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Rockland Mining Limited (N.P.L.)

Engineering Report

ROCKLAND PROPERTY

Silverton, British Columbia

J. F. McIntyre, P.Eng.
May 17, 1967

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INTRODUCTION

The writer examined the Rockland property on April 12 and 13, 1967, in company with Mr. D. H. Hawkins of Rockland Mining Limited (N.P.L.).

The property is located near Silverton, British Columbia, in the Slocan Mining Division. The district was one of the truly great, early mining camps of the Province and is renowned for its very large production of silver, much of which was derived from spectacularly rich ores. Among the several hundred prospects and mines found in the district, principally silver-lead-zinc and gold-silver vein deposits, a few gold-copper deposits were found. These while apparently of much larger dimensions, were of much lower grade and over the years were largely "passed-up" by prospectors and mining companies alike for the much more spectacular silver prospects. As a result little serious exploratory work has been done on them. The Rockland deposits are of this type.

The property is presently owned by Rockland Mining Limited (N.P.L.), a recently incorporated British Columbia company with offices in Vancouver.

DESCRIPTION OF PROPERTY

The Rockland property consists of three Crown-granted mineral claims held under a mineral lease and four mineral claims held by location, all of which are contiguous and constitute a solid block. Details are as follows:

Mineral Lease M-58	Willa Crown grant	Lot 1529
	Rockland " "	Lot 3884
	Rustler " "	Lot 3885
Claims held by location	DC 1 Mineral claim	
	DC 2 " "	
	DC 3 " "	
	DC 4 " "	

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Mineral Lease M-58 covers an area of 128 acres and the four claims held by location cover an additional area of approximately 180 acres.

The property is located on Aylwin (Eight Mile) Creek, five miles due south of Silverton and approximately 3/4 miles east of the Slocan Highway. Elevations on the property are in the 3,600 - 6,000' range with the workings and principal showings at 3,900 - 4,500', some 900 - 1,500' above the highway. The property is very conveniently situated both for ease of exploratory work and as a prospective mining site.

The terrain on the claims consists of relatively steep mountain slopes densely wooded with fairly mature coniferous and deciduous trees. While the slopes are steep there are few cliffs in the vicinity of the showings and sufficient soil cover for easy construction of roads. A narrow but firmly-based road extends from the highway to the lower boundary of the Willa Crown grant at 3,700' elevation. This road is suitable for trucks or cars during the summer season, however the upper grades are steep and suitable for only four-wheel drive vehicles during the other seasons. No problems would be encountered in providing moderate grades to the principal workings and showings.

The area is one of fairly moderate winter temperatures with relatively heavy snowfall, and warm, fairly dry summers.

HISTORY

The deposits were discovered some time prior to 1896, following, it would seem, discovery of copper carbonates and nodules and sheets of metallic copper in a log jam further down Aylwin Creek. These undoubtedly resulted from natural leaching of copper minerals in the deposits. Extensive prospecting and underground exploration were subsequently carried out and in 1899 some 331 tons of copper-gold ore were shipped to a smelter. The grade of that ore was not reported. Work continued to 1904, then the property lay essentially dormant except for occasional interest until fairly recent times. During 1955 it was examined by Mr. E. H. Lorntzen, Prospector, who sampled various of the workings and wrote a quite comprehensive report on his findings.

In 1964 the three Crown grants were leased by Mr. D. H. Hawkins and were reported on by Mr. Jack A. Millican, P.Eng., during July of that year. The lease and additional claims were optioned to Northlode Exploration Ltd.(N.P.L.). The latter in turn granted an option to the Consolidated Mining and Smelting Company of Canada Limited (Cominco). Cominco conducted a small program of road building and bulldozer trenching late in 1964 however the trenching was superficial and did not expose bedrock in any of the mineral zones. During the summer of 1965 they carried out a program of geological mapping and put down four diamond drill holes totalling 975 feet. Subsequently Cominco, and in turn Northlode, relinquished their options and the mineral lease was returned to Mr. Hawkins.

