

SHORT REPORT
 on a
 SEISMIC REFRACTION SURVEY
 on the
 SWAN PROJECT PROPERTY
 GRANITE CREEK, SIMILKAMEEN M.D., B.C.

Report for: Cal-West Petroleum Ltd.,
 101-902, 11th Avenue S.W.
 CALGARY, Alberta

by: David G. Mark
 Geophysicist
 GEOTRONICS SURVEYS LTD.,
 420-890 West Pender Street,
 Vancouver,
 British Columbia

dated: November 22nd, 1977

MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
 6766
 NO. _____



GEOTRONICS SURVEYS LTD.
 Engineering & Mining Geophysicists
 VANCOUVER, CANADA

6766

INVOICE



GEOTRONICS SURVEYS LTD.
420-890 W. PENDER ST.
VANCOUVER, CANADA V6C 1J9
(604) 687-6671

TO:

Cal-West Petroleum Ltd
101-902 11th Avenue S.W.
CALGARY, Alberta
T2R 0E7

DATE: November 10, 1977

INVOICE No.: 77-42(a)

DESCRIPTION:

Seismic Refraction Survey
Swan Project
Granite Creek, SIMILKAMEEN M.D. B.C.

3 man crew, 46 hours at \$65/hour
Room and Board
Truck Rental
Explosives, 100 lbs at \$100/100 lb
Seismocaps, 35 at \$1.40/cap
Recording Paper, 1 roll at \$30/roll
Instrument Rental, 1 week at \$350/week
Magazine rental

2,990.00	
522.72	
297.73	
100.00	
49.00	
30.00	
350.00	
20.00	
	\$4,359.45

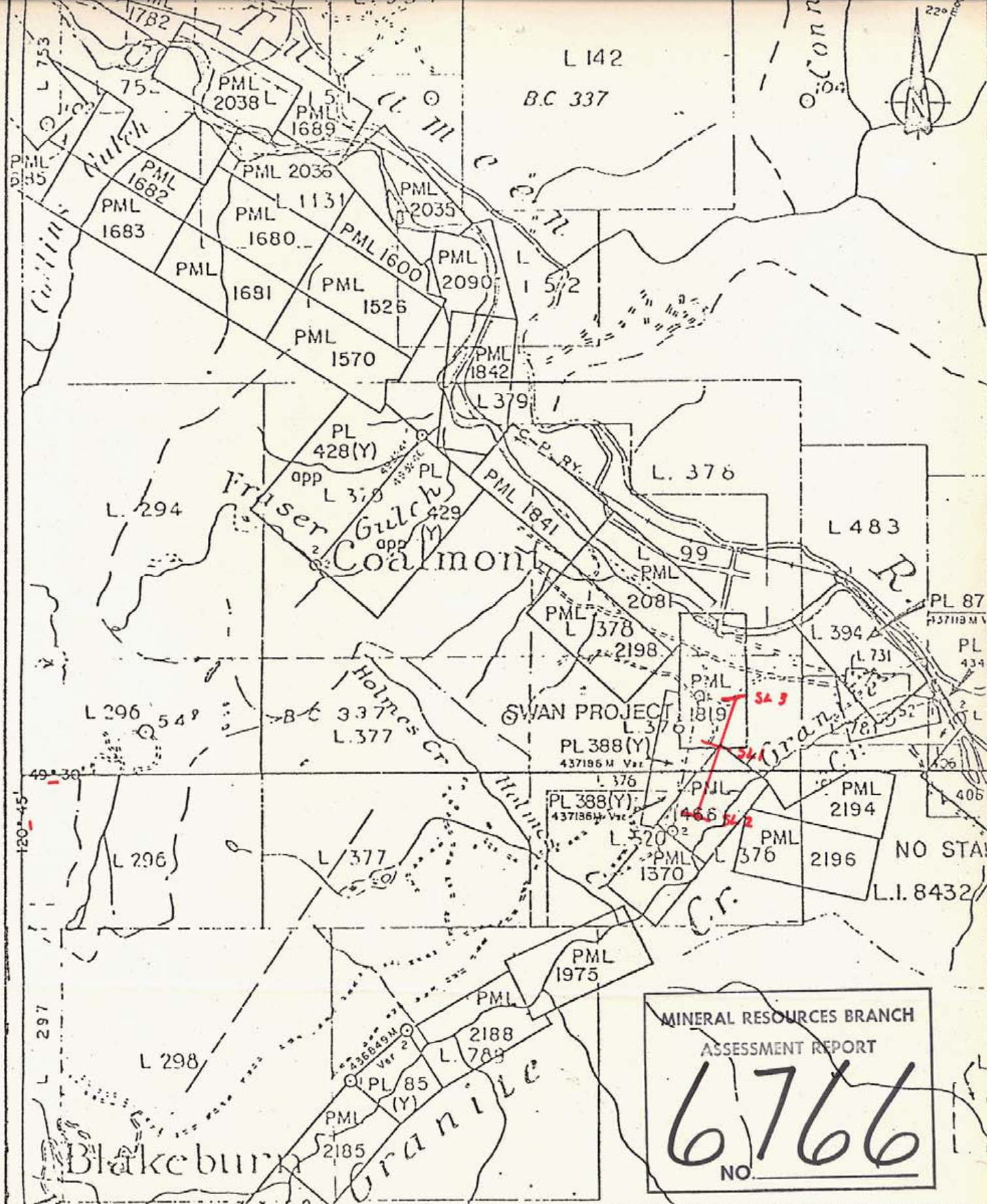
Note: This is the first of two invoices.
The second invoice is for interpretation
and the estimate is \$1,200.00

