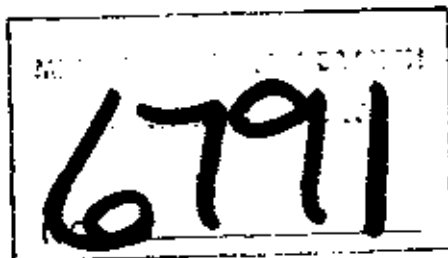


REPORT ON A MAGNETOMETER SURVEY
CONDUCTED ON THE
CL, CL. 2, JACK, RICH, JOY & PENSTEMEN CLAIMS
NICOLA AND VERNON MINING DIVISIONS

N.T.S. 82 E/13
119° 52' W. Long; 50° 01' N. Latitude



Owner: Raymond Hrkac
Operator: Pan Ocean Oil Ltd.
Consultant: Sander Geophysics Ltd.
Author: M. D. McInnis, E. Ebner
Date: June 5th, 1978

A handwritten signature in black ink, appearing to be "M. D. McInnis" or similar, written in a cursive style.

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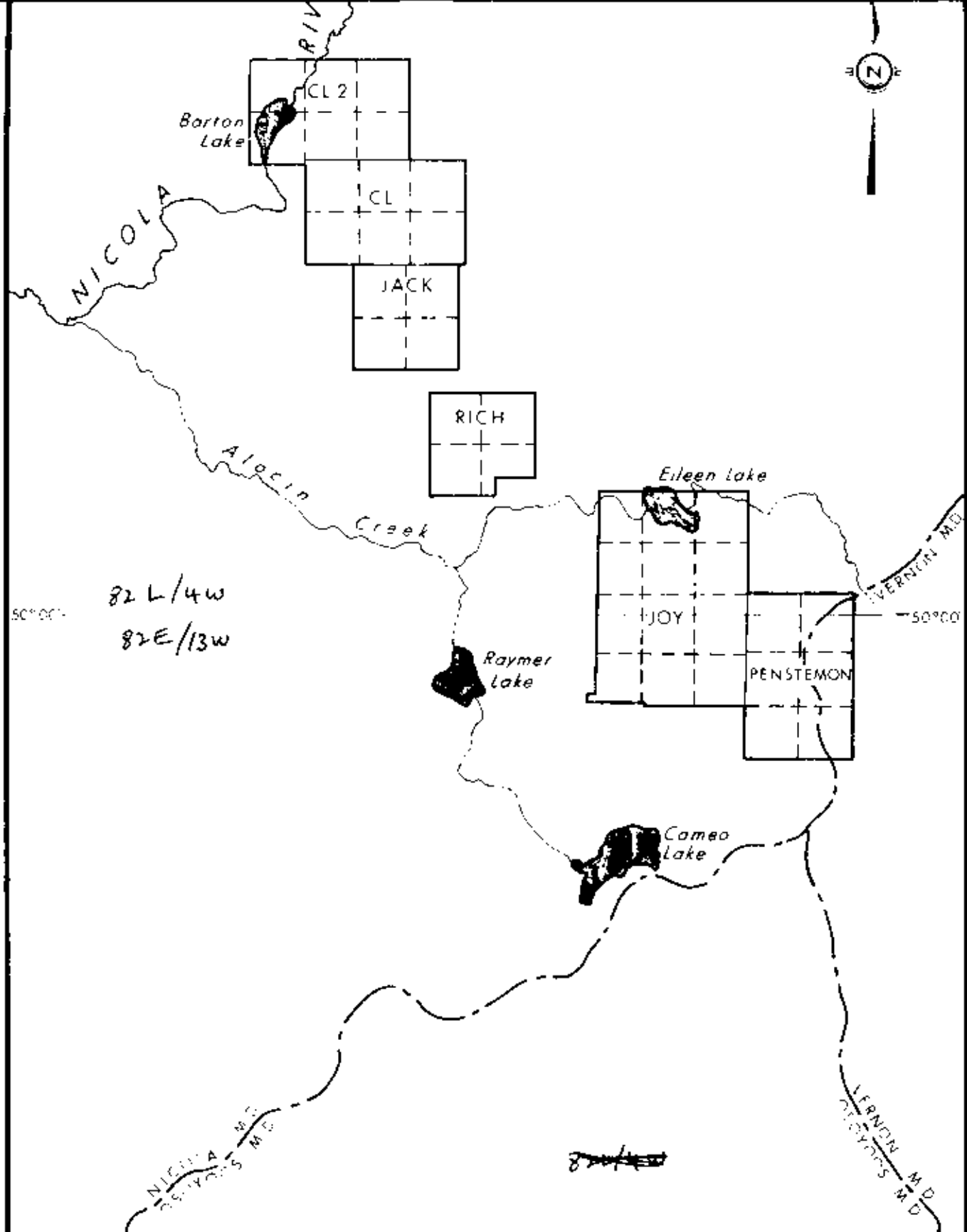
A. INTRODUCTION


