incorporated assumed sole ownership of the company.

The shareholders were paid the market value of the stock (30¢) plus a dividend of $1\frac{1}{2}$¢ per share. This, plus five earlier dividends of two cents, made a total of $41\frac{1}{2}$¢ per share realized by the shareholders.

The mine lay idle for two years. In the autumn of 1945, it

it was re-opened to improve ventilation especially above the 1850 level.

The 600 level crosscut was extended 1000 feet and a raise was driven to meet it from the 1400 level, a distance of 500 feet. A hoist station was cut at the 600 level and a 35 H.P. hoist installed. Stations were cut on the 900 and 1100 levels.

Some development work was done concurrently. On the 1100 level, the 3900 vein and 3500 vein were followed west into the upper band of quartzite (western limb of anticline) and 170 feet of ore was exposed in the 1100 drift on the 3500 vein. Also on the 1100 level the 4600 and 4800 veins (formerly the 4500 and 4600 veins) were drifted on to the east for short distances. Assays were good on both veins.

In 1946, the mine was again closed. North American Mines Incorporated has offered the property for sale. It was examined by a representative of Pioneer Mines but the price was considered too high. Sheep Creek Gold Mines Limited is the most likely prospective purchaser.

In June, 1948, the mill equipment was sold to United Keno Hill Mines Limited for $75,000. It was considered advisable to dispose of the machinery while it was still in good condition and worth a high price.

Future Possibilities

The present value of gold does not warrant resumption of work. A large outlay of capital would be required to put the mine in operation again. Nevertheless, the ore is there and the life of the mine is by

no means over.

The company has recently purchased the property to the north lying at depth within the quartzite belt; namely, the Bluestone, Fawn, and Nugget Claims formerly owned by Reno Mines Limited. These properties have not been tested at depth in this formation.

Development on the Bluestone, Fawn, and Nugget veins, and on several tight fractures observed in these properties beyond the eastern contact of the quartzite belt, should be directed on the 1100 and 900 levels.

Bibliography

1. Daly, R.A. Geology of the North American Cordillera at the Forty-ninth Parallel, Ottawa, Government Printing Bureau, 1912, Canada, Department of Mines, Geological Survey Branch, Memoir no. 38.

This very comprehensive report describes and maps the Sheep Creek structure. No underground work had been done and the stratigraphic thickness of the structure was estimated to be over 10,000 feet. (Now known to be 2500 feet.)

2. LeRoy, O.E. Sketch map of Sheep Creek mining camp, with explanatory notes, Ottawa, Government Printing Bureau, 1909, Canada, Department of Mines, Geological Survey Branch.

3. McGuire, R.A. "Sheep Creek Mining Camp," Transactions of the Canadian Institute of Mining and Metallurgy, 1942, vol. 45, pp. 169-190.

This report was based on field work mainly at the Reno and Queen Mines but contains notes on the Gold Belt Mine up to May 1941.

4. Minister of Mines, British Columbia, Annual Reports, Victoria, King's Printer, 1905 to 1911, 1931 to 1947.

On page E7 of the 1936 Report, H. Sargent, Resident Engineer, Nelson, describes in detail the Gold Belt property and all work done until that time. A map accompanies the description.

5. Walker, J.F. Geology and Mineral Deposits of Salmo Map-area, British Columbia, Ottawa, King's Printer, 1934, Canada, Department of Mines, Geological Survey Branch, Memoir 172.

This is a very comprehensive report on a 360-square mile area which includes the Sheep Creek district. Unfortunately, insufficient underground work had been done to disclose the existence of the western anticline of the Sheep Creek structure; nor had any fossils been found in the structure which was mapped as Precambrian.

1. Gold Belt Property

A. 2100 Level and Mill.

B. 1850 Level and Camp.

C. Clyde Workings.

D. 600 Level and Camp.

E. 200 Level.

F. Columbia Workings.

2. 1850 Portal and Dump.

3. 2100 Level and Mill.

4. 200 Level and Portal.