PAID
12/11/77
CR# 378
\$4,359.45
m.

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NO.

Please pay this amount. \$4,359.45

BALANCE DUE UPON RECEIPT OF THIS INVOICE



CLAIMS MAP

SCALE 1:31,680

FIGURE 2

0 1320 2640 ft

(1" = 1/2 ml.)

0 500 m

Above map from Dept. of Mines & Petr. Res., "Placer Titles Ref. 92H/7,10E." Aug 76

Cal-West Petroleum Ltd.

SWAN PLACER PROJECT SIMILKAMEEN MINING DIVISION
GRANITE CREEK AREA, B. C. N.T.S. 92H/10

Cochrane Consultants Limited
4402 Duna Street Duna B.C.

Map Prepared by B.A.C., September '76

SHORT REPORT

on a

SEISMIC REFRACTION SURVEY

on the

SWAN PROJECT PROPERTY

GRANITE CREEK, SIMILKAMEEN M.D., B.C.

The interpretation of data obtained from the seismic refraction survey carried out on the above-named property has been completed. A total of three lines, located as shown on the accompanying Figure No. 1, were profiled. These were labelled SL-1 to SL-3 respectively. The purpose of the study was to locate a buried bedrock channel that was probably an old course of Granite Creek. The geophysical information presented here is based upon our best interpretation of field data which were collected according to generally accepted field procedures.

The procedure was as follows:

Twelve geophones were planted at 50- or 100-foot intervals along the line of investigation. The 'two-way, in-line' seismic refraction method was used. The data were recorded from five or six shots; 2 200-500 feet off-end, one at each end and one or two within the spread. A 12-channel, SIE Dresser refraction seismic system was used for recording.

SL-1 and SL-2 were carried out by doing one 1100-foot spread with 100-foot separated geophones, and then moving the whole spread 50 feet west along the profile and redoing the spread. This then gave depth points every 50 feet. The 1100-foot spread was thought to be needed since the depth to bedrock was thought to be 150 feet or more. The length of these two profiles was therefore, 1150 feet. SL-3 was carried out with one spread 550 feet long and geophones 50 feet apart.

In addition to the three profiles, a velocity spread was done along each profile.

The data were interpreted by calculating the delay time for each geophone 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 'Russian', 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 to obtain the layer thickness. Adding the layer thicknesses together will give the total overburden depth.