1. Geography and Physiography

The subject claims are located on the upland plateau north west of Kelowna, British Columbia. Access to the area is gained by good gravel road beginning on the western shore of Okanagan Lake and travelling up the Lambly Creek valley to the property. In the vicinity of the claims, numerous logging roads provide access to most parts of the claims. The distance from Kelowna to the area of the claims is approximately forty kilometers.

The claim area is forested with good stands of fir and to a lesser degree, pine. The stands are not particularly dense which make traversing relatively simple.

The claims are situated at an elevation of about 1500 meters in a gently rolling topography. Relief would be about 200 meters. Between the rounded hills, slow moving, meandering streams and grassy swamps are generally present. Several lakes are also found within the U-shaped valleys.



 PAN OCEAN OIL LTD. CALGARY ALBERTA			
LOCATION OF MINERAL CLAIMS CAMEO CHROME PROJECT BRITISH COLUMBIA			
DATE	SCALE	NTS	DRAWING NO.
JUNE, 1978	1:5	82E/12, 13	A-0190

2. Property Definition, History and Economic Potential

This report deals with the lands consisting of B. C. Mineral Claims as follows:-

Name	Units	Recording Date	M.D.	Record No.	Tag No.
CL	6	July 12, 1977	Nicola	283	31779
CL2	6	July 12, 1977	Nicola	284	11129
Jack	4	July 12, 1977	Nicola	282	31778
Rich	4	June 27, 1977	Nicola	277	35572
Joy	12	July 14, 1977	Nicola	287	31777
Pensteman	6	June 30, 1977	Nicola/ Vernon	278	31776

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The claims were staked in May and June, 1977 by Raymond Hrkac and were recorded in June and July. In March, 1978, the claims were optioned from Mr. Hrkac by Pan Ocean Oil Ltd. of Calgary, Alberta. Under this agreement, Pan Ocean has agreed to fund and operate the exploration on these claims to earn 100% working interest.

The claims area are underlain in part by ultrabasics of the Old Dave Intrusions. It is known from other exploration that similar Old Dave ultrabasics near the subject claims are chromite-bearing. At present, no chromite is known to occur with the ultrabasics underlying the subject claims and no previous work is recorded.

3. Program Summary

Subsequent to optioning the claims, Pan Ocean examined various methods in an effort to determine a technique which could accurately locate the Old Dave intrusive dykes. As previous exploration by other parties indicated that the dykes had a strong magnetic signature, it was decided that a helicopter-mounted magnetometer survey could successfully map the position of the dykes.

Pan Ocean contracted the magnetic survey to Sander Geophysics of Ottawa, Ontario. On May 20th, 1978, a Sander crew, supervised by M. D. McInnis of Pan Ocean, flew approximately 186 kilometers of survey on lines spaced nominally at 200 meters. It is apparent from the results that the survey accurately located the position of the dykes.

B. GEOPHYSICAL SURVEY

The following report was submitted to Pan Ocean by Sander and contains the program and instrumentation particulars, the theory of operation and the results.

C. STATEMENT OF EXPENDITURES

Contract Charges-Sander Geophysics	
Mobilization of machine and equipment to survey area	\$1,500.00
For the first 100 miles	4,000.00
16 miles @ \$20.00/mile	<u>320.00</u>
TOTAL	<u>\$5,820.00</u>

REPORT ON THE
HELICOPTER-BORNE GEOPHYSICAL SURVEY
ON BEHALF OF
PAN OCEAN OIL LIMITED
IN THE
BARTON HILL AREA, BRITISH COLUMBIA

by

Erwin J. Ebner, Ph.D.

