GEOPHYSICAL REPORT

800009

ON A

SEISMIC REFRACTION SURVEY

ON

THE SLATE CREEK PASS

PLACER LEASES

MANSON CREEK AREA

OMINECA MINING DIVISION

BRITISH COLUMBIA

PROPERTY	: On upper reaches of Slate Creek, 5 km due west of village of Manson Creek, British Columbia.
	: 55° 41' North Latitude 124° 35' West Longitude
	: N.T.S. 93N/10E
WRITTEN FOR	: Highwater Resources Ltd. 870-885 Dunsmuir Street Vancouver, B. C. V6C 1N8
WRITTEN BY	: David G. Mark, Geophysicist GEOTRONICS SURVEYS LTD. #530-800 West Pender Street Vancouver, B.C. V6C 2V6
DATED	: February 4, 1989

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

MAPS - At End of Report		MAP #
Location Map	1:8,600,000	1
Claim map	1: 50,000	2
Plan (in pocket)	1: 5,000	3
Profiles	1: 1,000	4

SUMMARY

Seismic refraction work was carried out over several placer leases located about 5 km due west of the village of Manson Creek on Slate Creek in the Omineca Mining Division, B.C., during the period of November 1st to 28th, 1988. The object of the survey was to locate buried creek or river channels carrying placer gold.

The leases are underlain by Cache Creek sediments, probably argillites and slates, and possibly volcanics. The overburden is glacial till and localized fluvial sands and gravels.

The survey was carried out using a 24-channel seismic refraction system with 180-meter spreads, using 5-meter and 10-meter geophone spacings, and employing explosives as the energy course. Seventeen spreads were done along two lines resulting in a horizontal survey length of 2,143 m. The data were analyzed using an intercept time delay method.

CONCLUSIONS

The seismic survey has revealed a number of Tertiary buried creek channels interpreted from bedrock depressions. Considering the numerous placer deposits occurring within buried channels in the area, these channels are prime exploration targets. Six occur on SL-A and four on SL-B. In addition, several slow zones within bedrock were located and may represent in-filled, steep-sided channels. Because the lines are so far apart, it is difficult to extend any of the channels from one line to the next on the basis of the seismic work alone. Further work will be needed to rectify this.

RECOMMENDATIONS

Considering that the work was of a reconnoitering nature, and that channels were located, further seismic work is definitely recommended. The purpose would be to more accurately delineate the channels as well as to determine the depths to their bottoms. The line spacing should be no more than 100 metres and the method used should be such that a greater accuracy in depth calculations can be achieved.

The geophone spacing for the most part, could be left at 5 and 10 meters, but some narrower channels should be delineated with a smaller geophone spacing. A larger geophone spacing, perhaps 15 meters, should be used for the deep channel at the south end of SL-A. Care must be taken to use large enough charges to overcome the energy attenuation problem encountered in this area.

Once the above is completed, the purpose of further exploration would be to verify that the bedrock depressions are channels and that they carry placer gold. This would be done through digging holes with an excavator and/or borehole drilling.

GEOPHYSICAL REPORT

ON A

SEISMIC REFRACTION SURVEY

ON

THE SLATE CREEK PASS PLACER LEASES

MANSON CREEK AREA

OMINECA MINING DIVISION

BRITISH COLUMBIA

INTRODUCTION AND GENERAL REMARKS

This report discusses the results of a seismic refraction survey carried out along two lines within the Slate Creek Pass claims, located on the upper reaches of Slate Creek, 5 km to the west of the village of Manson Creek.

The purpose of the work was to locate buried Tertiary creek or river channels that is hoped would carry placer gold. The Manson Creek area is well known for numerous placer gold deposits occurring within buried channels. The Slate Creek Pass claims were located to encompass the possible channels that were delineated from airphotos and Landsat imagery by W.E. Kleinhout, geophysicist.

The seismic work was of a reconnoitering nature and, thus, the survey and interpretation methods were designed not so much to obtain bedrock depths, but the channel locations.

The work was carried out from November 1st to November 28th, 1988 by a crew of four men headed by Gaston Savard, geophysical technician. The additional three men consisted of one field technician and two labourers.

The work was done at the request of Bert Cameron, President of Highwater, and W.E. Kleinhout who also located the crew onto the property as well as managed the project.

PROPERTY AND OWNERSHIP

The property consists of five contiguous placer leases as shown on Map #2 and as described below.

Record Nos.	Expiry Date
PL 18074-78	Dec. 31, 1992

The expiry date takes into account the four years assessment work that has just been applied for and therefore assumes it will be accepted.

The property is owned by Auriga Mines Ltd. of Mission, B.C., and is being optioned to Highwater Resources Ltd. of Vancouver, B.C., the operator of the project.

