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GEOPHYSICAL REPORT

ON A

SEISMIC REFRACTION SURVEY

ON

PLACER LEASE #3497

AH LOCK CREEK,

MANSON CREEK AREA

OMINECA MINING DIVISION

BRITISH COLUMBIA

PROPERTY	: Southern boundary at confluence of Ah Lock Creek with Germansen River, and 13 km N60°W of village of Manson Creek, British Columbia.
	: 55° 44' North Latitude 124° 40' 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 6, 1989

LIST OF ILLUSTRATIONS

SUMMARY

Seismic refraction work was carried out over Placer Lease #3497 located about 13 km N60°W (300°E) of the village of Manson Creek on Ah Lock Creek and Germansen River in the Omineca Mining Division, B.C., during the period of November 1st to 28th, 1988. The object of the survey was to delineate a known buried river channel carrying placer gold that sub-parallels Germansen River.

The lease is underlain by Cache Creek sediments, probably clastic, and possibly volcanics. The overburden is glacial till as well as fluvial sands and gravels.

The survey was carried out using a 24-channel seismic refraction system with 90-meter spreads, downsized to 2.5-meter and 5-meter geophone spacings, and employing explosives as the energy course. Six spreads were done along four lines resulting in a survey length of 500 m. The data were analyzed using an intercept time delay method.

CONCLUSIONS

The seismic refraction survey delineated the eastern edge of the buried river channel on only one line (3+00N). The western edge can be determined from bedrock outcrops to the immediate west of the survey area. The channel is therefore mapped to run in a north-northwesterly direction within the survey area.

From bedrock depths determined on line 0+00N, the depths to the bottom of the channel is estimated to vary from 30 to 55 meters.

RECOMMENDATIONS

It is recommended to continue the seismic surveying on this property to map the channel, but using longer spreads. This can be accomplished by doing the work in the summertime, that is, while there is no snow on the ground, when the difficult terrain can be handled. Spread lengths of 180 m is probably quite adequate.

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INTRODUCTION AND GENERAL REMARKS

This report discusses the results of a seismic refraction survey carried out along four lines within Placer Lease #3497, located on Germansen River just north of Ah Lock Creek, 13 km N60°W of the village of Manson Creek.

The purpose of the work was to delineate a known buried Tertiary river channel carrying placer gold and running sub-parallel to Germansen River. The Manson Creek area is well known for numerous placer gold deposits occurring within buried channels, a number of these occurring on Germansen River.

The work was carried out within the period of 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 one placer lease as shown on Map #2 and as described below.

Record Nos.	Expiry Date
PL 3497	June 25, 1989

The property is owned by Don Gilliland of Germansen Landing and is being optioned to Highwater Resources Ltd., the operator of the project.

LOCATION AND ACCESS

The southern boundary of the property is located about 13 km N60°W (300°E) of the village of Manson Creek and to the immediate north of the confluence of Ah Lock Creek with Germansen River.

The geographical coordinates are 55° 44' north latitude and 124° 40' 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 southern part of the property from Manson Creek is reached by 18 km (11 miles) of gravel road which runs westerly along Slate Creek and northerly along Germansen River 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 along the northerly-flowing Germansen River. The terrain is therefore moderate to steep with the elevation varying from about 820 to 950 meters above sea level.

HISTORY OF PREVIOUS WORK

Placer gold was first discovered on Germansen River in 1870 and through the years since, worked by companies and individuals. Some large hydraulic pits occur to the north and to the south of the property.

It is unknown to the writer what work has been done on the property itself, though one adit drifted into the buried channel occurs on the northwestern part of the property.

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 northern part of the property is underlain by

greenstone (andesitic flows and tuffs) and minor argillite, chert, limestone, and serpentine. The southern part is underlain by argillite and/or slate with minor greenstone, chert, and limestone.

The overburden consists mostly of boulder clay overlying silts and gravels.

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 (20 to 30 m in this case being limited by topography). 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 (though, in fact, it was discovered later they weren't). 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 2.5 meters at the two ends and the middle of the spread and 5 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 90 m.

For better coverage, each 24-channel spread overlapped the adjacent one by 20 m. This ensured the channel edge would not be missed because it occured at the edge of a spread.

Two seismic lines were run, as shown on Maps 2 and 3, 100 m apart and in an east-west direction. Lines 0+00 and 1+00N each consisted of one spread for a total length of 90 m. Lines 2+00N and 3+00N each consisted of two spreads with a 20 m overlap for a total length of 160 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 the edge of the known channel.

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 reconnaissance nature of the work. Accuracy was not strived for in calculating depths, but only in locating the channel edge.

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
310 - 410	Overburden: loose surficial boulder clay, possibly sand, gravel.
2000 - 2500	Overburden: boulder clay, water-saturated, very compact.
3930	Bedrock: sediments, probably argillites and slates, possibly some volcanics.
5000	Bedrock: greenstones, possibly chert, limestone, or serpentine.

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 encountered on the survey lines is two. The first layer is a loose, surficial overburden of very low velocity. The second layer is either a compact boulder clay, or bedrock.

The eastern channel edge was only delineated on line 3+00N. Because it was steep-sided, and because the channel depth was too deep for the size of spreads used, the depths to the bottom of the channel could not be determined on line 3+00N. However, the depths to bedrock east of the channel was seismic-interpreted to be about 2 meters.

Bedrock was not encountered at all on lines 1+00N and 2+00N. It is therefore assumed these lines occur entirely within the buried channel.

