

REPORT
ON THE FORMER
SURF INLET CONSOLIDATED GOLD MINES LTD. PROPERTY
SKEENA MINING DIVISION, B.C.
FOR MATACHEWAN CONSOLIDATED MINES LTD.
OF TORONTO, CANADA

JULY 20, 1973

BY: J. C. HONSBERGER, P.ENG.

825977

TABLE OF CONTENTS

	<u>Page</u>
Letter of Transmittal	(i) & (ii)
Introduction	1
Location of the Property	1
General Economic Conditions	2
Topography	2
Water Supply	2
Power	3
Mining Supplies	3
Property and Titles	3
History and Production	4
Geology	6
Ore Reserve Estimates	10
Milling at the Surf Inlet Consolidated Gold Mines Ltd.	15
Summary and Conclusion	21
Recommendations	23
Costs	24
Certificate	25
Bibliography	i & ii

ENCLOSURES

Surf Inlet Consolidated Gold Mines Ltd. Longitudinal Section
of Ore Bodies, 500' = 1"

Surf Inlet Consolidated Gold Mines Ltd. General Plan, 500' = 1"

J. C. HONSBERGER
CONSULTING MINING ENGINEER
P. ENG. ONTARIO AND QUEBEC

OFFICE
SUITE 221
12 RICHMOND ST. E.
TORONTO 210, ONTARIO
416-363-0509

ADDRESS ALL CORRESPONDENCE TO
15 MEADOWACRES DRIVE
AGINCOURT 755, ONTARIO
416-491-1431

July 20, 1973

Mr. Paul H. McCloskey, President
Matachewan Consolidated Mines Limited
Suite 1110
55 Yonge Street
Toronto, Ontario

Dear Sir:

Re: Surf Inlet Mines, Princess Royal Island
Skeena Mining Division, B.C.

In accordance with your instructions early in June 1973, I have examined all of the data you have made available to me from your office files, maps, reports, production records, etc.

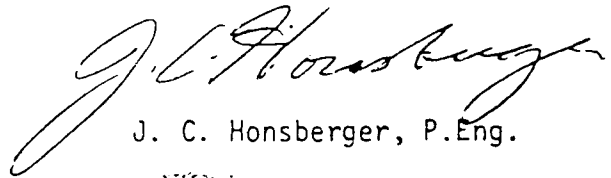
On June 15, 1973, on your instructions, I flew to Montreal and discussed this property with Dr. J. E. Gill, Professor of Economic Geology at McGill University. Dr. Gill was consultant for Surf Inlet for two years until November 1942, when the mill was shut down. During this visit Dr. Gill gave me a number of maps but not a final report, all of which I have turned over to you. In addition, you have loaned me voluminous reports and maps, all listed under Bibliography.

I have consulted a number of Annual Reports of the Minister of Mines of the Province of British Columbia and the Northern Miner Handbooks, as well as other references, all of which are listed in the Bibliography.

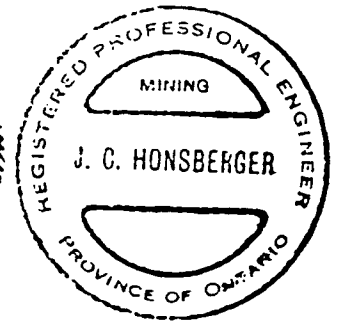
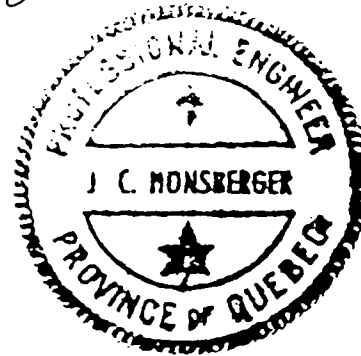
My instructions were to make an office appraisal of the property, including ore reserves and future possibilities, with recommendations for future work in view of recent escalation of the price of gold to around \$120.00 per ounce now.

My report, including some maps together with my summary and conclusions, is herewith respectfully submitted.

Yours very truly,



J. C. Honsberger, P. Eng.



J. C. HONSBERGER

CONSULTING MINING ENGINEER
P. ENG. ONTARIO AND QUEBEC

OFFICE
SUITE 221
12 RICHMOND ST. E.
TORONTO 210, ONTARIO
416-363-0509

ADDRESS ALL CORRESPONDENCE TO
15 MEADOWACRES DRIVE
AGINCOURT 755, ONTARIO
416-491-1431

REPORT ON THE FORMER SURF INLET CONSOLIDATED GOLD MINES
LTD. PROPERTY, SKEENA MINING DIVISION, B.C., FOR
MATACHEWAN CONSOLIDATED MINES LTD. OF TORONTO, CANADA

INTRODUCTION

As stated in the letter of transmittal with this report, the writer was engaged by your company to make an independent office appraisal of your Company's mining property on Princess Royal Island, in the Skeena Mining Division of British Columbia. The purpose of the appraisal was to determine what steps should be taken, if any, to rehabilitate this former gold producer. The basis of the appraisal was to be previous records of the old Belmont Surf Inlet Company and its successor company, Surf Inlet Consolidated Mines Ltd., and reports, both private and government.

LOCATION OF THE PROPERTY

The property of the former Surf Inlet Consolidated Gold Mines Ltd., N.P.L., consisting of 21 claims and fractions hereinafter tabulated and shown in red on accompanying Map No. 1, is situated at the head of Surf Inlet, Princess Royal Island, British Columbia. Princess Royal Island is approximately 400 miles northwest of Vancouver, and Butedale, on the east coast of the Island, 60 miles by boat from Port Belmont, the Company's landing dock at the head of Surf Inlet, is a port of call for ships en route between Vancouver and Prince Rupert. Ocean-going steamers can call at Port Belmont and will do so should there be sufficient business to warrant it.

The Company's wharf, at the head of Surf Inlet is about seven miles from the Surf Inlet and Pugsley Mines of the Company. These two mines are located on the north and south sides, respectively, of Paradise Creek which flows out of Paradise Lake into Bear Lake just north of the Bear Lake landing dock. The mine camp is reached via launch from the head of the incline railway leading to the crest of the dam at the outlet of Cougar Lake, to the mine wharf on Bear Lake, and thence by 1.3 miles of electric railway to the mine camp.

GENERAL ECONOMIC CONDITIONS

CLIMATE

The area in which the property is is one of heavy precipitation, the average rainfall per year being between 170 and 200 inches of rain and from 2 to 4 feet of snow. Temperatures are moderate, except for a cold snap early each year. Work, both underground and on surface, can be done at all seasons of the year without handicap. Water, as suggested, is plentiful.

TOPOGRAPHY

The topography of Princess Royal Island is moderately rugged, many of the mountain peaks rising as steep-sided, round-top domes of 3,000 to 3,500 feet elevation above sea level. In the vicinity of the two mining properties, the Surf Inlet and the Pugsley, the walls of the valley rise precipitously for 3,000 feet above the floor of Paradise Creek Valley. The lowest level on the Pugsley Mine is the 1500 which is about 500 feet below sea level. The lowest level on the Surf Mine is the 1400 and this is 275 feet below sea level.

WATER SUPPLY

Ample water for all domestic, mine and milling purposes was obtained by pumping to storage tanks. The water was taken from Paradise Lake.