LOCATION AND ACCESS

The eastern boundary of the property is located about 5 km due west of the village of Manson Creek on the upper reaches of Slate Creek.

The geographical coordinates are 55° 41' north latitude and 124° 35' west longitude.

Manson Creek can be reached by car from Fort St. James along gravel roads over a distance of 185 km (115 miles). The eastern part of the property from Manson Creek is reached by 6.5 km (4 miles) of gravel road which runs westerly along Slate Creek to Germansen Landing (about 27 km from Manson Creek).

PHYSIOGRAPHY

The property is located within the southern part of the physiographic unit known as the Swannell Ranges which is a division of the Omineca Mountains. The terrain is generally moderate with slopes varying from gentle to steep. Mountains in the area reach elevations in excess of 1,600 m (5,250 feet) a.s.l., but valley floors are often about 1,000 m (3,280 feet).

The property is located within a west-northwesterly trending saddle-shaped valley. The eastern part of the property is drained by the northerly- and easterly-flowing Slate Creek. The western part is drained by a westerly-flowing tributary of Germansen River. A number of small lakes occur on the southern part of the placer leases. The terrain is quite gentle with the elevation varying from about 1,000 to 1,050 meters above sea level.

HISTORY OF PREVIOUS WORK

Placer gold was first mined in the area in the late 1800's, and through the years since, the creeks in the general area have been worked off and on. Slate Creek itself was worked by various companies including Cominco, who worked it from 1929 to 1943 at a location about 1 to 2 km downstream of the present property. About 5 channels can be seen within their workings.

Since the five placer leases have been staked, no previous work has been carried out on them.

GEOLOGY

The G.S.C. geology map of the area shows the property to be underlain by mostly sediments and possibly some volcanics of the Cache Creek group of Pennsylvanian and Permian age. The Cache Creek group occurs as a northwest-trending band that averages 13 km wide. The Cache Creek Group in the area of the property consists mostly of argillites and slates with minor beds of greenstone and schist.

The overburden consists almost entirely of glacial till produced by easterly-flowing glaciers. Fluvial gravels occur in the placer channels close to bedrock.

INSTRUMENTATION

Two 12-channel seismographs, Model 1210F, manufactured by Geometrics/Nimbus of Sunnyvale, California, were used on the project. The two were interfaced together to make up a 24-channel system. The 1210F 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 90-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 1 decoder, series 200, manufactured by Input/Output of Houston, Texas. These were interfaced with Motorola portable FM radios.

FIELD PROCEDURE

The 'two-way, in-line shot' seismic refraction method was used. The technique consisted of laying out one spread of 24 geophones in a straight line and recording arrival times from shots fired at either end of the spread. Two off-end shots were fired at a distance of up to one-half the spread length from the nearest geophone (90 m in this case). Since the off-end shots were a good distance from the nearest geophone, it was 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 spacing used was 5 meters at the two ends and the middle of the spread and 10 meters for the rest of the spread. Because two 12-channel instruments were used, geophones 12 and 13 (1st geophone of each instrument) were placed together to ensure accurate timing between the two instruments. This resulted in a spread length of 180 m.

For better coverage, each 24-channel spread overlapped the adjacent one by 60 m. This ensured no channels would be missed because they occured at the edge of a spread.

Two seismic lines were run, as shown on Maps 2 and 3, about 750 m apart and in a S20°W (200°E) direction. SL-A consists of 8 spreads and has a horizontal length of 1,012 m. SL-B consists of 9 spreads and has a horizontal length of 1,131 m.

The shots ranged in size from 0.1 to 0.4 kg, and were placed in holes 0.4 m deep.

The terrain along each of the lines were surveyed in by hand-held clinometer.

It's important to emphasize that the work was of a reconnoitering nature. It was considered not so important to obtain absolute depths to bedrock, as it was to locate buried placer channels.

COMPUTING METHOD

All seismic data were analyzed using an intercept-delay time technique. Implementation of this method requires reverse refraction emanating form 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 refractions from either end back to their respective shot locations. With this information and related overburden velocities, it is possible to compute the depth to bedrock below each detector.

The interpretation is considered preliminary due to the reconnoitering nature of the work. Accuracy was not strived for in calculating depths, but only in locating possible buried placer channels.

The interpreted seismic profiles are plotted on Map #4 at a scale of 1:1,000. The location of the two lines is shown on the plan, Map #3, which is at a scale of 1:5,000. The base for this map was taken from the 1:50,000 topographic map (NTS - 93N/10) from which the 1:50,000 scale claim map (Map #2) was also taken.

DISCUSSION OF RESULTS

A suggested classification of the velocities is as follows:

Velocity (meters/seconds)	Suggested Material
300 - 625	Overburden: loose surficial glacial till, possibly sand, gravel.
1800 - 2500	Overburden: glacial till, water saturated, very compact.
3000 - 3750	Bedrock: sediments, probably argillites and slates, possibly some volcanics.