The seismic-interpretted profiles are shown on Figures 2 to 4 and are drawn at a scale of one inch to 50 feet. The plan of the survey area as well as the location of the buried channel is shown on Figure one. The profiles are

discussed as follows:

SL-1 (Figure 2)

This profile is basically a 2-layer case except for the channel area where it is a 3-layer case. The first layer has a velocity of 1,350 feet/sec. and is likely loose unconsolidated sand and/or gravel. The second layer has a velocity of 5,200 feet/sec and appears to occur from geophones 12 to 21. The third layer has a velocity of 19,400 feet/sec which is most assuredly the velocity of bedrock. In fact, it is a typical velocity for intrusives. However, the bedrock noted in all the outcrops in the area is slate (or shale) which at surface, is loose and broken up. Therefore, if this high velocity reflects the slate, then it must be hard and quite competent only a few feet below the surface.

The depth to bedrock, except for the channel area, varies from 6 feet below geophone 1, to 119 feet below geophone 15.

From geophones 16 to 19, a bedrock velocity was not obtained. It is, therefore, very likely that a canyon-type bedrock channel occurs between these geophones. The velocity spread indicates it to be filled with a 5,200 feet/second material, which is probably partially saturated sands and gravels. Because a bedrock velocity was not obtained, the depth to bedrock within the channel area cannot be calculated. The depth, however, is probably close to 200 feet.

SL-2 (Figure 3)

This is a 2-layer case, except for the channel area, with the upper layer having a velocity of 1,600 feet/second and the lower layer, 15,400 feet/second. As on profile SL-1 the 2 layers are likely loose, unconsolidated sand and/or gravel, and hard, competent slate.

The depth to bedrock, other than the channel area varies from 19 feet below geophone 1 to 86 feet below geophone 14. Geophone 1 appeared to be within one or two feet of bedrock and, therefore, depth to bedrock probably means hard, competent rock.

The channel on this profile appears to occur between geophones 6 and 9. Like that part of the channel on SL-1, it is filled with a 5,200 feet/sec. material that is likely partially saturated sands and gravels. The depth to the bottom of the channel is cautiously estimated to be somewhat over 100 feet.

SL-3 (Figure 4)

This profile is somewhat different from the previous two in that it is a 4-layer case rather than a 2-layer case.

The first layer is likely unconsolidated sand or gravel with a velocity of 1,500 feet/second. The second layer is probably more consolidated sand or gravel with a velocity of 2,500 to 3,000 feet/second. The third layer, considering its velocity of 5000 feet/sec, is probably the same material as the second layer, but water-saturated. The fourth layer has a velocity of 16,700 feet/second and is probably hard, competent slate.

The depth to hard, competent bedrock, other than the channel area, varies from 26 feet below geophone 12 to 126 feet below geophone 3. An outcrop of bedrock occurs near geophone 11 on the side of the road, and, considering the low velocity, is probably loose and fractured. However, the upper layer velocity below geophones 11 and 12 was somewhat difficult to determine and, therefore, the depth to the competent bedrock may be somewhat different.

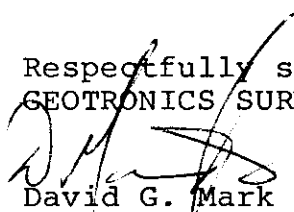
The channel on this profile occurs between geophones 3 and 8 and is filled with a 6,500 feet/second material which is probably water-saturated glacial till and/or well-consolidated gravels. As on SL-1, the depth to the bottom of the channel cannot be calculated.

In conclusion, the three seismic profiles show the buried bedrock channel to be a canyon-like feature with walls greater than 45° . It is probably filled with water-saturated sands and gravels and/or glacial till. Figure 1 shows it to strike approximately true north. Because the channel is a buried canyon-like feature, the depth to the bottom could not be calculated but is estimated to vary from 100 feet below SL-2 to 200 feet below SL-1.