POWER

When this mine was in operation, power was obtained from an excellent low-head hydro-electric plant which was constructed by the old Belmont Surf Inlet, and at the outlet of Cougar Lake. This plant developed 1230 horsepower and electric energy was transmitted to the mine camp 5.65 miles away by pole line at 23,000 volts to the mine substation, where it was stepped down to 440 volts for the mine use and for mill power. It is not known in what condition this power plant now is or the power transmission line or any of the mining plant and mill or the mining camps.

MINING SUPPLIES

Mining supplies were formerly purchased principally in Vancouver and due to the delay which must take place between the ordering and arrival of supplies, the mine inventory had to be carefully watched to prevent overstocking on key items which, if not on hand in an emergency, would cause a shutdown of parts of the plant and possibly all of the plant.

PROPERTY AND TITLES

From records and information supplied the writer by the Company under date of July 13, 1973, and subject to confirmation by competent legal authority, your Company owns or holds the following property:

Crown-granted Mineral Claims, all in Prince Rupert Assessment District, Coast Range 4, Skeena Mining Division, B.C.

<u>Name of Claim</u>	<u>Lot No.</u>	<u>No. of Acres</u>
Princess Royal	7	14.9
Sadie	8	42.9
Excelsior	9	45.3
DLS	31	51.65
Lake Fraction	32	26.72
Gulch	33	51.65
Bluff	34	33.75
Bench	35	26.67

<u>Name of Claim</u>	<u>Lot No.</u>	<u>No. of Acres</u>
Uta Fraction	36	51.37
Mountain Fraction	37	40.87
Twin Peaks	38	51.65
Le Quivree	39	48.97
Independence Fraction	222	35.35
Olive	227	24.9
Cassie	228	23.23
Lakeview	229	29.17
Sea Fraction	1914	31.35
Bee	1915	45.65
Granite	1916	41.50
Marcia	2484	41.35
Blue Bell	2485	49.

Certificates of Title

No. 80162-1 to District Lot 7 (except 1.43 acres) and District Lots 40, 2486, 2487 and 2488, all Range 4, Coast District.

No. 14746-1 to Lot 1966, Range 4, Coast District, reg'd in name of Surf Inlet Power Co. Ltd.

No. 9244-1 to Lot 11, Range 4, Coast District - reg'd in name of Surf Inlet Power Co. Ltd.

No. 12251-1 to 1.43 acres of Lot 7, Range 4, Coast District, reg'd in name of Surf Inlet Power Co. Ltd.

Surf Inlet is the lessee of a site for wharves and power house described as "that tract or parcel of foreshore or land covered by water lying within Range 4, Coast District, Lot 2483". It also has the water rights for the power plant at Cougar Lake.

The 21 claims and fractions listed comprise 807.90 acres.

HISTORY AND PRODUCTION

The original mineral claims are the oldest located in the Skeena Mining Division of British Columbia. The discovery was made by tracing white quartz float from the bottom of the valley to where the veins outcropped on surface along its north and south sides.

The Surf Inlet and Pugsley Mines were developed and operated by Belmont Surf Inlet Mines Limited between 1914 and 1926, both years inclusive, and from the operations it is reported from a total of 850,000 tons of ore a recovery

of approximately \$9.50 per ton in gold (at \$20.67 per ounce) principally, with some silver and copper, was made. During this period \$1,437,500 was paid out in dividends. The bulk of this ore came from the Surf Mine. The property was closed down and dismantled in 1926. In 1934 the price of gold advanced approximately 75 per cent to \$35.00 per ounce. The increased return to be obtained caused renewed interest to be taken in the property in 1934 by Mr. J. B. Woodworth and associates, and the mining and milling plant was rehabilitated for production. The Pugsley Mine was further tested at a somewhat greater depth.

By 1936 milling was in process at 50 tons per day. The rate was stepped up since then to a little over 100 tons daily. To June 30, 1941, ore had been produced as follows:

	<u>Tons Drawn</u>	<u>Oz. Au Recovered</u>
Surf Mine	37,144	12,182
Pugsley Mine	<u>98,627</u>	<u>34,000</u>
	135,771	46,182

To the 15th of December, 1942, the new company, Surf Inlet Consolidated Mines Ltd., had from January 1936, produced gold with a little copper valued at \$2,324,013 from 166,546 tons of ore. Due to wartime restrictions and scarcity of efficient labour, the mill was closed down on the 15th of December, 1942.

Production for the five years ending June 30, 1942, in a yearly breakdown was as follows:

	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>	<u>1936</u>
Tons Milled	37,511	39,643	34,295	22,531	14,691
Production	\$495,033	\$595,577	\$496,478	\$334,712	\$188,822
Average Per Ton	\$13.20	\$15.02	\$14.48	\$14.86	\$12.85

In the 5½ months to December 15, 1942, when the mill was closed, production was \$107,537.

In mid 1946, the Pugsley Mine was unwatered and drifting and raising was done and extensive diamond drilling was carried out. Considerable development was done on the 10th, 11th and 13th levels of the Pugsley Mine. In May 1947, a new horizontal tunnel was driven at 1,000-foot elevation to investigate large unexplored area to south of the workings. The Surf Mine has been inactive since 1942. It has adit at 550-foot level with winze to 1400 feet.

The reports of progress of exploration and diamond drilling from 1942 to 1947 which are available to the writer are sketchy and incomplete. No work is reported on the property since 1947.

In December 1954, the name of the company was changed from Surf Inlet Consolidated Gold Mines Limited to Surf Inlet Consolidated Mines Limited. In November 1959, the name was again changed from Surf Inlet Consolidated Mines Limited to Western Surf Inlet Mines Limited on the basis of one new share for four old shares.

In May 1966, Western Surf Inlet Mines Limited merged with Matachewan Consolidated Mines Limited on the basis of five new shares for four old shares.

GEOLOGY

The mine geology was described by J. E. Gill and A. R. Byers in "Structural Geology of Canadian Ore Deposits - A Symposium" by the Geology Division of the Canadian Institute of Mining and Metallurgy - 1948 as follows:

GEOLOGY

General

The ore deposits are in quartz-pyrite veins along a complex fault zone with a general north-south strike and a westerly dip averaging 45°. The fault zone is along or near the east side of a roof pendant or screen of meta-sediments and volcanics in the 'Coast Range batholith', which here is composed mainly of quartz diorite and bordering gneisses. The roof rocks are best

preserved in the north Surf workings. Farther south they have been recrystallized and injected by material of the batholith to form paragneiss and injection gneiss.

The fault zone traverses mainly gneissic marginal facies of the batholith. At a few places massive quartz diorite or quartz diorite porphyry is found within the fault zone, but generally the massive facies are at distances up to 500 feet to the east (fig. 1). A faint lineation is visible even in the massive rocks. It is more noticeable in the hornblende-quartz diorite gneiss nearer the fault zone, where a pronounced preferred orientation of hornblende laths and a streakiness due to segregation of hornblende crystals are striking features. Banding is more prominent in the biotite-quartz diorite gneiss, where contamination from the roof rocks is added to the effects of flowage. Examination of thin sections under the microscope has shown that many of the rocks, for some distance on either side of the 'break', have a marked cataclastic structure. It seems clear, therefore, that movements occurred along this zone during the crystallization of the intrusive rocks traversed by the fault zone, as well as afterward.