Table I. Total Production of Veins

Vein		to Mar. 39	39-40	40-41	41-42	42-43	to July 43	Totals	Grade
6600	Tons	1917	9460	15621	2062			29060	0.374
	Oz.	814.7	3375.8	6029.7	432.3			10652.5	
8000	Tons	9760	28490	11234	4382	285	5101	59292	0.299
	Oz.	4880.0	7777.7	2314.2	1119.7	46.4	939.1	17077.1	
8200	Tons	11749	20010	3964	1485	3513	67	40788	0.246
	Oz.	4076.9	4422.2	729.4	276.1	507.4	7.4	10019.4	
2360	Tons		571	21815	18727	5519	565	47197	0.254
	Oz.		156.7	5191.9	5263.6	1216.0	75.0	11903.2	
2590	Tons		157					157	0.380
	Oz.		59.6					59.6	
3040	Tons		978	4318	5724	6380	759	18159	0.353
	Oz.		179.9	1204.7	1633.4	3362.7	268.5	6649.2	
3500	Tons			5085	20072	21645		46802	0.398
	Oz.			1861.1	8118.0	8648.7		18627.8	
3900	Tons				3619	7544	6370	17533	0.268
	Oz.				757.7	2153.1	2257.7	5168.5	
Yearly Totals	T.	23426	59666	62037	56071	44886	12862	258948	0.312
	O.	9771.6	15971.9	17331.0	17600.8	15934.3	3547.7	80157.3	

Table II. STATEMENT OF EXPENDITURE ON ACCOUNT OF MILL CONSTRUCTION

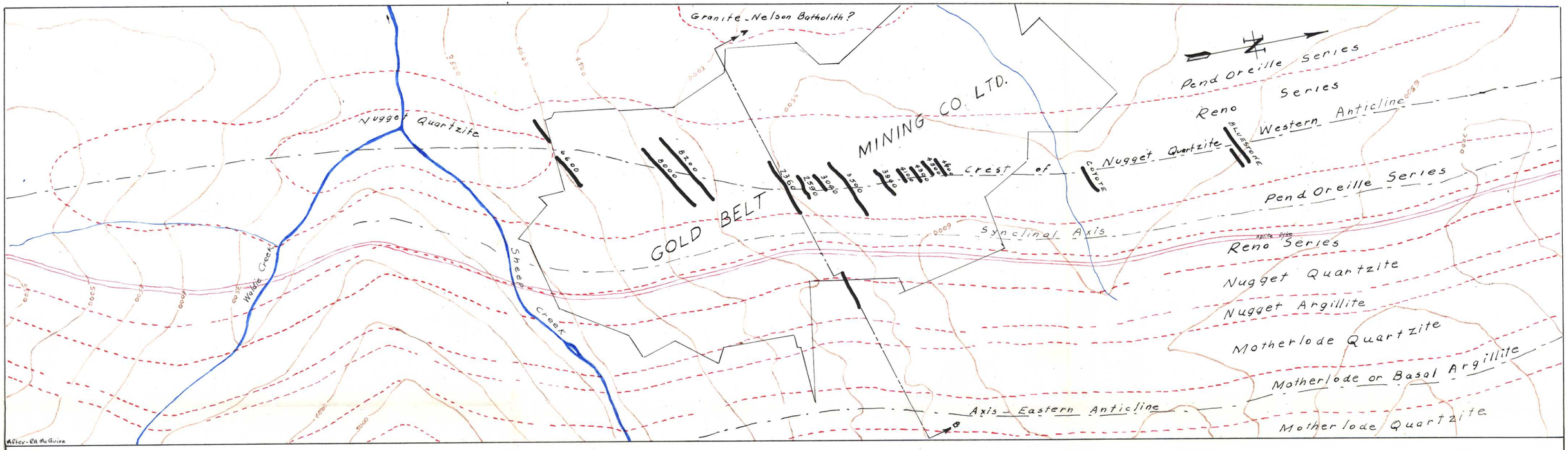
	Excavation		Fdns. & Floors		Framing		Total
Buildings	Labour	Material	Labour	Material	Labour	Material	
Clearing Site	443.10	39.08					482.18
Conveyor Building					485.12	383.38	868.50
Blacksmith Shop					62.40	92.28	154.68
Crusher Building	61.00		534.07	684.08	423.50	1353.04	3055.69
Cyanide Building	1086.95	2160.66	2115.15	2015.74	2890.22	3452.27	13720.99
Fine Ore Bin	510.38		284.70	384.59	150.40	141.27	1471.34
Mine Ore Bin	136.00	.30	106.60	63.50	416.30	855.62	1578.32
Trestle					476.02	89.22	565.24
Refinery	121.31					99.60	220.91
Office					182.60	427.91	610.51
Total	2358.74	2200.04	3040.52	3147.91	5086.56	6894.59	22728.36
Equipment in Buildings							
Tanks			674.39	624.53	238.89	4986.16	6523.97
Iron Pipe					116.38	2823.37	2939.75
Tailing Flume						226.50	226.50
Total			674.39	624.53	355.27	8036.03	9690.12
Machinery, Motors &c.							
Ball Mill			178.57	122.65		3245.65	3546.87
Crusher						1805.10	1805.10
Gyratory						1785.37	1785.37
Crusher Motors						790.00	790.00
Gryatory Motors						500.00	500.00
Compressor			72.78	25.00		600.00	697.78
Compressor Motors						494.53	494.53
Sundry Motors and Switches						447.00	447.00
Merrill Equipment						4833.00	4833.00
Dorr Equipment						7747.34	7747.34
Oliver Equipment						2458.50	2458.50
Conveyors						1921.15	1921.15
Installation					1512.33	405.97	1918.30
Freight Charges						1074.18	1074.18
Total			251.35	147.65	1512.33	28107.79	30019.12

