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GEOPHYSICAL REPORT

on a

SEISMIC REFRACTION SURVEY

on

PLACER LEASE 1120

SPANISH CREEK AREA

CARIBOO MINING DISTRICT, B.C.

Location: At the confluence of Spanish Creek and Cariboo River 7.5 km NE of Likely, B.C.

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

For: George Smith Consultants L
#611-850 West Hastings Str
Vancouver, B.C., V6C 1E1

Dated: August 22, 1980

GEOTRONICS SURVEYS LTD.
Engineering & Mining Geophysicists
VANCOUVER, CANADA

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MAPS - AT END OF REPORT

SUMMARY

Seismic refraction profiles were carried out over Placer Lease 1120 at the confluence of Spanish Creek and Cariboo River in the Cariboo M.D., B.C. on June 8th and 9th, 1980. The mouth of Spanish Creek is located 7.5 km NE of Likely. Access is easily gained by a 2-wheel drive vehicle over a series of logging roads. The object of the survey was to locate buried stream channels where placer gold could occur.

Old work on the property apparently consisted of an adit that was probably put in during the Cariboo gold rush.

The property is underlain by Upper Triassic sediments and meta-sediments overlain by glacial till and fluvial gravels.

The survey was carried out using a 12-channel seismic refraction system with 1 550-foot spread and 2 850-foot spreads, with explosives as the energy source. The data were analyzed using an intercept-delay time technique.

At least one channel, and quite possibly 2, were located parallel to the Cariboo River. The bedrock channel parallel to Spanish Creek was located as well. A fault or shear zone, or , less likely, a bedrock channel, was located on the eastern part of the Spanish Creek profiles.

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PLACER LEASE 1120

SPANISH CREEK AREA

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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 Placer Lease 1120 at the confluence of Spanish Creek and Cariboo River during the 8th and 9th of June, 1980.

The field work was carried out under the supervision of the writer with two helpers. The interpretation was done by the writer as well. The amount of seismic refraction surveying done was 686 m (2250 feet) terrain, or 612 m (2009 feet) horizontal.

The primary object of the profiles was to locate buried river/creek channels within the bedrock since these could contain concentrations of placer gold. One was postulated to occur parallel to the Cariboo River, and the other, through past work, is known to occur parallel to Spanish Creek.

PROPERTY AND OWNERSHIP

The property consists of one placer lease numbered 1120 issued June 8, 1978.

The seismic refraction survey discussed herein has been applied for one year's assessment work and it is planned to apply three more years. This will bring the expiry date of Placer Lease 1120 to June 8, 1984.

George Smith of West Vancouver is the registered owner of the property.

LOCATION AND ACCESS

Placer Lease 1120 is located at the confluence of Spanish Creek with Cariboo River which is about 7.5 km NE of Likely, B.C. within the Cariboo Mining District.

The geographical coordinates are 52^{o} 39' N latitude and 121^{o} 28' W longitude.

Access is easily gained by a 2-wheel drive vehicle over a series of logging roads about 12 km out of Likely.

PHYSIOGRAPHY

The property is located within the Quesnel Highlands which is a physiographic division of the Interior Plateau System. Much of the topography consists of upland areas that are remnants of a deeply dissected plateau of moderate relief.

Placer Lease 1120 centers on north-flowing Spanish Creek from its confluence with Cariboo River southwards almost to Blackbear Creek. The sides of the creek valley are

moderately steep varying in elevation within the property boundaries from 750 m (2450 feet) to 870 m (2850 feet) giving a relief of 120 m (400 feet).

GEOLOGY

The bedrock underlying the property is a meta-sedimentary group of the Upper Triassic Age.
The writer noted a bedrock bluff across Spanish Creek from SL-3 to be a slate or phyllite (possibly a schist?).

The overburden consists of fluvial gravels and glacial till.

HISTORY OF PREVIOUS WORK

Since Placer Lease 1120 was staked, no work has been done. However, an adit is apparently located on the property that was put in for the placer gold, probably during the Cariboo gold rush.

