ȚECK EXPLORATIONS LIMITED Kamloops, B. C.

INTERIM REPORT
ON THE
GRENOBLE/LEXINGTON PROPERTIES
GREENWOOD MINING DIVISION
BRITISH COLUMBIA

REPORT NO. KAM-2 February 24, 1982

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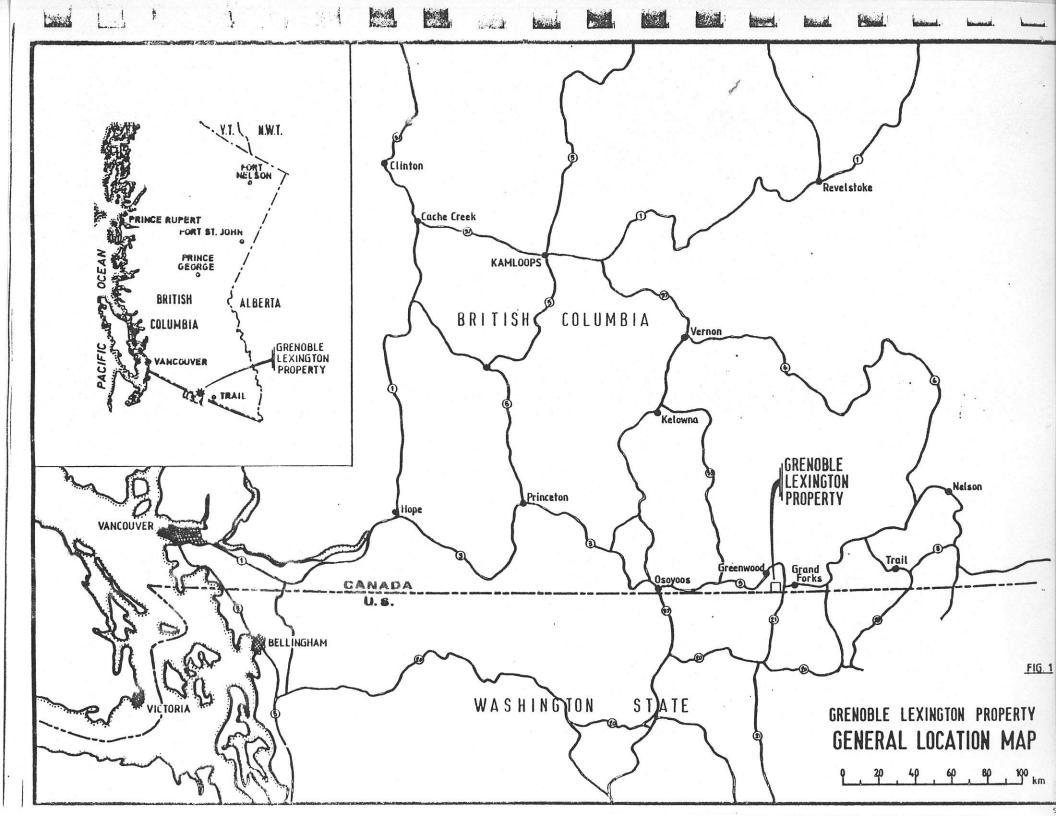
#### INTRODUCTION

