

GEOPHYSICAL REPORT

ON A

SEISMIC REFRACTION SURVEY

ON

PLACER LEASES 1160 AND 1161

KEITHLEY CREEK

CARIBOO MINING DISTRICT, B.C.

Location : At the confluence of Snowshoe Creek and Keithley Creek, 21.8 km N10E of Likely, B.C.

: 50° 121° NE

: NTS 93A/14W

Report By : David G. Mark, Geophysicist
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Dated : March 2, 1981



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Engineering & Mining Geophysicists
VANCOUVER, CANADA

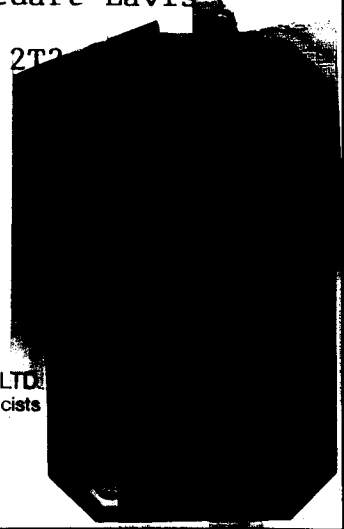


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MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

8707

NO. _____

SUMMARY

A seismic refraction profile was carried out over Placer Leases 1160 and 1161 at the confluence of Snowshoe Creek and Keithley Creek in the Cariboo M.D., B.C. on November 20th and 21st, 1980. The mouth of Snowshoe Creek is located 21.8 km N10E 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.

The 2 claims are underlain by Cambrian to Mississippian sediments and meta-sediments overlain by glacial till and fluvial sands and gravels.

The survey was carried out using a 24-channel seismic refraction system with 2 330-meter spreads, with explosives as the energy source. The data were analyzed using an intercept-delay time technique.

The seismic refraction survey showed the depth of overburden to vary from 16 to 80 m. It also revealed a buried creek channel probably a previous south-striking course of Snowshoe Creek.

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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 Leases 1160 and 1161 at the confluence of Snowshoe Creek and Keithley Creek during the 20th and 21st of November, 1980.

The field work was carried out under the supervision of the writer with 4 helpers. The interpretation was supervised by the writer as well. The amount of seismic refraction surveying done was 688 m terrain, or 677 m horizontal.

The primary object of the profiles was to locate buried creek channels within the bedrock since these could contain concentrations of placer gold. One was postulated to occur sub-parallel to Snowshoe Creek. Another object was to obtain the thickness of the overburden since placer gold was known to occur on the benches above Snowshoe Creek.

PROPERTY AND OWNERSHIP

The property consists of two placer leases numbered 1160 and 1161.

The seismic refraction survey discussed herein has been applied for two year's assessment work. This will bring the expiry date of both leases to December 27, 1982.

PL 1160 is owned by Dorothy Dennis of Burnaby, B.C. and PL 1161 is owned by Stuart Lavis of Vancouver, B.C.

LOCATION AND ACCESS

The two placer leases are located at the confluence of Snowshoe Creek with Keithley Creek which is about 21.8 km N10°E of Likely, B.C. within the Cariboo Mining District.

The geographical coordinates are 52° 48' N latitude and 121° 29' W longitude.

Access is easily gained by a 2-wheel drive vehicle over a series of logging roads about 42 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 Leases 1160 and 1161 center on south-flowing Snowshoe Creek at its confluence with Keithley Creek. The sides of the creek valley are moderately steep varying in elevation within the property boundaries from 1250 m to 1400 m giving a relief of 150 m.

GEOLOGY

The bedrock underlying the property could be Devonian to Mississippian sediments and meta-sediments either of the Snowshoe Formation or of the Midas Formation, both of which outcrop nearby. The Snowshoe Formation is composed of quartzite, meta-greywacke, phyllite, schist, and minor limestone. The Midas Formation is composed of chert, phyllite, argillite, limestone, and minor siltstone.

The overburden consists of fluvial sands and gravels and glacial till.

HISTORY OF PREVIOUS WORK

Since the placer leases have been staked, no work has been done. However, work, and probably placer mining, has been done previously, probably during the Cariboo gold rush.

