PRELIMINARY GEOLOGICAL-GEOPHYSICAL REPORT
ON
PLACER LEASES NOS. 1658 AND 1659
LOCATED ON FRASER RIVER BETWEEN LYTTON AND LILLOOET,
BRITISH COLUMBIA
KAMLOOPS MINING DIVISION
FRASER-BRALORNE DESIGNATED PLACER AREA
MAP 92I/12Wc
Latitude 50° 32'N, Longitude 121°46'W

For

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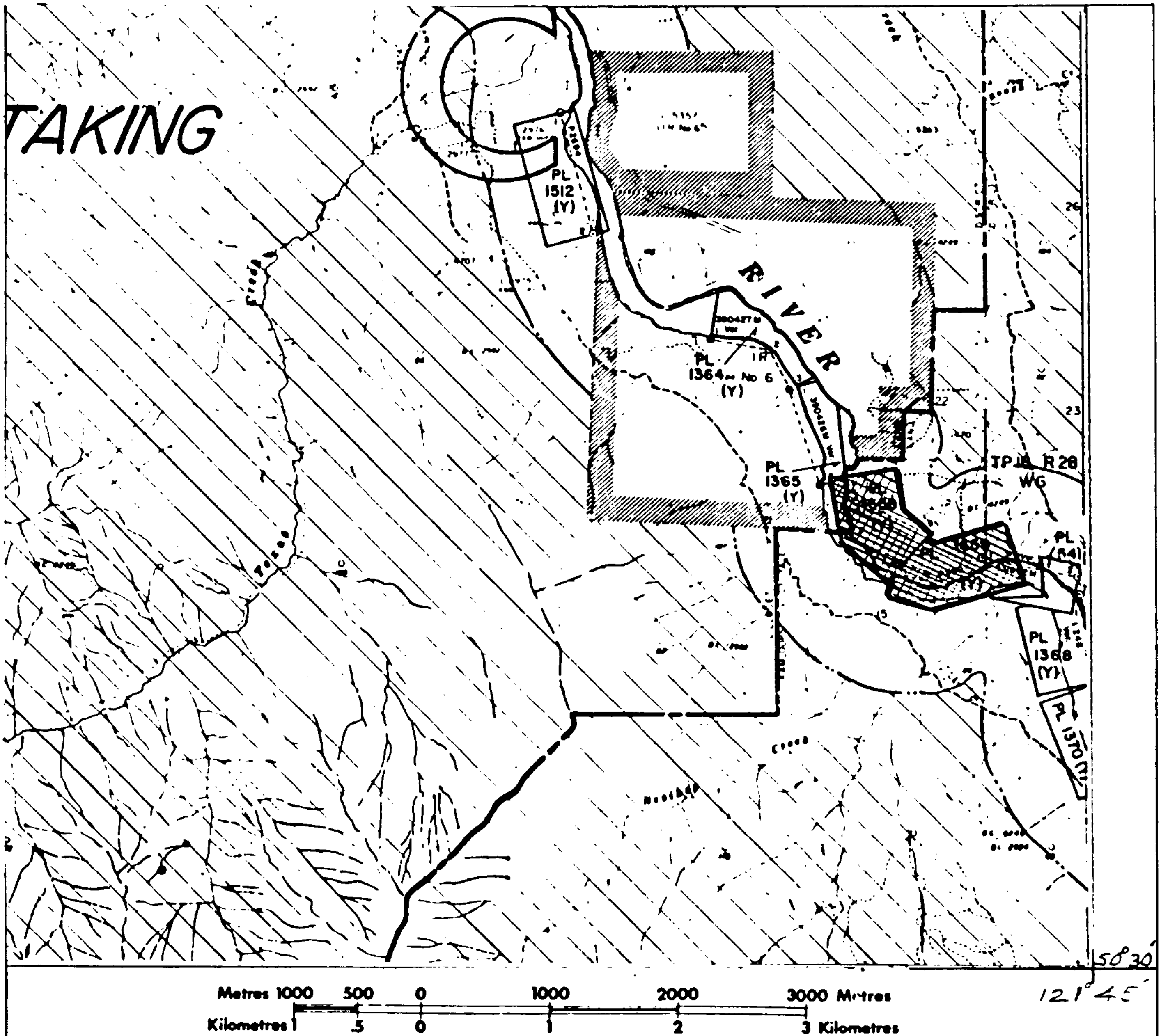
November 1979

