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COPPER RIDGE MINES LTD. 920-36
 Report on the Fraser Property
 Lake Cowichan, B. C.
 Van. B.C. L.G. White & Assoc. Ltd.
 Jan. 12/66 Consulting Engineers

PROPERTY FILE

EN. 151

~~See M.I. Maps~~

~~920/8E~~

REPORT

TRAIL PROPERTY

LONG CREEK - HENDERSON RIVER AREA

LAKE COQUICHAN, B.C.

VICTORIA MINING DIVISION

BRITISH COLUMBIA

Submitted to: Copper Ridge Mines Ltd.
74 East Pender Street
Vancouver, B.C.

Vancouver, B.C.
January 12, 1966

L.C. White & Associates
Consulting Mining Engineers

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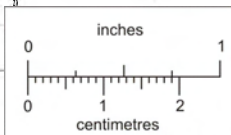
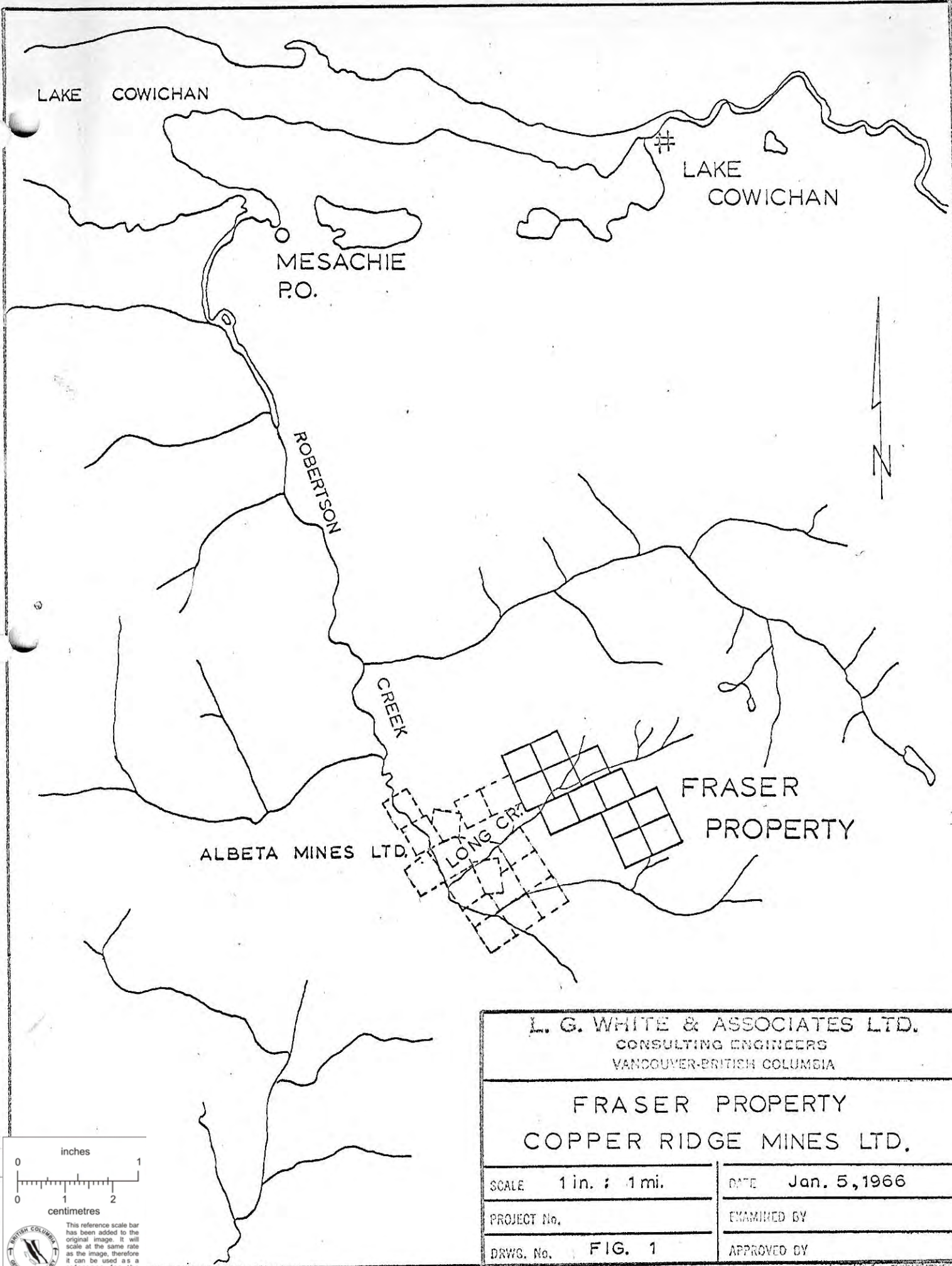
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INTRODUCTION