Flow layers in the gneissic facies strike on the average north-south, but there are many local deviations of as much as 60° . The lineation measured in all facies plunges on the average northwest at around 45° , but in this, too, there are many departures from the average position.

The Fault Zone

The fault zone has been traced for 14,500 feet horizontally and 3,300 feet vertically. In the part containing the two ore zones it is broadly convex toward the west, striking $N.23^{\circ}E.$ at the north end, north-south in the central section, and $N.18^{\circ}W.$ at the south end. Dips range from 30° to $60^{\circ}W.$, averaging $45^{\circ}W.$ Internally it consists of two or more parallel or sub-parallel shear surfaces or zones from a few inches to 30 feet thick. In places there are two

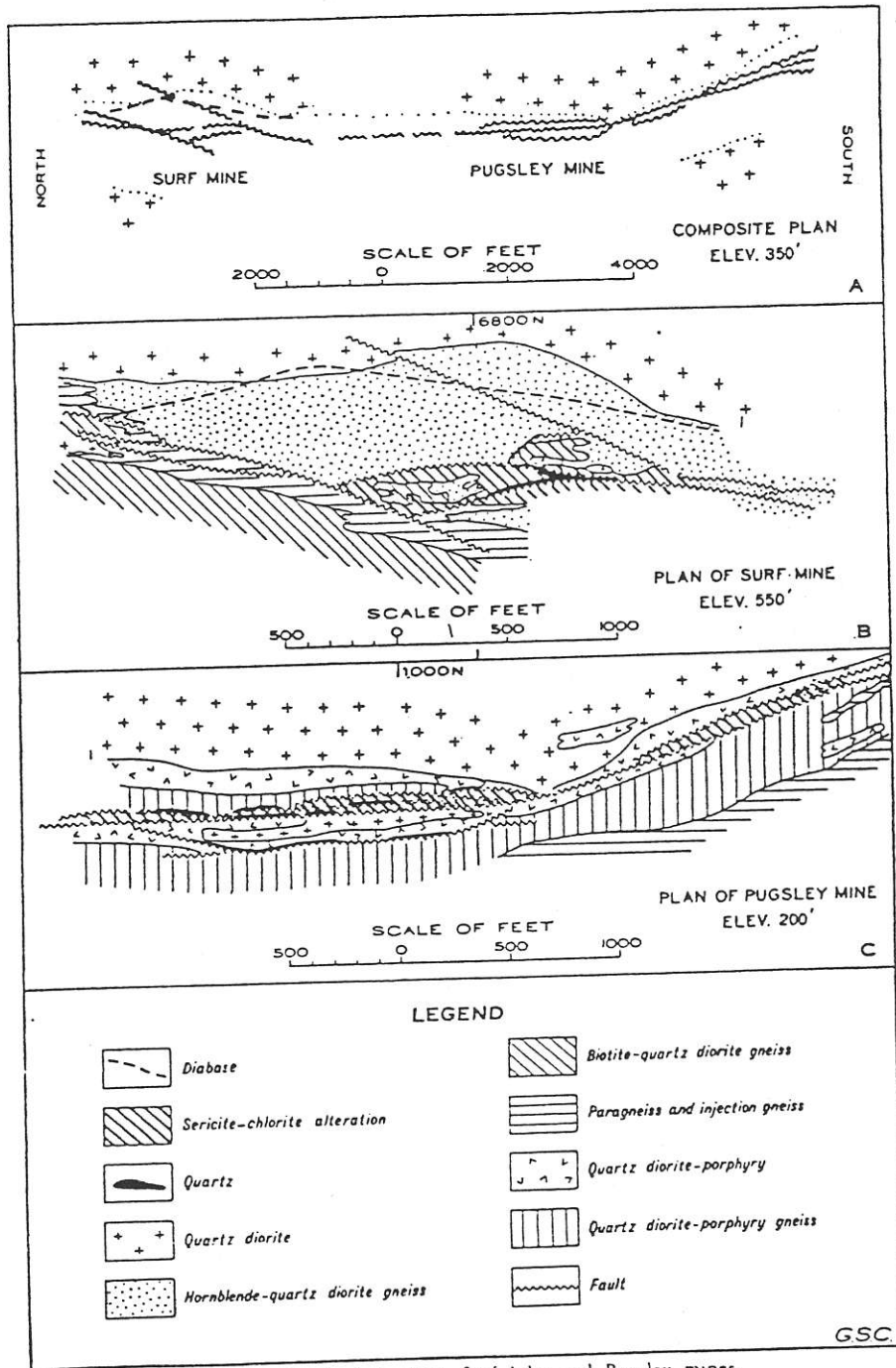


Fig. 1.—Geological plans, Surf Inlet and Pugsley mines.

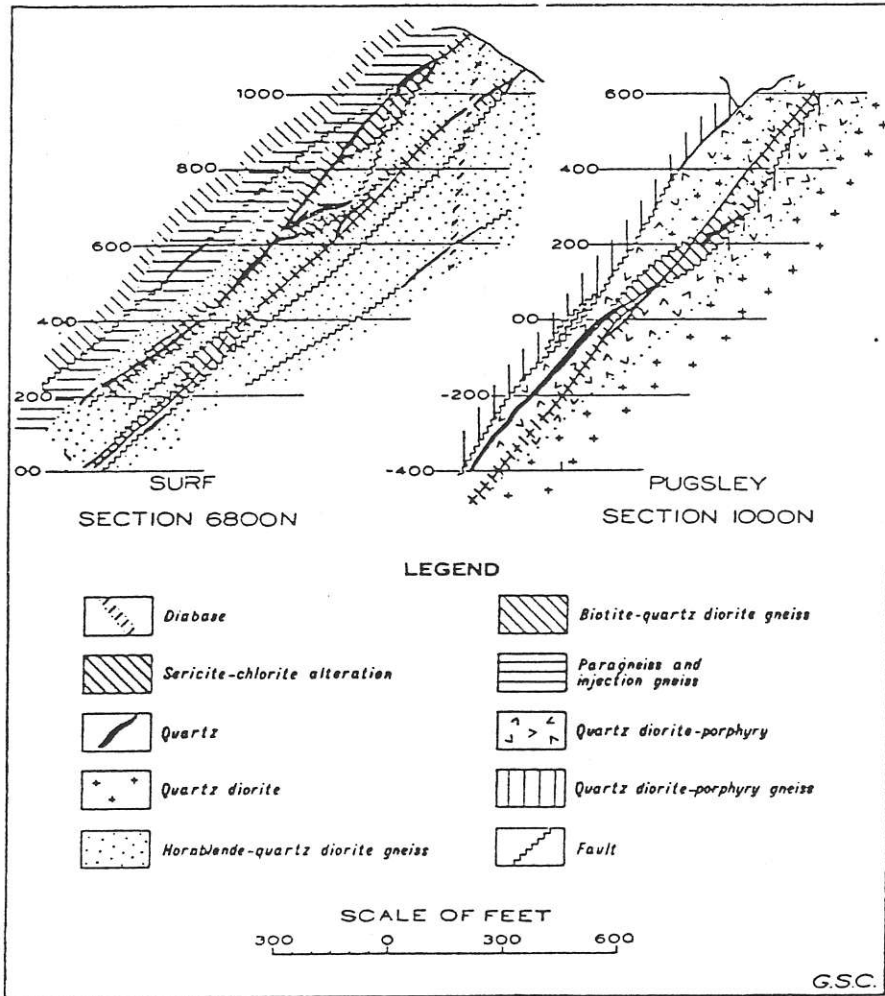


Fig. 2.—Geological cross-sections, Surf and Pugsley mines.

of these, 150 to 200 feet apart. More commonly, however, and particularly along the ore zones, there are several branch shear zones passing obliquely between these, or branching from and rejoining the same one to form loop structures (figs. 1 and 2).