SUGGESTED VELOCITY CLASSIFICATION

<u>Velocity ft/sec</u>	<u>Suggested material</u>
1,350 to 1,600	Loose, unconsolidated sands, and gravels
2,500 to 3,000	Consolidated sands and gravels
5,000 to 6,500	Water-saturated sands and gravels, possibly glacial till.
15,400 to 19,400	Hard, competent bedrock, probably slate.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.,


David G. Mark
Geophysicist

November 22nd, 1977

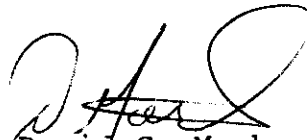
GEOPHYSICIST'S CERTIFICATE

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

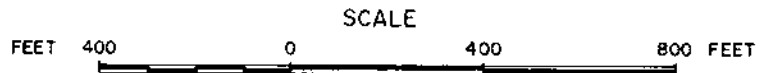
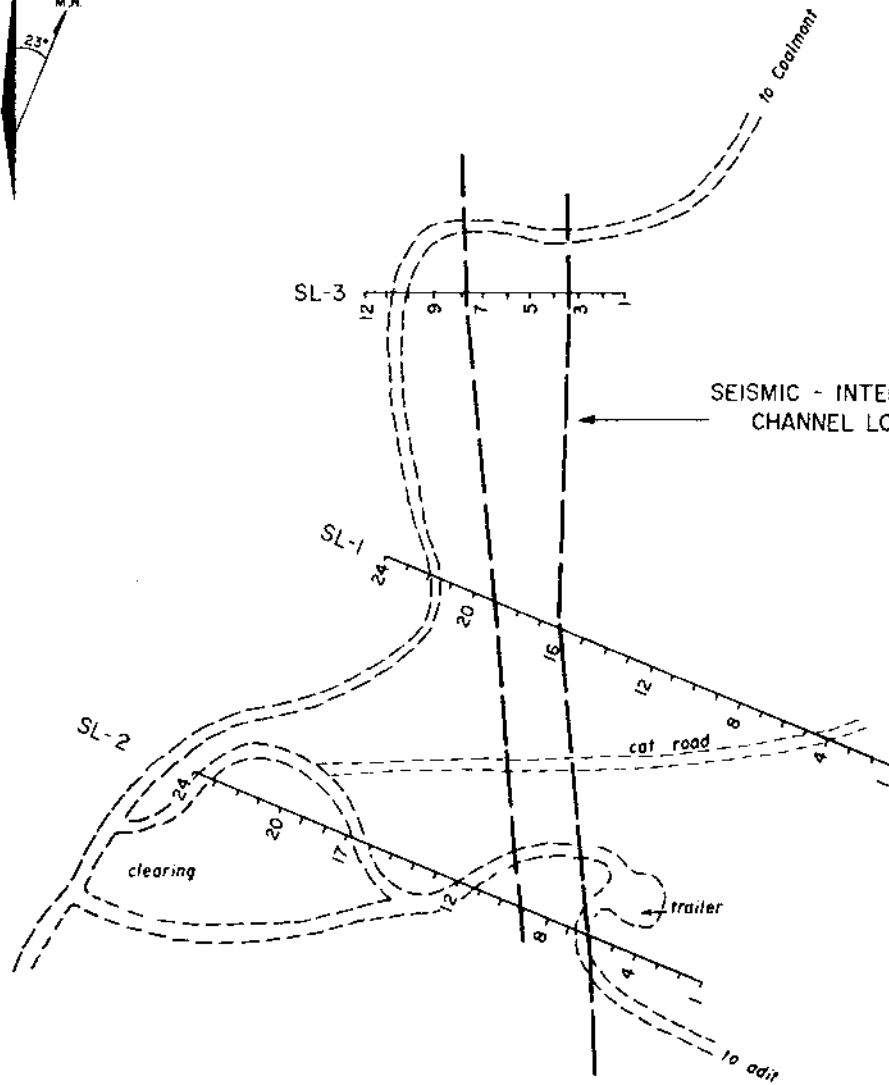
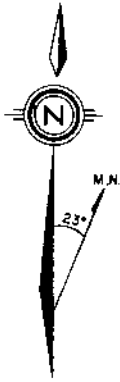
That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices at 420-890 West Pender Street, Vancouver, British Columbia.