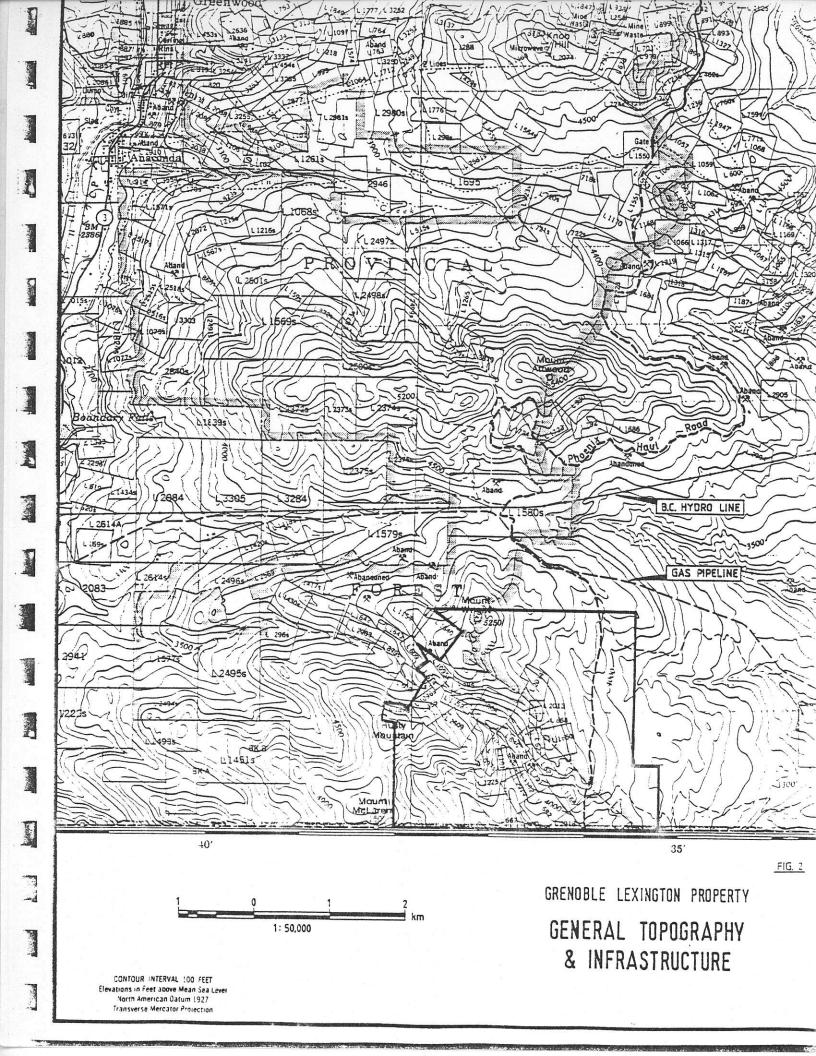
The following report is presented as an interim summary of all data and geological relationships concerning the Au-Cu mineralization present on properties near Greenwood, B. C. held or optioned by Teck Corporation. It should be emphasized that although the disbribution of the mineralization and factors concerning its localization are fairly well understood at present, further work on the property will no doubt alter and enhance this understanding.

This report is based on the author's supervision and core logging of the most recent diamond drilling program, geological reconnaissance of much of the property, and the compilation and evaluation of older reports, drill logs and sections.

#### LOCATION AND ACCESS

The property is located along the U.S. border in the Greenwood Mining Division of southern British Columbia, roughly 540 km by road from Mancouver (Fig. 1). Highway #3, the southern Trans-Canada, gives access to Greenwood and Grand Forks, while a number of good to fair gravel roads provide access to the property from either city. A heavy duty gravel road (Phoenix haul road) passes through the property, within 2 km of the main drilling areas, and can provide all-weather access to the ground (Fig. 2). A natural gas pipeline and major hydro sources are located within 3 km of the property boundaries.





#### PROPERTY AND OWNERSHIP

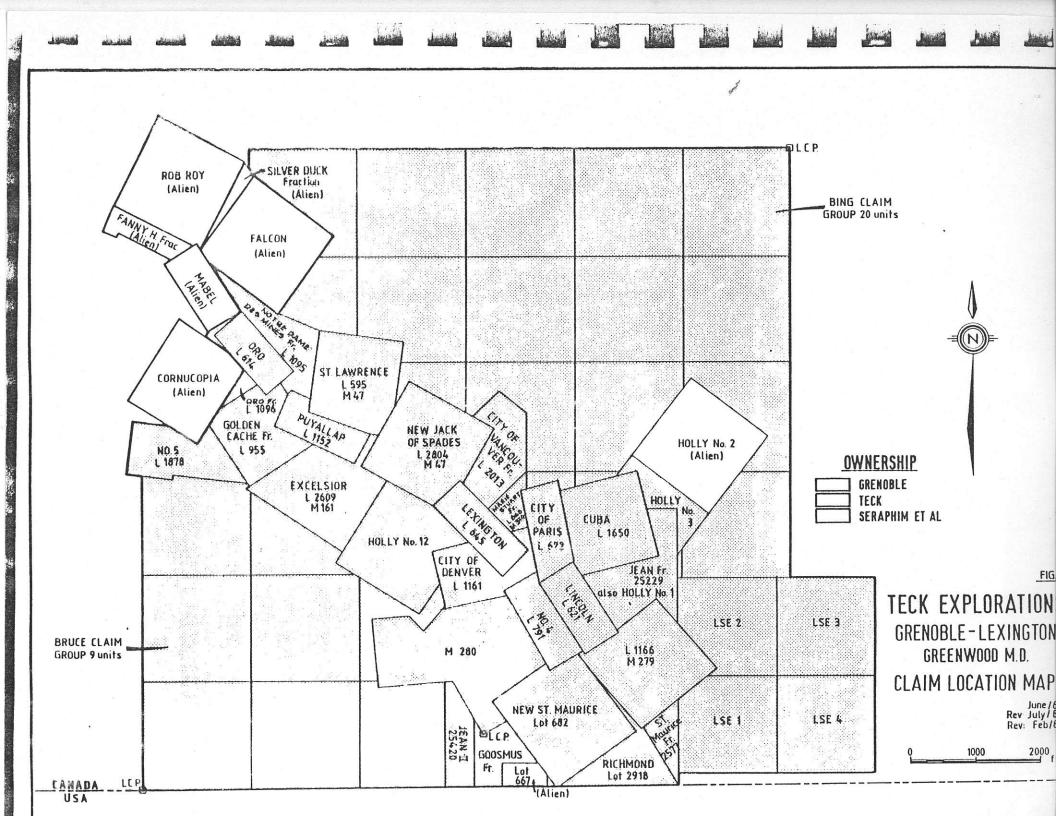
The property consists of 15 mineral claims (reverted crown grants), 13 crown granted claims, 4 mineral leases, and 2 staked mineral claims of 9 units and 20 units (Fig. 3).