Individual faults show broad corrugations, grooves, and striae plunging northward at 30° to 70° , averaging 45° , and there is abundant evidence that during the main movement the west or hanging-wall moved upward along these lines, relative to the footwall. Markings due to later movements are numerous and variously oriented, but two stand out. these are (1) along the dip or inclined steeply toward the southwest, and (2) horizontal. It was not possible to establish the sequence of these late movements, but it is almost certain that the openings for the veins were provided by the small adjustments they record, carrying one wall past the other in directions oblique to the main corrugations.

The Ore Zones

The Surf and Pugsley ore zones occur in complex parts of the fault zone developed at two prominent bends (fig. 1A). They are marked by the presence of numerous veins of milky quartz that have been inserted along slippage surfaces and tension cracks. Vein walls and inclusions show only slight silicification at a few points, so replacement could not have been important in vein formation. Rocks in and near the ore zone have sericite blende and biotite, but there is no close correlation in distribution between the veins and alteration.

The veins are of various sizes and shapes. Lengths range from less than 100 to 1,000 feet and thicknesses from 2 to 40 feet. Milky quartz is the main constituent, with pyrite forming up to 25 per cent by volume. Two stages of vein formation are evident. The early quartz and pyrite are locally seamed by later pyrite, chalcopyrite, and quartz. Assay tests show that the major part

of the gold came in with the late wave of mineralization. Visible gold is extremely rare, but at high magnifications a few particles measuring from 7 to 40 microns have been identified in the fractured pyrite. Ankerite is locally present in quite large amounts, especially in marginal parts of veins. Calcite, dolomite, chlorite, and molybdenite also occur, but always in minor amounts.

Although it is evident that the formation of the two ore zones has resulted from a series of minor adjustments about the two major bends in the fault zone (fig. 1), it has not been possible to work out the detailed sequence of those adjustments and their correlation with vein and ore formation. This might have been possible if systematic observations had been made in stopes during mining, but unfortunately there were no records for these except the total tonnage removed and the gold recovered.

In the Surf mine some of the veins occupy fissures that, from their positions in relation to the grooves, were tension cracks formed during the main fault movements, but these were no doubt reopened by small, horizontal or oblique, left-hand movements at the time of emplacement of the first quartz. The plunge to the southeast shown in fig. 2 is in part, at least, due to these, but it is probably only a local feature and ore may be expected to recur at greater depths downward toward the north.

In the Pugsley, the distribution of quartz is most readily explained by small, horizontal or oblique, right-hand movements, opening certain shear surfaces just west of the major bend (see fig. 1C). Not enough work has been done to define a trend for this ore zone as a whole, but because the major flutings plunge north, the best chances for occurrence of ore at depth lie in that direction.

The distribution of ore shoots within the veins depended mainly on still later adjustments during which only the veins along certain shear surfaces and zones were fractured and mineralized. It should be possible now, with a large

part of the upper section mined, to establish the positions and trends of these favoured zones and something about their origins, but in the Surf mine especially, quartz was mined wholesale and it is certain that much barren material was taken. The necessary details regarding the distribution of gold and associated later minerals are, therefore, lacking.

Sequence of Events

From the relations observed and briefly described above, the following sequence of events is inferred:

- (1) Intrusion of the quartz diorite with flowage upward and toward the south, probably on both sides of the roof pendant. Marginal parts, where contaminated by roof rocks, show banding as well.
- (2) Movements continued on the east side of the pendant in the late stages of crystallization of the gneisses, as shown by cataclastic structure.
- (3) Failure of the solid rocks under shearing stresses. The west block moved southward and upward, along corrugated surfaces, at around 45° to the horizontal.
- (4) Further adjustments, development of some linking shears and tension cracks while solutions rose from a deeper part of the batholith along two main channels near prominent bends and formed large quartz-pyrite veins.
- (5) Adjustments oblique to the original corrugations caused fracturing of the quartz and pyrite and provided openings for additional pyrite and quartz plus chalcopryite, gold and minor amounts of other minerals.
- (6) Intrusion of diabase dykes.

ORE RESERVES ESTIMATES

The mine reserve estimate figures by the mine staff as of June 30, 1942, were as follows:

Pugsley Mine - East Vein

June 30 1942

900 Level

Probable Ore	Block 900-1300 (Pillars)	800 Tons @ .44 oz.
" "	937 X - Vein "	500 " @ .40 oz.
" "	Block 650-750 "	400 " @ .40 oz.
		<hr/>
		1700 Tons

1000 Level

Probable Ore	Under 937 X - Vein	1500 Tons @ .46 oz.
" "	Block 850-950 (1009A)	1000 " @ .40 oz.
Possible "	Under 934 S. Drift	800 " @ .42 oz.
" "	Block 1100 - 1200 (1088 Rise)	500 " @ .40 oz.
		<hr/>
		3800 Tons

1100 Sub-Level

Probable Ore	Block 1120-1230	750 Tons @ .40 oz.
" "	Block 1100-1150	500 " @ .40 oz.
Possible Ore	Block 1400-1530	750 " @ .40 oz.
		<hr/>
		2000 Tons

1100 Level

Possible Ore	Under 1109X - Cut	700 Tons @ .50 oz.
Probable Ore	Under 1111B & 1111C Stopes	1500 " @ .50 oz.
" "	Under 1114N. Drift	500 " @ .40 oz.
" "	Under 1112S. Drift	1000 " @ .50 oz.
		<hr/>
		3700 Tons

11,200 Total

Pugsley Mine - West Vein

1000 Level

Possible Ore	Block 1460-1575	700 Tons @ .31 oz.
--------------	-----------------	--------------------

1100 Level

Possible Ore	Block 730-805	1000 Tons @ .39 oz.
--------------	---------------	---------------------

Estimated Ore in Place	12900 Tons
" Broken Ore	4327 Tons
	<hr/>

Total Estimated Ore 17227 Tons

Surf Mine

Shaft Pillar (862 Stope)

Positive Ore	844 Tons @ .30 oz.
	557 " Broken ore
	<hr/>
	1401 Tons

Summary

	<u>Pugsley</u>	<u>Surf</u>
Estimate as at June 30, 1941	64176 Tons	5569 Tons
Ore Found during the Year	1251 "	11839 "
Ore Drawn " " "	25282 "	15339 "
Written Off " " "	16440 "	668 "
" " June 30, 1942	6478 "	-
Estimate as at " " "	17227 "	1401 "

Production for the year ended June 30, 1942, amounted to 12,289.892 ounces gold, 4,778.31 ounces of silver, 216,446 lbs. of copper obtained from 3,460,084 dry tons of concentrate resulting from the milling of 37,512 dry tons of ore.

