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Surf Inlet
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COMINCO LTD.

ENGINEERING SERVICES
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WESTERN EXPLORATION

EXPLORATION AND DEVELOPMENT RECOMMENDATIONS

FOR

THE SURF INLET ~~MINING CAMP~~ GOLD PROJECT

SUBMITTED TO

FLEET DEVELOPMENTS LTD.
VANCOUVER, B.C.

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Excellent!

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SURF INLET

SUMMARY

The dormant Surf and Pugsley Mines are located near the head of Surf Inlet on Princess Royal Island, British Columbia, at latitude 53°05' north and longitude 128°53' west. Prince Rupert, the main supply base, lies 100 miles to the northwest (Plate 1).

The mines, situated in rugged terrain, are separated by 4,000 feet with the Surf located to the north and the Pugsley located to the south of Paradise Creek (Plate 2).

Gold mineralization is associated mainly with pyrite in quartz veins. The gold quartz veins hosted by diorite and gneiss outcrop discontinuously along a well exposed shear zone traceable for over 15,000 feet of strike length. This shear-vein system dips generally 45 degrees to the west and has been traced over a vertical distance exceeding 3000 feet.

From 1900 to 1943, the mines operated intermittently for 30 years. In 1946 and 1947 extensive underground work was carried out at the Pugsley Mine establishing new ore reserves and ore potential. Labour shortages, not reserves or economics, forced closure of the Mine. During 1981 a program of drilling, mapping and sampling was carried out by a group of companies.

Total production from both mines equals 1.0 million tons grading 0.385 oz/ton gold, 0.18 oz/ton silver and 0.29 percent copper recovered.

The Surf Mine produced 770 tons per vertical foot over a vertical distance of 1100 feet whereas the Pugsley Mine produced 325 tons per vertical foot over a vertical distance of 525 feet. Pugsley production per vertical foot was at time of closure increasing with depth. (900-1000 level production was 430 tons per vertical foot.)

Detailed work by former production staff established that there was no diminishing of shear strength or gold grade with deeper mine development.

Other gold quartz showings of significance occur at surface along the shear south of the Pugsley Mine. Showings outcrop on the Independence Fr., Anaconda, Bonanza, Summit and Cassie claims; the last of which occurs 2000 feet south of the end of the most southerly exploration drift (Plate 4).

The potential for continuation of known ore centers plus the potential for discovery of new ore centers is considered excellent. A substantial deep drilling commitment both from surface and from rehabilitated and newly developed underground workings is strongly recommended.

INTRODUCTION

Fleet Developments Ltd. has recently formed a joint venture with Matachewan Consolidated Mines Ltd. to conduct exploration along an extensive shear system; a small part of which hosts the former Surf and Pugsley Mines. From 1947 to 1981 no work was carried out on the property.

During 1981, Cominco Ltd., Placer Development Ltd. and Matachewan Consolidated Mines Ltd. entered into an agreement to develop the property. At that time claim holdings were considerably enlarged to protect extensions of the mineralized shear system. Present claim distribution is displayed on Plate 3. Jen claims 1-4 come due November 27, 1986.

1981 Program

Through shallow drilling, the main objective of the 1981 program was to test the large tonnage open pit gold potential in the vicinity of the Pugsley Mine.

The drill program combined with detailed mapping and sampling of the property surface showings and underground workings generated an understanding of the geological and structural constraints of mineralization and economic potential.

Ten drill holes totalling 5008 feet were cored over a strike distance of 6400 feet. Drill coverage extended south approximately 2300 feet from the heart of the Pugsley Mine, was carried out through the Pugsley system and extended to a point some 1000 feet south of the southern extension of the Surf orebody.

During the 1981 program, the property, including extensions, was mapped at 1:5000 scale (Plate 4). All surface showings and safely accessible portions of the underground were mapped and sampled in detail. Soil and rock sampling was carried out where possible and old mine dumps were sampled in detail.

1981 Program Conclusions

1. Drill results definitively established that there is no possibility of creating a large open pit deposit on the property.

2. Mineralization is restricted to one main shear system that splits into a multiplicity of shears in the vicinity of the Surf and Pugsley ore zones.

3. Gold values are found to be mainly associated with higher concentrations of pyrite, regardless of the abundance of quartz, ankerite, sericite, chlorite or calcite.

4. Surface sampling confirmed gold values in previously discovered surface showings. Assay returns revealed encouraging gold values over 1 foot to 5 foot widths.

5. Underground sampling results indicate that select shoots are auriferous but not all veins containing significant sulfides and alteration necessarily generate economic gold values.