GEOLOGY

The geology and ore deposits of the Slocan mining camp have been very extensively reported over the past seventy years by various geologists of the Geological Survey of Canada and the British Columbia Department of Mines. Most recent was the work of H. W. Little of the Geological Survey of Canada, Memoir 308, "Nelson Map-Area, West Half" (Map No. 1090A), 1960. During the 1965 exploratory program Cominco carried out detailed geological mapping within the boundaries of the property. The following description of the geology is derived from both of these sources and the writer's observations in the field.

The property lies in a remnant, some three miles north-south by $1\frac{1}{2}$ miles east-west, of Slocan Group Rocks, (Triassic age) resting on the intrusive rocks of the Nelson batholith (lower Cretaceous age). This remnant has frequently been referred to as a "roof-pendant," and may well be, however whether or not the Slocan rocks extend to the considerable depths characteristic of a true "roof-pendant" is yet to be established.

The Nelson intrusive rock surrounding the remnant of Slocan rocks is the coarsely porphyritic granite characteristic of this batholith in this area. The remnant is a complex assemblage of basic volcanic rocks and sediments, all extensively altered, and porphyritic intrusive rocks. The latter intrusives are mainly finer-grained than the Nelson granites and vary in composition from syenite to quartz diorite. They have been mapped by Little (Map 1090A) as Nelson rocks,

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however their different character lends support to the belief, held by some others, that they may be post-Nelson intrusives (possibly Tertiary). However they may have been emplaced during a latter stage of the Nelson intrusion. This also is yet to be established.

On and in the vicinity of the Rockland property the Slocan rocks are mainly altered andesitic augite-porphyry and relatively minor altered sediments. Together they form a most complex assemblage along with the finer-grained porphyritic intrusive rock which has generally been described as "quartz-eye porphyry." Adjacent to the showings there occurs a diabase dyke cutting the Slocan volcanics. Whether or not this cuts the finer-grained porphyry is not yet known.

On the Willa and Rockland Crown grants the rocks are generally well fractured. Traversing these claims are two strong, wide shear zones, referred to herein as the Willa and Rockland shears, which have further shattered these rocks. Away from the shears the degree of fracturing progressively decreases. Parts of the shears have been extensively silicified and these and the adjacent shattered volcanic rocks have been mineralized by pyrite, pyrrhotite and chalcopyrite, various of which carry values in gold and silver. At and near the surface much of the iron pyrites are altered by surface weathering to limonite and the chalcopyrite to malachite and azurite.

MINERAL SHOWINGS

The following description is derived from the reports of Lorntzsen, Millican and Cominco and the writer's observations in the field. At the time of the writer's examination much of the ground was covered by snow and it was impossible, due to previous caving, to enter any of the underground workings, as was also the case during 1964 and 1965.

Copper, gold and silver occur on the property in two principal structures, the Willa and Rockland shears, and possibly in a third shear zone in the vicinity of No. 3 tunnel. The Willa and Rockland shears appear similar in most respects except strike and probably were contemporaneous or approximately so.

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The Willa shear was explored by two adits prior to the turn of the century, Willa No. 1 immediately southwest of Aylwin Creek and Willa No. 2 immediately northeast of the same creek. It is a broad shear zone striking $N40^{\circ}E$ and dipping nearly vertical or steeply SE. It has been mapped by Cominco for 1200' NE and 1500' SW from the creek. At Aylwin Creek, at the location of the Willa No. 2 adit, the mineralized zone is some 130' wide of which the SE $1/3$ is extensively silicified and the NW $2/3$ is principally crushed, altered volcanics. Much of the latter interval had been opened to view for the first time by a bulldozer cut made a few days previous to the writer's examination. The silicified section contains much pyrite and pyrrhotite, much of which has been weathered at the immediate surface to limonite, and some malachite and azurite. The crushed section contains much limonite, considerable malachite and a little azurite but no unweathered sulphides. The writer took four chip samples from SE to NW over the entire exposed zone as follows:

<u>Width</u>	<u>Au.</u> oz/ton	<u>Ag.</u> oz/ton	<u>Cu.</u> %
+ 30'	.015	.30	.35 (silicified)
+ 20' Gap	-	-	- (covered by snow)
+ 30'	.025	.10	.35 (crushed volcanics)
+ 20'	.015	Tr.	.40 (" ")
+ 30'	.005	Tr.	.19 (" ")

From the appearance of the rock it is apparent that all of the copper sulphides included in the sampling have been weathered at the surface of the outcrop and it is logical to expect that the present apparent grade falls considerably short of the original grade at the location sampled.

The Rockland shear was explored by a single adit, the Rockland adit. Lorntzsen's work is the only available information. He mapped the shear in the adit, demonstrating a true width of 60' and a strike of $N70^{\circ}E$. He took four samples across the zone in the adit which averaged 0.51% Cu., Tr. Au., over the 60' width. Again the indication was that much of the copper sulphide on the walls had been leached out since the driving of the adit. Projecting his strike of the Rockland shear underground, it would intersect the Willa shear at the Willa No. 1 adit. The writer observed shearing planes of similar attitude at Aylwin Creek which appear to substantiate the intersection of the two shears at this point.

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In the Willa No. 1 adit the values are principally gold, 0.08 - 0.29 oz/ton, and a little copper, from information published during the early life of the property.

The Cominco program consisted of four diamond drill holes, C-1 to C-4 inclusive. Hole C-1 appears to have been collared too far south to intersect any part of the Rockland shear. At depth it appears to have intersected the Willa shear some 600' SW of the old workings and their nearest other hole. The grade was disappointing at this point, apparently only 0.11% Cu. over 73'. Hole C-2 cut the Willa shear of which 36' assayed 0.40% Cu., 0.02 oz/ton gold. Hole C-3 recovered no core while C-4 recovered no core in the interval through the Willa shear.

CONCLUSIONS AND RECOMMENDATIONS

The Rockland property is the site of two wide, strongly developed shear zones, silicified and mineralized with values in copper, gold and a little silver. The principal copper values occur in the form of chalcopyrite. The mineral association of the gold and silver values is as yet unknown and they may occur with the chalcopyrite or the iron sulphides, pyrite and pyrrhotite.

At and near the surface of the ground the ore zones are extensively weathered and much copper (and possibly some gold and silver values) has been leached out with probable substantial reduction in the grade at the location of the writer's surface sampling.

The Willa shear appears to have a mineralized width of up to 130' at Aylwin Creek and has been mapped by Cominco along strike over a total length of 2,700'. Exploration to date includes the Willa No. 1 and No. 2 adits, the four diamond drillholes by Cominco and the sampling of the writer in the new bulldozer cut adjacent to the Willa No. 2 adit and three of the four drillholes. The first of the four drillholes, C-1, was a 600' step-out from known mineralization. In the writer's opinion this was an extravagant distance for a primary step-out. The second, C-2, achieved a reasonable intersection but of apparently marginal grade. The third and fourth holes, C-3 and C-4, were reported to be in overburden, and hence no core was recovered, for the first 46' of each hole. It is noteworthy that this interval in both holes

should have been in ore and the writer's observations in the new bulldozer cut point strongly to the conclusion that in both of these holes that interval was indeed in mineralized, shattered volcanics of the ore zone and not in overburden. Further, the directions of both holes was such that neither should have been expected to remain in the mineralized portion of the Willa shear much further than those depths. It is concluded that the drilling results of hole C-3 and the first 46' of C-4 should be disregarded.

It is the writer's information that core recovery from the drilling was far from complete yet no record of core recovery is shown on the drilling logs. Further, it is reported that no sludge samples were taken. Under the circumstances, such samples would be definitely required for a reliable evaluation of grade. It is therefore possible that the grade results reported from holes C-1 and C-2 are not reliable.

