80-160-8461

GEOPHYSICAL REPORT

ON A

SEISMIC REFRACTION SURVEY

ON THE

LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA

GREENWOOD M.D., B.C.

Location : On Goosmus Creek 10.5 km S25E of the town of Greenwood, B.C.

: N.T.S. 82E/2E

: 49° 118° SW

Report By : David G. Mark, Geophysicist
GEOTRONICS SURVEYS LTD.
403-750 West Pender Street
Vancouver, B.C., V6C 2T7

For : Grenoble Energy Ltd.
1015-470 Granville Street
Vancouver, B.C., V6C 1V5

Dated : February 15, 1980

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8461
NO.

GEOTRONICS SURVEYS LTD.
Engineering & Mining Geophysicists
VANCOUVER, CANADA

8461

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SUMMARY

Seismic profiles were carried out over the Lexington Copper-Gold Property on Goosmus Creek, 10.5 km S25E of the town of Greenwood in the Greenwood M.D. Access is easily gained by two-wheel drive vehicle over a good gravel road. The object of the survey was to determine the thickness of the overburden, or, depth to bedrock to ascertain the optimum location for an adit.

Previous work on the property dated from 1892, when a copper discovery was made and some production was obtained.

Since 1962, considerable exploration has been carried out.

The Lexington property area is underlain by a northwesterly striking 1.6 km wide belt of Paleozoic gneiss and schist bounded on the north and south by zones of Paleozoic or early Mesozoic metavolcanic and metasedimentary beds.

The survey was carried out using a 12-channel seismic refraction-reflection system over 6 550-foot lines, with explosives as the energy source. The data were analyzed using an intercept-delay time technique.

GEOPHYSICAL REPORT

ON A

SEISMIC REFRACTION SURVEY

ON THE

LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA

GREENWOOD M.D., B.C.

INTRODUCTION AND GENERAL REMARKS

This report discusses the field procedure, compilation of data and interpretation of results of a seismic refraction survey carried out over Lexington Copper-Gold Property on Goosmus Creek 10.5 km S25E of Greenwood during the 18th - 20th September, 1980.

The field work was carried out under the supervision of the writer with four helpers. The interpretation was done by the writer as well. The amount of seismic refraction surveying done was 1.0 km (3300 ft).

The object of the survey was to determine the thickness of the overburden, or otherwise, depth to bedrock for the purpose of determining the optimum location for an adit. The geophysical information presented herein is based on our best interpretation of field data which were collected according to generally accepted field procedures.

The purpose of this report is not to recommend the best site for

an adit, but simply to provide information that will help with other information on the property in the decision making.

PROPERTY AND OWNERSHIP

The Lexington property consists of the Following claims:

Name	Number	Status	Registered Owner
No. 5	L 1878	Reverted Crown Grant	Kent Energy Ltd.
Maria Stuart	L 868	Reverted Crown Grant	Kent Energy Ltd.
City of Paris	L 622	Crown Grant	M.F. Johnson (75%) R.C. Church (25%)
Lincoln	L 621	Crown Grant	M.F. Johnson (75%) R.C. Church (25%)
No. 4	L 791	Crown Grant	M.F. Johnson (75%) R.C. Church (25%)
St. Lawrence	Record #1000	Crown Grant	Peter Casorso, Kelowna
New Jack of Spades	Record # 996	Crown Grant	Peter Casorso, Kelowna
Excelsior	Record #1351	Crown Grant	Engelbert Sperling, Kelowna
Cuba	Record # 997	Crown Grant	Engelbert Sperling, Kelowna
Holly #12	Record #1282	Located Claim	R. Sostad
Holly #1	Record #1271	Located Claim	R. Sostad
Holly #3	Record #1273	Located Claim	R. Sostad
City of Vancouver	L 2013	Crown Grant	Notre Dame des Mines, Ltd.
Lexington	L 645	Crown Grant	Notre Dame des Mines, Ltd.
City of Denver	L 1161	Crown Grant	Notre Dame des Mines, Ltd.
Notre Dame des Mines (Fr)	L 1095	Crown Grant	Notre Dame des Mines, Ltd.
Oro	L 614	Crown Grant	Notre Dame des Mines, Ltd.
Oro Fr.	L 1096	Crown Grant	Notre Dame des Mines, Ltd.
Puyallup	L 1152	Crown Grant	Notre Dame des Mines, Ltd.
Golden Cache Fr.	L 995	Crown Grant	Notre Dame des Mines, Ltd.

ALL THE ABOVE CLAIMS ARE BEING OPTIONED TO GRENOBLE ENERGY LIMITED

LOCATION AND ACCESS

The Lexington property is located on Goosmus Creek 10.5 km S25E of the town of Greenwood, B.C. at an elevation of 1130 m to 1430 m.

The geographic coordinates are 49° 01' N latitude and 118° 37' W longitude.

Access to the property is by a good gravel road beginning at Highway 3 approximately 3 1/2 km southwest of Greenwood.

PHYSIOGRAPHY

The property is located within the Monashee Mountains, a physiographic division of the Interior Plateau System on the southeast- to south-flowing Goosmus Creek.

GEOLOGY

The following is taken from the July, 1979 Report on the Lexington Copper-Gold Property, Greenwood M.D., B.C. for Grenoble Energy by P.W. Phendler, P.Eng.

"The area in which the Lexington property is located is underlain by a northwesterly striking 1.6 kilometer wide belt of Paleozoic (?) gneiss and schist bounded on the north and south by zones of Paleozoic or Early Mesozoic metavolcanic and metasedimentary beds. These rock are cut by a wide variety of igneous instrusions including a porphyrytic quartz feldspar stock (dacite) and a few large serpentine and gabbro dyke-like bodies. Also, dykes and irregular shaped diorite intrusions are found throughout the area cutting many of the units. The youngest rocks consist of a few pulaskite and basalt dykes and a small outlier of Tertiary

conglomerate.

The serpentine intrusives are sill like bodies that enclose a thick band of quartz porphyry (dacite) intrusive that has been traced on surface for 1800 meters in the southeast part of the claim group. These formations strike northwest and dip 20° to the northeast. The enclosed quartz porphyry contains subhedral quartz phenocrysts and composite quartz eyes set in a matrix of small rectangular plagioclase crystals, chloritized biotite and interstitial fine grained quartz and feldspar. It is a very competent rock and can be expected to present few mining problems.