Peter A. Diorio

SANDER GEOPHYSICS LIMITED

KANATA

May 26, 1978

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Summary

A helicopter-borne magnetometer survey was conducted in the Barton Hill area, approximately 43 km northwest of Kelowna, B.C. The survey area is bordered in the south by Cameo Lake and Porcupine Lake and extends northwesterly to north of Old Dave Lake. The average width of the area is 3 km. The total magnetic field was measured using a Bell 476382 helicopter equipped with a Sander NPM-5 proton precession magnetometer. Survey altitude for the magnetometer was 35 metres. Traverse lines were flown in the east-west direction and control lines in the north-south direction. Line spacing was nominally 200 metres.

The results of the survey are shown in both profile and contour form. The data are dominated by several sets of anomalies which stand out in strong relief to the general background. These are characteristic of dike-like ultramafic features which are often enriched in magnetite as a result of serpentinization. Contacts between ultramafic rock and the surrounding country rock are clearly shown and should allow accurate delineation of these bodies when existing geological information is incorporated.

Introduction

A helicopter-borne magnetometer survey was flown in the Barton Hill area northwest of Kelowna, B.C. on May 20, 1978.

Pan Ocean Oil Limited is engaged in a chromium exploration program in this area. The current airborne survey was part of this program. It was the purpose of this magnetometer survey to outline accurately the formation of dikes and contact zones from the surrounding country rock, and to gain more information about the geology of the area.

Geology

It is not the intent of this report to discuss the local geology in detail. The geology (as well as the geomagnetic data) is dominated by the presence of ultramafic dikes cutting through surrounding chloritic schist and quartzite.

These dikes are clearly delineated by strong northwest-southeast trending anomalies. In several places, these dike-like features appear to have been displaced by northeast trending faults.

Access and Topography

The area is accessed from Kelowna, B.C. via West Bank mainly on gravel roads. Being part of the Okanagan Provincial Forest, the area is mostly wooded, flat and gently rolling land. Local trails permit easy access on foot to almost all of the survey area.

Technical Data

The survey was conducted along traverse lines in the east-west direction with an average line spacing of 200 m. Three control lines were flown in the north-south direction. The aircraft flew at an elevation of 60 m above the ground. The elevation was well maintained, however some slight deviation from this distance was unavoidable over the hills. The magnetometer "bird" was suspended 25 m below the aircraft, giving an average sensing height of 35 m.

A mosaic, produced from a National Air Photo Library aerial photograph blow up to a scale of 1:10,000, was used for navigation. Flight path recovery was facilitated by the use of 16 mm tracking film and carried out on the negative of the final base map.

Instrumentation

The instrumentation used in this survey is owned and operated by Sander Geophysics. The majority of the equipment is designed and manufactured by this Company.

The Bell 47G3B2 helicopter was equipped with a Sander NPM-5/2 proton precession magnetometer, a Sander SEM-4 Interface for digital and analogue data, a Sander ADR-11 digital cassette recorder, a Century 444 analogue chart recorder, a Sander CAM 4 - 16 mm camera (with a 5.6 mm super wide angle lens), a Honeywell HG 7605 4403 radar altimeter and a Bonzer TRN-70 radar altimeter.

Theory of Operation

The survey was conducted with a Sander NPM-5 proton precession magnetometer. This instrument records the total magnetic field to a resolution of 0.1 gamma and an accuracy matching this resolution. Every measurement lasted for 1.25 seconds and was recorded digitally twice in this interval and once in an analogue form.

To place readings on exact locations, every second reading is supported by 1 camera frame picture.

The sensor was suspended 25 m and the preamplifier 22 m underneath the aircraft. This way any heading error is avoided and no compensation of the data necessary.

No diurnal variations were recorded for this survey on our part. According to information gathered from the Geomagnetic Division of the Geological Survey of Canada, the period in which the survey was flown was diurnally quiet. To offset any diurnal variation, the three control lines were used to "level" the data on the contour map.

Data Processing

The following section of this report concerns itself with data processing in general.

After each flight, the analogue records were checked immediately for data quality. After the survey was completed, all raw data were checked on the survey site. The digital data were verified on a Sander Cassette reader. The survey film

was developed and pictures were quickly referenced against the mosaic to get a basic idea about the flight path.