I further certify:

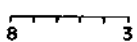
1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc., degree in Geophysics.
2. I have been practising in my profession for the past ten years and have been active in the mining industry for the past thirteen years.
3. I am an active member of the Society of Exploration Geophysicists and a member of the European Association of Exploration Geophysicists.
4. This report is compiled from data obtained from a seismic refraction survey carried out by myself with two crew members from November 3 to 8th, 1977.
5. I have no direct or indirect interest in the properties or securities of Cal-West Petroleum Ltd. (NPL), Calgary, Alberta, nor do I expect to receive any interest therein.


David G. Mark
Geophysicist

November 22nd, 1977

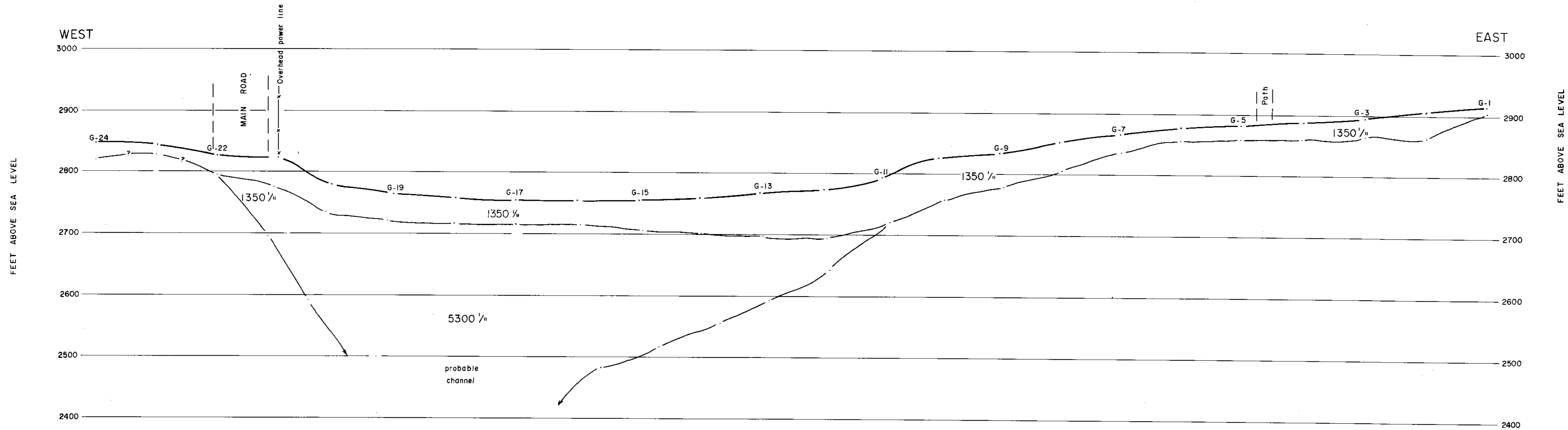


LEGEND






Seismic line showing
geophone locations

GEOTRONICS SURVEYS LTD.				
CAL-WEST PETROLEUM LTD. SWAN PROJECT GRANITE CREEK COALMONT AREA, SIMILKAMEEN M.O., B.C.				
SEISMIC REFRACTION STUDY PLAN				
DRAWN BY: D.G.M.	SCALE: 1 inch = 400 feet	DATE: NOV. 1977	JOB NO. 77-42	SHEET NO. 1



LEGEND

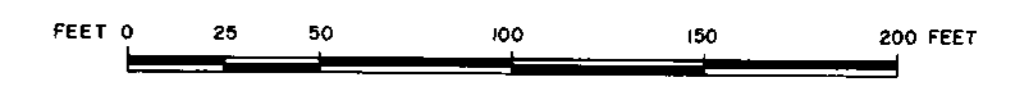
-  G-3 Geophone location
-  Computed depth point on inferred layer boundary
-  5000' / s Average velocity feet per second