The Rockland shear was not tested by the drilling program. Whether or not hole C-1 was intended to intersect this shear it appears that it did not intersect this zone. The only information available is from Lorntzsen's report and it is the writer's opinion that his sampling and mapping are credible as much care and thought appear to have been employed in the work. It is concluded that this is a strong shear with significant mineralization.

At first glance it would appear that the 1965 drilling program denies the possibility of an economic ore occurrence on the Rockland property. However, it is the writer's conclusion that the drilling practice employed seriously compromises the significance of the largely negative results obtained, that recent bulldozer trenching tends to deny those results and that the recent work tested only a very small fraction of the total lengths of the zones, viz none of the Rockland shear and only about 15% of the known length of the Willa shear. It is therefore concluded that both zones are still essentially unexplored and the property is worthy of renewed exploratory efforts and expenditures.

The writer recommends that a program of additional surface prospecting, bulldozer trenching and diamond drilling be carried out. Particular care should be taken in the drilling techniques employed and in the evaluation of both trench sampling and drillhole sampling. Certainly drill sludge samples should be taken. In the writer's opinion the following minimum program (laid out on Figure 2) would be required to definitively test the zones and such expenditures are considered quite justifiable.

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(1) Additional surface prospecting .	\$ 3,000
(2) Bulldozer trenching and sampling, 20,000 c.y.	10,000
(3) Rehabilitation of Rockland adit for drilling and re-sampling	2,000
(4) Underground diamond drilling, Rockland adit - 2,000 ft.	8,000
(5) Surface diamond drilling, Rockland shear - 2,000 ft.	20,000
(6) Surface diamond drilling, Willa shear - 2,000 ft.	20,000
(7) Camp and crew maintenance	6,000
(8) Administration, engineering, assaying, miscellaneous	12,000
	<hr/>
Total	<u>\$81,000</u>

It is worthy of note at this time that the natural chemical conditions (and possibly biological as well) prevailing in the copper-bearing shear zones of the Rockland property are such as to promote unusually effective natural leaching of copper from the deposits. Certainly natural leaching is far more prevalent than in most copper deposits in this Province. This gives rise to the conclusion (albeit the concept is considered premature at this time by many in the mining industry) that the ores of the Rockland property are probably much better suited than are most, to "pile-leaching" as a method of copper recovery as opposed to conventional milling. If so the grade required for economical copper recovery could be substantially lower than that required utilizing conventional means and this factor is worthy of consideration at this time.

Respectfully submitted.


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CERTIFICATE

I, J. F. McIntyre, P.Eng., hereby declare that:

- (1) I hold the degree of Bachelor of Science in Mining Engineering, University of Alberta, 1949; and,
- (2) I am a registered member, in good standing, of the Association of Professional Engineers of British Columbia and Alberta; and,
- (3) I carry on consulting mining engineering practice with offices at Suite 408, 475 Howe Street, in the city of Vancouver in the Province of British Columbia; and,
- (4) I have practiced my profession continuously since 1949 with wide experience in mining and geophysics; and,
- (5) I personally examined the Rockland property on April 12 and 13, 1967; and,
- (6) I have derived my descriptions and conclusions from my personal examination of the property, published reports and the reports referred to herein; and,
- (7) I have never, nor do I hold any interest whatever in the securities or properties of Rockland Mining Limited (N.P.L.) or its principals; and,
- (8) My sole remuneration for this report is the professional fee charged for it.