Complete flight path recovery was carried out to the best possible detail in the head office in Ottawa. The flight path was recorded with a Sander 16 mm tracking camera. This camera is synchronized with the analogue and digital records by a fiducial code printed on the film and on both recording media. (See Appendix A.) All fiducial marks were transferred onto a negative from which the mosaic and the final base map were produced. Digitizing of the flight path was accomplished by the use of the Sander Digitizer which has a resolution of .1 mm. In this way, the coordinates of fiducial marks with their respective numbers and the line numbers were entered into the computer system. A second data stream was created by converting the digital field recordings into IBM compatible tapes. By using an identical code for line numbers, it was then possible to correlate the geophysical data with the flight path.

All data processing was accomplished on two Texas Instrument 980A computers and a Gerber Flatbed Table driven by an Intel SBC 80/20 Microprocessor.

Production of Magnetometer Maps

The magnetic maps were produced by using a cubic spline function to interpolate data between flight lines. This function was defined by utilizing the actual flight data and forming cubic splines across the lines. Data values were created for

each intersection point of a square grid, with a spacing of .1 inch. These data were then contoured by computer to an interval of 10 gammas.

In carrying out corrections, heavy reliance was placed on the control line data. The production of the map was a rather difficult one because the dynamic range of the survey is so large, having isolated and extremely strong anomalies as well as quiet zones.

In magnetometer contouring, it is customary to suppress contours where the gradient is very steep to prevent contour lines from running into each other. Contour values of 10, 50, 250 and 1000 gammas were chosen for this survey to express the gradients and anomalies on this map properly.

The profile map was plotted at a scale of 1000 gammas per inch, using a background of 57,000 gamma. Background means that on any particular flight line, the profile value found vertically above it is the magnetometer in 1000 gamma/inch + 57,000 gamma.

Results

The results of this survey are presented on two screened stable Cronaflex copies of the aerial photograph at a scale of 1:10,000.

The flight line plot is, of course, identical for both the contour and profile maps and generated by digitizing the recovered flight path, processing and plotting on the Gerber Flatbed Table.

The lowest contour lines on the map are 10 gammas (dashed lines), the next higher value contours are 50 gammas (solid lines of the same line weight as 10 gammas), the next higher contours are 250 gammas (medium line weight) and finally the 1000 gamma contours are plotted in heavy line weight. Contour values, put on by the computer, indicate the total magnetic field.

The profiles are plotted along the flight lines at a scale of 1000 gammas per inch. The total field value may be found by measuring the distance from any point on a flight line to the profile. The direction of measurement is taken normal to the average direction for the flight line. All profiles are offset by a background of 57,000 gammas.

Personnel

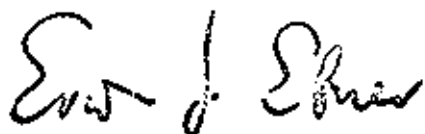
The survey was under the direction of Dr. Erwin J. Ebner, who planned the survey operation, conducted the survey and supervised the data processing.

Dr. Ebner, a graduate of the University of Innsbruck, Austria, joined Sander Geophysics in 1974 and has carried out and supervised many geophysical surveys, especially helicopter-borne magnetometer surveys and fixed-wing high resolution magnetometer surveys.

The survey helicopter was flown by Mr. Denis Ford. Mr. Ford is a senior pilot with Northern Mountain Helicopters Limited, Prince George, B.C.

Flight path recovery was carried out by Mr. Dan Maitland. Mr. Maitland, B.A., a graduate of the University of Ottawa, has extensive experience in flight path recovery and has proven his ability to trace a flight path as accurately as possible on many projects.

Data processing was done in Sander Geophysics' Computing Centre by Mr. Michael Giroux and Mr. Andrew Locke. Mr. Giroux, a graduate of Algonquin College, Ottawa, is the supervisor of computer operations and Mr. Locke, B.Sc., has several years of experience in processing magnetometer maps.



Erwin J. Ebner, Ph.D.



Peter A. Diorio, B.Sc.


Pan Ocean Oil Ltd.