The property can be reached by paved road from the town of Lake Cowichan to the village of Macchia Lake and then via well maintained gravel logging for a further seven miles. The property is on Long Creek, a tributary of the Robertson River about two miles above the junction with the River.

Water supply, topography, climate and access make work on this property feasible at any time of year.

The writer, accompanied by Mr. W. Fraser, one of the owners of the property, spent one day on the property on December 17th; unfortunately, further examination was curtailed by a heavy snowfall that night.



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L. G. WHITE & ASSOCIATES LTD. CONSULTING ENGINEERS VANCOUVER-BRITISH COLUMBIA	
FRASER PROPERTY COPPER RIDGE MINES LTD.	
SCALE 1 in. : 1 mi.	DATE Jan. 5, 1966
PROJECT No.	EXAMINED BY
DRWG. No. FIG. 1	APPROVED BY

SUMMARY AND RECOMMENDATIONS

The Fraser Group is composed of 12 contiguous claims on land leased from Canadian Pacific Oil & Gas Co. Ltd., of easy road access from the town at Lake Cowichan.

The rocks are predominantly andesitic flows and tuffs which have been intruded by several phases of granodiorites. Sulphide mineralization is of the contact metamorphic type with chalcopyrite being the main copper mineral.

Limited work to date has uncovered two promising areas of copper mineralization plus several other areas of sulphides and one zone of magnetic and one zone of self potential anomalous conditions.

In the writer's opinion, the property has considerable merit and should be explored as follows:

- Phase I. Detailed geological mapping, prospecting and sampling.
 Surveyed with S.M. equipment with followup detail by magnetometer and/or self potential instrumentation.
- Phase II. Diamond drilling of recommended areas, upon appraisal of the results of Phase I.

PROPERTY

The property consists of 12 mineral claims (Fig. 1) with the area covered by these claims under lease from Canadian Pacific Oil & Gas Ltd., P.O. Box 400, Calgary, Alberta.

The showings on these claims can be listed as follows:

- 1. Hillcrest Showing
- 2. Anomaly Showing
- 3. Arrow Showing
- 4. Anomalous Magnetic Area
- 5. Anomalous Self Potential Area
- 6. Crown Showing

The locations of the showings in relation to one another can be seen on the accompanying geological map - Fig. 2.

DEVELOPMENT

1. Hillcrest Showing

W. Fraser did considerable trenching and stripping with a bulldozer in 1956. This trenching exposed a total of 11 outcrops showing magnetite pyrrhotite and chalcopyrite mineralization. Surface sampling of these outcrops gave values up to 3.5% copper. Mr. Fraser also put in seven X-ray drill holes which gave results varying from 0.26% copper to 23 feet of 2.60% copper (Fig. 3).

This zone was also partially covered by a dip needle survey done by Noranda Mines Ltd. in 1956 (Fig. 5) and by a magnetometer survey

4.

done by Gunnex Ltd. in May of 1966 (Fig. 6). Both these surveys showed anomalous areas.

2. Anomaly (Brymsalen) Showing

Mr. Fraser did some bulldozer trenching on this showing and exposed what are apparently two parallel zones, having magnetite pyrite and chalcopyrite mineralization. Stripping consisted of 150 ft. on the westerly zone and 20 ft. on the easterly zone.

In addition, 10 X-ray size diamond drill holes were put in for a total footage of 300 feet - six holes were put in on the westerly showing, three on the easterly showing, and one in between. Core sampling showed values ranging from 0.6% to 5.6% copper with one 3 foot section showing 4.5% zinc and 2.03% copper. This drilling was not sufficient to define the mineralization (Fig. 4).