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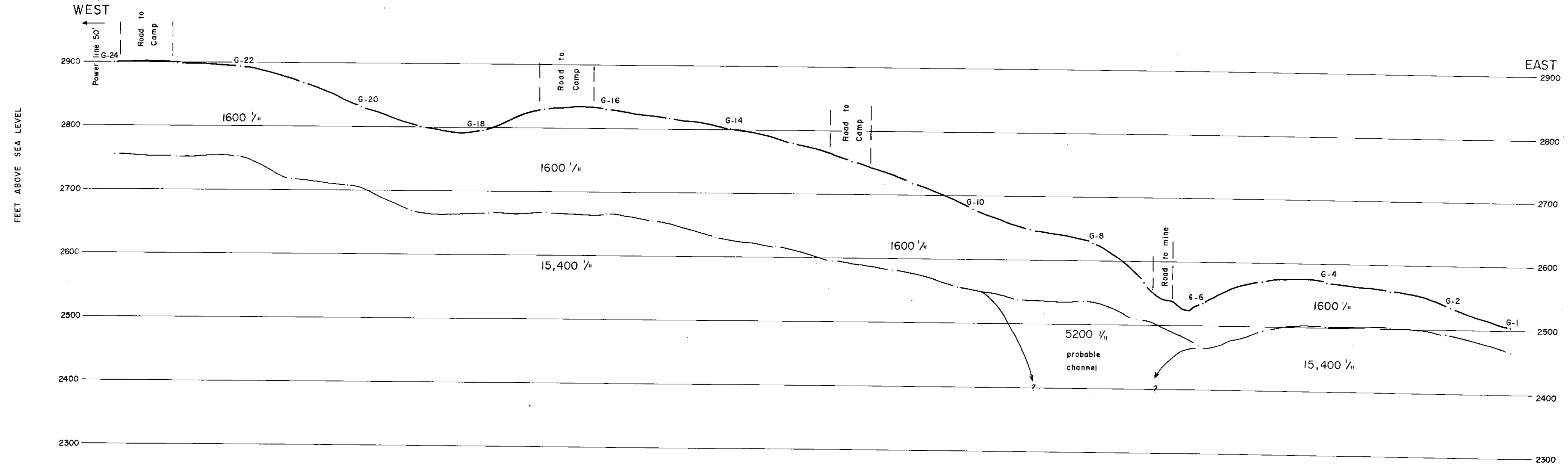
NOTE: The elevations above sea level as shown are estimated only.

Direction of line — N 68° W (292°)

SCALE



GEOTRONICS SURVEYS LTD.			
CAL-WEST PETROLEUM LTD. SWAN PROJECT GRANITE CREEK COALMONT AREA, SIMILKAMEEN M.D., B.C.			
SEISMIC REFRACTION STUDY PROFILE SL-1			
DRAWN BY: D.G.M.	SCALE: 1 inch = 50 feet	DATE: Nov., 1977	JOB No: 77-42
		SHEET No: 2	



LEGEND

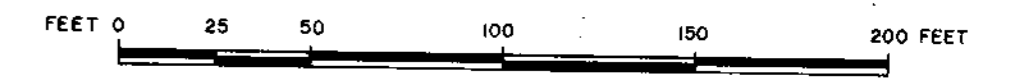
- G-3 Geophone location
- Computed depth point on inferred layer boundary.
- 5000 $\frac{1}{11}$ Average velocity feet per second