TABLE OF CONTENTS

APPENDIX

ILLUSTRATIONS



NORA M. MAGRATH, ETAL

LOCATION MAP

PLACER LEASES NOS 1658 + 1659
FRASER RIVER, LILLOOET AREA
KAMLOOPS MINING DIVISION, B.C.
FRASER - BRALORNE DESIGNATED AREA

MAP P92I/12W

SEPTEMBER 1979

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VANCOUVER, BRITISH COLUMBIA, NOVEMBER 1979

ABSTRACT

During the three days spent on the above placer leases located on the Fraser River between Lillooet and Lytton, three samples were taken on the bench some 100 feet above the present river. The samples consisted of sand and gravel which was probably deposited by the Fraser River in the form of a bar or bench deposit when the river was at this level. The samples were carefully panned down and studied for heavy mineral content. The total heavy mineral content of all three samples was far above the content of heavy minerals in average stream channel. This would indicate that there was a fairly high degree of concentration on the bar or bench. No effort was made to evaluate the gold content since the gold was very fine. The bench has several cuts with rocks piled up, typical of sluicing operations.

Part of the three days was spent on a shallow refraction seismic line located just above the low water level of the Fraser River. The location of the line is shown on the enclosed map. A cross section was prepared from the seismic work and is enclosed at the back of the report. The cross section shows a possible deep or old channel of the Fraser River near the eastern end of the line. Bedrock is exposed immediately east of the deep channel and has evidence of faulting with springs in the area.

Both the deep or old channel and the bench above the river have a good potential for placer gold. Bulk samples should be run on the bench for determined gold content. Placer gold on the bench is apt to be fine or flour gold so care will have to be taken to get good recovery. The deep channel will probably have to be drilled and reverse circulation with air or water used to recover a bulk sample for testing.

GEOLOGICAL-GEOPHYSICAL REPORT ON PLACER LEASES NOS. 1658 and 1659, FRASER RIVER AREA, KAMLOOPS MINING DIVISION, BRITISH COLUMBIA.

INTRODUCTION

The field work on the placer leases as well as the report on the results was commissioned by Nora M. Magrath, owner of the two leases. The monies spent on the geological and geophysical work and the cost of the report will be claimed as assessment work on the two leases.

The two leases were staked on the 25th day of March, 1979. The leases, Nos. 1658 and 1659, were issued on May 7, 1979.

The two leases are located on the Fraser River forty kilometers north of the town of Lytton, British Columbia. The leases are in the Kamloops Mining Division and in the Fraser-Bralorne Designated Placer Area. The leases lie immediately south of Indian Reserve #6 in a sharp bend of the river. The leases are plotted on N.T.S. Map 92I/12Wc. A portion of this map is enclosed with the report as a claim location map. The co-ordinates of the two leases are Latitude 50° 32' N. and Longitude 121° 46' West.

The leases are readily accessible via Provincial Highway 12 some forty kilometers north of the town of Lytton, B.C. Access to the bench above the Fraser River on placer 1659 is by good gravel road through part of the Twenty-six Mile Ranch. An access road will have to be made down the talus slope to the Fraser River to test the deep channel. The area is not steep and a road should be easy and reasonable to build.

The climate in the area of the leases is moderate with very little snowfall or cold weather. The general area has a semiarid climate with very little snowfall. Placer operations could be carried on for at least 10 months of the year even in adverse weather conditions.