The two staked claims and Goosmus fraction claim are held by Teck Corporation. The key ground is held by Grenoble Energy Ltd. and Messrs. W. G. Hallauer, W. E. McArthur, and R. E. Seraphim. Exploration conducted to date by Teck is sufficient to meet assessment requirements well beyond the limits of the option agreements.

#### HISTORY

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Early exploration on the property was focused on the City of Paris crown-granted claim, but minor underground workings were also sunk on the Lexington and Lincoln claims. The first significant work in the City of Paris area was in 1892 when two adjacent shafts were sunk and underground drifting was begun on a pyrite-chalcopyrite rich quartz vein. At the same time another shaft was sunk to shallow depth and drifting began on a tetrahedrite-bearing quartz vein located about 600 feet to the southeast on the Lincoln claim. By 1989 the City of Paris Gold Mining Company had gained control of the property and commenced major underground development. Within a year a crosscut tunnel 805 feet long was driven northeast, intersecting the southeasterly trending vein system at a depth of approximately 300 feet below surface exposure. A drift was run about 600 feet to the northwest from the crosscut tunnel connecting with the City of Paris shaft; a



second drift was extended 300 feet to the southeast toward the area under the Lincoln shaft. Other work included construction of an adit and 250 feet of drifting on a pyrite-chalcopyrite vein on the Lexington claim near Goosmus Creek, 2,000 feet northwest of the City of Paris portal.

After a year of production, in 1900, the City of Paris mine was dormant until 1922, when prospecting began again, and in 1938 minor production was realized. Total production from the City of Paris amounted to 2,100 tons grading 3.12% Cu, 0.40 oz. Au/ton and 2.1 oz. Ag/ton.

Subsequently, virtually no further exploration or development was done until 1962, when King Midas Mines Ltd. consolidated many of the old Crown-granted claims and carried out a reconnaissance geochemical survey. A short, nrothwesterly trending adit was driven at this time near the base of the Lincoln shaft, yielding a few tons of argentiferous ore.

On strike across the Canada-U.S. border, and occurring within a similar geological environment, the Lone Star mine produced sporadically between 1890 and 1920, yielding about 40,900 tons of which 6,500 tons graded 2.6% Cu, 0.032 oz. Au/ton, and 0.19 oz. Ag/ton. In the early 1970's, this ground was extensively explored by a number of mining companies, finally achieving some 400,000 tons of production in 1977-78. This was trucked and treated at the Phoenix mill of Granby Mining Co. Ltd. During this

1

period, Silver Standard Mines Ltd. and Granby explored the ground with some 34 percussion holes (R-1 through R-34) totalling about 2,546 m (8,353 feet), in the area southeast of the main zone, but north of the U.S.-Canada border (Richmond property). This ground is included in the ground now under option to Teck. The ground south of the border is held by Azure Resources Ltd. (VSE).

In 1967, Lexington Mines Ltd. acquired the claims covering most of the current property and gradually increased their holdings to 132 claims and mineral leases in 1970. Lexington's initial work involved geochem and IP surveys and approximately 10,000 feet of bulldozer trenching.

Between April 1969 and July 1970, Lexington put down 33 BQ and NQ diamond drill holes (DDH-1 through DDH-33) totalling 5,564 m (18,225').

In 1972, Granby Mining Co. Ltd. opticaed the Lexington Mine property and drilled 37 percussion holes (P-1 through P-37) for a total of 2,018 m (6,620 feet). This drilling was conducted to test IP anomalies northwest of the main zone, and attempted to outline open pit reserves of copper mineralization between the Lexington adit and the main zone.

