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REPORT ON
SEISMIC INVESTIGATIONS
AT
MAUS CREEK, KOOTENAY DISTRICT, BRITISH COLUMBIA

for

MR. GEORGE R. CASTLES,

LETHBRIDGE, ALBERTA

by

HUNTING TECHNICAL AND EXPLORATION SERVICES LIMITED

Toronto, Ontario

August, 1959

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INTRODUCTION

A seismic refraction survey was carried out for Mr. George R. Castles between July 8th. and July 16th., 1959 in the Maus Creek area, Kootenay District, British Columbia.

The seismic party consisted of a geophysicist and an engineer from Hunting Technical and Exploration Services Limited of Toronto. The instrument used was a Geophysical Specialties Company Model MD-1 single channel portable refraction seismograph. At distances up to two hundred feet a hammer was the principal source of seismic energy, beyond this distance dynamite was used.

The survey ran smoothly with the instrument functioning well and only slight delays for line cutting. No time was lost from bad weather.

TOPOGRAPHY AND GEOLOGY

The surface topography is that of alluvial terraces filling the lower part of intermontane valleys and extending for several miles out from the mountains. These terraces are in turn cut by younger streams such as Maus Creek which has cut its bed roughly one hundred feet below the terrace surface in the upper part of the survey area and lies on the terrace surface in the lower part of the area.

Geologically the prospect is underlain by argillites of the Pre-Cambrian Lower Purcell series. The overburden consists of Recent and Pleistocene glacial drift, sand, silt and gravel. A more detailed treatment of the sequence will be found in the discussion of results.

LOCATION OF POINTS

Survey points were located by chain along lines cut by Mr. William Strickland as directed by Mr. Castles. At the end of the work all lines were surveyed by means of a transit borrowed from the Department of Public Works in Cranbrook. Since the purpose of the survey was to provide topographical information along the seismic lines, it was broken up into three sections as shown in the accompanying plan

and no vertical or horizontal tie-in was made between the sections. Elevations are shown in the cross-sections with respect to three separate arbitrary data: one for the AB, CD, EF, and NO lines; one for the LM line; and another for the GH and JK lines. Relative bearing between the three sections was determined by compass.

VELOCITIES

The velocities observed in the survey fall for the most part into four groups which tend to reflect in a general way the nature of the material being encountered. The range of from 500 to 1000 feet per second usually indicates the so-called "aerated layer" of loose soil and/or organic matter. The second group of velocities are characteristic of dry uncemented overburden, probably sands, silts and gravels, and range from 2000 to 4000 feet per second. Velocities from 7500 to 11,000 feet per second probably represent a layer of dense, cemented till or gravel while bedrock falls in the range 10,000 to 20,000 feet per second.

The poor velocity contrast between the cemented till or gravel and the bedrock has made interpretation of the rock surface difficult. On the other hand the good contrast between the loose unconsolidated layer and the dense layer has made it possible to observe at least one valley in the surface of the latter.

RECORD QUALITY

Record quality was for the most part fair to good and most of the determinations should be good within ±10% or ±5 feet whichever is greater.

EXCESSIVE DEPTH

Several depths have been stated as greater than a certain figure. This indicates that the spread length attempted failed to provide evidence of bedrock and the minimum depth is readily calculated assuming a normal bedrock velocity.

DISCUSSION

For the purpose of discussion the survey may be divided into three main divisions: the northern map area comprising AB, CD, EF and NO lines; the central map area containing the LM line; the southern map area with the GH and JK lines.

NORTHERN MAP AREA:

From the seismic evidence it is possible to outline a rather consistant stratigraphic section in this area.

From about elevations 3360 to 3340 are found unconsolidated sands, silts or gravels.

From about 3340 to 3200 feet is a layer of hard dense till or cemented gravel which was encountered in the old mine workings.

Below elevation 3200 is the surface of the bedrock.

At the ground surface in all cases is an aerated layer roughly five feet thick consisting of dry soil and humus.