The geological and geophysical work Shallow Refraction Seismic Survey was carried out on the lease during the latter part of the 1979 field season. The work was done on September 20, 21 and 22, 1979. The geological work consisted of an examination of the aggregate on the bench above the river and the faulted bedrock near the eastern portion of the leases. Three samples were taken on the bench, and carefully panned down in order to make a study of amount and composition of the heavy minerals. Approximately one day was spent on this work. Two days were spent on the Shallow Refraction Seismic Survey. The theory, field operations and interpretation of the seismic work is outlined in a publication "Shallow Refraction Seismic Exploration by Wm. Howard Myers, Consultant 1977 and enclosed in the appendix of the report. Two days were spent on the seismic survey. The seismic work was in the form of a continuous line from bedrock outcrop in the river east to the fault in the eastern portion of the area. The location of the seismic work or line F-1-79 is shown on the enclosed location map as well as the cross section along the line. Two men were used (writer and helper) on the seismic survey. All of the profiles were reversed so that dip information on the interphase can be computed. The cost of the seismic survey with two men is $250.00 per day for field work. The geological work (one man) is at $200.00 per day. The cost of computing of seismic data and plotting of the cross section is $200.00 per day. Two days were required to work up seismic data (October 10th + 11th 1979). Drafting and typing of the report is $125.00. Total cost of the work is as follows:

Field work		$ 700.00
Computing plotting Data		400.00
Typing & Drafting		125.00
	TOTAL COST	$1,225.00

Information for this report is from published and unpublished maps and reports and my work on the property on September 20, 21 and 22, 1979. The published maps and reports used are listed under the bibliography in the Appendix of the report.

The equipment used to carry out the Shallow Refraction Seismic Survey on the two placer leases is the Model E-S-125 Signal Enchantment Seismograph. The equipment is manufactured by Geometrics, Inc. 395 Jana Drive, Sunnyvale, California 94086. Two geophones were used to reverse most of the profiles. The spread length varied from 50 to 150 feet depending on field conditions and subsurface penetration required.

HISTORY

The history of placer gold production in this general area of the Fraser River is incomplete. The amount of gold produced from the area is also incomplete and is probably a good deal more than given in the government publications.

Local names were used for different bars and benches along the river such as Hills' Bar, Crowns Bar, Texas Bar etc. The location of many of these areas is indefinite. In the area of the two leases the workings on the bench some 100 feet above the river could not be identified in the literature. The workings do not appear to be too old but they certainly are not recent. There is a report (verbal) that the work was done by the Chinese near the turn of the century. The work was appearantly by hand with a sluice box using water from the small creek in the area. The workings are in the form of trenches of cuts (water) in the bench with larger rocks piled up along and near the end of the box. The work is fairly extensive with possibly as much as one third of the bench having been worked.

A great deal of the gold produced on the Fraser River is fine gold and is probably concentrated from local glacial drift material brought in by the glaciers. Quite a bit of coarse gold was produced in the Lillooet Area. Dawson considered that the coarse gold was of local orgin and was eroded from the argillite and micaceous schists found in the area. The general area also has a strong structure in the form of the Fraser River Fault Zone. Conditions are favourable in the general area of the claims to have course gold as well as fine gold from the glacial drift.

GEOLOGY

Rocks in the Lillooet area are considered favorable as a possible source rock for the placer gold in this area. Dawson considered that the coarse gold such as was found around Lillooet was of local origin and was eroded from the belts of argillite and micaceous schists that cross the river. There is also strong structures in this general area. The source of the fine or flour gold in the area is probably from the glacial drift which filled the Fraser Valley during the glacial

The three general categories or types of placer gold deposits found in the Cariboo Region of British Columbia, as outlined by Wm. Howard Myers in the publication "Types of Placer Gold Deposits in the Cariboo", would be applicable in this area of British Columbia also. This publication is included in the appendix of the report. The interglacial and post glacial types of deposits are more common or prevalent in this area. Post glacial deposits in the form of bars or benches in the present Fraser River are very common and have been worked in the past history described earlier. The deep channel or old channel shown on the cross section could very well be a pre-glacial or Tertiary channel. There could also be some local inter-glacial deposits in the channel above the pre-glacial or "gut gravels".