The underlying and overlying serpentine is composed almost entirely of feathery and platy serpentine minerals with veins and disseminations of magnetite, carbonates and pyroxenes. It is suggested that mine openings be kept clear of this rock type, because of its platy cleavage and general incompetence."

HISTORY OF PREVIOUS WORK

The Crown Grants have been staked since 1892 when a copper discovery was made. Some production was obtained. Considerable exploration has been carried out since that time particularly since 1962. Work has included various geophysical and soil geochemical surveys, geological mapping, trenching, percussion drilling and diamond drilling.

INSTRUMENTATION

This investigation was carried out using an SIE 12-channel refraction-reflection seismograph amplifier system with an SIE PRO 11 photo recording oscillograph and 8-cycle/sec geophones.

FIELD PROCEDURE

The "two-way, in-line shot" seismic refraction method was used for all traverses. The technique consisted of laying out 12 geophones in a straight line and recording arrival times from shots fired at either end of the spread. The geophone separation was 15 m on all lines. The arrival times from two additional shot points approximately every 1/3 of the spread length within the spread were also recorded. This provided the overburden depth and velocity variations along the spread, and also gave additional information about the deeper layers. Finally, for each spread, two additional off-end shots were fired at a distance of one-half the spread length from the nearest geophone. Since the off-end shots were fired fairly far from the nearest geophone, it was safely assumed that the first arrivals were from the bedrock surface, This was felt necessary so that the refractions received from the other shot points could be correlated and assigned the correct layer number.

The shots were placed in holes 0.4 to 0.7 meters deep. Depending on the conditions, the shot size ranged from 0.5 to 1.3 kg.

COMPUTING METHOD

All seismic data was analyzed using an intercept-delay time technique. Implementation of this method requires reverse refraction profiles with bedrock refraction emanating from a common point for at least two detectors. This rock overlap is necessary in order to obtain a true refractor velocity and travel time in the overburden independent of bedrock dip and/or surface irregularities. The off-end shot times are used to extrapolate the rock locations. With this information and related overburden velocities, it is possible to compute the depth to rock not only below each shot point, but also below each detector. However, the computed depths below shot points should be considered

slightly more accurate than those below detectors.

The procedure is as follows:

1. Pick the first arrivals from the field records and draw time-distance graphs for each spread;

2. With the help of a plot of the differences in arrival times, determine which points are bedrock and which are overburden, and how many layers occur in the overburden;

3. Draw a delay line for each end shot and from this determine the delay time for each geophone;

4. Proportion the delay time for each geophone into the various times spend in the various layers. Multiply each layer time by the corresponding layer velocity, adjusting to Snell's Law to obtain the layer thickness. Adding the layer thickness together will give the total overburden depth.

DISCUSSION OF RESULTS

A plan of the survey is shown on Sheet 1 at a scale of 1" = 100 feet. The thickness of the overburden is shown above the line and the depth to competent bedrock is shown below the line. A profile of the seismic interpretation of each line is shown on Sheets 2 to 6, respectively, at a scale of 1" = 50 feet.

A geological map of the property as well as the results of a few of the drill holes were available to the writer and were found to be quite helpful in the seismic interpretation.

The results and comments are as follows.

becoming much less distinct.

The third layer is referred to as competent bedrock having a velocity range of 13,000 to 20,000 feet/sec. From the known geology of the property, this bedrock consists of both diorite and serpentine.

On all the lines except 12N, the seismic results appear to reveal the contact between these two rock types. On 21N, the velocity difference was probably too small to detect. The velocity range of diorite was determined to be 13,000 to 15,400 feet/sec, and that of serpentine, 15,400 to 20,000 feet/sec. The dip of the contact was drawn in solely from the available geological information.

The position of the contact as interpreted from the seismic results agrees fairly well with the known geology, except on lines 18N and 23N. On line 18N the seismic-interpreted contact is about 150 feet northeast of the geologically interpreted one, and on 23N, abouth 50 feet southwest. The discrepance may be due to the fact that the geologically-interpreted contact is not known that well, especially on line 23N. An equally possible explanation for line 18N is that the dip of the contact as well as the shape of the second layer has resulted in the diorite being too thin to be picked up by seismic. It, therefore, in the area southwest of geophone 8 on line 18N, is acting as a hidden layer.

Some parts of the survey were rather difficult to interpret largely because of the velocity changes due to a more complex geology associated with an orebody. This could have been partly rectified by a smaller geophone spacing, but at a much greater cost, which, in the writer's opinion, would not have been cost

The seismic survey has revealed on each profile a three-layer case.

The first layer has a velocity of 1200 feet/sec, which is therefore undoubtedly overburden. From the writer's observation in the field, this overburden is probably a glacial till. The thickness varies from 5 to 17 feet with most of the area having a thickness of about ten feet.

The second layer has a velocity range of 4,550 to 6,990 feet/sec. It was for this layer that the drill hole information proved to be quite valuable. In almost all cases, this velocity range would be reflecting a water-saturated material and/or glacial till. However, the drill results clearly show this layer to be fractured and weathered bedrock. The unusually low velocity for bedrock is likely due to the fracturing and weathering associated with the nearby mineralization. It appears from the seismic results that the bedrock is both serpentine and diorite.
The thickness of this layer varies from near 0 feet on the southwest end of L-18N to about 90 feet on the northeast end of the same line. The thickness over the remainder of the survey grid is fairly uniform being in the 40-to 60-foot range.

Only on the southwestern part of L-18N was this layer not evident in the seismic results. The layer may have actually pinched out or, alternately, it may have become too thin for the seismic method to pick it up. This is referred to as a hidden layer. The writer has calculated the maximum thickness of layer 2 if it exists as a hidden layer, and consequently drawn the possible layer 2/layer 3 interface on Sheet 2 as a dashed line.

Within the center of lines 18 and 19N, this layer flattens out as a bench. On the remaining lines this bench almost disappears

GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd. with offices at #403-750 West Pender Street, Vancouver, British Columbia.