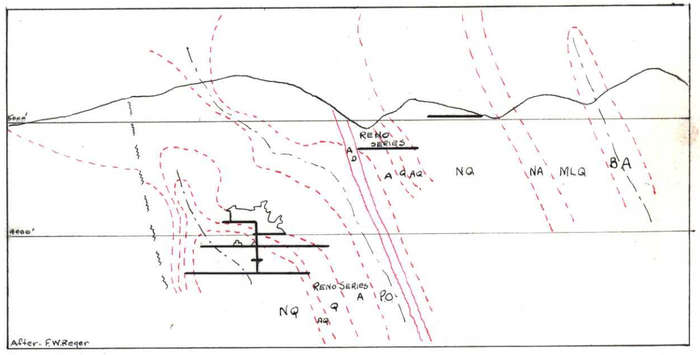
Table II. cont'd.

	Excavation		Fdns. & Floors		Framing		
	Labour	Material	Labour	Material	Labour	Material	Total
Power and Light					667.54	3108.17	3780.71
Water Supply					410.07	1833.21	2243.18
Miscellaneous Expense						1024.76	1024.76
Total Expense	2358.74	2200.04	3966.26	3920.09	8031.77	48999.45	69476.35

Table III. OPERATING COSTS

	1938		1939		1940		1941		1942	
	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
Mining	74,498.08	3.180	173,075.99	2.900	196.153.72	3.162	242,021.52	4.316	104,357.32	2,325
Development	17,510.72	.747	123,783.76	2.074	116,730.24	1.882	109,443.39	1.952	37,137.94	.827
Milling	34.356.60	1.467	78,597.73	1.318	75,488.74	1.217	68,602.53	1.224	70,607.94	1.573
Ore Delivery	2,087.32	.089	6,522.43	.109	6,889.40	.111	5,146.60	.091	6,407.24	.143
Refining	2,428.89	.104	1,320.46	.023	1,009.15	.016	1,072.21	.019	1,232.47	.028
Mine Operating Cost	130,881.61	5.587	383,300.37	6.424	396,271.25	6.388	426.286 .25	7.602	219,742.91	4.896
Miscellaneous Operating Expenses	2,499.28	.107	1,749.60	.029	2,694.10	.043	4,785.60	.085	9,557.81	.213
Cost of Production	133,380.89	5.694	385,049.97	6.453	398,965.35	6.431	431,071.85	7.687	229,300.72	5.109
General Administration	2,113.61	.090	4,820.86	.081	10,307.84	.166	12,880.57	.230	14,559.72	.324
Mineral and Property Taxes									11,232.66	.250
Total cost of Production	135.494.50	5.784	389,870.83	6.534	409,273.19	6.597	443,952.42	7.917	255,093.10	5.683





SECTION
A - B

KEY MAP OF SHEEP CREEK AREA BRITISH COLUMBIA

Scale: 0 1000' 2000'