Maus Creek itself has cut well below the unconsolidated layer into the cemented gravel but still lies roughly eighty to ninety feet above the bedrock. A similar stream channel which has since been abandoned may have once flowed as shown on the EF line with its bed roughly ten to twenty feet below the surface of this hard layer. The NO line was surveyed in an attempt to trace this channel but because of the surface topography the results were not quite so conclusive. There is however some suggestion that the valley continues as shown.

Because of the depth and the poor velocity contrast it was impossible to determine the nature of the bedrock topography although the consistant depths at the end points might hint at a relatively even surface.

CENTRAL MAP AREA:

The one profile attempted in this area failed to encounter bedrock because of the high velocity layer which lies just below the surface and the narrowness of the valley which prevented extending the spread.

SOUTHERN MAP AREA:

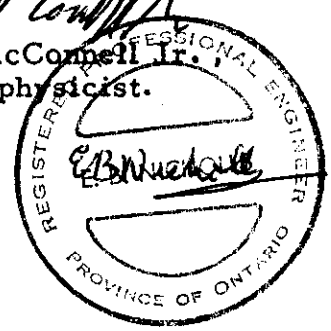
Results in this region were quite inconclusive but the section suggested by the seismic results is shown in cross sections JK and HG. One or two layers of unconsolidated alluvium overlie a high velocity layer which may be either the cemented layer encountered in the more northerly profiles or the bedrock itself. It was unfortunately impossible to distinguish between the two types of material in this area on the basis of velocity.

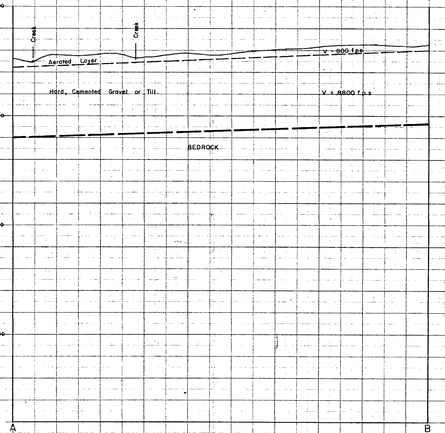
SUMMARY AND CONCLUSIONS

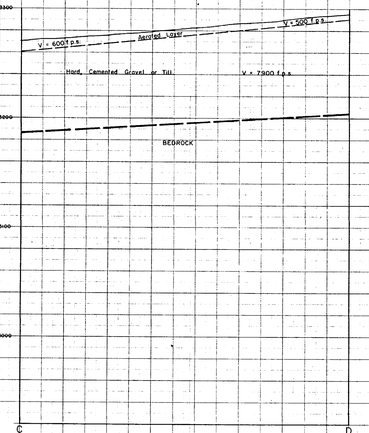
Although the thickness and high velocity of the overburden prevented a detailed interpretation of the bedrock surface, it was possible to outline a possible buried stream channel in the surface of a layer of dense overburden which may reflect the former position of Maus Creek. This former channel might be as worthwhile investigating as any former channel in the bedrock.