No detailed figures are available for the period from July 1, 1942, to the shutdown of the mine and mill on December 15, 1942.

The mine staff made an estimate of ore reserves January 1, 1943, as follows:

	<u>Tons</u>	<u>Grade Ounces</u>	<u>Value</u>
<u>PUGSLEY MINE:</u>			
<u>1000 Level</u>			
Possible Ore - Under 937X - Vein	800	.45	\$ 12,600.00
<u>1100 Sub-Level</u>			
Possible Ore - Block 1400-1550	750	.40	10,500.00
<u>1100 Level</u>			
Possible Ore - Under 1112-3 Drift	1,400	0.5	24,400.00
" " " 1114 "	800	0.4	11,200.00
" " " 1115 "	1,100	0.5	19,000.00
" " " 1119 "	1,100	0.5	19,000.00

	<u>Tons</u>	<u>Grade Ounces</u>	<u>Value</u>
<u>1300 Level</u>			
Possible Ore - 1302 Drift	6,000	0.4	\$ 84,000.00
<u>1500 Level</u>			
Possible Ore - Under 1302 Drift	1,100	0.35	20,400.00
<u>TOTAL ORE - PUGSLEY MINE</u>	<u>13,050</u>	<u>0.44</u>	<u>\$201,100.00</u>
 <u>SURF MINE:</u>			
Shaft Pillar - 900 Level	800	0.3	\$ 8,400.00
Below 967 Stope	3,000	0.5	52,500.00
<u>TOTAL ORE - SURF MINE</u>	<u>3,800</u>	<u>0.46</u>	<u>\$ 60,900.00</u>
<u>GRAND TOTAL</u>	<u>16,850</u>	<u>0.44</u>	<u>\$262,000.00</u>

ESTIMATE JAN 1 1943

In a letter to Mr. P. H. McCloskey from A. McLeod, formerly mine superintendent of Surf Inlet Consolidated Gold Mines Limited, dated March 14, 1961, an estimate of ore reserves as furnished by Mr. A. J. Ingraham, formerly mine engineer and geologist at the Surf Inlet Consolidated Gold Mines Limited for the period 1936 to 1947, gives the following reserves based on reports as of April 1946:

<u>Pugsley Mine - East Vein</u>		<u>Gold</u>
<u>1000 foot Level</u>		
Probable Ore - Under 937 X-Vein	1500 Tons	@ .46 oz.
Possible Ore - Under 934 S. Drift	800 Tons	@ .42 oz.
Possible Ore - Block 1100-1200 (1088 Raise)	500 Tons	@ .40 oz.
	2800	
<u>1100 Sub-Level</u>		
Possible Ore - Block 1400-1550	750 Tons	@ .40 oz.

Gold

1100 Level

Possible Ore - Under 1109 X-Cut	700 Tons	@ .50 oz:
Probable Ore - Under 1111B & 1111C Stopes	1500 Tons	@ .50 oz.
Probable Ore - Under 1114 N. Drift	500 Tons	@ .40 oz.
Probable Ore - Under 1112 S. Drift	<u>1000</u> Tons	@ .50 oz.
	3700	
	750	
	<u>2800</u>	
	7250 E. Vein Total	

WEST VEIN

1000 Level

Possible Ore - Block 1460-1575 700 Tons @ .31 oz

1100 Level

Possible Ore - Block 730-805 1000 Tons @ .30 oz.

1700 W. Vein Total

7250 E. Vein Total

8950 Tons

EAST VEIN

Hanging Wall possibilities Block 1250-1600 5000 Tons

TOTAL ESTIMATE 13950 Tons

Based on 33% of work and adjoining Production

900-1000 Level 600 N. to 800 N. (100' x 200') 3300 Tons

1000-1300 Level 600 N. to 1000 N. (300' x 400') 20000 Tons

Partially tested South Area 23300 Tons

Partially tested North Area

900-1000 Level 1000 to 2000 (150 x 400) 10000 Tons

Carried forward from above 13950 Tons

TOTAL 47250 Tons

The total reserves, therefore, of the Pugsley Mine as estimated by A.J. Ingraham are 47,250 tons which are in the category of probable and possible ore. The probable grade of this material is excellent being in the vicinity of between 0.35 and 0.45 ounces per ton. The east vein total of 7,250 tons averages 0.485 ounces per ton and the west vein total of 1,700 tons averages 0.356 ounces per ton.

Undoubtedly this tonnage can be upgraded when the mine has been dewatered and inspected by taking a lower cut off grade of better than 0.20 ounces and up per ton owing to the recently increased price of gold now in the vicinity of \$120.00 per ounce.

MILLING AT THE SURF INLET CONSOLIDATED GOLD MINES LIMITED

The following description of the mill was taken from the report dated June 30, 1941 by Mr. Charles Mentzel of New York City, Mining Consultant:

ORE TRANSPORTATION TO MILL

From the Pugsley Mine, Ore is hauled from the Mine Ore Bins to the Mill in Ore Cars, holding approximately three tons each, the electric trolley locomotive taking them to the foot of the Mill Incline, from which point they are hauled up the Incline by cable a distance of some 800 feet, where they are dumped in the Coarse Ore Bins above the Mill.

Surf Mine Ore is conveyed from the Ore Bins at the 550 level by means of an aerial tramway 400 feet in length. At the Mill an automatic trip dumps the contents of the buckets into the Coarse Ore Bins.

MILLING

Ore from Pugsley and Surf Mines is received at the Mill in two 50-ton Coarse Ore Bins - one for Pugsley Ore, one for Surf Ore - and is fed from these to an Allis-Chalmers Blake type "Jaw Crusher" 20 x 10. A bucket elevator raises the Crushed Ore to the top of a 75-ton Fine Ore Bin, where a short conveyor belt

carries it to the centre of the bin.

From the Fine Ore Bin the Crushed Ore is fed, by means of a belt type ore feeder, to the 6' x 5' Allis-Chalmers Ball Mill, which is in closed circuit with a 36" Akins Classifier, the Mill being of the centre overflow type (converted from low discharge). The Mill, which uses 4" balls at a rate of 3 lbs. per ton of Ore milled, runs at 23 revolutions per minute and can handle approximately 115 tons of Fine Ore per day.

The presence of oversize in the Classifier overflow having given evidence of excess load, a secondary Classifier - an old type Dorr single-rake, running at 30 strokes per minute, with a 25% slope - was installed, with a 24-inch Denver Unit cell ahead of it. Sands are returned to the Ball Mill by means of the middlings pump, a 2-inch rubber-lined Wilfley.

FLOTATION

Flotation equipment consists of the Denver Unit Cell, already mentioned, a 3½-foot pneumatic Forrester Type rougher cell, an 8-cell Union Iron Works gravity flow mechanical flotation machine and a 12-foot Forrester Type Scavenger Cell. The feed or overflow from secondary classifier passes through the 3½-foot Forrester type air cell, a finished concentrate being taken off that cell. The feed then flows to #2 cell of the 8-cell mechanical flotation machine. A finished concentrate is taken off #2, 3 and 4 cells. The concentrates from #5, 6, 7 and 8 cells flow to #1 cell where it is cleaned. The tailings from the mechanical cells then pass through the 12-foot scavenger air cell. The product or middlings from this cell go to the middlings pump and are returned to the ball mill. The tailings from the scavenger cell are split and distributed over two Wilfley Tables. The product of the tables, which consists of some particles that were insufficiently ground and also some sulphides that failed to float, flow to the middlings pump and are returned to the ball mill. The tailings from the tables are the final tails.