INSTRUMENTATION

This investigation was carried out using an SIE 12-channel refraction-reflection seismogragh 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 arrival times from 2 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 in fact from the bedrock surface. This was felt necessary so that the refractions received from other shot points could be correlated and assigned the correct layer number.

The geophone separations were 15 meters for SL-1 as well up to geophone 6 on SL-2 and SL-3. From geophone 6 to as 12 on these latter 2 spreads, the separation was increased to 30 meters.

The shots were placed in holes 0.4 to 0.7 meters deep. Depending upon the conditions, the shot size ranged from 0.5 to 2.5 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 spent 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 area is shown on Sheet 2 at a scale of 1:2400 (1"=200'). Profiles SL-1 to SL-3 are drawn on Sheets 3 to 5 respectively, at a scale of 1:1000.

PROFILE SL-1, which runs approximately perpendicular to the Cariboo River was put in to locate any possible buried river channel. It consists of a 3-layer case, the first two being overburden, the third one being bedrock.

The first layer has a velocity of about 335 m/s and is undoubtedly loose, unconsolidated surface material. Its thickness varies from 1.6 to 3.7 m (5.1 to 12.3 feet).

Layer 2 is probably the same material as layer one, except more consolidated and water-saturated. It probably consists of sands, gravels, and glacial till. It has a velocity of 1680 m/s and varies in thickness from 1 to 34 m (3 to 110 feet). The velocity drops to 1340 m/s at the upper end of the profile probably due to a lower water content.

The third layer is bedrock and has a velocity of 3470 m/s, which is a typical velocity of phyllites or shales. The depth to bedrock varies from 4 to 36 m (13 to 118 feet).

The most interesting aspect of this profile is a third layer slow zone below geophone 7. This could be a fault or shear zone, but is more likely a canyon-type of bedrock channel. Because of this, the depth to bedrock below geophone 7 could not be calculated.

There also appears to be a channel below geophone 4 where bedrock depth is 22 m (72 feet).

SL-2 AND SL-3, were profiled for the purpose of locating the buried bedrock creek channel parallel to and to the

east of Spanish Creek. Both profiles resulted in a 3-layer case similar to SL-1.

The first layer is loose, unconsolidated surface material, probably sands and gravels, and varies in thickness from 1 to 5 m (0.3 to 16 feet).

The second layer has a velocity of 1250 m/s for SL-2 and 1650 m/s for SL-3. Like SL-1, it is probably the same material as layer 1, except more consolidated and water-saturated. The higher velocity on SL-3 is probably due to water saturation. A creek flows nearby much of this profile. For SL-2, the layer two thickness varies from 9 to 59 m (30 to 194 feet) and for SL-3, 12 to 69 m (40 to 227 feet).

Layer 3, which is bedrock, has a velocity of 3600 to 3970 m/s, which like layer 1, is a typical velocity of shales and phyllites. Bedrock depths vary from 10 to 62 m (33 to 204 feet) for SL-2, and 15 to 74 m (50 to 243 feet) for SL-3.

Both profiles reveal a channel to occur below geophone 4 where on SL-2, the bedrock depth is 37 m (121 feet), and SL-3, 38 m (125 feet). On SL-3, either a parallel channel occurs below geophone 6, or the channel is wider. Below geophone 6, the bedrock is 62 m (205 feet) deep.

There is also another bedrock feature common to both profiles, and that is a slow zone on the eastern part of each profile. It probably is a fault or shear zone,

but the possibility of it being an infilled creek channel should not be overlooked. Unlike SL-1, the writer favours the former because of its location on the profile.

SUGGESTED VELOCITY CLASSIFICATION

Velocity (m/s)	
330 to 335	Loose, unconsolidated surface material
1250 to 1700	Consolidated; partially water-saturated to completely water-saturated; probably sands, gravels, and/or glacial till; also, possibly shear zone gouge material.
3470 to 3970	Bedrock; probably shale or phyllite.

August 22, 1980

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,

David G. Mark
Geophysicist

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 (1068) 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 June 8 and 9, 1980.