Horizontal changes in overburden velocity may be caused by a variable water content, type of material and/or compactness of the material.

Arbitrary boundaries within the overburden should be treated as physical changes and not necessarily as geological boundaries.

The number of seismic velocity layers occurring on the project site is either two with the 2nd layer being bedrock, or three, with the 3rd layer being bedrock. The first layer in both cases is loose, surficial overburden. The middle layer of the 3-layer case is a very compact, possibly water-saturated glacial till and occurs in most of the suggested buried creek channels.

As can be seen on the profiles of the 2 lines (Map #4), a number of bedrock depressions interpreted to be buried creek channels have been profiled. Not all the depressions are necessarily channels, but all must be checked by further work.

Because of the large line separation, it is difficult to connect the channels from one line to the other based on the seismic work alone. Again, further work will overcome this problem.

The depths that have been calculated to the bottom of the channels must not be treated as accurate. Firstly, as mentioned above, accuracy was not considered important at this stage of the exploration project. Secondly, in these areas it is more likely to encounter velocity inversions or hidden layers, either one of which will adversely affect the accuracy of the seismic - interpreted depths.

SL-A has the most channels, or possible channels. The channels are described in the following table with the numbering going from north to south.

Channel	Horizontal meter location	Width	Depth to bottom
1	255 to 288	33 m	7.5 m
2	310 to 329	19 m	4 to 8 m
3	359 to 387	28 m	7 to 18 m
4	491 to 550	59 m	16 to 22 m
5	673 to 724	51 m	23 to 37 m
6	803 to 961	158 m	36 to 70+m

The depths to bedrock other than within the channels vary from 3 to 4.5 meters over the northern third of the line. Over the southern 2/3's, the depths appear to be about 8 to 10 meters.

The large channel (#6) at the south end of the line could only be defined in a very approximate way due to a serious energy attenuation problem on the last 2 spreads. The problem was caused by the explosive charge being too small since the depth of overburden was much greater than expected. However, indications are the depth to the bottom of the channel could easily be 60 meters.

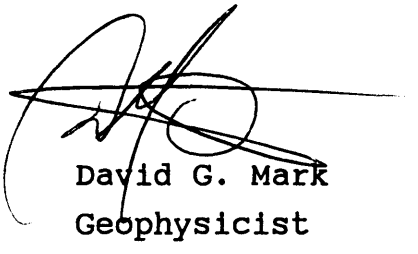
Along SL-B occur at least 4 channels or possible channels which are described as follows with the numbering going from north to south:

Channel	Horizontal meter location	Width	Depth to bottom
1	60 to 109	49 m	21 to 29 m
2	225 to 275	50 m	20 to 35 m
3	465 to 704	299 m	12 to 29 m
4	827 to 290	63 m	11 to 20 m

The great width of channel #3 may be due to, (1) it reflecting 2 or 3 channels close together, or possibly, (2) a curve or elbow within one channel. The depth to bedrock apart from the channels varies from about 1 to 20 meters.

A number of slow zones within the bedrock have been mapped by the seismic survey. These can be faults and/or steep-sided buried channels. It would appear, however, the width would be no more than 10 meters. Not surprisingly, a number of these occur within channels.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.



David G. Mark
Geophysicist

February 4, 1989
49/G

REFERENCES

Armstrong, J.E., Fort St. James Map - Area, Cassiar and Coast Districts, British Columbia, Geological Survey of Canada, Mem. 252, 1965.

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 #530-800 West Pender Street, Vancouver, British Columbia.

I further certify that:

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 my profession for the past 20 years and have been active in the mining industry for the past 23 years.

3. This report is compiled from data obtained from a seismic refraction survey carried out under my supervision and under the field supervision of geophysical technician, Gaston Savard, during the period of November 1st to November 28th, 1988.

4. I do not hold any interest in Highwater Resources Ltd. nor in Auriga Mines Ltd., nor in any placer leases these companies may have an interest in, nor do I expect to receive any interest as a result of writing this report.