RESULTS OF GEOLOGICAL-GEOPHYSICAL EXPLORATION WORK

The three samples of aggregate taken on the bench, some 100 feet above the present Fraser Fiver, were panned down and analized for heavy minerals. All three samples showed similiar assemblage of heavy minerals with considerable magnetite. All of the samples showed above average in the amount of heavy minerals. This would indicate that the bench does have some degree of concentration. No effort was made to evaluate the values in placer gold for most of the gold was very fine. Bulk samples will have to be run to evaluate the amount of placer gold per cubic yard under different specific recovery techniques.

The fault shown of the enclosed map is primarily inferred. There is some evidence of faulting in the bedrock and relief on bedrock is very sharp. There are also some springs in the area of the fault zone.

The shallow refraction seismic line on the beach above low water level on the Fraser River is shown on the enclosed location map. Immediately west of the line the river is running out bedrock and bedrock outcrops in the river bed for several hundred feet upstream. To the west near station 2400 bedrock drops off or deepens very rapidly. Near the possible deep channel, as indicated on the enclosed cross section no bedrock velocities were recorded on the seismic survey. Near the deep channel hardpan velocities were recorded below the near surface gravel velocities. The hardpan layer appears to get thicker where the bedrock gets deeper. The hardpan velocities are normal hardpan velocities encountered in other areas. Hardpan is often encountered in other areas of the Cariboo where bedrock becomes deeper or over deep channels.

CONCLUSIONS

The bench above the Fraser River where three samples were taken and analized for heavy mineral content, appears to have above average concentration. The gold and other heavy minerals are fine and will take special equipment to concentrate.

Bedrock drops off quite sharply near the east end of seismic line F-1-79 just west of the fault. It is very possible that there is an old channel of the Fraser River in this general area.

RECOMMENDATIONS

Bulk samples should be run on the bench some 100 feet above the river. Special equipment and care will have to be used to recover the fine gold on the bench. If possible 10 or 50 cubic yard samples should be run in order to get an accurate value per cubic yard. Final or additional concentration of the material will probably have to be done in the laboratory due to the fineness of the gold and other heavy materials.

Further testing should be done on the indicated old channel. A road will have to be built down the talus slope from the bench to just above high water level. Test holes should be put down in the area of the channel. If at all possible bulk samples should be obtained from any gravel encountered in the drilling by reverse circulation using air or water. The bulk samples can be concentrated down for gold and heavy mineral content and the lithology of the gravel studied. It is expected that the gold in the old channel will be much coarser.

This is considered to be a very worth while placer gold prospect and well worth the expenditure of additional monies to evaluate both the potential of the possible old channel and the bench above the present River.

Respectfully Submitted

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November, 1979

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Expiry Date: June 16, 1979 80

APPENDIX

BIBLIOGRAPHY

British Columbia Department of Mines

- Bulletin # 3- Douglas Lay 1940
- Bulletin #11 Douglas Lay 1941
- Bulletin #21 Placer Mining in B.C. 1953

Geological Survey of Canada

- Annual Report 1887 - 88
- Annual Report 1896
- Memoir #213

SHALLOW REFRACTION SEISMIC EXPLORATION

BY

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November, 1977

THEORY

The quantity that is observed in the refraciton method of seismic exploration is the time between the initiation of the shock wave at the shot point by hammer blow on a steel plate or explosion and its first arrival at the detector placed at a measured distance from the shot or impact point. As the first arrivals only are usually considered in the analysis, the wave arriving at the detector first must be the one which has travelled the minimum time path between shot point and detector. By observing first arrivals for different separation distance of source and receiver, a time distance curve can be constructed representing variations of minimum time path with distance, (see figure 1 at end of text). From these variations, the nature and depth of the elastic discontinuities can be determined.

The shock waves travel through earth materials as through air, with a definite velocity and along a definite path. The velocity depends primarily upon the degree of consolidation. The travel path of the seismic waves, like the path of light waves, follows whatever course that will require the least amount of time between the source and the detector.

The travel path of shock waves for minimum travel time can be traced out by a simple relationship form a familiar low of optics known as Snell's law where $\frac{\text{Sin } i}{\text{Sin } r} = \frac{V1}{V2}$.