5. I hold no interest directly or indirectly in Placer Lease 1120 or in any properties of George Smith Consultants Ltd.

David G. Mark
Geophysicist

August 22, 1980

AFFIDAVIT OF EXPENSES #1

This is to certify that seismic refraction surveying carried out on Placer Lease 1120 on June 8, 1980, was done to the value of the following:

3-man crew, 8 hrs at $70/hr	$ 560.00
Room and board	100.00
Instrument rental, 1 day at $100/day	100.00
Expendables	120.00
Truck	70.00
Interpretation and report	300.00
	$ 950.00

David G. Mark
Manager

August 22, 1980

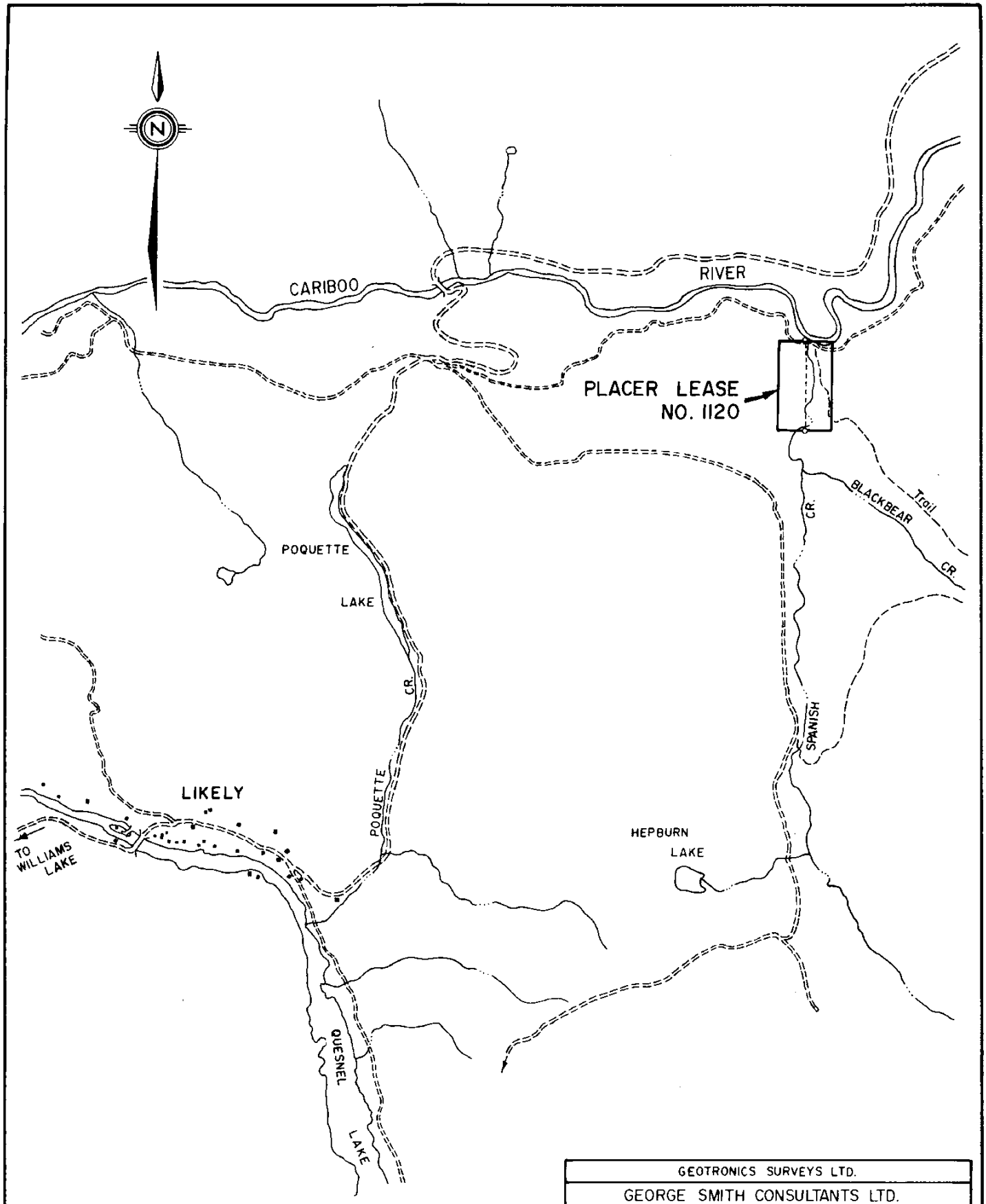
AFFIDAVIT OF EXPENSES #2

This is to certify that seismic refraction surveying carried out on Placer Lease 1120 on June 9, 1980, was done to the value of the following:

3-man crew, 11 hrs at $70/hr	$ 770.00
Room and board	100.00
Instrument rental, 1 day at $100/day	100.00
Expendables	60.00
Truck	70.00
Interpretation and report	400.00
	$1,500.00

David G. Mark
Manager

August 22, 1980



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PLACER LEASE 1120

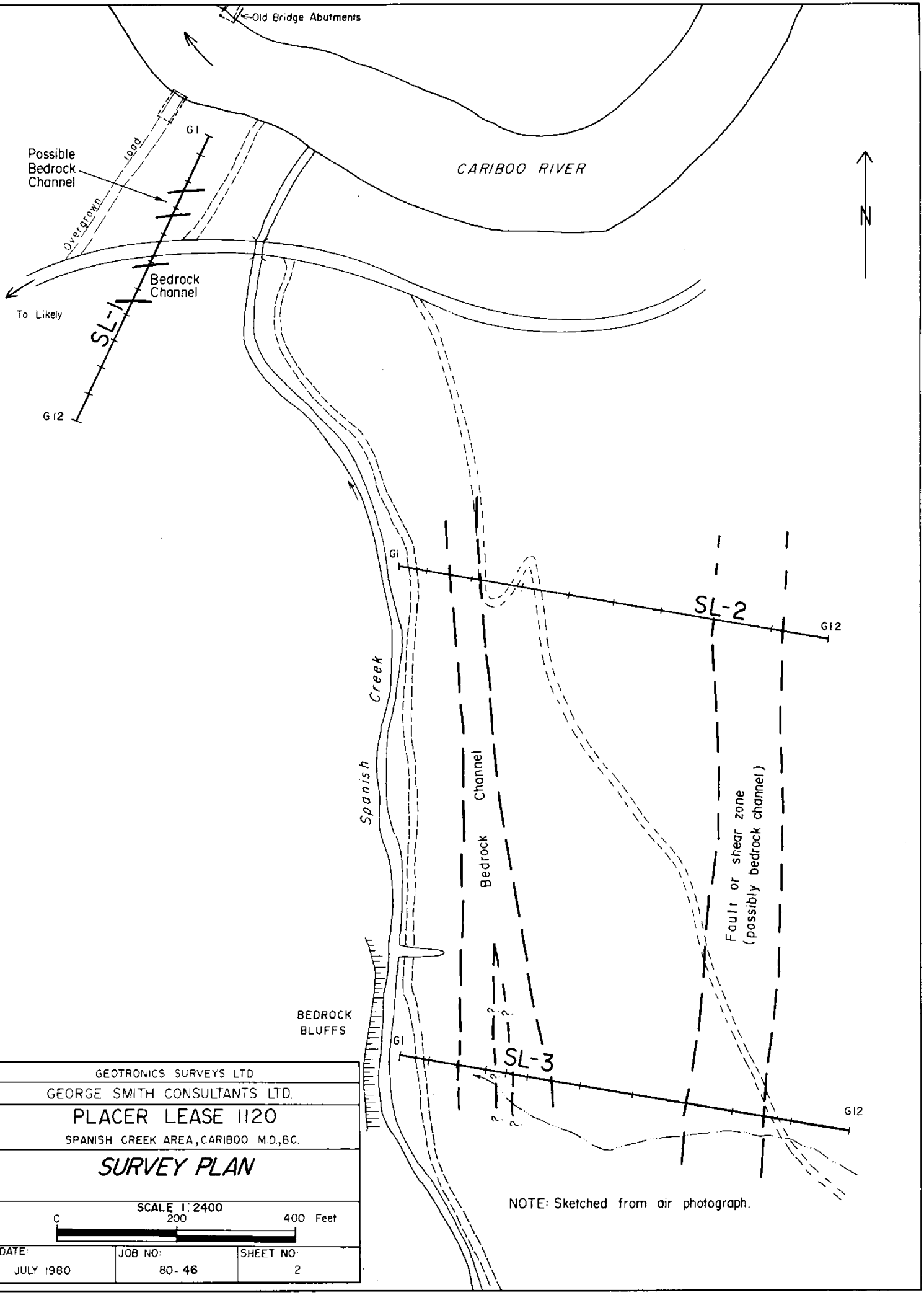
SPANISH CREEK AREA, CARIBOO M.D., B.C.