6. Waste dump sampling yielded encouraging values in the 0.05 to 0.1 oz/ton gold range (straight arithmetic average).

PROPERTY GEOLOGY (Plate 4)

A. Main Rock Units

These units predate shearing and mineralization and include:

(i) quartz biotite feldspar gneiss;
(ii) diorite gneiss assimilation zone;
(iii) diorite - granodiorite.

B. Minor Rock Units

These units post date mineralization and include:

(i) pegmatite;
(ii) diabase.

C. Altered Host Rocks

On the flanks of the shears, subtle kaolinite, chlorite epidote and silica alteration occurs. Host rocks display varying degrees of fracturing, aligning and mylonitization. Minor ankerite calcite and siderite, restricted to fractures, are late stage introductions. With progression to the heart of the alteration envelope; silica sericite and ankerite increase at the expense of chlorite, calcite and epidote. Massive quartz veining with subordinate ankerite and sericite reflect the ultimate alteration zones.

D. Quartz Veins and Mineralization

Throughout the shear zone there are many quartz ± ankerite, sericite ± sulfide veins. These veins vary in thickness from a few inches to 40 feet and commonly display a strong pinch and swell nature. The veins consist primarily of quartz with lesser ankerite pyrite and chalcopyrite. Gold often as telluride occurs almost exclusively with pyrite. Little free gold has ever been detected although silver occurs in native form. Secondary copper minerals plus traces of molybdenite and scheelite are occasionally detected.

Pyrite and chalcopyrite are believed to have been deposited during at least four pulses of mineralization, not all of which contained gold. Sulfide minerals in general occur as massive seams on fractures and as disseminations of extremely fine to very coarse grain size throughout the shear.

THE FAULT SYSTEM (with excerpts from Gill and Byers)

The fault zone visibly strikes in excess of three miles. This fault likely extends considerably further to the south although overburden largely obscures that ground.

In the vicinity of the two ore zones, the system is broadly convex towards the west striking approximately north 20 degrees east at the north end, north-south at the central section and approximately north 20 degrees west at the south end. Dips in this zone approach 45 degrees to the west.

The system comprises a multiplicity of shears including one main footwall shear. True thickness of the main footwall shear altered and mineralized rock varies between 15 feet and 250 feet. In the vicinity of the Surf and Pugsley Mines, the main footwall shear splits into two main parallel shears plus several oblique sub-shears.

Gill and Byers further suggested that "Individual faults show broad corrugations, grooves and striae plunging at various angles but mainly northward at 30^{o}-70^{o} but averaging 45^{o}. Evidence suggests that during main movement, the hangingwall moved up relative to the footwall and ultimately south".

Intensity of deformation, alteration and vein dimension varies markedly both in the horizontal and vertical sense. Those areas reflecting ore centers or surface mineral showings must represent areas of dilatancy which facilitated the ascent of altering and mineralizing fluids.

THE ORE ZONES

A. General

The Surf and Pugsley Mines are separated by 4000 feet. Twenty-five hundred feet of this distance has been developed by underground drifting as access to the orebodies. The remaining 1500 feet which crosses Paradise Creek Valley has been explored by numerous shallow drill holes (Plate 5). The best and only gold quartz intersection from this latter zone yielded 1 foot of 1.28 oz/ton gold.

The Surf Mine levels were established by the Belmont Company at approximately 100, 200, 320, 430, 550, 700, 800, 900, 1000, 1100, 1200 and 1400 feet vertical depths below an arbitrarily chosen datum at 1110 feet above sea level. The Pugsley Mine produced from levels at approximately 550, 700, 800, 900, 1000 and 1100 feet below the same datum. In later years a winze at the Pugsley was extended with encouraging ore development to the 1300 level.

In both mines, workings above and including the 900 level are accessible through adits although most are caved at the portals. All levels below 900 are flooded.

B. The Surf Mine

The Surf Mine is broken into west and east veins with a complex network of vein filled sub shears and tension gashes enhancing the tonnage. In past production areas, maximum shear vein separation approaches 200 feet with economic vein widths ranging from 2-40 feet and lengths varying between 100 and 1000 feet. The old workings were flooded in 1939.

Mine operators believed in a southerly pitch to ore shoots and carried out successful exploration and development on that basis. Structural work suggests a northerly pitch to ore shoots is equally possible and, if correct, new exploration opportunities lie to the north of the old workings.

Mine development and exploration ceased when the down dip or plunge extension of the Surf ore zone approached the boundary of a north-south trending group of claims held by a man named Wells (Plates 5, 6).

The former Wells claims comprising six contiguous crown grants are named: Sheet Anchor Fr., Sea Lion Fr., Sunlight Fr., Little Tommy Fr., Sea Gull Fr. and Brown Bear (Plate 4).