This showing was also partially covered by the self potential survey done by Moranda Mines Ltd. in 1956 (Fig. 7).

3. Arrow Showing

This zone was uncovered during logging road construction and should have some work done on it. One sample taken over 6 feet ran 1.58% copper.

4. Magnetic Anomaly Area

This anomalous area along with another small area nearby was discovered and partially covered by the Gunnex Ltd. magnetometer survey

along with the Hillcrest Showing in May of 1904 (Fig. 6).

5. Self Potential Anomaly Area

This Self Potential survey was done by Noranda Mines Ltd. in 1956. It covered the zone known as the Anomaly Showing and gave anomalous indications there, but also covered a certain amount of ground to the south and east of the above showing, and it is on this ground (covered with overburden) that a much stronger anomaly was located, but not completely delimited. No followup development work was done however (Fig. 7).

6. Crown Showing

The location of this the original showing on the property is questionable and it could be either above or below the Hillcrest Showing in the thicker and new growth timber. Considerable stripping and trenching was done on this zone by American Smelting and Refining Co. in 1920, but no work has been done since then.

GENERAL GEOLOGY

The rocks on the property consist mainly of greenstones and reefs which have been intruded by light coloured phases of granitic and dioritic intrusives. Also present elsewhere on the property are noted limestones, chert quartzites and more intrusives.

GEOLOGY AND MINERALIZATION

1. Hillcrest Showing

The mineralization consists of magnetite with pyrrhotite and chalcopyrite in an andesitic flow. The ore zones are apparently irregular contact metamorphic deposits along the contact of the above rock with a fine grained granodiorite. The outcrop of mineralization lies in a northerly trending belt exposed for approximately 400 feet. A limited number of samples have been taken and assayed - note Fig. 3.

The intrusives are probably of different ages as there is a granitic dyke cutting the mineralization near the north end of the zone.

2. Acqually Showing

The mineralization here consists of pyrrhotite and chalcopyrite in two sheared zones in the volcanics. The westerly zone has been exposed by bulldozing for 150 feet along a 160 - 115° strike and the easterly zone has been exposed for 39 feet roughly parallel to the first zone. There seems to be some type of structural control possibly bedding plane faulting in these zones. Results of the samples taken to date can be seen in Fig. 4.

3. Arrow Showing

A small exposure well mineralized with chalcopyrite and pyrrhotite about 1500 feet to the north of the Hillcrest Showing along the diorite contact with the volcanics.

4. Magnetic Anomaly Area

Mr. Fraser has exposed here in a small pit a shaly area of heavy magnetite with some chalcopyrite. The remainder of the anomalous area is covered with overburden.

5. & 6. The remainder of the mineralized areas are covered with overburden and/or have had no recent development work done on them. It is unknown whether they occur along the intrusive contacts or are completely surrounded by the greenstones.

EXPLORATION POSSIBILITIES

A. Recent logging road building has uncovered more volcanic rocks in areas which were formerly considered to be entirely gran^{and}odiorite. This increases the area in which the mineralization is likely to be found.

B. Because of results obtained thus far and because of A above, there are good possibilities of additional mineralization being located by an expanded geophysical coverage.

C. The areas surrounding the Fraser property show some possibilities which could be ascertained by further prospecting and reconnaissance mapping.

D. The possibility of including the adjoining Alberta Mines Ltd. property into the overall exploration picture should be considered. A summary on this property by H.D. Kalkschick - Minister of Mines Report for 1962 - is included in this report.

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RECOMMENDED PROGRAM

Phase I

1. Detailed mapping of, and further prospecting on the entire property.
2. Lay out a grid at 200 foot intervals across the recommended area - Fig. 2.
3. Coverage of the grid area by E.M. geophysical methods with detailed follow-up work with magnetometer and/or coil potential instruments.
4. Bulldozer stripping and trenching in anomalous areas.
(Machine might be hired from the Jack Roach Logging Co. which is the logging contractor in the area).

Phase II

Pending on appraisal of the above results a decision can be made to follow-up with a diamond drilling program.