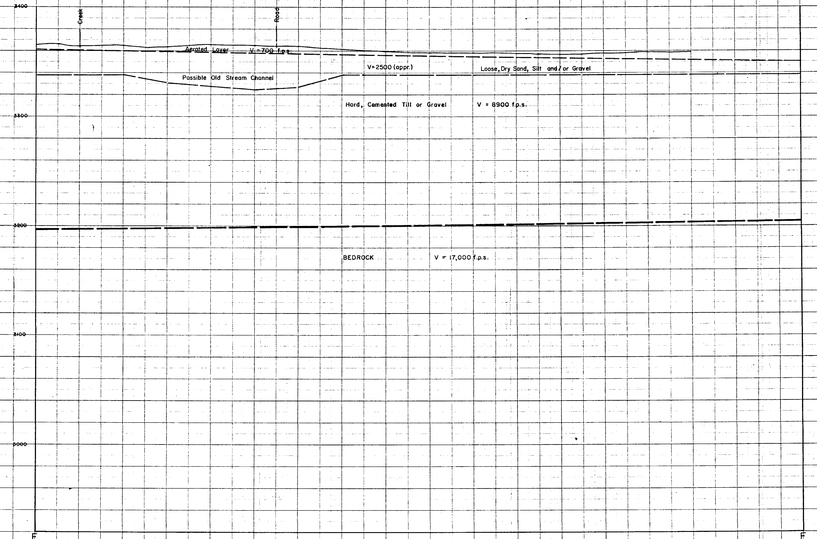
HUNTING TECHNICAL AND EXPLORATION SERVICES LIMITED

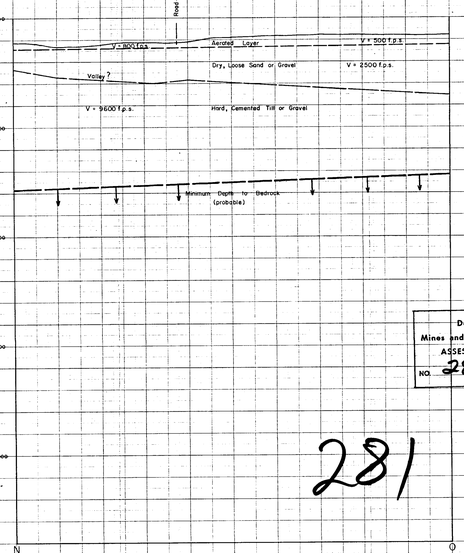
R. K. McConnell Jr.,
Geophysicist.











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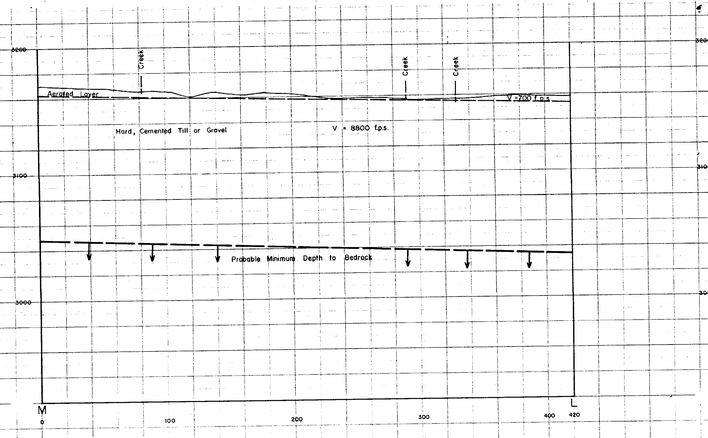
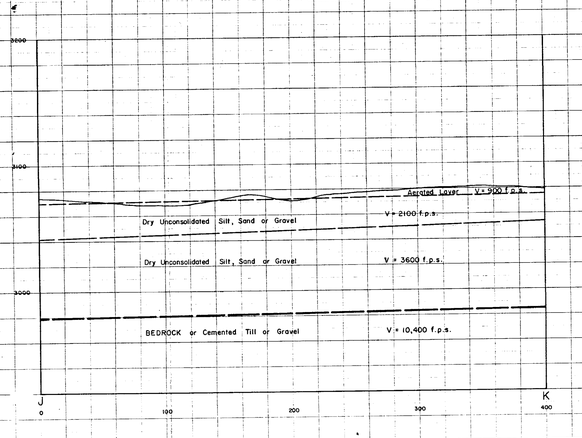
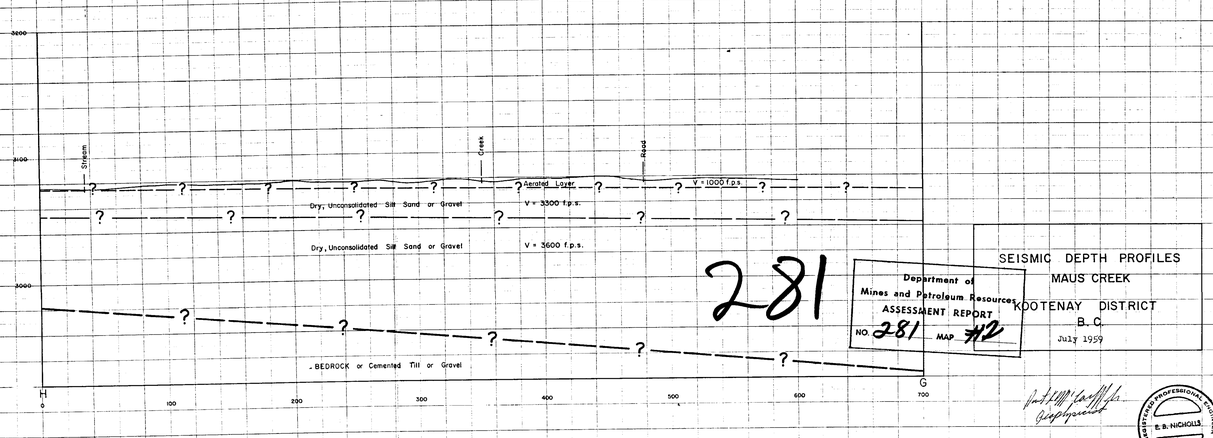
SEISMIC DEPTH PROFILES
MAUS CREEK
KOOTENAY DISTRICT
B.C.