INSTRUMENTATION

Two 12-channel seismographs, model 1210F, manufactured by Geometrics/Nimbus of Sunnyvale, California were used on the project. This instrument features signal enhancement by stacking repeated signals in a digital memory. A CRT (cathode ray tube) continuously displays the signal stored in the memory on all channels. The stored signal can then be printed on a permanent paper record by a built-in electric-writing oscillograph. The instrument also contains active signal filters on each amplifier.

Two 165-meter geophone cables were used as well as 8 cycle/sec. marsh geophones manufactured by Mark Products of Houston, Texas.

The blasting was done with 1 encoder and 2 decoders, series 200, manufactured by Input/Output of Houston, Texas. These were inter-

faced with Motorola portable FM radios.

FIELD PROCEDURE

The 'two-way, in-line shot' seismic refraction method was used for all traverses. The technique consisted of laying out 24 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 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 separation was 15 meters. The direction of the line from geophones 12 to 35 was N10°E; and from 35 to 58, N35°E. The line, in effect runs parallel to Snowshoe Creek. The labelling on the profile (SL-3, geophones 12 to 58) are from the tie-in with work on an adjacent lease. 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 3.5 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 difference 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 thicknesses together will give the total overburden depth.

DISCUSSION OF RESULTS

The location map and plan of the survey area is shown on Sheet 1 at a scale of 1:50,000. The seismic results are drawn in profile form on Sheet 2 at a scale of 1:1000.

Profile SL-3 has revealed a 3-layer case, the first two being overburden, the third one being bedrock.

The first layer has a velocity of 550 to 600 m/s and is undoubtedly loose, unconsolidated surface material. Its thickness varies from 0 to 6 m.

Layer 2 is probably the same material as layer 1, except more consolidated and water-saturated. It probably consists of fluvial sands and gravels, as well as glacial till. It has a velocity ranging from 1700 to 2100 m/s and varies in thickness from 14 to 83 m.

The third layer is bedrock and has a velocity range of 4800 to 5820 m/s.

If either the Snowshoe Formation or the Midas Formation underlies SL-3, the velocity range would suggest the rock-type to be schist, limestone and/or possibly chert. A velocity of 5820 m/s is very suggestive of limestone. Another possibility that shouldn't be overlooked is that the velocities of intrusives occur entirely within this range.

The depth to bedrock varies from 16 m below geophone 12 to 80 m below geophone 37. From this geophone to geophone 47 the bedrock profile is at the lowest, suggesting this part to be a buried creek channel. From seismic work done to the south on PL 29, the writer feels that this is probably a south-striking former channel of Snowshow Creek. Also in support of this is that Snowshoe Creek to the north lines up directly with the seismic-interpreted channel, as shown on Figure 1.

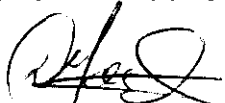
Within the channel area occurs a slow zone of 2400 m/s within

the bedrock. This could very well be a canyon-type buried creek channel and/or a fault. That is, creeks and rivers often are found along zones of weaknesses which are usually faults.

SUGGESTED VELOCITY CLASSIFICATION

<u>Velocity (m/s)</u>	<u>Suggested Classified</u>
550 - 600	Loose, surficial, fairly dry sands, gravels or glacial tills.
1700 - 2100	Compact, water-saturated fluvial sands and gravels, and glacial till.
4800 - 5820	Bedrock: schist, limestone, or possibly intrusive.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.



David G. Mark,
Geophysicist

March 2, 1981

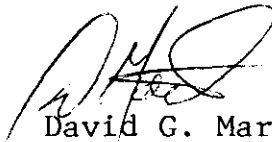
GEOPHYSICIST'S CERTIFICATE

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 thirteen years and have been active in the mining industry for the past sixteen 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 November 20th and 21st, 1980.
5. I hold no interest directly or indirectly in Placer Leases 1160 and 1161 or in any properties of Dorothy Dennis or Stuart Lavis.