I further certify:

1. That I am a graduate of the University of British Columbia (1968) and hold a B. Sc., degree in Geophysics.
2. I have been practising my profession for the past twelve years and have been active in the mining industry for the past fifteen years.
3. That I am an active member of the Society of Exploration Geophysicists and a member of the European Association of Exploration Geophysicists.
4. This report is compiled from data obtained from a seismic survey carried out under the field supervision of myself during September, 1979.
5. I hold no interest directly or indirectly in Grenoble Energy Limited nor in the Lexington Copper-Gold Property.

David G. Mark,
Geophysicist

February 15, 1980

STATEMENT OF EXPENSES

FIELD:

5-man crew, 27 hours @ $100/hour	$ 2,700.00
Truck rental and gas	281.13
Room and board	334.00
Instrument rental, 2 days @ $100/day	200.00
Explosives	241.33
Seismocaps, 42 @ $2.50/cap	105.00
Recording paper, 1 roll @ $30/roll	30.00
	$ 3,891.46

OFFICE:

Geophysicist, 35 hours @ $35/hour	$ 1,225.00
Drafting and printing	302.19
Xeroxing and compilation	30.00
	1,557.19

TOTAL $5,448.65

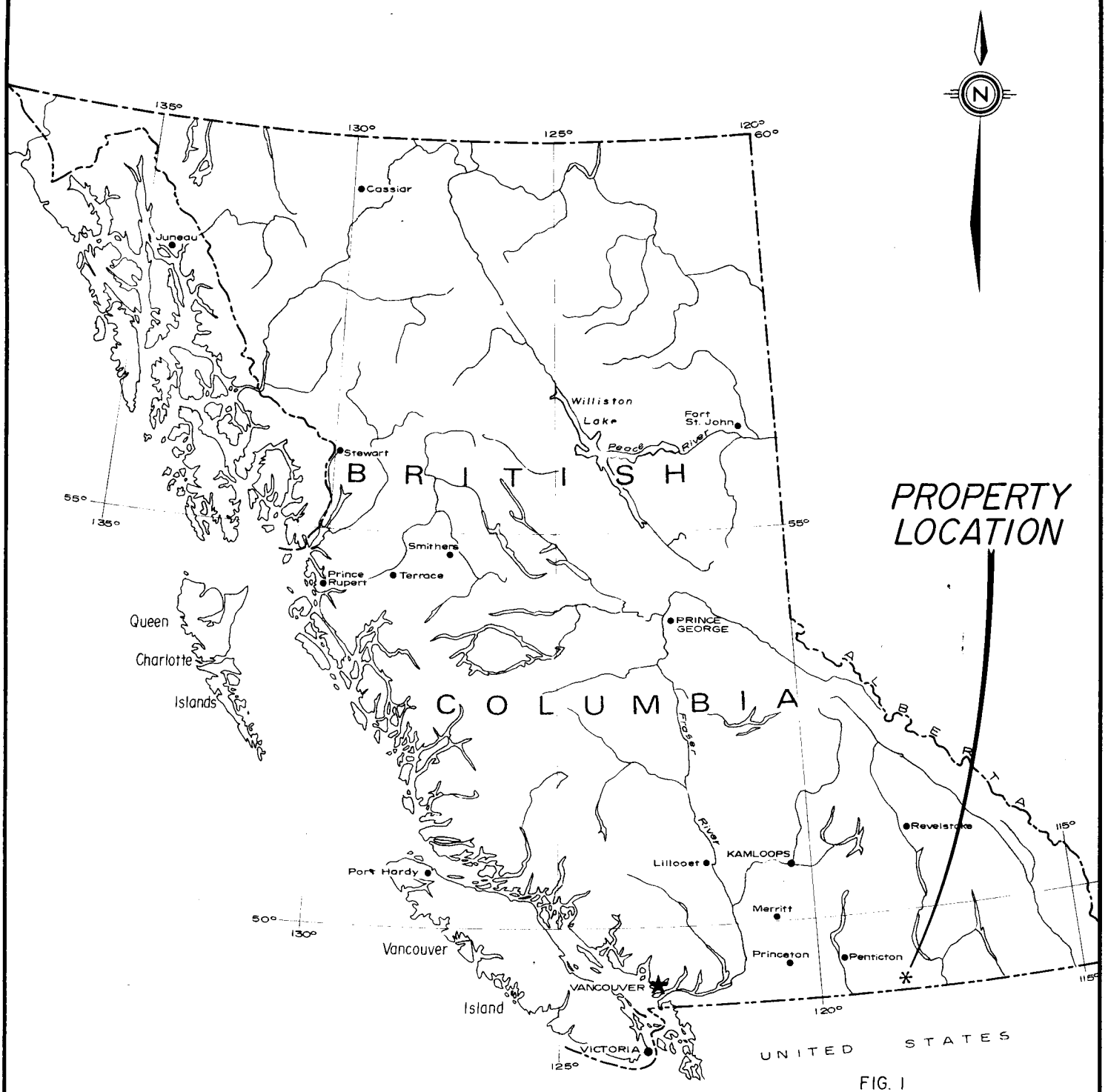

FIG. 1

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LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