July 1959







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SEISMIC DEPTH PROFILES
MAUS CREEK
KOOTENAY DISTRICT
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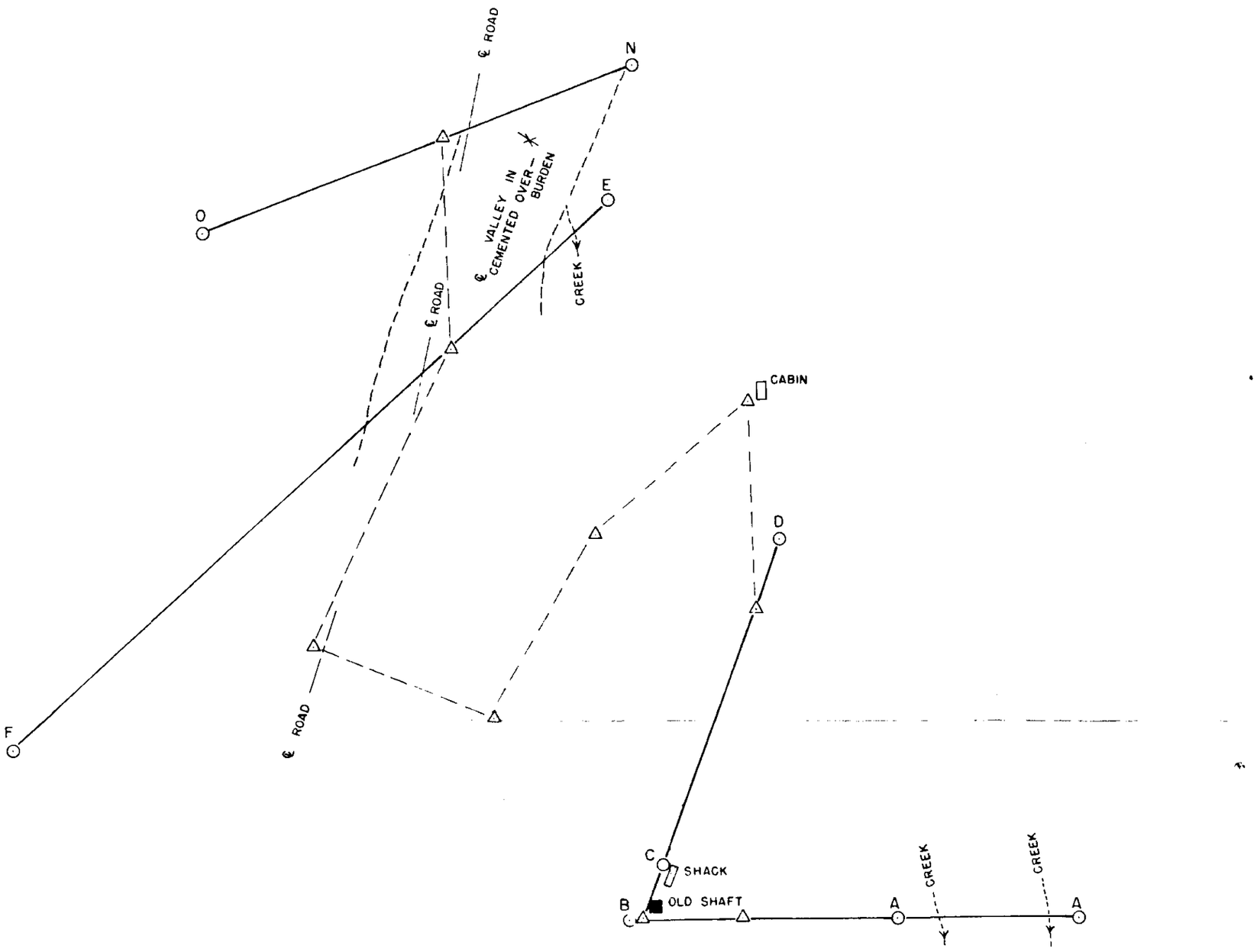
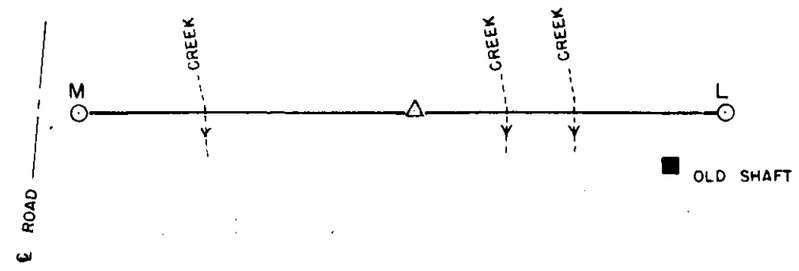
E. B. NICHOLLS