DEWATERING

The flotation concentrates are settled and thickened in a 14-foot Denver Thickener Tank and Mechanism. Pulp is pumped by a Diaphragm Pump at about 70% solids to a 5½ x 6 foot Oliver Filter. The filter handles about 12 tons of concentrates in 8 to 12 hours, depending on the condition of the canvas. The moisture content of the filtered concentrates averages about 8.0%. A 40-ton storage bin is directly under filter, from where it is weighed and hauled in 4-ton cars to the 300-ton bin at the beach.

REAGENTS

Soda Ash is added to the ball mill in quantities to keep the pH. of the flotation pulp at 9.0 to 9.2. The oil mixture (50% Aerofloat #25 and 50% Barrett's #4) is added at this point as well as a small quantity of Sodium Sulphide. Butyl Xanthate is added ahead of the Unit Cell and also at Scavenger Cell. Aerofloat #25 is used at head of Scavenger Cell and Pine Oil, if necessary, at #5 cell of the mechanical cells. A small quantity of Sodium Silicate is used at the #1 or cleaner cell. Lime is used for settling purposes in the thickener.

RESEARCH

A small batch ball mill and air cell are used for experimental purposes. The ball mill has a capacity of about 10 lbs. dry ore. The flotation cell has the same capacity. Samples of the ore have been sent to different metallurgical laboratories at various times. From tests done on the ore it appears that the gold is associated with the pyrite (and possibly with the chalcopyrite) in a very fine state, probably only a few microns in size, which would be too fine to respond to any means of gravity concentration. Over-grinding or sliming has a decidedly detrimental effect on flotation results, so a close watch is kept on the grind. Our present grind is about 55% minus 200 mesh with 2.0% plus 48 mesh.

SAMPLING, ETC.

A cut of the feed is taken every half hour as it drops off ore feed belt. A total of about 300 lbs. is taken every 24 hours and is crushed to minus half inch by a small laboratory crusher before being cut down. A sample of the Akins classifier overflow is taken every hour as a check on the head sample. The concentrates are sampled every hour, and the tailings are sampled every half hour by an automatic sampler. The filtered concentrates are sampled by an auger sampler from the loaded cars before shipping.

During the past year the Mill has run 96.28% of possible operating time, shutdowns being due to normal replacements and repairs.

MAINTENANCE

In the crushing department six new jaw-liners were replaced in the crusher during the year, also three toggles. A new conveyor belt was installed over Fine Ore Bin, replacing one that was partially worn when first installed.

In the fine grinding department six sets of liners were changed in the ball mill, consisting of two sets of feed end liners, two sets of discharge end liners and two sets of shell liners, the end liners lasting about eight months and the shell liners, seven. Blueprints were made of the feed end liners and also the shell liners and a set of liners, end and shell, was made up in Vancouver, at slightly reduced cost; they are now in use and it remains to be seen how they wear in comparison with liners bought in the East.

A rubber liner scoop has been installed recently on the ball mill, replacing one which had been in use over four years, and should last indefinitely, with occasional renewals of rubber lining.

Some trouble has been experienced during the past few months with the ball mill pinion gear. A new pinion gear and shaft assembly was ordered in March but it has not yet arrived. The gear and shaft were replaced about two months ago with an old gear and shaft, discarded by the old company, and this has run

satisfactorily to date.

The pinion shaft and the ball mill feed end trunnion were fitted with new bearings.

A considerable amount of repair work was done on the eight row mechanical cells, wear-plates being installed in the sides and bottoms of most of them. Sixteen impellers also were changed. Impellers on these machines have a life of less than six months, compared to between three to four years on the Denver machine, in which the rubber covered impeller has been in operation for three and one-half years.

A used rubber lined Wilfley Pump was purchased early in the year and has operated to date without repair. The impeller, which is metal, should be serviceable for at least another month.

A new main drive gear was put on the filter, replacing one badly worn. Your canvases were replaced on filter during the year.

FLOTATION

Practically no changes were made in the reagents used during the year. Cresylic Acid was used in place of Aerofloat No. 25 for a period of two days, with poor results.

A change in the flow sheet was made about two months ago by installation of a Dorr single-rake classifier near the Akins classifier to handle the overflow. Such overflow from the Akins classifier which, before the installation of secondary classifier, was the flotation feed, formerly ran between 3 to 4% plus 48 mesh and about 52% minus 200 mesh and was kept between 33 to 34% solids. It is now kept around 35% solids while the overflow from the secondary classifier, which is the present flotation feed, is about 32% solids, running between 2 and 3% plus 48 mesh and about 58% minus 200 mesh. The sand returns from the secondary classifier, amounting to about 15 tons per 24 hours, is pumped back to the head

of the ball mill by a Wilfley Pump, which handles the table product and scavenger cell product as well. The finer grind now obtained without sliming has made no reduction in the daily tonnage, but has affected a marked improvement in the grade of the concentrates, giving a better ratio of concentration with little or no loss of recovery.

The unit cell has been placed between the Akins and Dorr classifiers, in which position it does excellent work.

A considerable amount of experimental work was done on the separation of the copper minerals from the pyrite with the object of obtaining a separate copper concentrate, so securing payment for a higher percentage of copper than normally obtained.

While an 80% recovery of copper was effected, which figure in practice might be improved upon, it was found that a good separation involved the use of cyanide, the dissolving action of which on the gold would be difficult to measure. Some success was obtained by floating, first, the copper minerals, and afterwards, the pyrite, but the disadvantage of this was the necessity of grinding the total tonnage passed through the mill to somewhere about 90% minus 200 mesh, thus cutting milling capacity to about 80 tons per day. An alternative method was to make first a bulk concentrate and re-grind these concentrates before separating the copper minerals.

From the results to date, both here and at Ottawa, where the problem was submitted for advice, the cost of additional equipment required would not be warranted.

The tonnage of ore milled during the year was 39,643; concentrates produced totalled 4,396.221 dry tons.

MILLING COSTS

Year ended June 30th, 1941

		<u>Per Dry Ton</u>
Ore Sorting	\$ 4,636.59	\$.117
Crushing	2,411.87	.061
Grinding	12,958.06	.327
Flotation	12,933.65	.326
Dewatering	834.56	.021
Sacks and Sacking	-	
Power	2,695.64	.068
Repairs	3,707.30	.093
Assaying and Sampling	1,072.62	.027
Miscellaneous	<u>362.70</u>	<u>.010</u>
	\$41,612.99	\$1.050
W.C.B. Assessments	1,074.81	.027
Superintendence	<u>2,064.79</u>	<u>.052</u>
	\$44,752.59	\$1.129
Ore Transportation	<u>7,799.14</u>	<u>.197</u>
	<u>\$52,551.73</u>	<u>\$1.326</u>

SUMMARY AND CONCLUSIONS

1. The Surf and Pugsley ore deposits are quartz veins containing blobs and streaks of auriferous pyrite and chalcopyrite with some carbonates and minor amounts of other minerals. These veins were inserted from below into a curved fault zone traversing quartz diorite of the Coast Range batholith. The fault zone strikes generally north-south, but is broadly convex toward the west and is corrugated in detail; the broader corrugations are 1000 to 2000 feet across and on these smaller ones are discernible. The dip of the fault zone is 45°

to 60° westward. The corrugations pitch at 45° to 80° downward toward the north.