Early in 1974, much of the Lexington Mines property was optioned to Aalenian Resources Ltd. who drilled four additional NQ core holes (DDH-34 through DDH-37) totalling 336 m (1,103 feet), and 13 percussion holes (P-74-1 through P-74-13) for a total of 974 m (3,195 feet). In 1972, because of a market down-turn, the option was dropped and no work was conducted on the ground until Grenoble Energy Ltd. acquired the key claims in 1979.

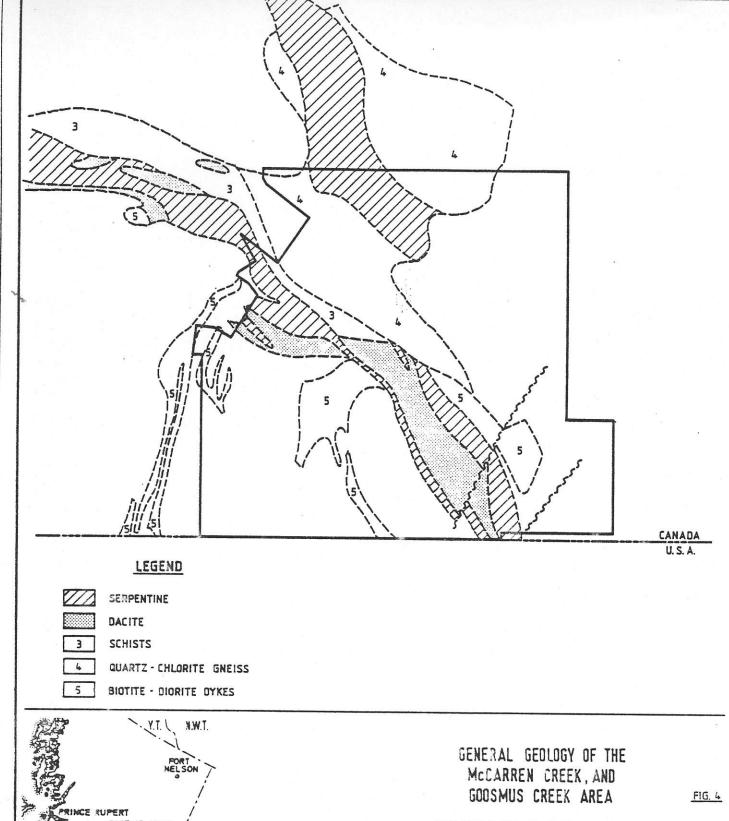
Early in 1980, Grenoble contracted a seismic refraction study of the area where the main zone approaches the sub-crop surface, and later in the year drove a 115 m horizontal test adit. A raise was cut into the mineralized area, and 20 holes were drilled from the new workings for a total of 1,056 m (3,466 feet).

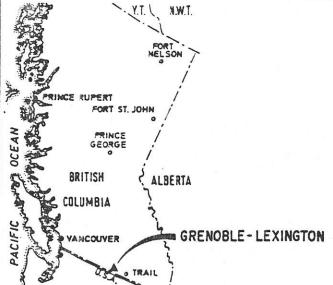
Teck Corporation optioned the Grenoble Energy holdings in March 1981, and the ground to the southeast from Seraphim et al in June 1981. Additional ground was acquired by Teck through purchase and claim staking at about the same time. Since the spring of 1981, Teck has concentrated on exploration drilling within and along the main zone of mineralization. Twenty-three (23 NQ holes have been completed to date (T-38 through T-60) for a total of 4,535 m (14,880 feet). A summary listing of all drilling on the property is presented in Table 1.

#### GEOLOGY

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Bedrock on the property and surrounding area consists in general of an older schist unit and a younger sequence of moderately deformed bedded rocks, cut in turn by: (a) early Mesozoic? felsic intrusives; (b) Cretaceous? serpentinite bodies; and (c) early Tertiary diorite to alkali diorite dikes and stocks (Fig. 4). The most significant mineralization on the property occurs within a quartz porphyry to felsite unit of the early Mesozoic? felsic intrusives, collectively termed dacite on property plans and sections.