ESTIMATED COSTS

1.	1 Geologist	\$700	
	1 Assistant	<u>500</u>	
		\$1,200	
			For 3 months
			\$ 3,600.00
2.	Line Cutting 3 miles @ \$40.00		120.00
	D7 Cat plus operator 100 hr. @ \$22.00		2,200.00
	Contract Geophysicist		
	4 days 2 men on E.M.		2,000.00
	3 days follow-up on Magnetometer		30,000.00
	Diamond Drilling 5,000 ft. @ \$6.00		600.00
	Additional Claim Staking		
3.	Equipment Rental		
	Vehicle Rental \$300.00 per month		900.00
4.	General Expenses		
	Lodging and Bd. 2 men \$740.00 for 3 months		2,220.00
	Assaying		500.00
	Small Tools		150.00
5.	Administration		
	Tel. and Tel.	\$100.00	
	Travel	100.00	
	Office	50.00	
	Consultants	<u>500.00</u>	
		\$750.00	
			For 3 months
			<u>2,250.00</u>
	Total Charges -		\$ 44,540.00
	Contingencies -		<u>6,700.00</u>
	GRAND TOTAL -		<u>\$ 51,240.00</u>

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COWICHAN LAKE (48° 124° N.E.)*

Copper

Company office, 764 Cowichan Lake Road, Lake Cowichan.

Alpha, Beta, etc. Allan H. Harder, president and managing director; George (Albeta Mines Ltd.) E. Apps, general manager. The property consists of three Crown-granted and twenty recorded mineral claims and fractions on the east fork of Robertson River, northwest and southeast of Long Creek, 7 miles south of Mesachie Lake. Access from the end of the Forest Service road is by way of four-fifths of a mile of road and a bridge over the river.

The mineral showings were located in 1904. Three original claims—Alpha, Beta, and Taboga—were Crown-granted in 1910, and although lying within the Esquimalt and Nanaimo Railway belt carry both mineral and surface rights. Results of various development undertakings are described in the Annual Reports for 1927, 1929, 1930, and 1931.

The present company began work in 1961 with magnetometer surveys. Two anomalies were found southeast of the original showing at the junction of Long Creek and Robertson River. Diamond drilling from surface at these anomalies and at other sites comprised some 4,400 feet. A crosscut adit started on the north side of Robertson River at 920 feet elevation and 350 feet southeast of the mouth of Long Creek had been driven on a bearing of north 60 degrees east to a length of 250 feet by late August. About 480 feet of diamond drilling had been done underground. A raise was driven to an elevation of 30 feet above the adit. A plan and section at the adit is shown on Figure 11.

The rocks are basaltic flows of the Franklin Creek Formation overlain by tuffs and limestones of the Sutton Formation. Limestone is scarce in the vicinity of the showings and of the adit; the beds become more numerous and thicker eastward. The beds strike about east-west and dip steeply both northward and southward.

The beds are cut by three successive intrusive rocks determined megascopically as granodiorite, granite porphyry, and diorite porphyry. The granodiorite is a medium-grained, equigranular, crystalline rock composed chiefly of hornblende and white feldspar, sometimes showing a pink tinge, and quartz. It is appreciably coarser grained than the other two and so is readily distinguished from them. It appears to follow irregular fractures in the lavas and sediments, and drill cores indicate that it commonly holds large inclusions of these rocks. The granite porphyry is younger than the granodiorite and is the principal intrusive rock of the vicinity. It is grey to green, medium to fine grained, with more or less rounded feldspar phenocrysts. Surface exposures show that it occupies fractures striking east-west and dipping 70 degrees south, and striking north 30 degrees east and dipping 65 degrees to the southeast. Distributions in drill cores show that the granite porphyry may have very low dips, at least locally, and that its masses may take very irregular shapes. A similar condition obtained with a porphyry at the Cowichan Copper (Blue Grouse) property at Cowichan Lake, distant 11 miles west of north. Diorite porphyry, dark grey to green with somewhat irregularly distributed small feldspar phenocrysts in a fine-grained to aphanitic matrix, is the youngest intrusive rock and is also younger than the mineralization. It forms small lenticular bodies.

The lavas and sediments and the granodiorite have been locally silicified and altered to skarn. The skarns are of four main types—a garnet-epidote skarn, a red garnetite, a light buff to brown garnetite, and epidotite. There are no obvious relationships between these types and the original rocks. Magnetite occurs most commonly with the garnet-epidote skarn but is found also in the others. Distribu-

* By N. D. McKechnie.