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NO

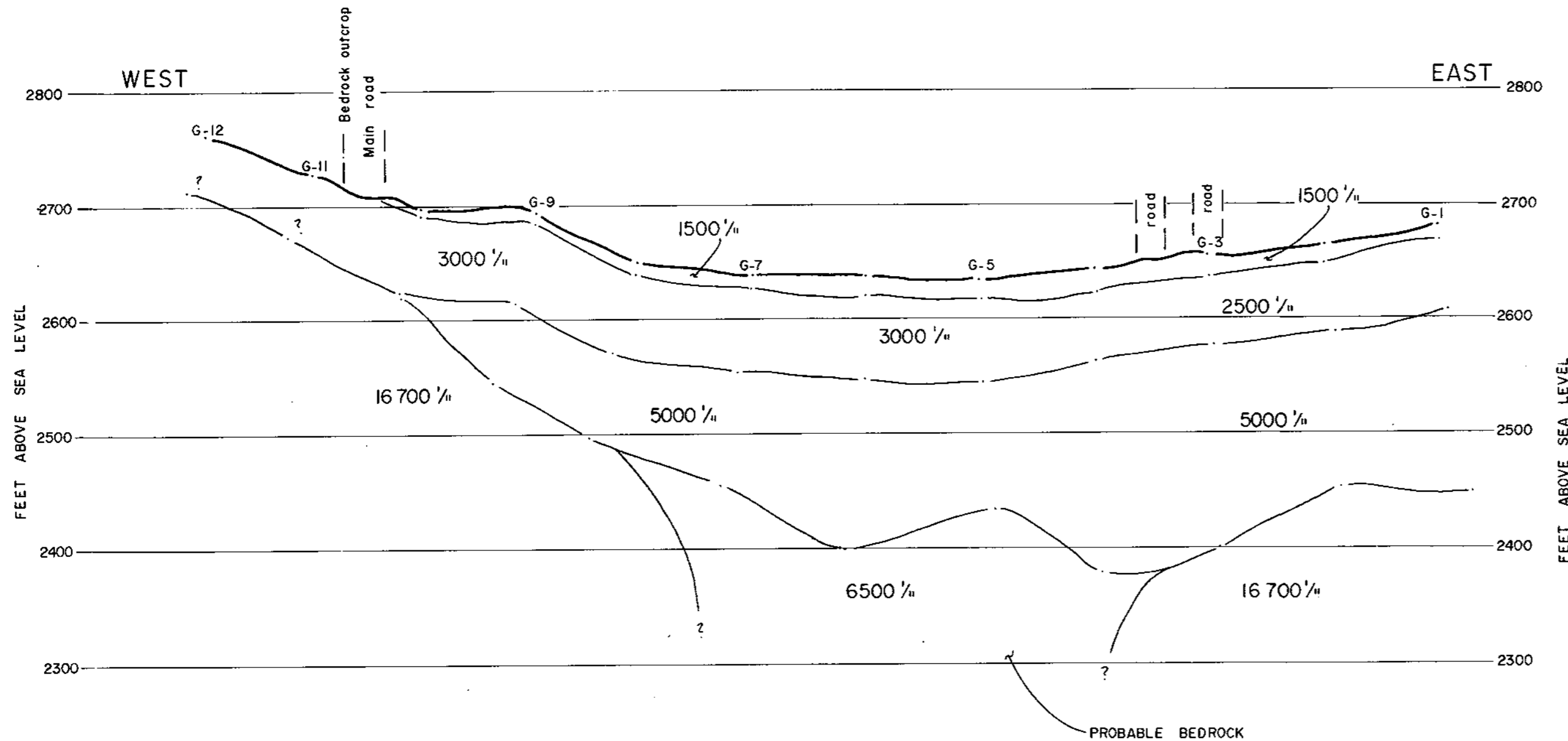
NOTE: The elevations above sea level as shown are estimated only.

Direction of line — N.68°W. (292°)

SCALE



G.E.T.R.O.N.I.C.S. S.U.R.V.E.Y.S. L.T.D.				
CAL-WEST PETROLEUM LTD. SWAN PROJECT GRANITE CREEK COALMONT AREA, SIMILKAMEEN M.D., B.C.				
SEISMIC REFRACTION STUDY PROFILE SL-2				
DRAWN BY: D.G.M.	SCALE: 1 inch = 50 feet	DATE: Nov., 1977	JOB No: 77-42	SHEET No: 3



LEGEND

- G-3 Geophone location
- Computed depth point on inferred layer boundary.
- 5000'"/s Average velocity feet per second

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NO.

NOTE: The elevations above sea level as shown are estimated only.

Direction of line — True West

SCALE



GEOTRONICS SURVEYS LTD.				
CAL-WEST PETROLEUM LTD. SWAN PROJECT GRANITE CREEK COALMONT AREA, SIMILKAMEEN M.D., B.C.				
SEISMIC REFRACTION STUDY PROFILE SL-3				
DRAWN BY: D.G.M.	SCALE: 1 inch = 50 feet	DATE: Nov., 1977	JOB No. 77 - 42	SHEET No. 4