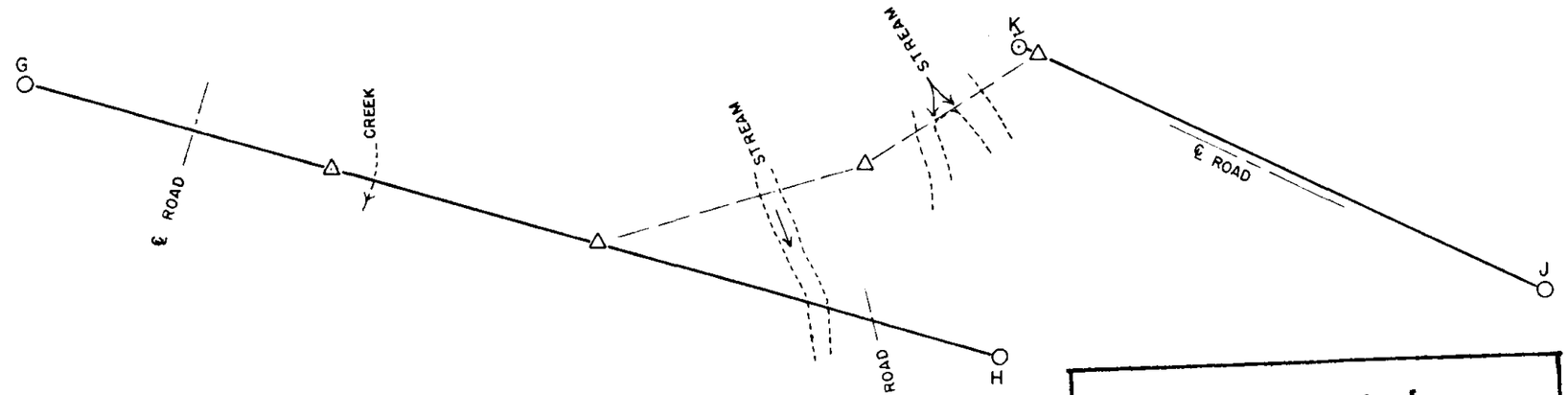
NORTHERN MAP AREA



CENTRAL MAP AREA



SOUTHERN MAP AREA



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LEGEND

Seismic Profile Line

Transit Line

Scale: 1" = 100'

KEY PLAN SHOWING RELATIVE LOCATION OF SEISMIC PROFILES
MAUS CREEK, BRITISH COLUMBIA
JULY, 1959

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