In the equation i is the angle of incidence and r is the angle of refraction. A shock wave will travel in a straight line through any material which has a constant velocity but will be bent if it passes through a discontinuity where there is an abrupt change in elastic properties. In refraction seismic work, we are interested only in the rays which go down at the critical angle, become refracted parallel to the boundary and are refracted back to the detector (surface) at the critical angle. When r = 90° then the above equation (Snell's law) becomes $\text{Sin } i_c = \frac{V_1}{V_2}$.

Interpretation:

The process of refraciton seismic interpretation can be illustrated by a simple case of the single horizontal discontinuity as shown in Figure 2 at end of text. Any number of discontinuities can be recorded as long as there is sufficient thickness and velocity contract. In the ideal case and for simple interpretation of the refraction data the velocities will be higher in succeeding layers from surface down and the thickness will be greater than the overlying layer. This is not always the case and in such instances where deeper layers are thinner and velocities lower the interpretation becomes complex and experience is necessary for accurate and definitive interpretation of the refraction data.

The field data consisting of times recorded in milliseconds and distances measured form shot point to detector are plotted on a time distance graph. A line is drawn through the points that line up in a straight line. The velocity on each segment of straight line is computed form the basic formula $V = \frac{D}{T}$. Overlays with velocity scales computed from the above formula can be made up so that a direct read out can be obtained for each segment representing different velocity layers (see figure 1 at end of text).

The thickness of a layer is computed by the means of the formula Thickness = $\frac{XV1}{2} \sqrt{\frac{V2-V1}{V2+V1}}$, where XV1 is the horizontal distance from the zero point or detector to the change from velocity one to velocity two. The function $\sqrt{\frac{V2-V1}{V2+V1}}$ for the different velocities can be plotted on a graph so that a direct read out can be determined for rapid computation. In the simple two layer case where bedrock is covered with one layer of low velocity material then the depth to bedrock is the same as the thickness of the layer. In the three or more layer case the depth calculation is made with the formula $D_2 = 0.8D_1 + \frac{XV-2}{2}\sqrt{\frac{V3-V2}{V3+V2}}$ (See figure 1 at end of text).

Additional information and greater accuracy can be obtained by reversing each profile in the field. When the profile is reversed dip calculations can be made on the various interphases. The length of the profile (distance from detector to shop point) depends on the depth of penetration desired. As a rule of thumb the depth penetration is roughly one quarter of the horizontal separation. A separation of 100 feet gives 25 feet penetration. This rule is only approximate and depends on velocity of the near surface layers.

Field Operations:

The operation of the shallow refraction seismic survey in the field is relatively simple and can be done by one or two men. The horizontal distance, with ten foot intervals moves down the line and strikes a steel plate with a sledge hammer at each 10 foot interval and records the time in milliseconds on the seismic timer. The time and distance is written down with notes on changes in surface conditions and terrain for different hammer points. If the readings are anomalous then a time-distance plot is made in the field to check data. With two men in the field, one on hammer and the other recording data, progress is much more rapid. Two men can run up to twenty profiles a day where conditions are favourable along logging roads or good trails. The plotting and interpretation of the data requires almost as much time as the field work.

The equipment, consisting of two cables, geophone and sledge hammer and small steel plate and seismic timer can easily be carried by one man.

<u>Applications</u>:

Some of the applications or cases of the refraction seismic method of subsurface exploration are:

(a) Depth of Alluvium (Depth to Bedrock)

(b) Relief on Bedrock (Dip or irregularities)