The Surf shear zone extends on to these claims over a strike length of 5000 feet and to an average projected distance of 2500 feet down dip (Plate 6). The nearest known ore development in relationship to the Wells claims lies on the 1400 level approximately 100 feet from the Sunlight Fr. claim boundary.

As a deal with Wells could never be completed, this ground has never been explored. As a consolation prize, a very exciting and excellent exploration opportunity now exists.

C. The Pugsley Mine

The Pugsley ore zone to the south of the Surf covers a strike distance of 1000 feet. Stated reserves from development in 1946 and 1947 are 14,000 tons firm at 0.35-0.40 oz/ton gold. This figure was calculated from mine workings which exposed ore. The estimate for reserves above the 1300 level is 57,000 tons (probable) and this figure is considered conservative as it is based on a yield of 50 percent of the historical

productivity of the Pugsley and only 30 percent of the productivity between the 900 and 1000 levels (C. Mentzel, 1946).

At the Pugsley the west vein varies between a few inches and 10 feet thick. The east vein is a shear-vein network that locally expands to 100 feet in thickness. Ore zones as at Surf lie entirely within quartz veins and are defined by assaying. Quartz and gold are irregularly distributed so detailed drilling is needed to define the configuration of an ore shoot.

OTHER SHOWINGS WITHIN THE CLAIMS

Other gold quartz showings on the property from south to north include the following (Plate 4):

(A) Cassie

The Cassie showing is located on the Cassie claim, 1.5 miles south of the 900 level portal Pugsley Mine at an elevation of 1700 feet. A 215 foot adit has been driven on the showing, including an internal shaft and sub drift. Two shallow surface holes have been drilled to test the vein at depth with one hole encountering two - five foot quartz ankerite veins assaying 0.04 oz/ton gold.

Quartz vein samples at the portal assayed 0.12 oz/ton gold over 8 inches and 0.18 oz/ton gold over 1.5 feet. A select sulfide rich sample from the ore dump assayed 1.84 oz/ton gold. Old sample records revealed a best assay of 4.0 feet of 0.98 oz/ton gold from inside the tunnel.

(B) Summit

At approximately 1300 feet north of the Cassie showing, on the Summit claim between 2300 and 2400 feet elevation outcrop a series of quartz veins known as the Summit showings. The veins are narrow, varying between 0.5 feet and 2.5 feet thick. The best chip sample yielded 0.19 oz/ton gold over 2.5 feet. Old records revealed an assay of 3.5 feet grading 0.32 oz/ton gold. Three shallow drill holes picked up the shear, but no gold.

(C) Bonanza

This showing is located on the Bonanza claim north of the Summit showings at an elevation of 2600 feet. The showing consists of two mineralized quartz veins 40 feet apart. The upper or western vein is 2.0 feet wide and the eastern vein is 4.0 feet wide. These veins assayed 0.12 oz/ton gold and 0.37 oz/ton gold respectively.

Three short holes have been drilled with one hole yielding 20.0 feet of vein grading 0.02 oz/ton gold with a hole to the north yielding 7.0 feet of 0.03 oz/ton gold.

(D) Diabase

This showing is located NW of the Bonanza showing, on the same claim at an elevation of 2540 feet. It is considered part of the hangingwall shear system and at this location is cut by a diabase dyke. The quartz vein assayed 0.13 oz/ton gold over 2.3 feet.

(E) Hangingwall Shear East of DDH 81-1

At the 2300 foot elevation on the Anaconda claim a 1.0 foot quartz vein contains 10 percent pyrite. The sample assayed 0.12 oz/ton gold over the vein width. The drill hole did not cut this vein at depth.

(F) Anaconda

The Anaconda adit is located at 2018 feet in the west bank of the footwall creek. It is 40 feet long.

The quartz vein is up to 3 feet wide and contains 4 percent pyrite. Four samples were collected, none of which returned significant gold values. DDH 81-2 returned two intersections yielding 2.0 feet at 0.3 oz/ton gold and 2.5 feet at 0.06 oz/ton gold down dip from the adit.

(G) Independence

The Independence showings are located in part on the Independence claim and in part on the Excelsior claim. The showings are located in the footwall creek between elevations 1020 feet and 1150 feet and represent the largest outcropping of quartz on the Pugsley side. Unfortunately, the showings are barren of sulfides and gold.

An adit 40 feet long was driven on one vein. Maximum vein width approaches 3.0 feet. Hole 81-4 intersected 5.2 feet of this vein projection yielding 0.04 oz/ton gold.