Signed:

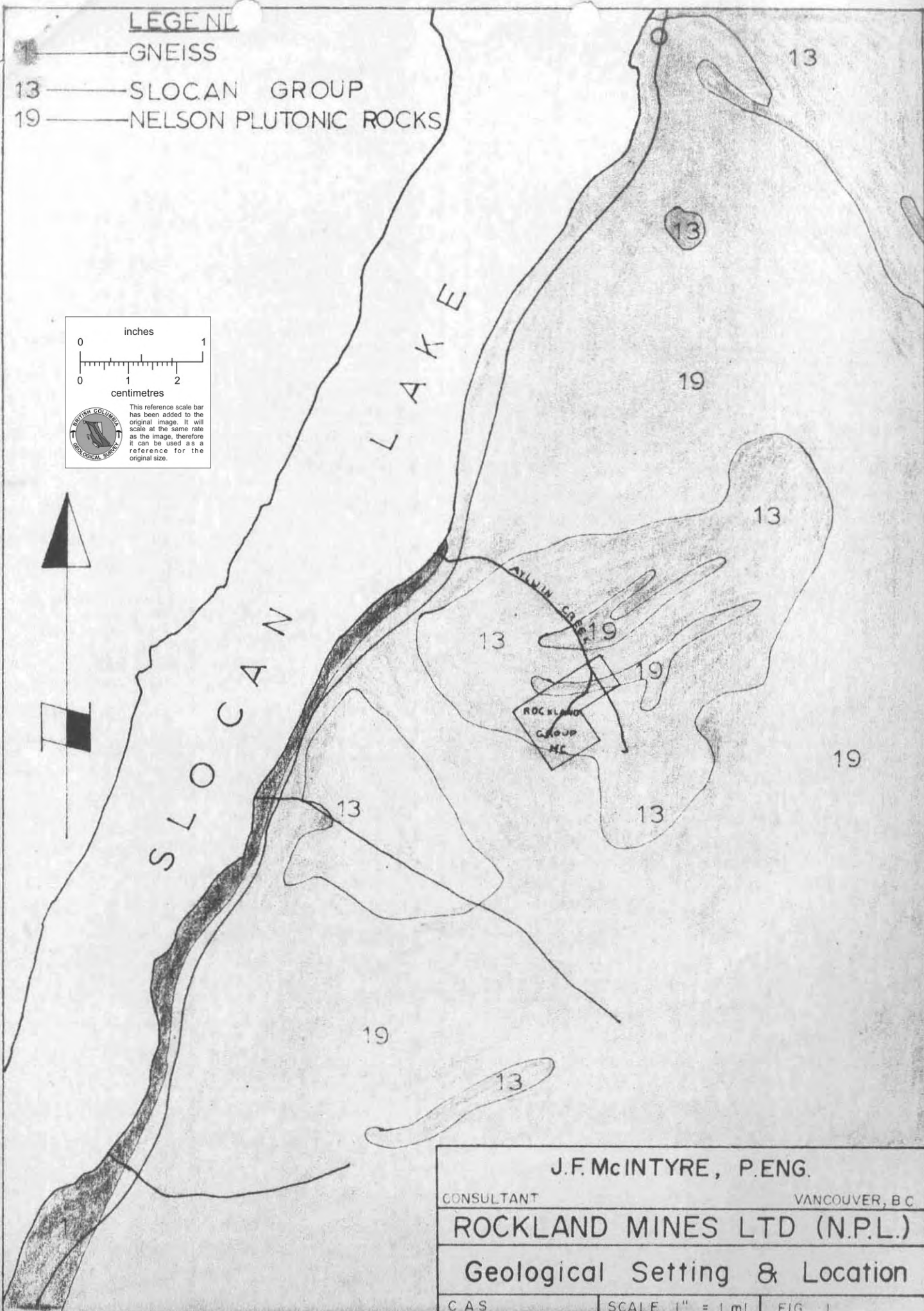
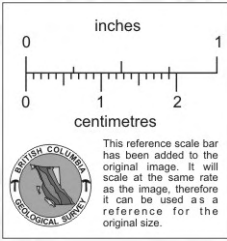


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LEGEND

- GNEISS
- 13 — SLOCAN GROUP
- 19 — NELSON PLUTONIC ROCKS



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ROCKLAND MINES LTD (N.P.L.)	
Geological Setting & Location	
C A S	SCALE 1" = 1 mi
FIG 1	