CLAIM MAP

SCALE IN MILES

1 0.5 0 1

DATE:	JOB NO.:	SHEET NO.:
September/1980	80-46	1



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PLACER LEASE 1120

SPANISH CREEK AREA, CARIBOO M.D., B.C.

SURVEY PLAN

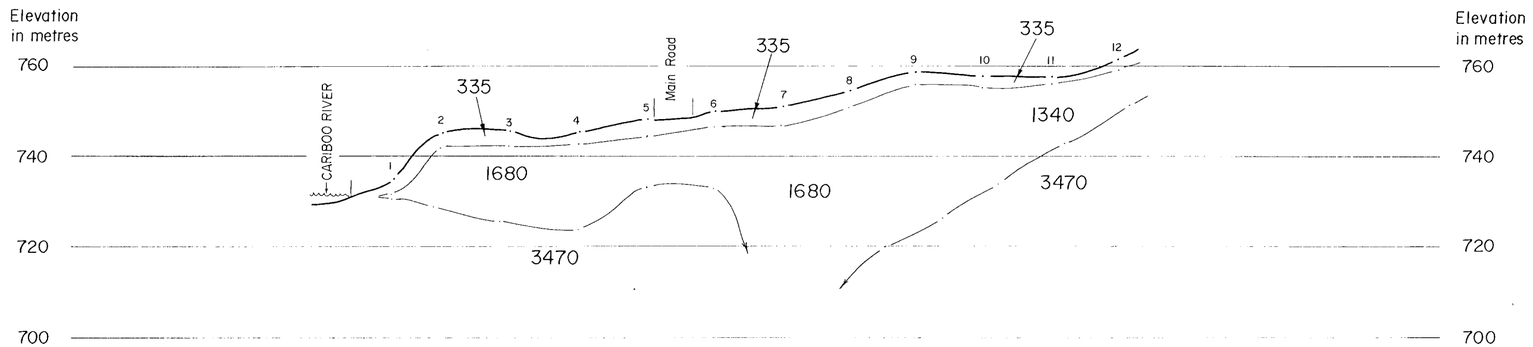
SCALE 1:2400

0 200 400 Feet

DATE:	JOB NO:	SHEET NO:
JULY 1980	80-46	2

N.

S.



LEGEND

3 — Geophone location

Computed depth on inferred layer boundary

3470 — Average velocity in metres per second

VELOCITY (m/s)	CLASSIFICATION
300 to 500	– Relatively dry, surficial, unconsolidated sands and coarse gravels
1300 to 1900	– Water-saturated sands and coarse gravels; glacial till
3400 to 3900	– Bedrock: probably shales or phyllites

SCALE

METRES 20 10 0 20 40 60 80 METRES

Direction of line – S 25° W (205° E)

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PLACER LEASE 1120

SPANISH CREEK AREA, CARIBOO M.D., B.C.