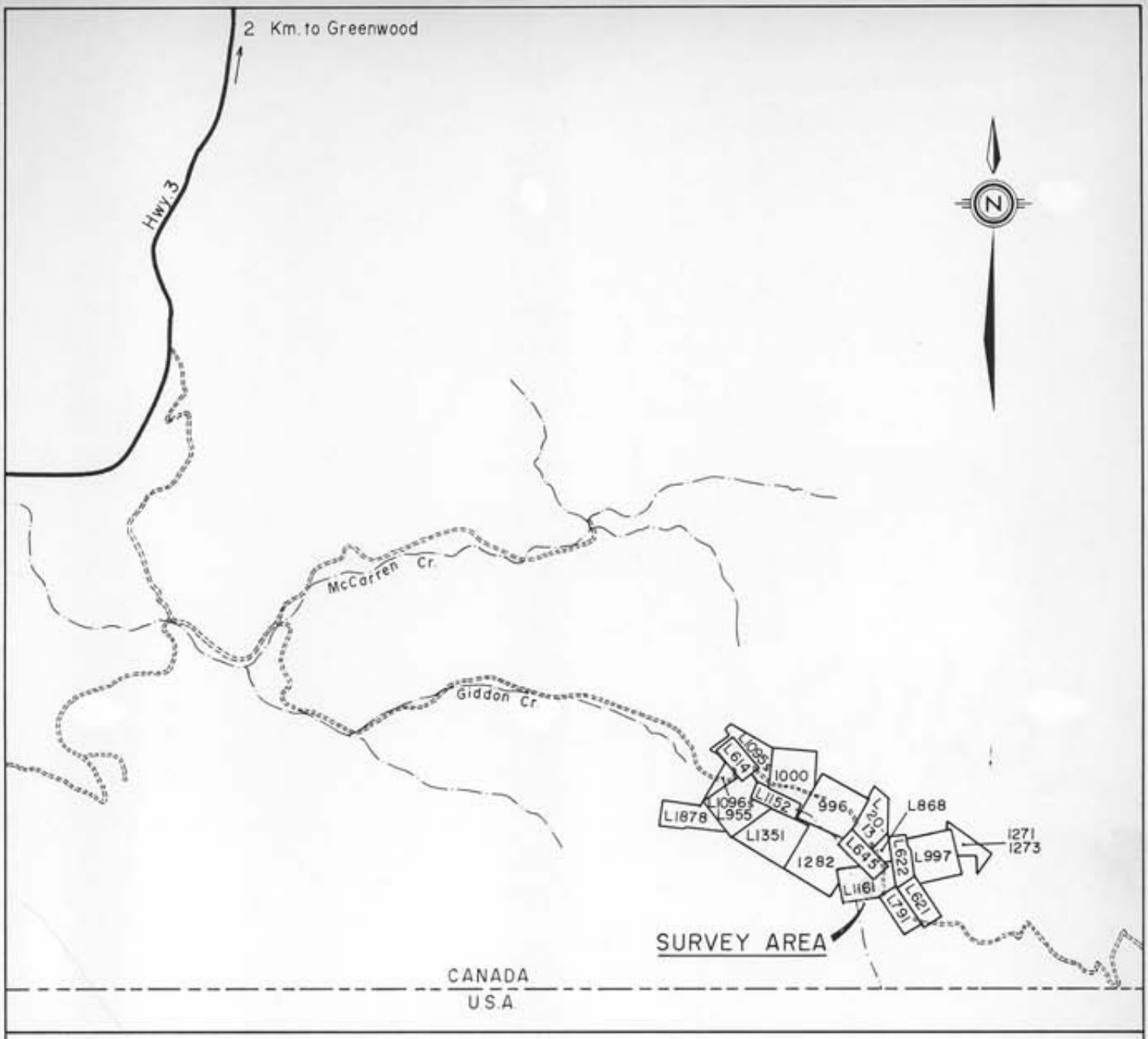
LOCATION MAP

SCALE

Km. 100 50 0 100 200 300 400 Km.

Miles 100 50 0 100 200 Miles

ALTAIR drafting services ltd.



SCALE

KILOMETRES 1 5 0 1 2 KILOMETRES

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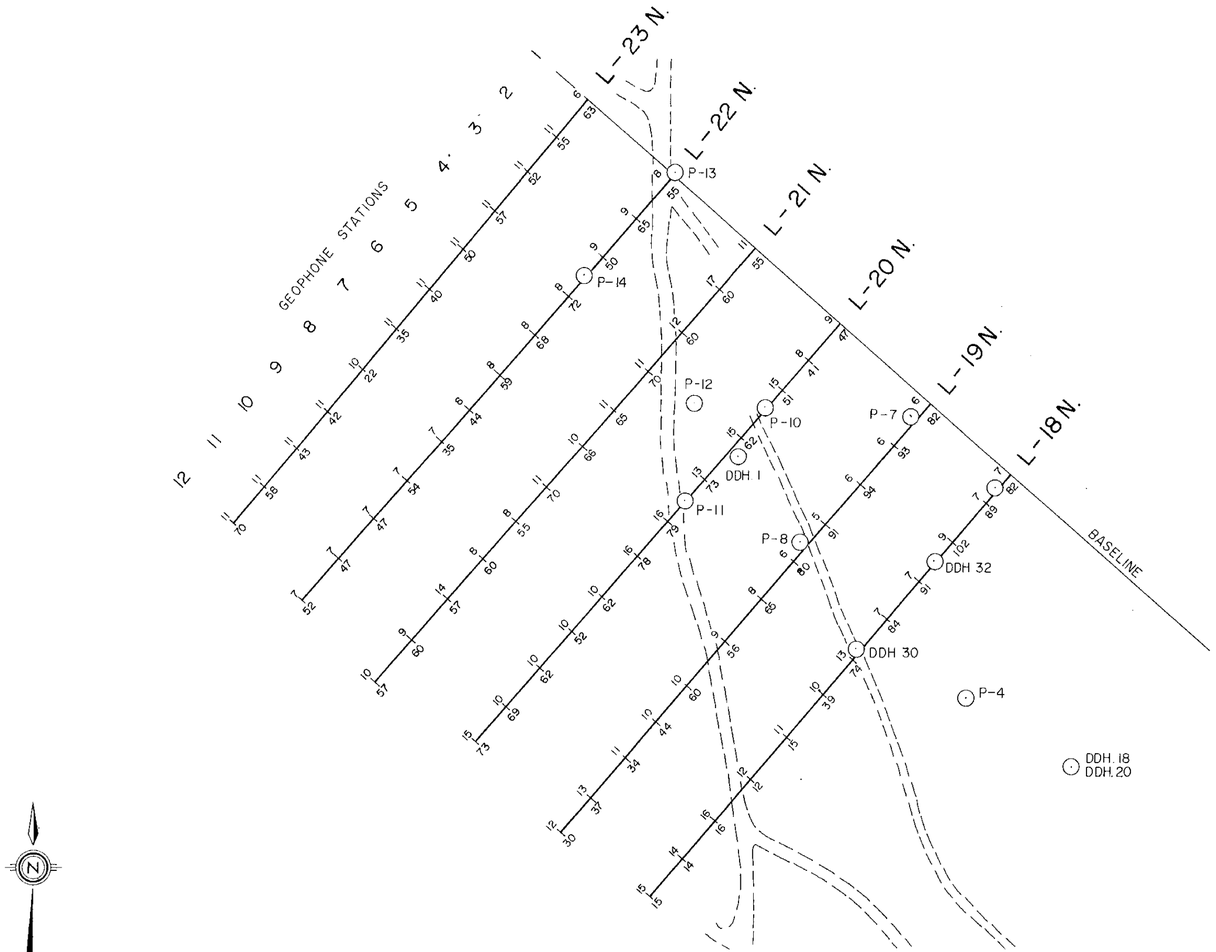
LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D, B.C.