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# GRENOBLE-LEXINGTON

GREENWOOD MINING DIVISION

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TABLE 1

DRILLING SUMMARY

Grenoble-Lexington (incl. Seraphim et al) Property

<u>Date</u>	Diamond Drill Hole	Percussion Drill Hole	Meters (feet)	Drilled by
1967		R-1-R-5	457m ( 1,500')	Silver Standard
1968	68-1, 68-2		289m ( 947')	Silver Standard
1970		R-6-R-22	1,226m ( 4,022')	Silver Standard
1969 <b>-</b> 1970	DDH-1-DDH-33		5,564m (18,225')	Lexington
1972		P-1-P-37	2,018m ( 6,620')	Granby
1974	DDH-34-DDH-37		336m ( 1,103')	Aalenian
1974	·	P-74-1-P74-13	974m ( 3,195')	Aalenian
1976	•	R-23-R-34	863m ( 2,830')	Granby
1980	UG-1-UG-20		1,056m ( 3,466')	Grenoble
1981	T-38-T-60		4,535m (14,880')	Teck

Diamond Drilling	11,780m (38,651	')
Percussion Drilling	5,538m (18,169	)')
TOTAL DRILLING	17,318m (56,820	)')

#### Layered Rocks

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Within the property area, bedded strata includes a basement schistgneiss complex, and a younger sedimentary-volcanic succession. The
older succession is broadly equivalent to the Shuswap crystalline
series and consists of thinly-layered quartz-chlorite gneiss, massive
lenses of pure metaquartzite and graphitic quartzite, minor muscovite
schist and carbonated schists, and a major unit of amphibolite. The
younger succession appears to be of Late Paleozoic-Early Mesozoic age
and unconformably overlies the basement complex. Three major units are
well-exposed southwest of the property, including a lower zone of mafic
lavas, an intermediate zone of carbonaceous phyllite, and an upper zone
of quartz wacke and conglomerate. These younger rocks are only locally
deformed, their overall distribution being sub-horizontal.

# Dacite and Related Intrusive Rocks

Early Mesozoic(?) intrusive rocks consist of an assemblage of apparently related small stocks and hypabyssal felsic sills and dikes, including quartz-feldspar porphyry, quartz porphyry, felsite, and schistose felsite. The largest of these units is a body of quartz-feldspar porphyry located west of the property, near the junction of McCarren and Gidon Creeks. An elongated, composite, quartz porphyry felsite intrusion (the property dacite) follows the general course of Goosmus Creek and appears to be an easterly extension of the quartz-feldspar porphyry stock.

The dacite exhibits a number of facies, including porphyrytic and non-porphyritic phases, an equigranular (1-2 mm) phase, and a fine-grained chilled selvage. The typical porphyry phase contains subhedral quartz phenocrysts and composite quartz eyes (2-7 mm diameter) set in a matrix of euhedral sodic plagioclase, chloritized biotite, and interstitial fine-grained quartz and feldspar. Sericite, and lesser chloritic alteration is dispersed throughout the intrusion; potash feldspar is scarce.

Most of the dacite on the property is moderately foliated and contains 0.5-1.0% disseminated pyrite. In the areas of the City of Paris, Grenoble, and Lexington adits, the dacite contains 2-5% disseminated pyrite and frequently shows malachite as fracture coatings and fine disseminations.

#### Late Intrusive Rocks

Late intrusives on the property include Cretaceous (?) serpentinite masses, early Tertiary diorite and alkali diorite dikes and stocks, and pre-diorite andesite dikes (?). The ultramafic bodies consist of two elongate masses and several smaller lenses, all consisting primarily of an antigorite-rich serpentinite (altered peridotite). Locally, the ultramafics consist of foliated talc rock, talc and brucite(?) + carbonate, or carbonate + quartz + mariposite rock, essentially altered varieties which appear to be related to hydrothermal and/or tectonic activity along faults. Foliated talc rock is prominant along the dacite footwall contact, and occurs locally as narrow dikes ( $\leq$ /m thickness) within the body of the dacite.

The late intrusive andesite and diorite bodies are essentially unmineralized and sharply cross-cut the dacite. The andesite masses were subjected to regional deformation along with the dacite as they are moderately foliated and chloritized. The diorite dikes are massive, black, porphyritic rocks which followed both pre-existing weaknesses and later tensional structures within the dacite and older rock units.

#### STRUCTURE

The overall disposition of the key rock types on the property is that of a gently to moderately dipping sheet (dacite) enclosed by, and locally intruded by serpentinite. The general dip of the major contacts is 20 degrees to 30 degrees to the northeast, with the strike changing in a gentle arc from northwest in the south to nearly east-west in the north. Foliation in both the dacite and serpentinite generally parallels strike, but is more steeply dipping (30 degrees to 60 degrees to the northeast).