The western edge of the channel probably occurs at the western ends of lines 1+00N, 2+00N, and 3+00N since bedrock outcropping apparently occurs nearby. As a result, it would appear the channel trends in a north-northwesterly direction within the area of the survey grid, as has been drawn on the survey plan, Map #3.

The seismic survey along line 0+00N encountered bedrock at depths varying from 1 to 6.5 m. However, this line occurs at 25 to 50 m below the elevations of the 3 lines to the north. That is, lines 1+00N to 3+00N occur on a bench above the river, and line 0+00N occurs on the river valley bottom. It is apparent from the delineation of the channel on the survey plan that line 0+00N occurs within the channel near its bottom. As a result the depths to the bottom of the channel on the other three lines can be estimated to vary from 30 to 55 m.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark
Geophysicist

February 6, 1989
50/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 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 6, 1989

50/G

AFFIDAVIT OF EXPENSES

This is to certify that the seismic refraction survey carried out on placer lease 3497 at the confluence of Ah Lock Creek and Germansen River 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)	$ 420.00
2-man linecutting crew, 2 days @ $400/day	800.00
4-man geophysics crew, 20 hours at $110/hr.	2,200.00
Room and board	720.00
Instrument rental, 2 days at $350/day	700.00
4-wheel drive truck rental and gas	220.00
Explosives and seismocaps	176.00
	$5,236.00

Report:

Senior geophysicist, 5 hours at $45/hr.	$ 225.00
Junior geophysicist, 20 hours at $35/hr.	700.00
Drafting and printing	250.00
Report typing and compilation	100.00
	$1,275.00

$6,511.00

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark,
Geophysicist

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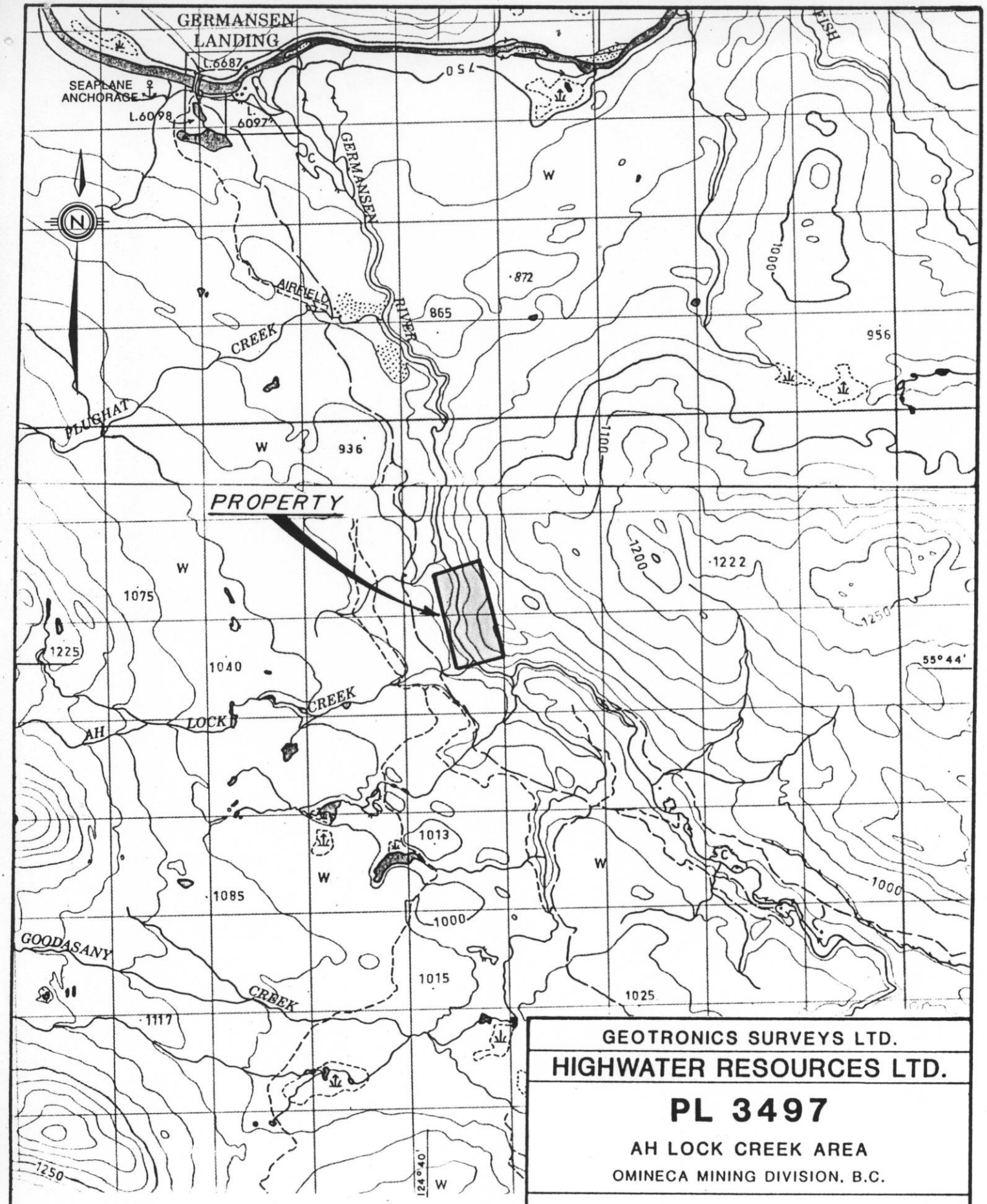

GEOTRONICS SURVEYS LTD.

HIGHWATER RESOURCES LTD.

PL 3497

AH LOCK 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