David G. Mark,
Geophysicist

March 2, 1981

AFFIDAVIT OF EXPENSES

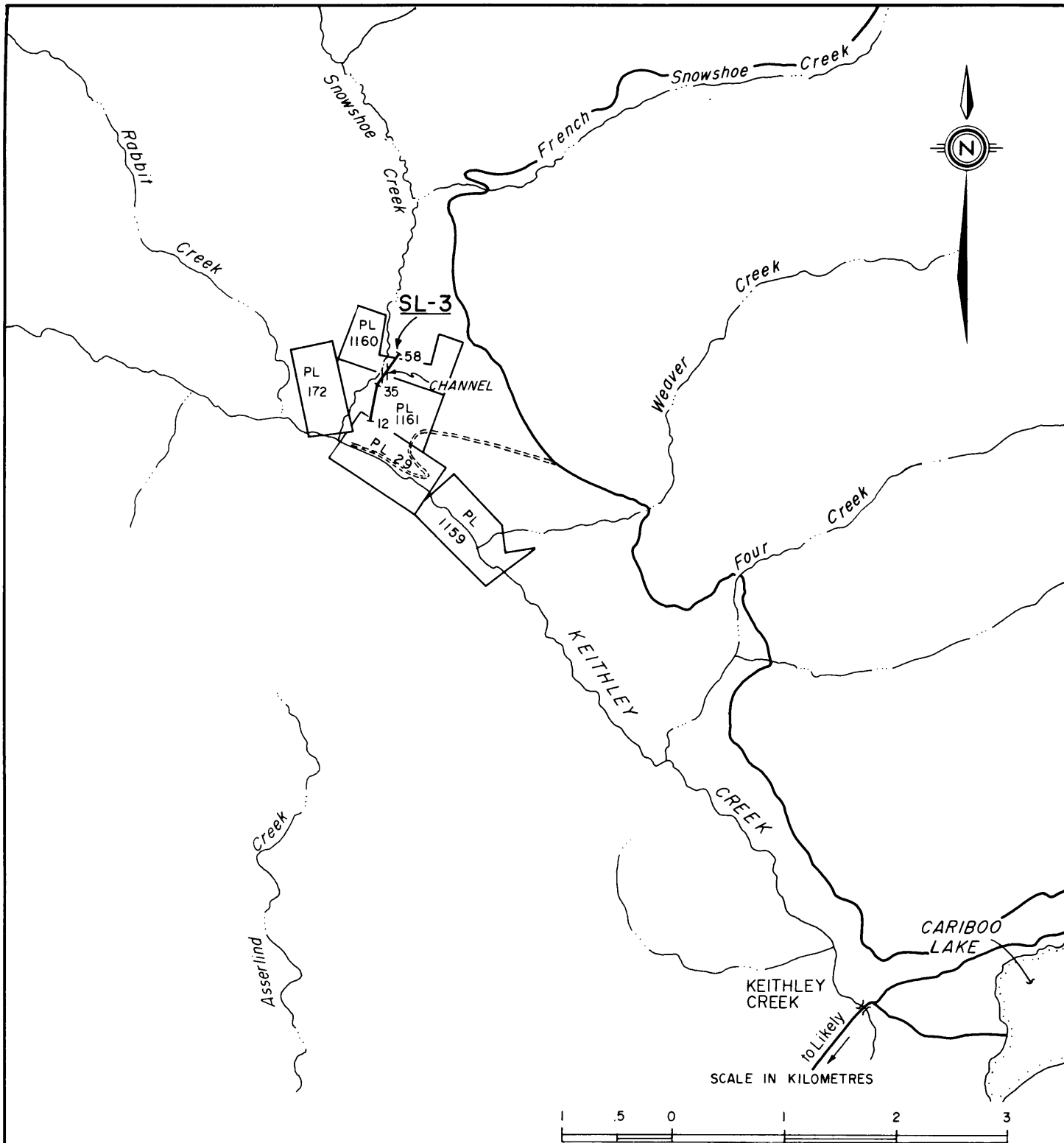
This is to certify that seismic refraction surveying carried out on Placer Leases 1160 and 1161 on November 20th and 21st, 1980, was done to the value of the following:

5-man crew, 13 hours at \$110/hr.	\$1,430.00
Room and board	180.00
Instrument rental	200.00
Explosives and seismocaps	140.00
Truck rental and gas	170.00
Airfares and airfreight	160.00
Interpretation and report	<u>1,380.00</u>
	\$3,660.00