CLAIM MAP

DRAWN BY:	JOB No:	DATE:	SCALE:	FIG. No.:
M. R.	79-54	FEB 1981	1:50,000	2



THICKNESS OF OVERBURDEN (FEET)

GEOPHONE STATION

DEPTH TO COMPETENT BEDROCK (FEET)

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SCALE

FEET 100 50 0 100 200 300 FEET

METRES 25 0 25 50 75 METRES

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LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

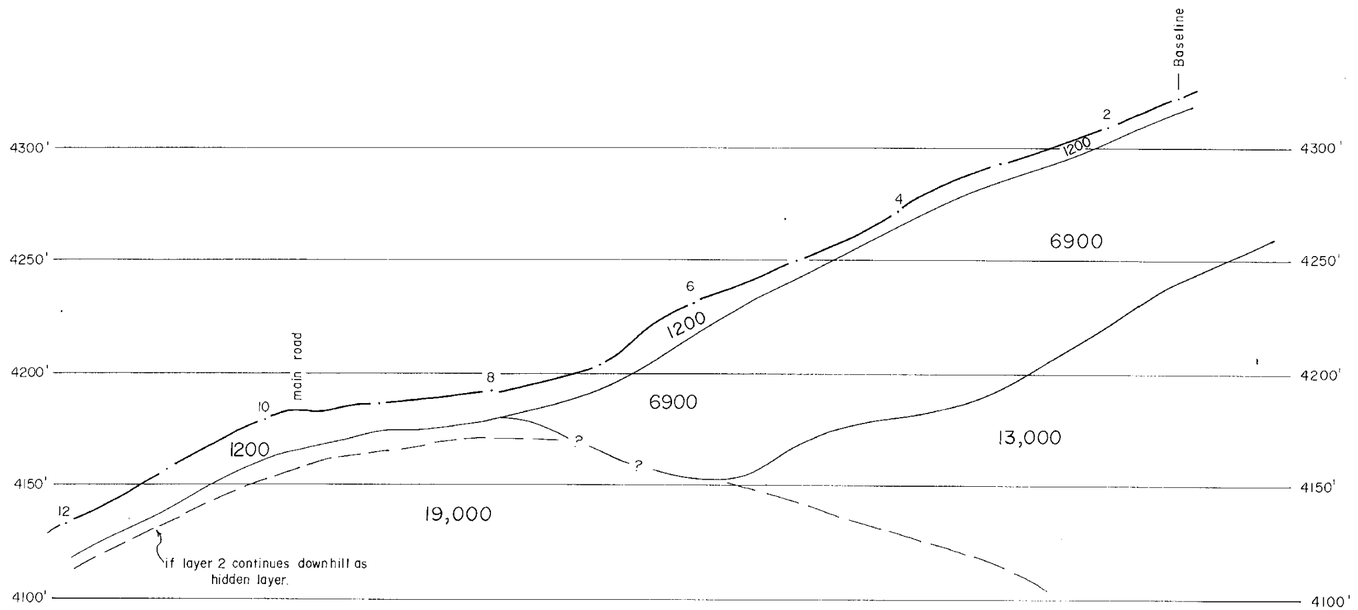
SEISMIC REFRACTION STUDY

PLAN

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No
D.G.M.	1" = 100' 1 : 1200	JAN. 1980	79 - 54	1

S.W.

N.E.

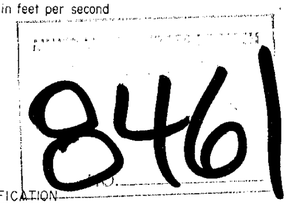


LEGEND

3 — Geophone location

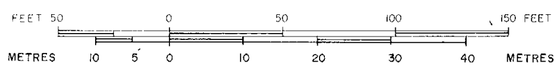
Computed depth on inferred layer boundary

6900 Average velocity in feet per second



VELOCITY (ft/s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock: diorite
15,400(?) to 20,000	–	Bedrock: serpentine

SCALE



Direction of line – S. 40° W (220°E)

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LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