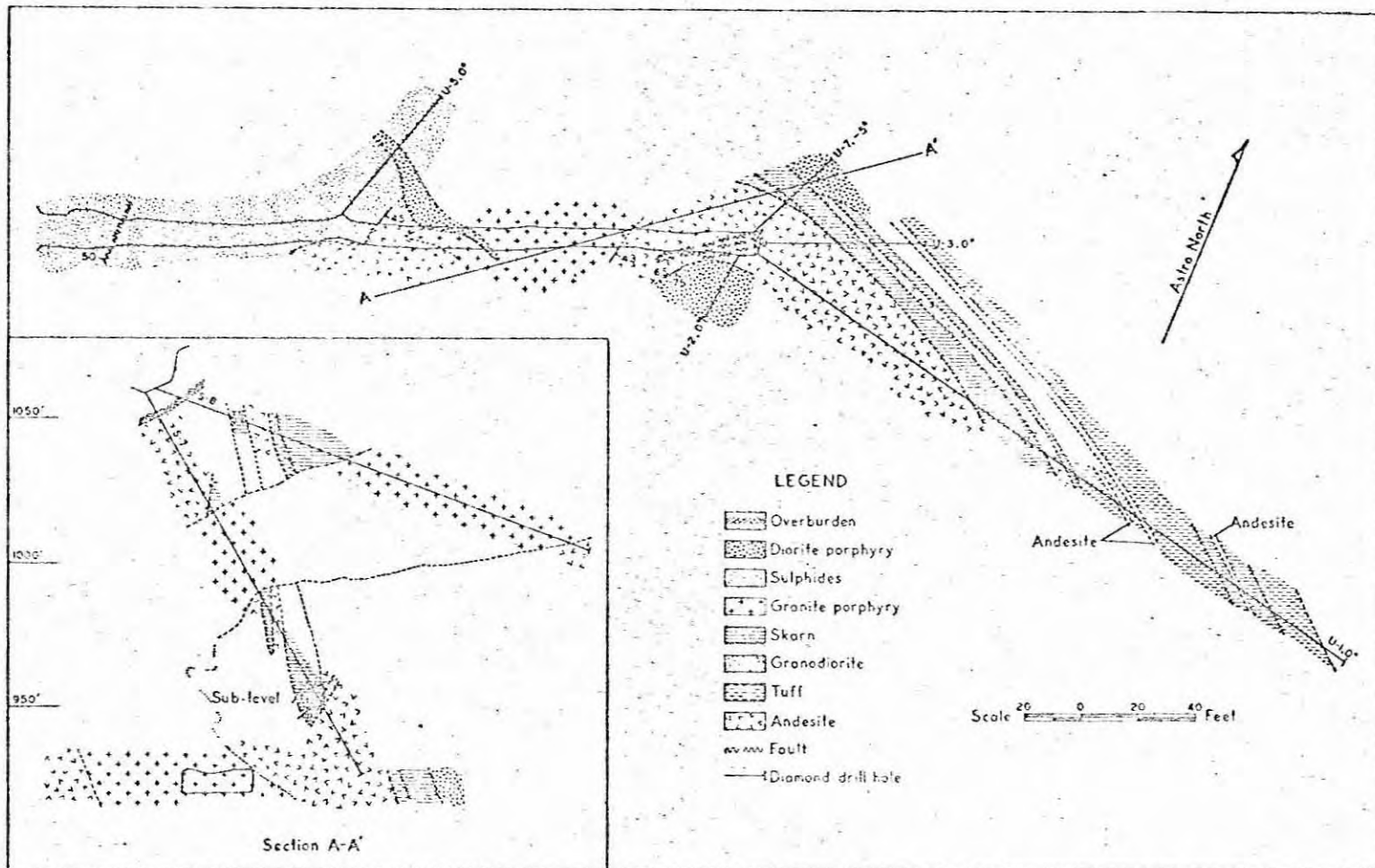
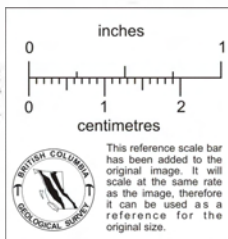


Figure 11. Alberta Mines Ltd.—underground geology.



tion of skarn in drill cores indicates that it may form along favourable beds and also along fractures in tuff, andesite, or granodiorite. In the sublevel from the raise a narrow dyke of granodiorite was seen to be changed to skarn where it crossed the skarn zone there. It was apparent that the skarn alteration followed a structure crosscutting the dyke. No skarn was seen in the granite porphyry nor in the still younger diorite porphyry; presumably these rocks are younger than the skarn alteration.