2. The initial fault movement carried the west block upward and southward relative to the east block, producing a corrugated shear zone as described. Later movements carried the hanging wall southward at lower angles, obliquely across the initial corrugations, producing openings through which vein-forming solutions passed easily. These movements were small, but apparently they persisted through the ore-forming period. Post-ore faults occur, but displacements are small and they should not cause any serious complications in mining.

3. The Surf and Pugsley ore zones are about 4000 feet apart. Each occupies a length of about 1000 feet and shows more complex fracturing than adjacent barren parts of the fault zone. The ore shoots are so erratic in their size, grade and distribution, that estimation of reserves ahead of mining cannot be very accurate. In the Pugsley, J. A. Ingraham, the former engineer and geologist for Surf Inlet Consolidated Gold Mines Limited has estimated 47,250 tons in the category of possible and probable ore and the writer would suggest the grade to be between 0.35 and 0.45 ounces gold per ton. In the case of the Pugsley Mine, the writer considers the chance of obtaining a much larger tonnage to be very good.

4. Laterally, the Surf and Pugsley zones are pretty well delimited. At the Pugsley, downward, ore persists on the 900, 1000, 1100 and 1300 foot levels and is wide open at greater depths.

5. In the opinion of the writer, the best chances for making important large additions to the ore reserves are offered by parts of the main fault zone below the known ore bodies in the Pugsley Mine. The 1500 foot horizontal section between the two mines so far has not yielded much results from the diamond drill work done up to 1946. Drilling done from surface to the north on the Cassie claim of the Gold Coast group has not yet been promising. Perhaps deeper drilling under the tunnel where excellent sampling results in 1928 were obtained by

H. L. Batten, Mining Engineer, might yield better results.

6. The predecessor company, Belmont Surf Inlet Mines Limited, between 1914 and 1926, both years inclusive, produced a total of 850,000 tons of ore from which a recovery of \$9.50 per ton principally in gold, with small amounts of silver and copper, was obtained. This was at a time when gold sold at \$20.67 per ounce and \$1,437,500 in dividends was paid. Although the bulk of the production came from the Surf Mine an important and growing increment came from the Pugsley Mine when the property was closed in 1926.

7. The recent increase in the price of gold from \$35.00 to currently around \$120.00 makes the whole operation more attractive and exploration and development should be vigorously pursued as hereinafter recommended in general terms.

RECOMMENDATIONS

1. It is recommended that the Pugsley Mine be pumped out and re-examined in light of the large increase in the price of gold.

2. It is recommended that a total of 4,000 feet of drifting and crosscutting be done on the 1000, 1100, 1300, and 1500 foot levels on the East and West Vein systems.

3. It is recommended that a minimum of 12,000 feet of underground diamond drilling be done in connection with this work.

4. It is recommended that 5,000 feet of surface diamond drilling be done on the Cassie tunnel area claim and beyond to the south.

5. It is recommended that prior to starting any work or negotiations for financing, Matachewan Consolidated Mines Limited acquire by staking or optioning that ground west of the Marcia and Bluebell claims, also the area south of the Bluebell and west of the Independence Fraction, Sea Fraction, Bee Fraction, Granite, Olive, Cassie, and Lakeview, and especially south of the Lakeview claim.

COSTS

1. The cost of 1, including mobilization and surface plant installation would be \$100,000.00 providing no water problems were encountered, which is not anticipated owing to the history of the mine. Washing down drifts and some additional sampling and check sampling would be \$10,000.00.
2. The cost of 2, 4,000 feet of drifting and crosscutting at \$90.00 per foot would be \$360,000.00.
3. The cost of 12,000 feet of underground diamond drilling at \$5.00 per foot would be \$60,000.00.
4. The cost of 5,000 feet of surface diamond drilling at \$12.00 per foot would be \$60,000.00.
5. The cost of supervision, consulting, assays, etc., would be \$60,000.00 plus \$50,000.00 for other contingencies.

The costs, therefore, would be:

(1)	\$110,000.00
(2)	360,000.00
(3)	60,000.00
(4)	60,000.00
(5)	<u>110,000.00</u>
TOTAL =	<u>\$700,000.00</u>

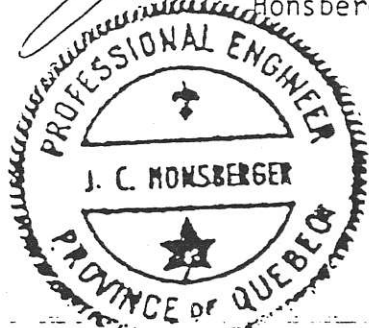

All of which is respectfully submitted.

15 Meadowacres Drive
Agincourt, Ontario

July 20, 1973

J. C. Honsberger

Honsberger, P. Eng.

J. C. HONSBERGER, P. ENG.

J. C. HONSBERGER

CONSULTING MINING ENGINEER
P.ENG. ONTARIO AND QUEBEC

OFFICE
SUITE 221
12 RICHMOND ST. E.
TORONTO 210, ONTARIO
416-363-0509

ADDRESS ALL CORRESPONDENCE TO
15 MEADOWACRES DRIVE
AGINCOURT 755, ONTARIO
416-491-1431

- 25 -

C E R T I F I C A T E

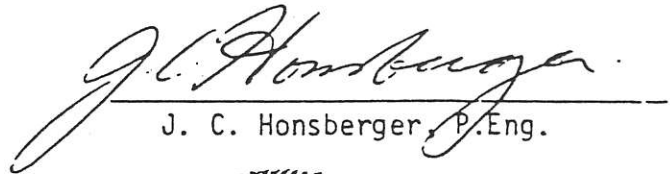
With respect to my Report on the former Surf Inlet Consolidated Mines Limited property, Skeena Mining Division, B.C., for Matachewan Consolidated Mines Limited, dated July 20, 1973, I, J.C. Honsberger, do hereby certify and state:

- (1) I am a Consulting Mining Engineer with offices at 15 Meadowacres Drive, Agincourt, Ontario, and Suite 221, 12 Richmond Street East, Toronto, Ontario.
- (2) I am a Graduate Mining and Metallurgical Engineer with the degree of B.Sc. (1928 - Queen's University, Kingston, Ontario). I am a life member of the Canadian Institute of Mining and Metallurgy, 1929; I am a life member of the American Institute of Mining, Metallurgical and Petroleum Engineers, 1944; I am a member of the Corporation of Professional Engineers of Quebec, 1945; I am a member of the Association of Professional Engineers of Ontario, 1944. I have practised my profession continuously since graduation and have been an independent consultant for 29 years. From August 1942 to March 1944 I was General Superintendent of Siscoe Gold Mines Limited. For ten years subsequent to 1944 I maintained a consulting engineering office in Val d'Or, P.Q., and have reported on many properties in this area and along the gold belts in Quebec and Ontario.