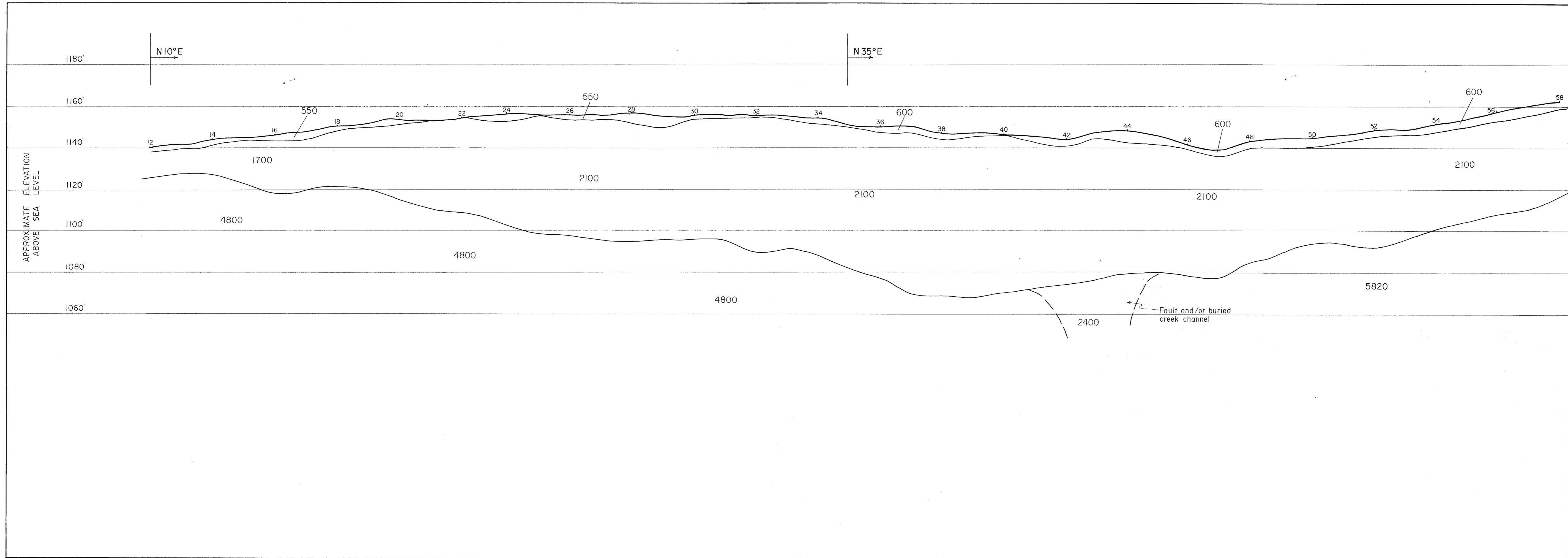


David G. Mark,
Geophysicist



March 2, 1981



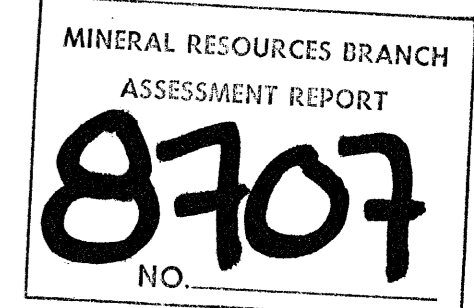
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DOROTHY DENNIS / STUART LAVIS P.M.L. 1160 AND 1161			
KEITHLEY CREEK, CARIBOO LAKE AREA, B.C.			
SEISMIC REFRACTION STUDY PLAN			
SCALE: 1 : 50,000	DATE: FEB. 1981	JOB No. 80 - 84	SHEET No. 1



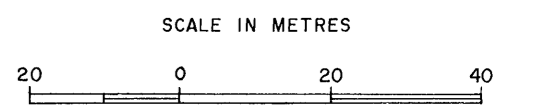
LEGEND

-  Geophone location
-  Calculated seismic interface
- 2100 Average velocity in metres per second

VELOCITY (m/s)	CLASSIFICATION
550 - 600	Fairly dry to partially saturated, loose to semicompact silts, sands and gravels
1700 - 2100	Saturated, compact fluvial sands and gravels, glacial till
4800 - 5820	Bedrock: probably schists, limestones and/or possibly intrusives



DIRECTION OF LINE - AS SHOWN



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DOROTHY DENNIS / STUART LAVIS
PML 1160 and 1161
KEITHLEY CREEK, CARIBOO LAKE AREA, B.C.

SEISMIC REFRACTION STUDY
PROFILE SL-3

SCALE: 1 : 1,000	DATE: FEB. 1981	JOB No. 80-84	FIGURE No. 2
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