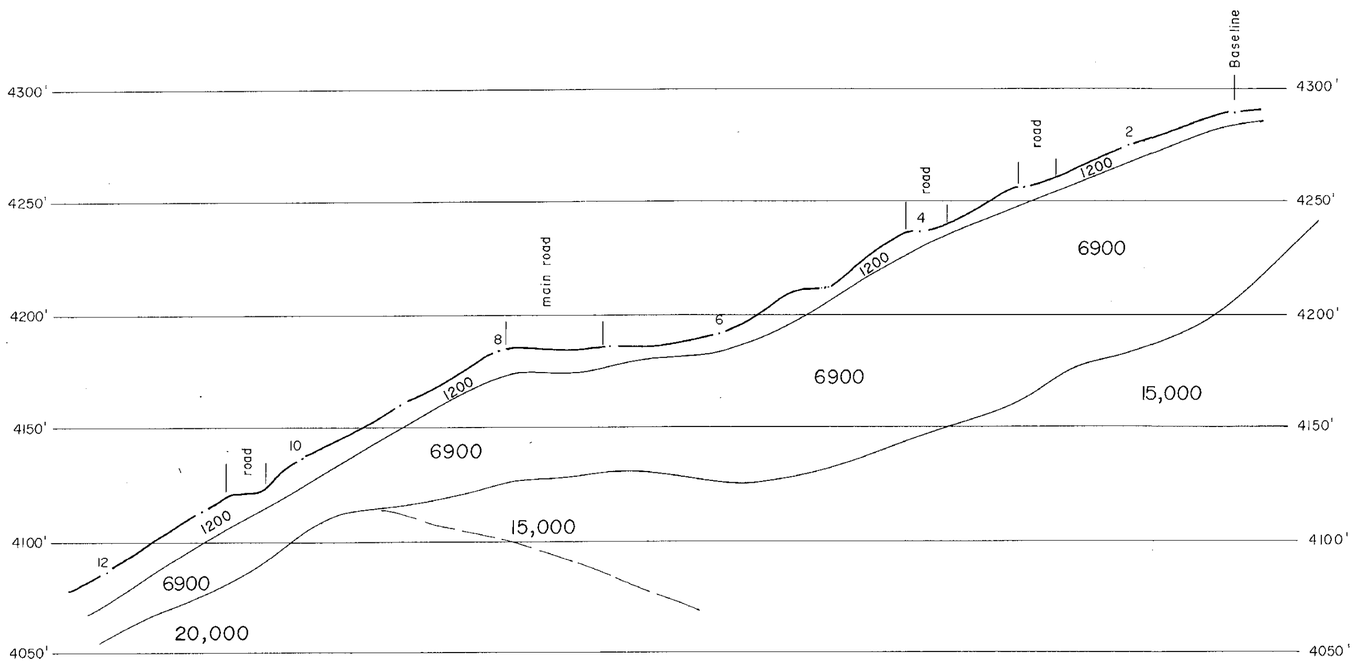
SEISMIC REFRACTION STUDY

PROFILE L-18N

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No.
D.G.M.	1" = 50' 1 : 600	JAN. 1980	79-54	2

S.W.

N.E.



LEGEND

3 — Geophone location

Computed depth on inferred layer boundary

6900 — Average velocity in feet per second

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VELOCITY (ft./s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock: diorite
15,400(?) to 20,000	–	Bedrock: serpentine

SCALE

FEET 50 0 50 100 150 FEET

METRES 10 5 0 10 20 30 40 METRES

Direction of line – S. 40° W (220°E)

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LEXINGTON COPPER-GOLD PROPERTY

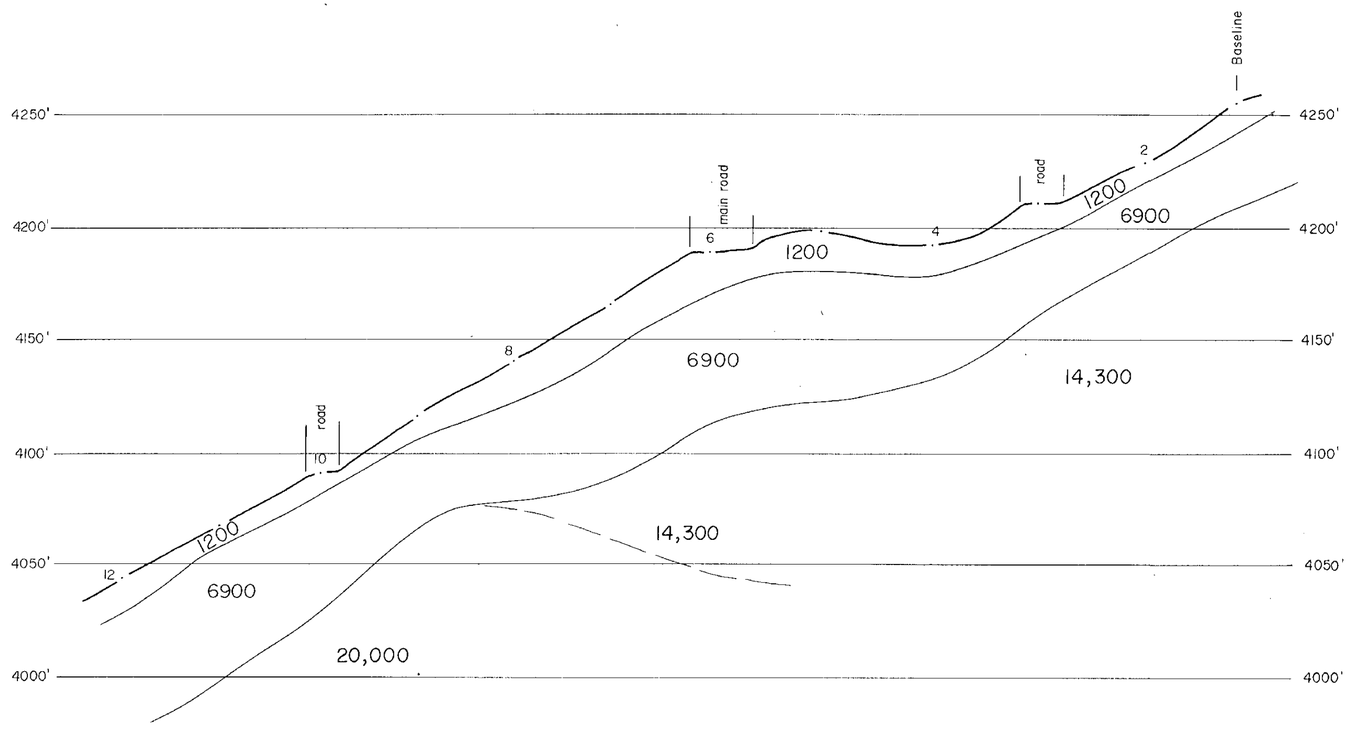
GREENWOOD AREA, GREENWOOD M.D., B.C.

SEISMIC REFRACTION STUDY
PROFILE L-19N

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No
D.G.M.	1" = 50' 1:600	JAN. 1980	79-54	3

S.W.

N.E.