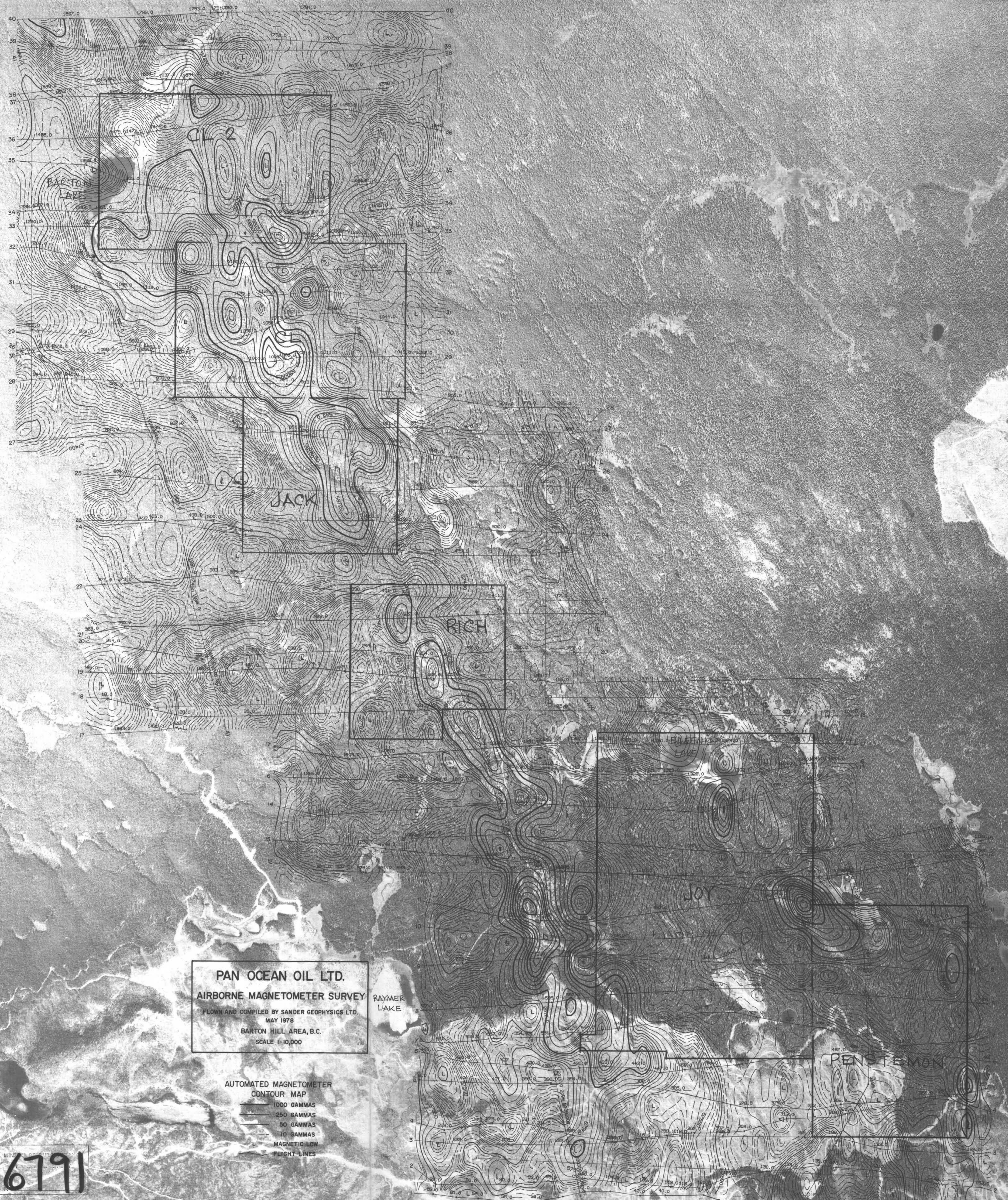
APPENDIX I

STATEMENT OF QUALIFICATIONS

I, Michael D. McInnis, state that:-

1. I am a 1969 graduate of the University of British Columbia with a B.Sc. degree in Honours Geology.
2. I have been actively and continuously engaged in the practice of mineral exploration in all parts of Canada for at least nine years.
3. I have successfully passed the required examinations for entrance into the Professional Engineer's Society of British Columbia, and currently hold a non-resident licence from that Society.
4. I have supervised the work carried out by Sander Geophysics which is the subject of this report.