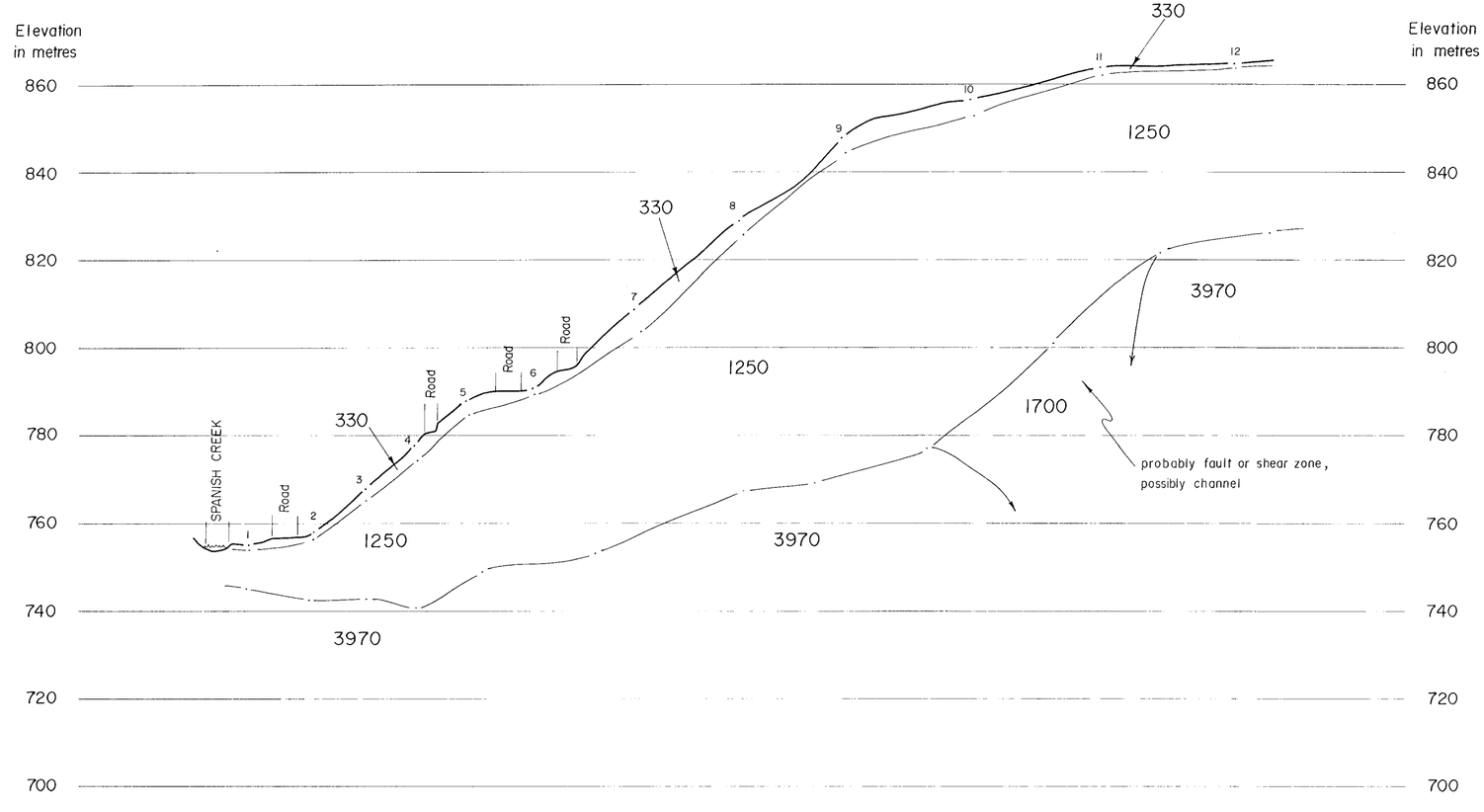
SEISMIC REFRACTION STUDY

PROFILE SL-1

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No.
D.G.M.	1 : 1000	AUG, 1980	80-46	3

W.

E.



LEGEND

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Computed depth on inferred layer boundary

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SCALE

METRES 20 10 0 20 40 60 80 METRES

Direction of line – S 80° E (100° E)

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PLACER LEASE 1120

SPANISH CREEK AREA, CARIBOO M.D., B.C.