(H) Sadies Creek

Showings south of the Pugsley Portal occur in Sadies Creek at 640 foot, 540 foot, 475 foot, 410 foot, 345 foot and 310 foot elevation. These veins represent surface exposures of the Pugsley orebody.

Assays collected from the above veins yielded 2.5 feet at 0.55 oz/ton gold, 3.0 feet at 0.35 oz/ton gold, 2.0 feet at 1.3 oz/ton gold, 1.0 foot at 0.23 oz/ton gold, 3.0 feet at 0.05 oz/ton gold and 3.0 feet at 0.03 oz/ton gold respectively.

(I) Bluff

The Bluff showings are the surface expressions of the Surf orebody 700-1100 feet above sea level. Vein widths at this location are up to 13.0 feet wide. Samples collected assayed 3.0 feet at 0.88 oz/ton gold, 3.0 feet at 0.04 oz/ton gold, and 5.0 feet at 0.18 oz/ton gold.

EXPLORATION POSSIBILITIES

A. Surf Mine (Plates 4, 5, 6)

(a) It is realistic to expect a fault zone of such great strike length will extend to much greater depths than the present limits of exploration and thus will extend through the Wells claims. It is also realistic to expect that Surf ore structures will extend onto the Wells claim group and will contain gold.

Since the fault zone on the Wells ground at no place approaches surface nearer than 500 feet, and since all but 10 percent of it is beyond the reach of surface drills, it can only be prospected by:

(i) sinking 1000 foot shaft on the Sea Gull claim and drifting;
(ii) rehabilitate the 900 level and deepen the Surf Mine shaft past the 1400 level to facilitate exploration development headings;
(iii) surface drilling a minimum length of 1500 feet for a test of the extreme southern extension of the Surf deposit.

(b) A promising structure at the north end of the 550 level may develop into an ore shoot and extend on to the Sea Lion claim.

(c) On the 900 level, a structure occurs which could extend to the Little Tommy claim.

(d) The north plunge theory of ore shoots adds exploration possibilities from all levels to the north of stoping at the Surf Mine.

(e) It is possible that a distinctly new ore center could blossom on the Wells acreage as exploration evolves.

B. Pugsley Mine (Plates 4, 5)

(a) Deep drilling from surface to test beneath the 1400 level will confirm shear strength and hopefully gold continuity.

(b) Between the 900 and 1000 level from 600 N to 1600 N ore reserves and continuity have not been completely established. The last round from 901A drift encountered 4.0 feet at 0.60 oz/ton gold.

(c) Between 1100 level and 1000 level around 750 N exploration is required to firm reserves. Drilling in this vicinity has intersected 8.5' at 0.16 oz/ton gold, 10.0 feet at 0.35 oz/ton gold and 9.0 feet at 0.91 oz/ton gold.

(d) On the 1400 level, the ground between 1000 N and 2000 N has never been tested. This test could be adequately carried out from surface or underground.

(e) The long drift to the south on the 900 level contains a section from 250 north to 1800 south with sporadic intervals containing sub economic mineralization. These anomalous sections possibly reflect the beginning of one or more new ore centers and in these regions there is much room in the back as well as at depth. Some minor rehabilitation or 901 Drift South and 935 South Drift is required.

The best section lies between 400 and 500 south which over 80 feet of strike averages 0.16 oz/ton gold over an average 4.5 foot width.

The 940 East Crosscut between 1200 and 1300 south possibly reflects a quartz shear zone exceeding 20 feet in width with pick and chip sample grades varying between 0.1 and 0.5 oz/ton gold.

C. Other Areas

The numerous gold quartz showings on the property are all from the same genesis as the Surf and Pugsley ore zones. Deep drill testing in the Cassie and Summit claim area is recommended as no deep underground development has tested these shoots.

CONCLUSIONS

It is recognized from Cominco's 1981 exploration program that open pit potential at Surf Inlet does not exist. It is also apparent that a widely spaced drill program is not sufficient to test satisfactorily the underground potential on the property.

While the shear zone is strong and continuous, ore shoots are discontinuous both in a horizontal and vertical sense and thus require a much tighter drill pattern complemented by underground development to establish reserves.

It is highly possible that former Surf Mine staff placed too much emphasis on the southwest ore plunge theory and did not adequately assess the ground to the north of the former workings. There is a very good chance new reserves can be established in this section.

Deep drilling to test the extensions of the Cassie and Summit showings is recommended.

The depth extensions of the Surf and Pugsley orebodies including the former Wells claims as well as the sub economic zones along 935 south drift Pugsley are the best bets for new ore in the camp. There is every reason to believe that the structures and associated mineralization persist to considerably greater depths, and the recommended development will yield one or more ore deposits sufficient to resume production.

Reported by: _____
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