Pyrite and chalcopyrite are found locally in the skarn and, like the magnetite, usually in the garnet-epidote type. Control of the distribution of sulphides is not apparent, but it is not the same as that of the skarn. At the original discovery, at the junction of Long Creek and Robertson River, the sulphides occur in skarn on the hangingwall of an 18-foot-wide granite porphyry dyke striking north 30 degrees east. Skarn on the footwall side of this dyke is barren of sulphides. The northeastward-striking dyke here joins an east-west striking dyke of the same rock. At less than 100 feet northeast along the hangingwall of the first-mentioned dyke, both skarn and sulphides die out and the rock becomes basaltic lava. It is possible that the mineralization is a pipe-like deposit associated with the junction of the two dykes. Relationships are obscured by a post-mineral fault striking north 60 degrees east and dipping 65 degrees southeast which crosses the junction of the dykes; skarn and sulphides are exposed in the hangingwall of the fault, but granite porphyry is not. As illustrated on Figure 11, there is an apparent alignment on dip between sulphides in the skarn at the sublevel and sulphides in skarn in diamond-drill hole S-8. The intervening granite porphyry is barren. Diamond drilling from surface on sections 70 feet northwest and 60 feet southeast of the adit sections did not show this mineralization to continue that far. Sulphide intersections obtained in a drill section some 250 feet southeast of the adit have not been developed further. Sulphides were cut by two underground holes in skarn about 30 feet ahead of the adit face.

The sulphides probably follow structures allied to the intrusion of the granite porphyry. A possible sequence of events is: development of the skarn alteration, immediately followed by intrusion of granite porphyry accompanied and followed by the introduction of sulphides, and the intrusion of the post-mineral diorite porphyry which cuts skarn and sulphides in the sublevel. The results of the work done indicate that within the present working area no structures exist which are likely to lend much lateral continuity to mineralization. The possibility of mineral pipes remains.

JORDAN RIVER (48° 120° S.E.)*

Copper

Sunloch and Gabbro (Cowichan Copper Co. Ltd.) Company office, 620 Howe Street, Vancouver 1; mine office, River Jordan. Oswald G. MacDonald, president; J. R. Billingsley, mine manager. This property is on the Jordan River about 1 mile upstream from its mouth and is reached by a road which leaves the Victoria highway about one-half mile east of the River Jordan Post Office. An operating lease was obtained by Cowichan Copper Co. Ltd. from Sunro Mines Limited (controlled by The Consolidated Mining and Smelting Company of Canada, Limited) to remove ore from eighteen claims which include the Cave, Central, and River ore zones.

The installation of the crushing, grinding, and concentrating sections of the underground mill, commenced in 1961, was completed by the end of April, and the production of concentrates began May 1st. The initial mill rate of 600 tons per

* By N. D. McKechnie and J. E. Merrett.

REFERENCES

1. Minister of Mines & Petroleum Resources Reports.
1930; 1956; 1962; 1963.
2. Report on the Hillcrest Showing by A.C. Skel - 1956.
3. Report on the Property by A.K. Aho - 1958.

CERTIFICATION

I, Leonard George White, of the City of Vancouver, in the Province of British Columbia, hereby certify as follows:

1. That I am a Registered Professional Engineer in the Province of British Columbia and reside at 704 Parkside Road, West Vancouver, B.C.
2. That I am a graduate of the Washington State University with a Bachelor of Science degree in Mining Engineering and have practiced my profession for twenty years.
3. That I have no interest either directly or indirectly in the claims or securities of Copper Ridge Mines Ltd. nor do I expect to receive any.
4. That the report is based on an examination made for me by E.W. Johnson, Geologist, on December 18, 1965, my personal knowledge of the area, and reference to previous Government reports.



L.G. White, P. Eng.

Vancouver, B.C.
January 12, 1966.