The dacite-serpentinite package is in turn cut by: (a) northeast to north trending, steep normal faults; (b) a moderately northwest dipping thrust? fault; (c) a probable east-west trending vertical fault; and (c) an unknown amount of local contact shearing and faulting concentrated in the talc-rich zones of the serpentinite.

#### MINERALIZATION

Gold-copper-(silver) mineralization occurs in several styles within the property. Most of these varieties appear to be related to local structural environments and virtually all significant mineralization occurs within the dacite intrusive, at or close to its contacts with either the hanging wall or footwall serpentinites.

The principal varieties of mineralization include: (1) low-angle veins and vein-complex replacements; (2) high-angle (isolated) veins; (3) massive to disseminated pyrite + magnetite + chalcopyrite in talc rock; and (4) low-grade disseminated and fracture-filling pyrite + chalcopyrite.

#### Low-Angle Veins and Vein-Complex Replacement

Low angle pyrite + chalcopyrite veins are distributed in the dacite in a pattern similar to high-angle veins, but because of their geometry (\$\leq\$30 degrees from the dacite-serpentine contacts) they tend to fill or gently cut across the major foliation. Where a number of such veins are localized, a main zone (or footwall zone) style of mineralization is developed. This is better described as a vein-complex replacement, apparently consisting of both low angle veins, high angle veins and heavily disseminated sulphides. The enclosed dacite host in such zones is extensively pyritized (10 15% pyrite), and generally contains 0.5-1.5% copper as disseminations and lacey fracture fillings of chalcopyrite. As such, the main zone style of mineralization lends itself to lower cost open pit and bulk underground mining methods and is the primary exploration target on the property.

The <u>Grenoble main zone</u> is presently outlined as a gently sinuous mineralized body, of variable width (25-70 m) and thickness(2-24 m), extending for a length of about 375 m. The zone lies at or near the footwall contact of the dacite intrusive, plunging gently to the southeast. It is apparently cut by a number of cross faults in the vicinity of the Grenoble adit, and is cut by diorite dikes near the (presently defined) southeast end. Details and the significance of exploration targets for extensions and similar zones on the property are outlined in a subsequent section of this report.

#### High-Angle Veins

High-angle veins (and vein systems) form an arbitrary classification in this report, and include all sulphide veins which are oriented at an angle ≥30 degrees measured from the dacite-serpentinite hangingwall or footwall contacts. Although high-angle veinlets (0.1-1.0 cm width) occur with some regularity throughout the dacite, they become more common near the serpentinite contacts. Larger high-angle veins (1.0-10-100 cm width) appear to be prominent only within 30-40 m of these contacts.

The most persistent of these veins is apparently the City of Paris system which, although mined and explored for a strike length of over 300 m, produced only some 2,100 tons of ore. As the workings do not extend up or down the vein dip for appreciable distances, there is a clear indication of a simple pyrite-chalcopyrite vein of 0.1 to 1.0 m width. This general vein description is similar in most respects to veins intersected above and adjacent to the "main zone" along the dacite footwall.

Due to their generally narrow widths and the low content of gold + copper in the wallrocks, such high-angle veins are not considered to be significant exploration targets. Their principal importance may be suggested as lateral indicators of main zone style mineralization.

#### Serpentinite Mineralization

Massive and disseminated pyrite-magnetite-chalcopyrite mineralization occurs frequently within talc-rich altered serpentinite, particularly in the dacite footwall contact. The more significant of these occurrences are intimately associated with the main zone style of mineralization and were undoubtedly formed at the same time. Preliminary evaluation of data suggests, however, that the gold content of talc-hosted mineralization is relatively low, despite the generally high copper values (1-3%). While such mineralization may not hold a significant exploration potential, such zones offer supportive data for definition of drill targets.

#### Low-Grade Mineralization

The dacite intrusive as a whole is extensively pyritized, containing on the order of 0.5-1.0% pyrite from the Lone Star mine in the U.S.A. to trench exposures in the northwest portion of the property. Locally, large areas of the dacite contain 2-5% pyrite and small amounts of chalcopyrite as disseminations, fracture coatings, and small veinlets. The general tenor of this low-grade mineralization is suggested by over 120 core samples from the recent diamond drilling in the City of Paris area which assay in the range of 0.1-0.3% Cu, 0.002-0.008 oz. Au per ton.

#### Copper-Gold Variations

Preliminary evaluation of several hundred assays in the area of the Grenoble main zone indicates a consistent relationship between copper and gold contents. Within and close by the main zone, 125 assays exhibit a positive linear variation, based on a least-squares regression analysis. This analysis yields a correlation coefficient(r) of 0.82. These and additional data will assist in ore reserve statistics and should aid future exploration.