- (3) I have no interest in the subject claims described in this report or in the shares or securities of Matachewan Consolidated Mines Limited nor expectant.
- (4) I have not been on this property or in this area. My report is based on an office study of all the mine records and reports by various consulting mining engineers and geologists and other federal and provincial reports and maps and other data described hereinafter under Bibliography. I also discussed this property in June 1973 with Dr. J. E. Gill of Montreal, formerly consulting geologist for Surf Inlet Consolidated Mines Limited from 1942 to 1944. Most of the data was made available to me by Mr. P. H. McCloskey, President of Matachewan Consolidated Mines Limited, and the writer had numerous consultations with him.

15 Meadowacres Drive
Agincourt, Ontario

July 20, 1973


J. C. Honsberger, P.Eng.



	<u>Pugsley Mine</u>	<u>Surf Mine</u>
Geology Plans	550 level	320 level
	700 "	430 "
	860 "	550 "
	1000 "	700 "
	1100 "	800 "
	1100 sub level	900 "
	1200 level	1000 "
	1300 "	1400 "
	1500 "	

General Legend

Geology Sections

Survey Logs

Diamond Drill Logs

Engineering Plans - General 500' = 1"

Claim Map Linens

Section Linens - 650 through 1500' level

Longitudinal Section through Ore Bodies

Cross-Section 1" = 500' showings and outcrops

Ore Reserves, January 1943 and 1946

Map of Shear Zone - 900' level

Surface Drilling between Zones

List of Claims provided by Matachewan Consolidated Mines Ltd., July 1973

Report by Victor Dolmage, 1939

P.W. Racey, 1936

J.E. Gill, 1941

A.M. Richmond, 1936

H.L. Batten, 1928

Annual Report of Charles Mentzel, 1941

Report by J.E. Gill, June 30, 1942

Letter from J. W. Watson, Secretary, May 22, 1946

Report, June 30, 1941

Recommendations, J. E. Gill, August 1942

Report by Charles Mentzel 9/2/41

Report by Charles Mentzel 4/2/41

Report by J.W. Watson, Secretary, Surf Inlet Consolidated Mines Ltd. 5/31/46

Northern Miner Handbooks: 1936, 1937, 1938, 1939, 1940, 1942, 1943, 1944,
1945, 1946, 1947, 1948, 1956, 1957, 1960, 1966-67

Annual Reports of the Minister of Mines of the Province of British Columbia:

1902, 1903, 1904, 1905, 1912, 1913, 1916, 1922,
1923, 1935, 1936, 1937, 1938, 1939, 1940, 1942

Surf Mine - Assay Plans 1100 level)

1200 ") Complete set available.

1400 ")

East Vein of Pugsley - Plan and Section

West Vein of Pugsley - Plan and Section

Diamond Drilling Folder - Pugsley Mine.

Diamond Drilling Folder - Surf Mine

Pugsley Geological Plan, Lower Levels

Assay Plan 1100 level

1400 sub level

1300 level

1500 level

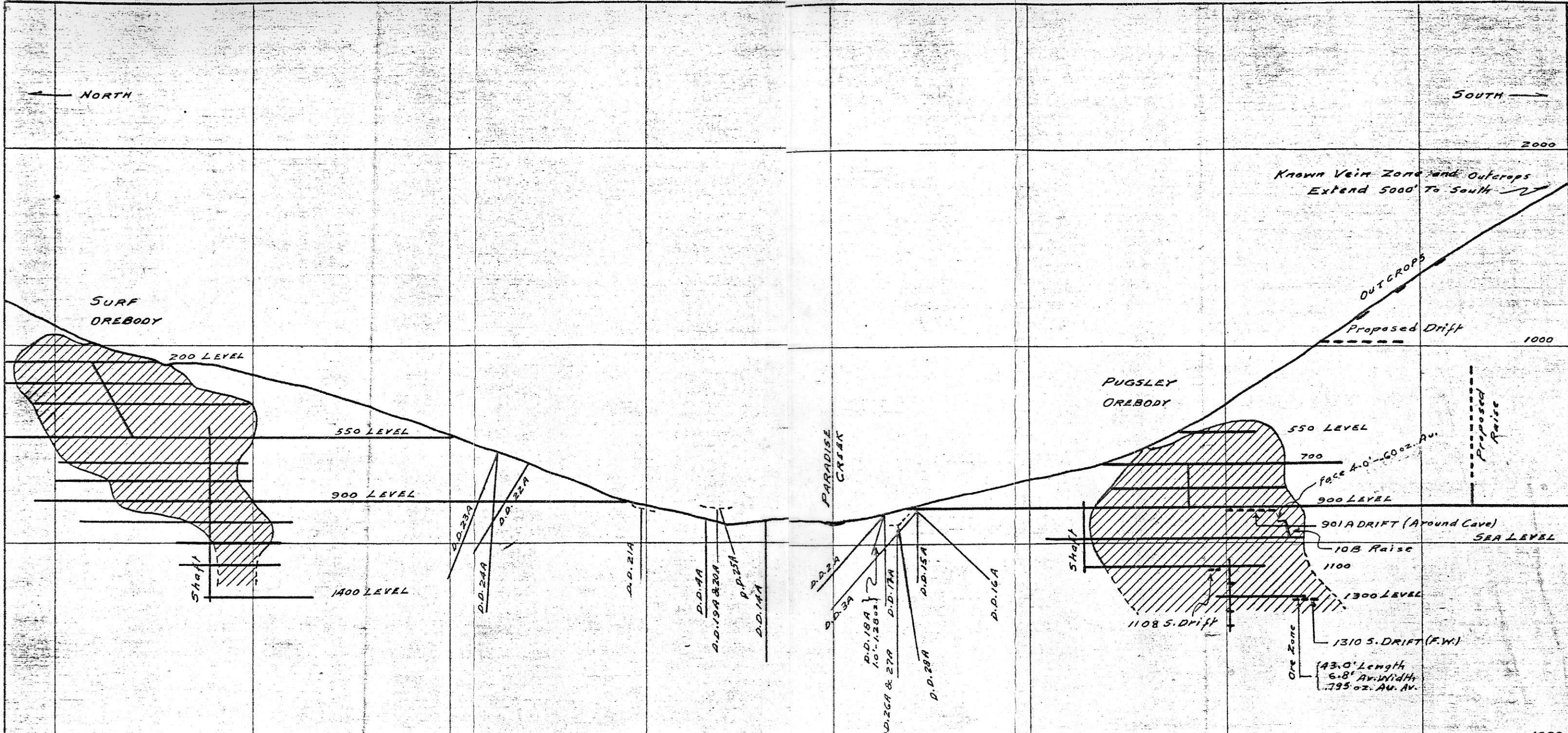
Plan between Surf and Pugsley Mines

Summary Report G.S.C. - 1912 - p. 63

Canadian Lode Gold Areas - Economic Geology Series No. 15 - 1946

by Mines & Geology Branch, G.S.C. - p. 15 & 16

Geology and Mineral Deposits of Northern British Columbia - G.S.C. Bulletin
No. 5 - p. 25



To Accompany Report on the former Surf Inlet Consolidated Gold Mines Ltd property, Skeena Mining Division, B.C. for Matachewan Consolidated Mines Ltd. of Toronto, Canada.
July 20, 1913.
J.C. Honsberger, P.E.

SURF INLET CONS. GOLD MINES LTD.
LONGITUDINAL SECTION OF OREBODIES
Scale