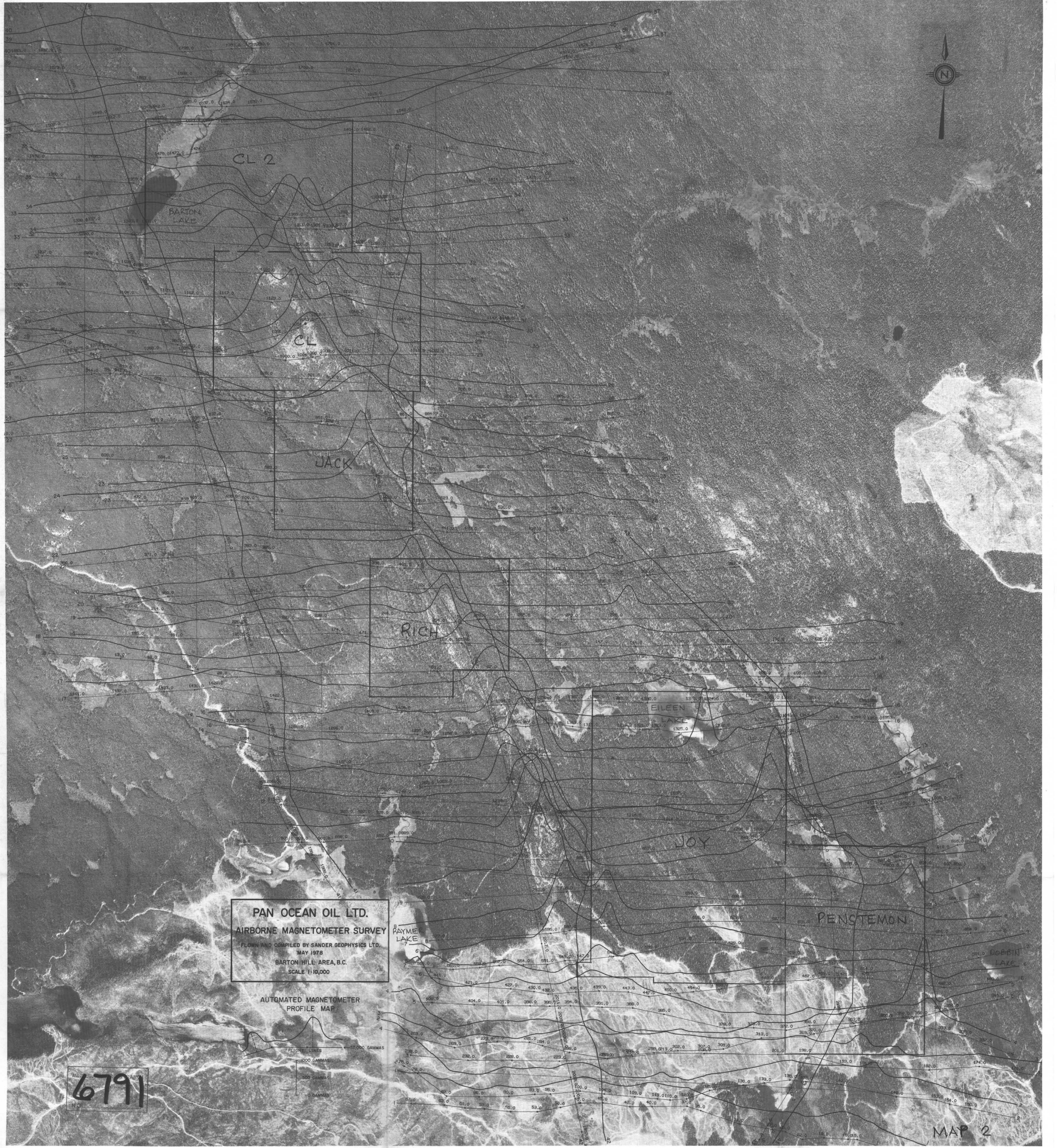

M. D. McInnis



PAN OCEAN OIL LTD.
AIRBORNE MAGNETOMETER SURVEY
FLOWN AND COMPILED BY SANDER GEOPHYSICS LTD.
MAY 1978
BARTON HILL AREA, B.C.
SCALE 1:10,000

AUTOMATED MAGNETOMETER
CONTOUR MAP
1000 GAMMAS
250 GAMMAS
50 GAMMAS
10 GAMMAS
MAGNETIC LOW
FLIGHT LINES

MIN
6791



PAN OCEAN OIL LTD.
AIRBORNE MAGNETOMETER SURVEY
FLOWN AND COMPILED BY SANDER GEOPHYSICS LTD.
MAY 1978
BARTON HILL AREA, B.C.
SCALE 1:10,000

AUTOMATED MAGNETOMETER
PROFILE MAP



6791

MAP 2