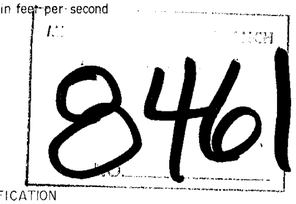


LEGEND

3 — Geophone location

Computed depth on inferred layer boundary

6900 — Average velocity in feet per second



VELOCITY (ft./s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock : diorite
15,400(?) to 20,000	–	Bedrock : serpentine

SCALE

FEET 50 0 50 100 150 FEET

METRES 10 5 0 10 20 30 40 METRES

Direction of line - S 40° W (220°E)

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LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

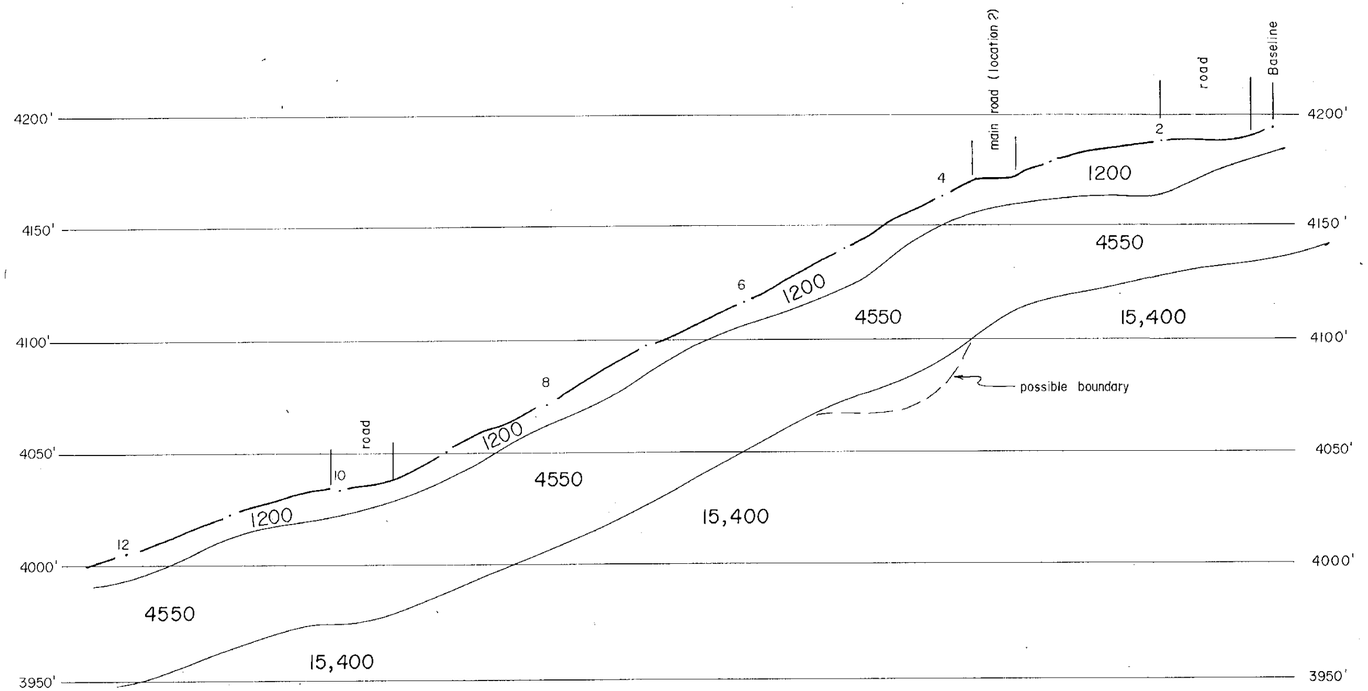
SEISMIC REFRACTION STUDY

PROFILE L-20N

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No.
D.G.M.	1" = 50' 1:600	JAN. 1980	79-54	4

S.W.

N.E.



LEGEND

3 — Geophone location

Computed depth on inferred layer boundary

6900 — Average velocity in feet per second

VELOCITY (ft./s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock : diorite
15,400(?) to 20,000	–	Bedrock : serpentine

SCALE

FEET 50 0 50 100 150 FEET

METRES 10 5 0 10 20 30 40 METRES

Direction of line – S. 40° W (220°E)

GEOTRONICS SURVEYS LTD.

GRENOBLE ENERGY LIMITED

LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

SEISMIC REFRACTION STUDY

PROFILE L-21 N

DRAWN BY:	SCALE:	DATE	JOB No:	SHEET No
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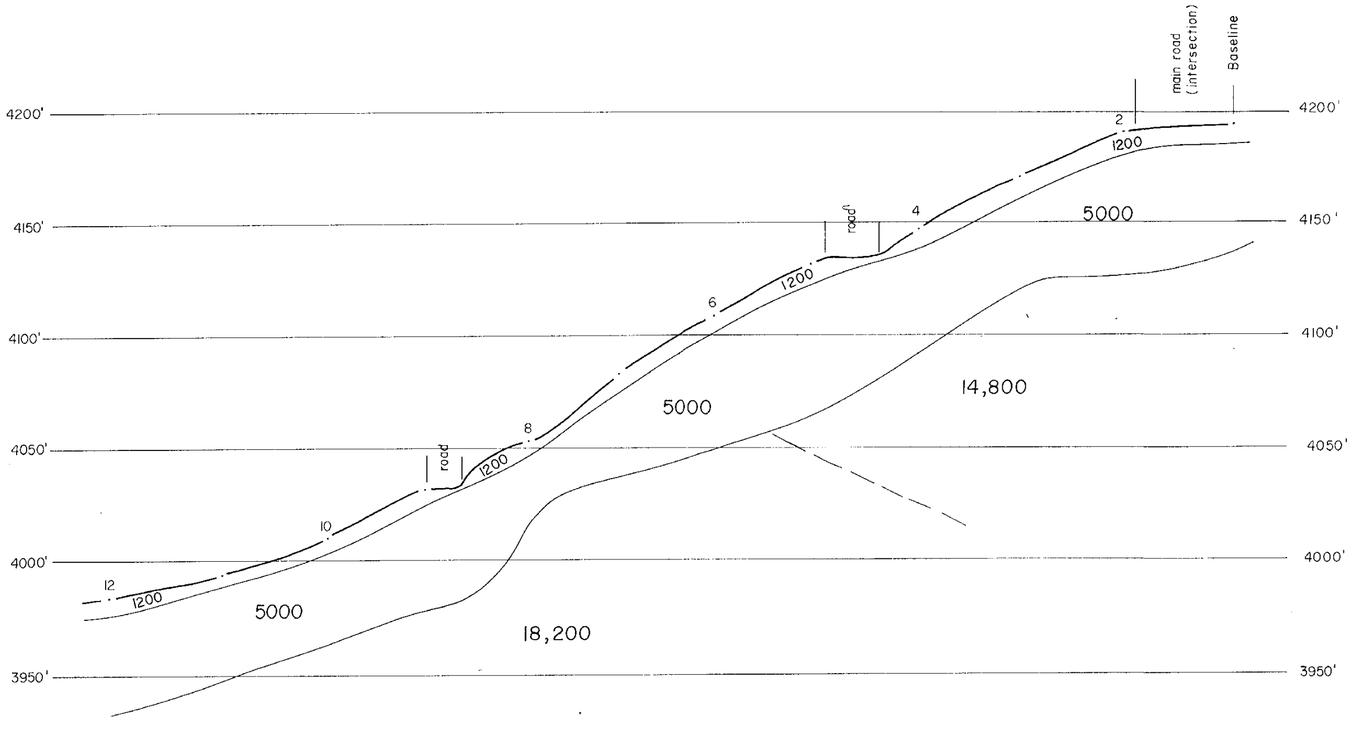
S.W.