#### DRILL INDICATED RESERVES

Details of the current drill indicated reserve calculations are presented in the Appendix, with an independent calculation by R. W. Phendler. Main zone indicated reserves have been calculated at a minimum of 210,000 tons grading 0.20 oz. Au/ton and 1.20% Cu utilizing a gold cut-off grade of 0.06 oz./ton. Less conservative estimates are presented in the Appendix.

#### EXPLORATION TARGETS.

From the vicinity of the Lone Star mine to the northwest portion of the property, the favourable dacite-serpentinite (footwall) contact is traceable for roughly 2,300 m. Of this total strike length, approximately 2,200 m are contained in the Teck properties. The Grenoble main zone is currently tested over a length of approximately 450 m, leaving significant areas of moderate to untested ground.

- 1. Approximately 400 m strike length, Lexington adit area;
- Approximately 700 m, southeast of the main zone (to the U. S. border);
- 3. Approximately 650 m, northwest of the Lexington area.

Within these areas, four specific drill targets are currently defined as follows:

- 1.a. Lexington adit sampling (by previous operators) has been summarized variously as 0.98% Cu + 0.218 Au/ton over 70 feet, or 0.76% Cu + 0.08 oz.Au/ton over 220 feet (adit lengths). The assay data is clearly indicative of main zone style mineralization and is a high priority target.
- 1.b. Percussion drill hole P-15 (3450N, 5900E) intersected 30 feet of 0.52% Cu in dacite near the footwall contact, between the Grenoble main zone and the Lexington adit. Check assays over 40 feet, including the above 30 feet, returned low Au values, but are not felt to be an accurate evaluation. Re-drilling the hole is a high priority.
- 2.a. Diamond drill hole T-54 intersected 6 m of footwall type mineralization at the southeast end of the Grenoble main zone beyond a swarm of late dikes. The intercept is open in two directions, and at least one hole should be drilled to test the zone width prior to seeking the longitudinal extension.

2.b. Percussion hole R-11 (2825N, 6280E) intersected 10 feet of 0.3% Cu + 0.109 oz. Au/ton, again near the dacite footwall. This intercept is difficult to evaluate because of the low copper content, but its position in the dacite footwall indicates a moderate to high priority target.

Some amount of fill-in drilling appears to be warranted within the

Grenoble main zone. DDH-26 intersected 15-16 m of the zone and is

have cut the main zone. These delineation holes should probably

open to both sides. DDH-25 is similarly open, but does not appear to

follow favourable results from the exploration holes described above.

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# REFERENCES

CHURCH, B. N., 1971

B.C.D.M. Geology, Exploration, and Mining 1970, p. 413-425; and B.C.D.M. Preliminary Map #2.

# **APPENDIX**

- I Reserve Calculation and data, Teck Explorations Limited (1982)
- II Ore Reserve Estimation, R. W. Phendler
  (1982)
- III Proposed Program and Budget

#### APPENDIX I

#### RESERVE CALCULATIONS AND DATA

Table A-l presents the results of a computer estimation of the main zone reserves using a polygon method on horizontal slices of 3 m thickness. The estimation may be optimistic in that the 15 m polygon influence radius used is probably not applicable to the lateral continuity of the zone (although it does apply to the longitudinal dimension).

#### TABLE A-1

Geological reserves by grade:

Cutoff increment: \$20.00
Polygon influence radius: 15 metres

Based on Gold at: \$400.00
Silver at: \$10.00
Copper at: \$1.00

AVERAGE VALUES Cutoff Value Primary (gross metal (gross metal 0re Cu Мо value/ton) Tons value/ton) Αu Ag \$ (000)\$ oz./ton oz./ton % oz./ton 54.75 20.00 621 .1510 .8401 .0050 .1161 108.93 40.00 312 .2067 .2124 1.2067 .0072 60.00 194 144.65 .2444 1.4805 .0133 .2815 204.22 .2117 1.8671 .0134 80.00 107 .4119 235.76 .2124 2.0322 .0136 100.00 85 .4825 280.95 120.00 62 .5832 .2662 2.2505 .0144 305.97 140.00 54 .6345 .2778 2.4693 .0146 316.44 2.4820 .0141 160.00 50 .6603 . 2675 327.28 2.6188 .0137 180.00 47 .6806 .2674 43 337.84 .7088 .2674 2.5827 .0130 200.00

#### APPENDIX II

# ORE RESERVE ESTIMATION R. W. PHENDLER (1982)

I

A visual evaluation of the computer data yielded a <u>mineable ore zone</u> of some 326,000 tons grading 0.21 oz. Au/ton and 1.35% Cu. Again, this is probably somewhat optimistic as a gross metal value was utilized; this has the net effect of biasing the tonnage and grade towards high copper values. As mentioned in the text, Cu-rich intercepts in mineralized talc rock tend to carry only moderate gold values. The indicated reserve estimate given in the text discounts such intercepts.