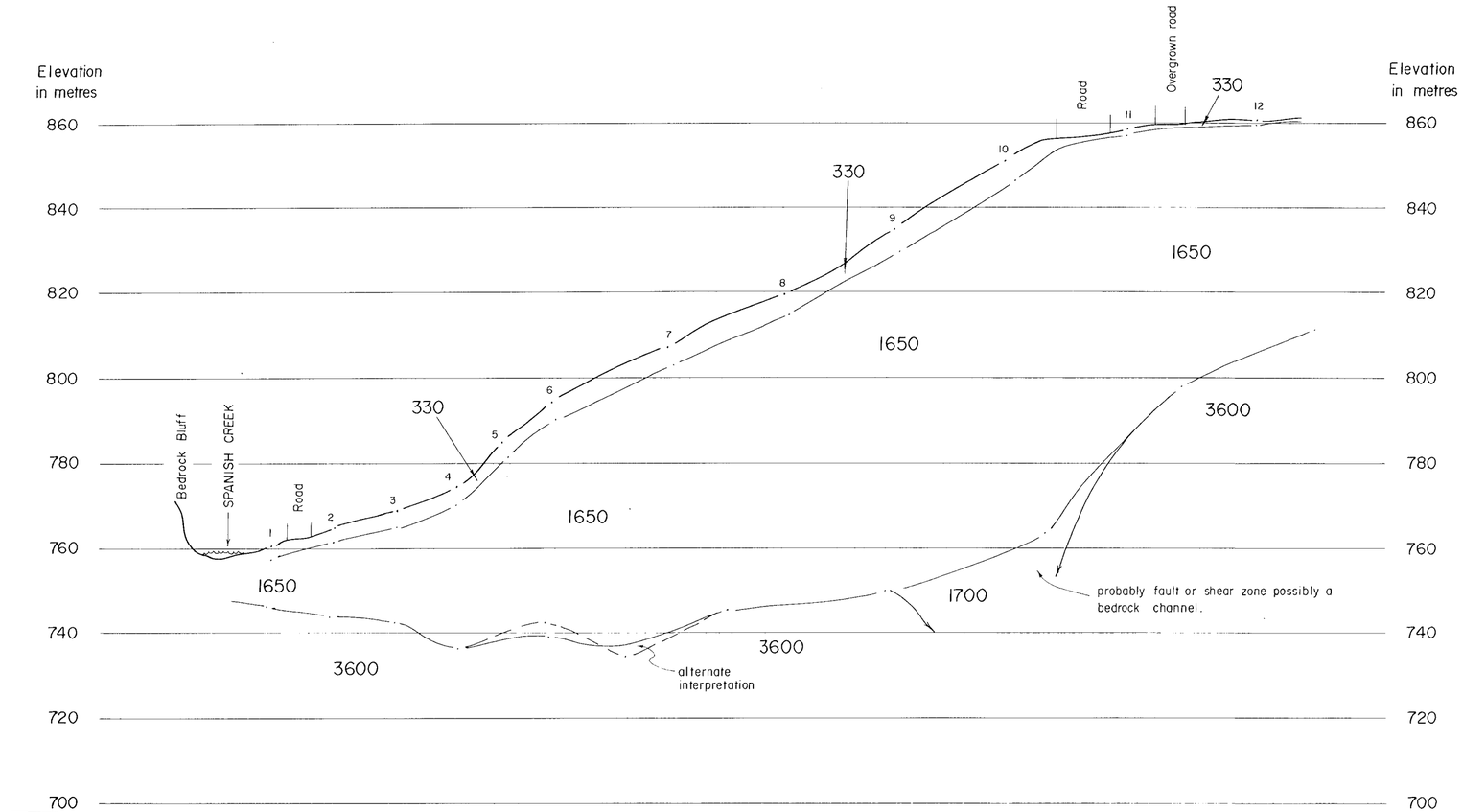
SEISMIC REFRACTION STUDY

PROFILE SL-2

DRAWN BY:	SCALE:	DATE:	JOB No:	SHEET No.
D.G.M	1 : 1000	AUG, 1980	80 - 46	4

W.

E.



LEGEND

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3470 — Average velocity in metres per second

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SCALE

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Direction of line – S 80° E (100° E)

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PLACER LEASE 1120

SPANISH CREEK AREA, CARIBOO M.D., B.C.

SEISMIC REFRACTION STUDY

PROFILE SL-3

DRAWN BY	SCALE	DATE	JOB No	SHEET No
D.G.M.	1 : 1000	AUG, 1980	80 - 46	5