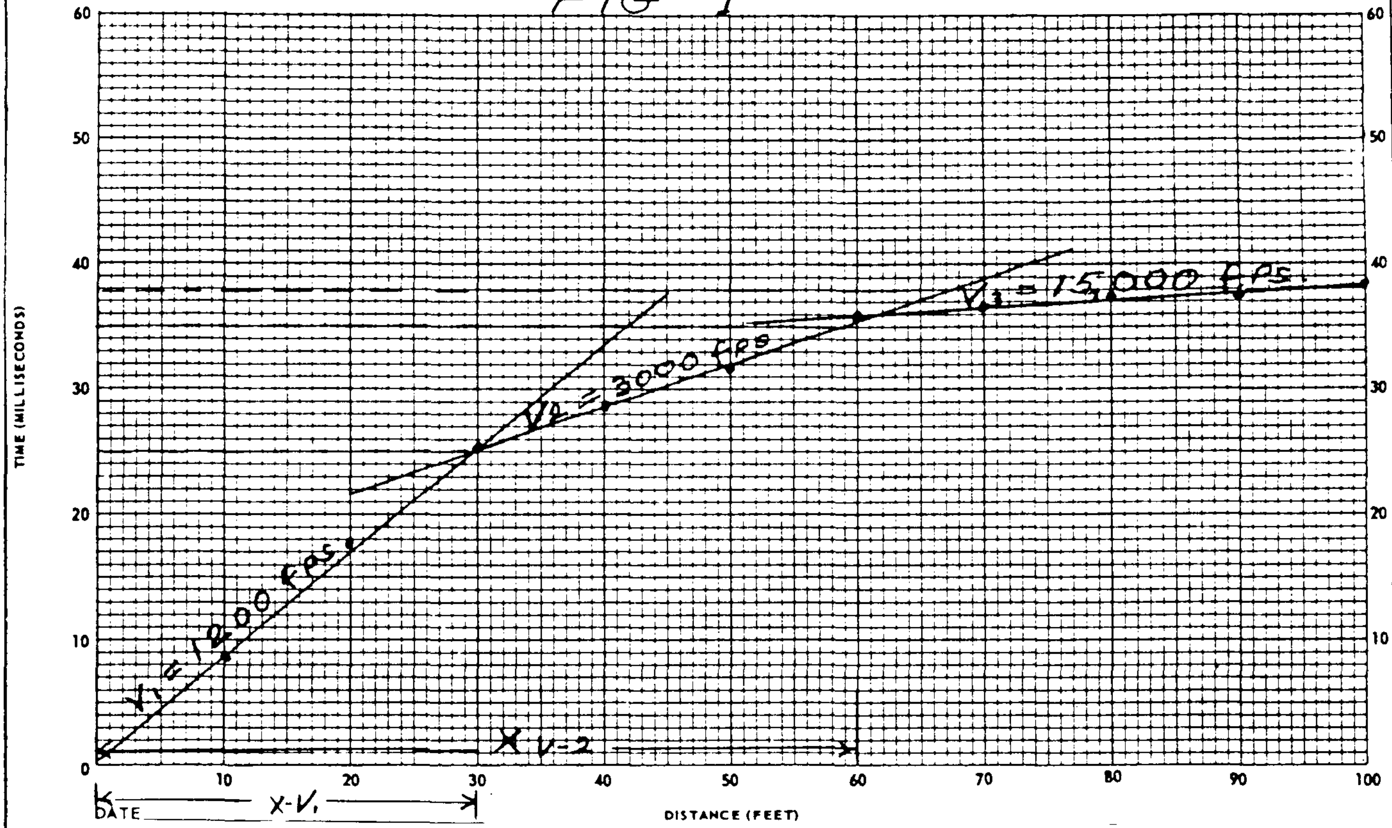
(c) Identification of material below the surface for excavation purposes such as gravels, clays and hard pan.

(d) Type of bedrock and possible weathering or faulting.

(e) Geological mapping for mineral and ground water.

The refraction seismograph is an excellent method for placer gold exploration in that all of the applicaitons listed above are useful.

FIG #1



Velocity Computation - $V = \frac{D}{T}$

$V_1 = \frac{30}{.025} = 1200$ FPS - $V_2 = \frac{30}{.010} = 3000$ FPS - $V_2 = \frac{40}{.0027} = 15{,}000$ FPS