An independent ore reserve calculation has been provided to Grenoble Energy Ltd. by their engineering consultant, R. W. Phendler. His calculations include both an underground zone based on both the recent and older drilling data, and an open pit zone based on pre-1980 exploration. These results include:

U.G. 300,440 tons grading 0.202 cz.Au/ton, 1.107% Cu Pit 121,220 tons grading 3.064 oz.Au/ton, 0.92% Cu.

As in the computer evaluation, a maximum 15 m radium of influence was taken from intersections, a method not strictly applicable to the lateral dimensions of the deposit.

R. W. PHENDLER, P. Eng., GEOLOGICAL CONSULTANT.

EXPLORATION AND MINING

7360 DECOURCY CRES., RICHMOND, B.C. V7C 4E9 (604) 271-2588

January 22, 1982

Grenoble Energy Ltd. 109 - 525 Seymour St. Vancouver, B.C.

Gentlemen:

Re: Lexington Property - Drill
Indicated Reserves - 1981 Drilling.

In reviewing the results of the 1981 diamond drilling program carried out by Teck Explorations Ltd. combined with results of earlier drilling, I have calculated that 272,632 tonnes of reserves exist on the Lexington property. This does not include recent drilling carried out southeast of the crosscutting diorite dyke, where it is believed favourable results have been received.

Plans and drill sections were provided by Teck Exploration Ltd. and were used in these calculations. A total of 32 blocks were calculated over a strike length of 300 meters.

Blocks were projected a maximum of 15 meters from any drill hole and a factor of 3.0 tonnes per cubic meter was used. With a 15% dilution factor applied results are as follows:

	Tonnes	oz Au per ton	<u> </u>
No dilution	272,632	J.202	1.107
15% diluted	313,527	0.175	0.96

Gold grades were not cut but it is not believed that higher grade blocks (15,000 tonnes average 1.0 oz Au per ton) exert undue influence on the general average.

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With additional drilling on the fringes of the zone as presently outlined and down plunge to the southeast, it is felt that significant amounts of additional reserves can be discovered.

About 110,000 tonnes averaging 0.92% Cu and 0.064 oz Au is believed to be available by open pit mining methods. This is based on pre-1980 diamond and percussion drilling and was partially explored and verified by the 1980 underground exploration carried out by Grenoble Energy Ltd. This tonnage is in addition to that shown earlier in this letter report.

Respectfully submitted,

R.W. Phendler, P. Eng. .

R.W. PHENGLER

RWP/bj

#### APPENDIX III

#### PROPOSED PROGRAM AND BUDGET

The next phase in the exploration of Grenoble's Lexington property should centre on the drill testing of extensions to the main zone and the testing of three additional exploration targets. In addition to these targets an effort must be made to determine the geometry of, and grade distribution within the main mineralized zone. It is proposed to drill rings of holes from the present Grenoble adit for this purpose. This can be accomplished at relatively modest cost.

The estimated cost of the above program is outlined below:

#### Main Zone Extension

A total of six holes in two "fences" beyond DDH T-54

- Total estimated footage

4,000 feet (1,220 m)

- Estimated cost

\$ 140,000

#### Lexington Adit Area

The Lexington adit encountered typical footwall type mineralization which is only partially explored between the Lexington and Grenoble adits. Thirty-two short holes would be required to test this area.

- Total estimated footage

6,800 feet (2,075 m)

- Estimated cost

\$ 238,000

#### Richmond Area

Three additional holes are required in the area of DDH 12 and R-11.

- Total estimated footage

1,800 feet (550 m)

- Estimated cost

\$ 63,000

#### Grenoble Adit ·

Three "rings" of holes drilled from the Grenoble adit are proposed as a check on the geometry and grade distribution as noted above. Thirty short holes would be required.

- Total estimated footage

3,000 feet (914 m)

- Estimated cost

\$ 90,000

Total footage all zones

15,600 feet (4,755 m)

Total estimated cost all zones

\$ 531,000

The nature and extent of an ongoing program would be contingent on the results of the above program.

W. Meyer, P.Eng.