David G. Mark
Geophysicist

February 4, 1989

AFFIDAVIT OF EXPENSES

This is to certify that the seismic refraction survey carried out on placer leases 18074, 18075, 18076, and 18077 near Manson Creek in the Omineca M.D., B.C., within the period of Nov. 1st to Nov. 28th, 1988, was done to the value of the following:

Field:

Mobilization-demobilization (share)	$ 1,190.00
2-man linecutting crew, 4 days @ $400/day	1,600.00
4-man geophysics crew, 60 hours at $110/hr.	6,600.00
Room and board	1,920.00
Instrument rental, 1 week at $1,750/week	1,750.00
4-wheel drive truck rental and gas	900.00
Explosives and seismocaps	800.00
	$14,760.00

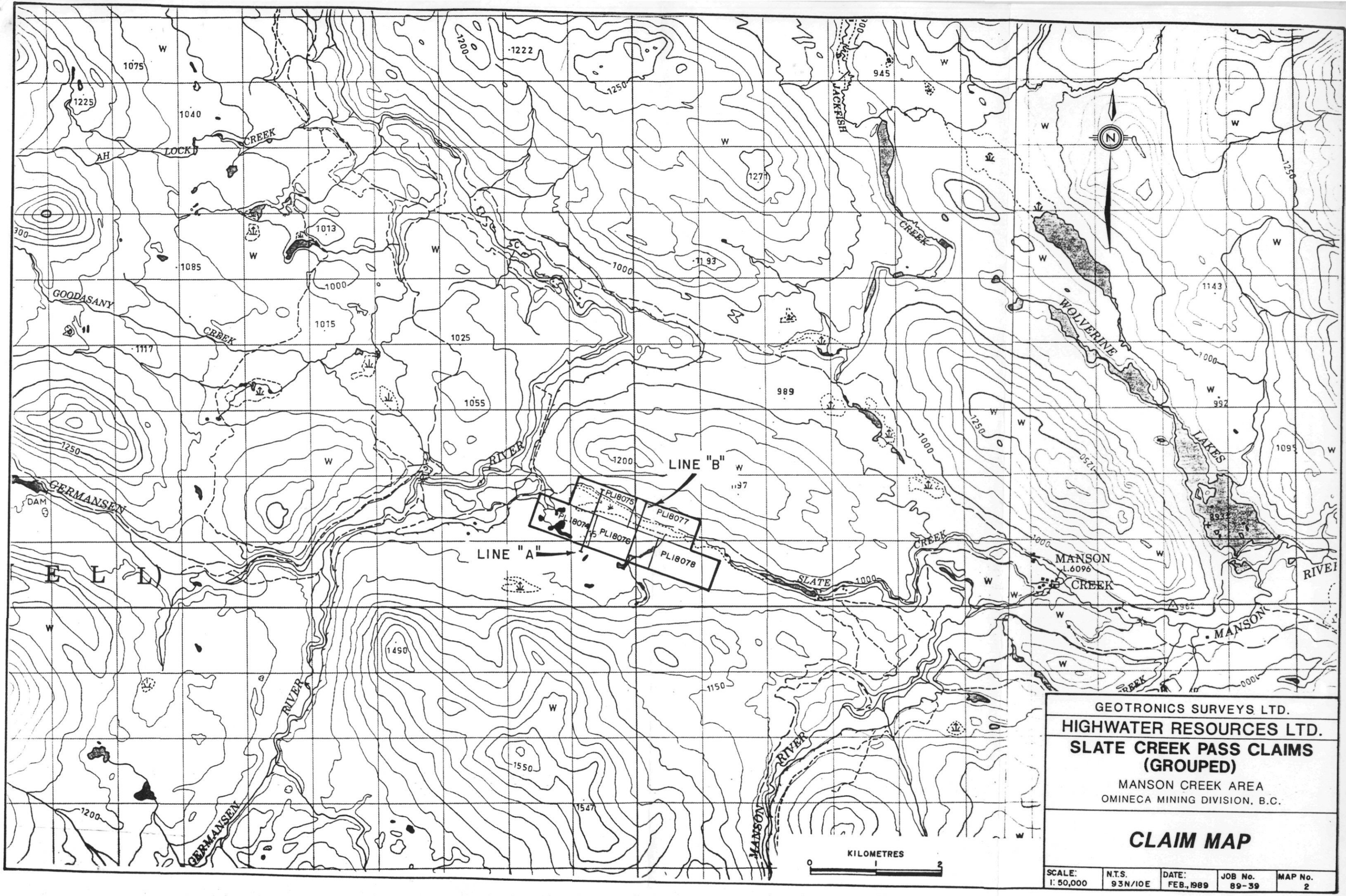
Report:

Senior geophysicist, 20 hours at $45/hr.	$ 900.00
Junior geophysicist, 75 hours at $35/hr.	2,625.00
Drafting and printing	800.00
Report typing and compilation	100.00
	$4,425.00
	$19,185.00

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark,
Geophysicist

42/G412



GEOTRONICS SURVEYS LTD.

HIGHWATER RESOURCES LTD.

SLATE CREEK PASS CLAIMS (GROUPED)

MANSON CREEK AREA

OMINECA MINING DIVISION, B.C.

CLAIM MAP

SCALE:	N.T.S.	DATE:	JOB No.	MAP No.
1: 50,000	93N/10E	FEB., 1989	89-39	2