N.E.



LEGEND

3 — Geophone location

——— Computed depth on inferred layer boundary

6900 Average velocity in feet per second

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VELOCITY (ft/s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock: diorite
15,400(?) to 20,000	–	Bedrock: serpentine

SCALE

FEET 50 0 50 100 150 FEET

METRES 10 5 0 10 20 30 40 METRES

Direction of line – S 40° W (220°E)

GEOTRONICS SURVEYS LTD.

GRENOBLE ENERGY LIMITED

LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

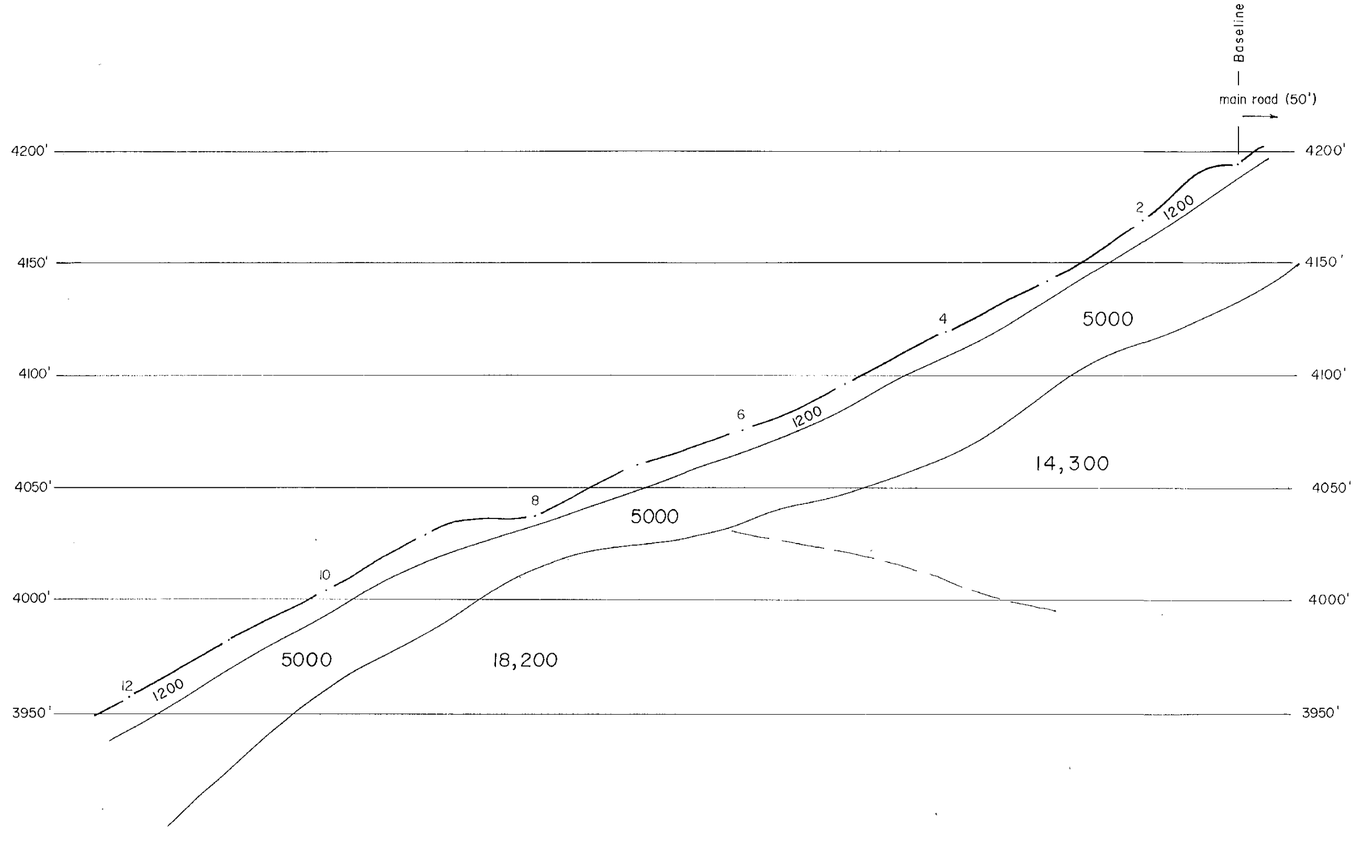
SEISMIC REFRACTION STUDY

PROFILE L-22N

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No.
D.G.M.	1" = 50' 1 : 600	JAN. 1980	79 - 54	6

S.W.

N.E.



LEGEND

3 — Geophone location

Computed depth on inferred layer boundary

6900 — Average velocity in feet per second

MINERAL RESOURCES BRANCH
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VELOCITY (ft/s)		CLASSIFICATION
1200	–	Overburden
4550 to 6900	–	Bedrock: weathered and fractured (could be diorite or serpentine)
13,000 to 15,400(?)	–	Bedrock : diorite
15,400(?) to 20,000	–	Bedrock : serpentine

SCALE

FEET 50 0 50 100 150 FEET

METRES 10 5 0 10 20 30 40 METRES

Direction of line – S 40° W (220°E)

GEOTRONICS SURVEYS LTD.

GRENOBLE ENERGY LIMITED

LEXINGTON COPPER-GOLD PROPERTY

GREENWOOD AREA, GREENWOOD M.D., B.C.

SEISMIC REFRACTION STUDY
PROFILE L-23N

DRAWN BY	SCALE	DATE	JOB No.	SHEET No
D.G.M.	1" = 50' 1:600	JAN 1980	79-54	7