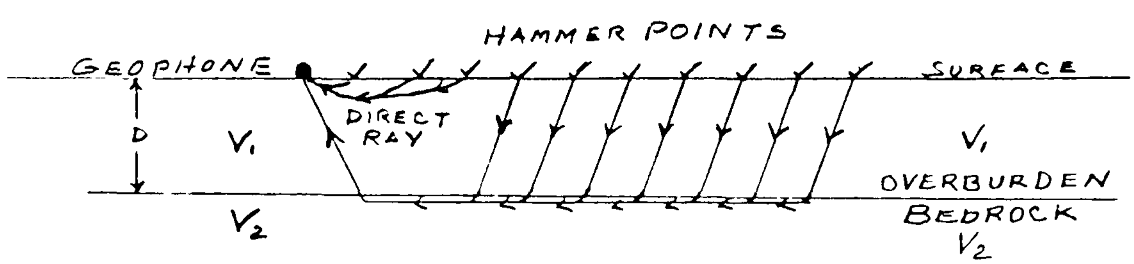
Depth Calculation - $D_1 = \frac{XV\text{-}1}{2}\sqrt{\frac{V2-V1}{V2+V1}}$ - $D_2 = \frac{XV\text{-}2}{2}\sqrt{\frac{V3-V2}{V3+V2}} + 0.8\ D_1$

$D_1 = \frac{30}{2}\sqrt{\frac{3000-1200}{3000+1200}} = 9.8'$: $D_2 = \frac{60}{2}\sqrt{\frac{15000-3000}{15000+3000}} + 0.8 \times 9.8 = 32.33$

Results:

0 - 9.8' soil: Gravel @ 9.8' Bedrock @ 32.33

FIGURE # 2



CROSS SECTION – AA'
ALONG SEISMIC LINE F-1-79
ON
BEACH OF FRASER RIVER
FIVE FEET ABOVE LOW WATER LEVEL
N 70° E
RIVER ON BEDROCK FROM HERE SEVERAL HUNDRED FEET UP STREAM
SURFACE OF SEISMIC PROFILE APPROX 5' ABOVE LOW WATER LEVEL OF RIVER
1600 FPS
SAND & GRAVEL (DRY) 1600 FPS
LOW WATER LEVEL
9500 FPS
GRAVEL 4000 FPS
SAND & GRAVEL (DRY) 1700 FPS
LOW WATER LEVEL
9500 FPS
GRAVEL WITH WATER 4000 FPS
9000 FPS
9200 FPS
BEDROCK
7500 FPS
GRAVEL – 3900 FPS
SAND & GRAVEL 1300 FPS
DRY
GRAVEL 3900 FPS
HARDPAN
5600 – 6800 FPS
GRAVEL – ROCKS
4400 – 4700 FPS
NO BEDROCK VELOCITIES RECORDED
LOOSE SAND & GRAVEL
1100 FPS
SAND & GRAVEL (WET)
2600 FPS
LINE UPHILL APPROX 20 FEET
SURFACE OF PROFILE APPROX 28' ABOVE LOW WATER LEVEL
LOOSE GRAVEL – TALUS 1600 FPS
SAND & GRAVEL (DRY)
BENCH DEPOSITS
3100 FPS
GRAVEL (WITH WATER)
SOME ROCKS 4800 FPS
NO BEDROCK VELOCITIES RECORDED
BEDROCK BELOW THIS LEVEL
POSSIBLE OLD CHANNEL
OF
FRASER RIVER
LOW WATER LEVEL OF FRASER RIVER
BEDROCK ABOVE RIVER
BEDROCK FAULT
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 7856
NORA M. MAGRATH, ETAL.
VANCOUVER, B.C.
CROSS SECTION-AA'
ALONG SEISMIC LINE F-1-79
PLACER LEASES NOS. 1658, 1659
FEET 20 0 10 20 FEET
m 3.5 0 3.5 6.1 m
SCALE : 1" = 10' = 3.5 m
HORIZONTAL AND VERTICAL
TO ACCOMPANY REPORT ON GEOLOGICAL
GEOPHYSICAL EXPLORATION WORK
PROFESSIONAL ENGINEER
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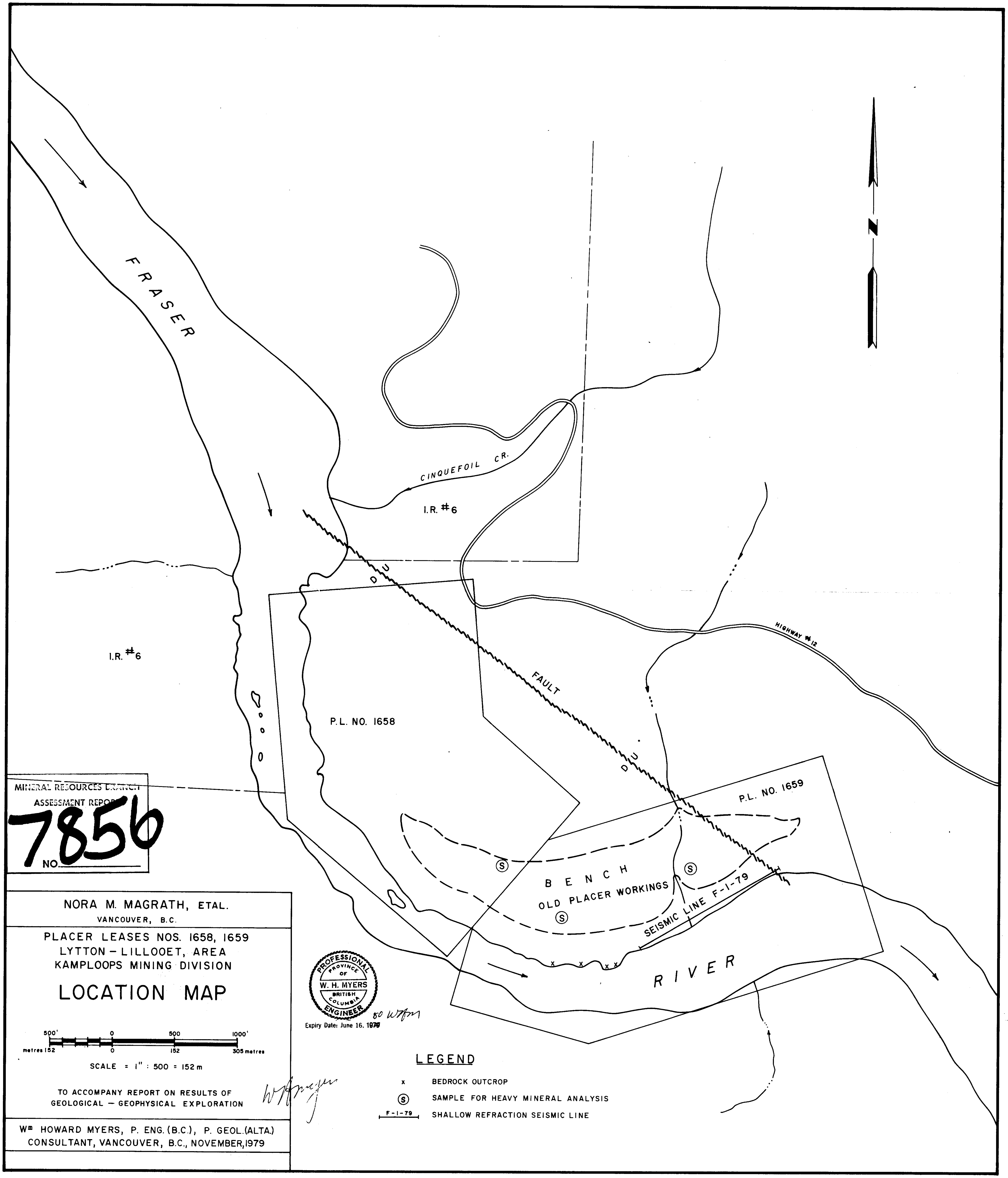

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PLACER LEASES NOS. 1658, 1659
LYTTON – LILLOOET, AREA
KAMPLOOPS MINING DIVISION

LOCATION MAP

500' 0 500 1000'
metres 152 0 152 305 metres

SCALE = 1" : 500 = 152 m

TO ACCOMPANY REPORT ON RESULTS OF
GEOLOGICAL – GEOPHYSICAL EXPLORATION

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