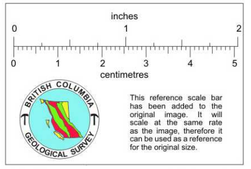
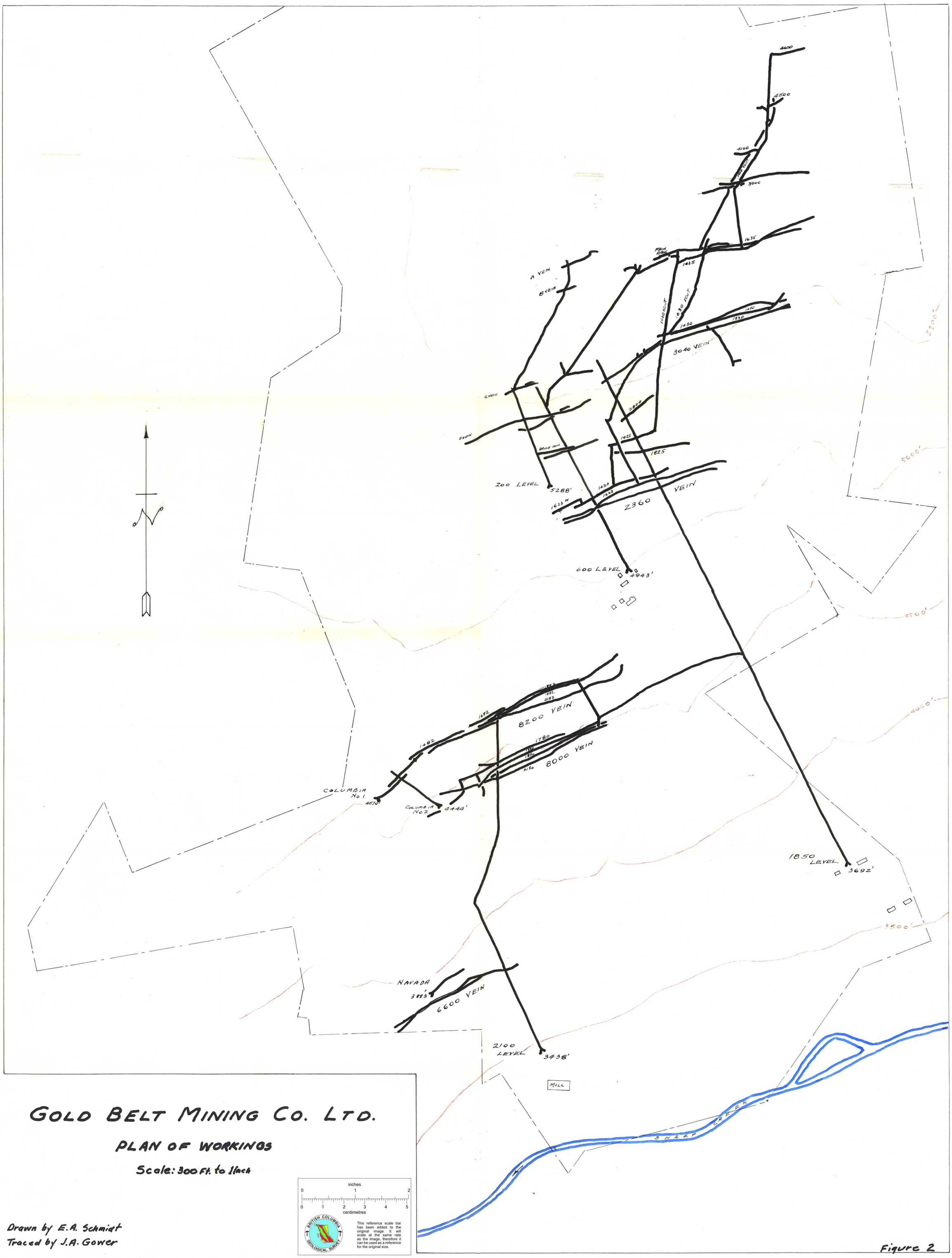


Figure 1 J.A.G.



GOLD BELT MINING CO. LTD.

PLAN OF WORKINGS

Scale: 300 Ft. to 1 Inch

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Drawn by E.A. Schmidt
Traced by J.A. Gower

Figure 2