

206

REPORT ON AIRBORNE MAGNETOMETER
SURVEY IN NORTHWEST
TERRITORIES.
CARRIED OUT BY AEROMAGNETIC
SURVEYS LTD.

By

M. S. Reford.

Calgary, Alberta.
August 6, 1954.

CONTENTS

	<u>Page</u>
Introduction	1
Area of Survey	1
Method of Survey	2
Interpretation	4

TABLE OF ILLUSTRATIONS

Map of a Part of the Northwest Territories showing the Area covered by the Airborne Magnetometer Survey (Blocks 1 and 2).

* Twenty maps showing data obtained from Survey (16 of Block 1 and 4 of Block 2)

* 2 maps missing from this report covered areas in N. E. British Columbia.

INTRODUCTION

In July 1952, Socony-Vacuum Exploration Company entered into an agreement with the Aeromagnetic Surveys Ltd., to map with the airborne magnetometer a large area in the Northwest Territories, in the vicinity of Trout Lake, Fort Providence and the Liard River.

The purpose of this survey was to obtain magnetic data over a large area which could be used to interpret the geology on our former Permit Areas Nos. 300 to 321 in the Trout Lake area, Permit Areas 319 to 321 along the Liard River and areas 226 and 227 in the Bovie Lake area.

The Aeromagnetic Surveys Ltd., carried out the survey in July, August and September 1952 and the final maps were completed and delivered in December 1953.

The cost of this survey to Socony-Vacuum for preparing base maps from aerial photographs, flying the area and preparing the final magnetic maps, as attached herewith, was \$44,000.00. The Aeromagnetic Surveys Ltd., retained the copyright of the maps and original records of the information obtained and these can be sold to individual subscribers.

AREA

The Area covered by the airborne magnetometer instruments lies between latitudes 60° and 62° North and longitudes 117° and 124° west, and it contains approximately 15,229 square miles. The area

involved consists of two blocks; Block 1 contains 11,552 square miles, and Block 2 contains 3,677 square miles.

The total area included in the survey as shown outlined in green on the attached index map (Showing location of Blocks covered by Airborne Magnetometer Survey) Scale 1 inch - 16 miles.

METHOD OF SURVEY

The Magnetometer instrument mounted in the aeroplane was of the continuous recording type. It measured the total intensity of the earth magnetic field continuously on a profile while the aeroplane was in flight. The noise level from all extraneous sources did not exceed, plus or minus 1.5 gammas, and the resolution of the instruments was such that variations of 2.5 gammas were readable.

The magnetometer instruments can give satisfactory results only when the weather is fine and free from magnetic storms. In the northern country magnetic storms are often present even though the day may appear clear and fine and, as a result, much time was lost during the survey due to magnetic storms.

To ensure that profiles run during magnetic disturbances were not used, a ground monitor magnetometer was operated at the base camp whenever the airborne magnetometer was in use. When this instrument at camp recorded a magnetic disturbance, the profile run during this time was not used.

The blocks to be mapped were divided into three zones. This division was necessary because of the great differences in elevation

of the country. The aircraft was flown with a minimum ground clearance of 1000 feet and a maximum not excessive. Each zone was flown at a constant barometric altitude.

The zones with the altitude flown are as follows:-

1. Block 1 (Sheets 1 to 4) 123° - 124° W. 5500 feet.
2. Block 1 (Sheets 5 to 16) 120° - 123° W. 3500 feet.
3. Block 2 117° - 120° W. 2500 feet.

A network of overlapping control lines were flown along the perimeter of the above mentioned zones. These larger loops were broken down by tie lines flown in a north-south direction at about ten mile intervals. Finally the traverse lines were flown in an east-west direction at one and one half mile intervals. The control grid was so arranged that no point on any profile would be more than five miles from a magnetic control line. The control and flight lines are shown on the attached magnetometer maps as fine dashed lines.

Base maps were prepared from aerial photographs on a scale of one inch to one mile showing culture and drainage. The flight lines were located by means of photographs of the ground taken simultaneously with the magnetic profiles.

After the flights were completed the magnetic values as recorded on the magnetic profiles were transferred to the one mile to one inch maps. In transferring these values an arbitrary datum intensity was assumed. A correction for the normal regional magnetic intensity was applied. A further correction was made for the diurnal variation (magnetic changes due to minor magnetic storms). Having

applied these corrections to any magnetic profile, the points where magnetic values were exactly divisible by ten were marked on the profiles. These contour intersections were transferred to the maps and joined smoothly to produce contours at ten gamma intervals and these contours are shown on the attached final maps.

INTERPRETATION -

From $120^{\circ} 30'$ W. to the western limit of the survey the magnetic maps show a relatively flat area disturbed by two large maximum features at the join of sheets 3 and 4, and on sheet 8. Roughly along the meridian 121° W. the magnetic values rise to the east and a series of maximum and minimum axis develop; those striking N.W.-SE on sheet 13 and in the N.E. quarter of sheet 15 are particularly well developed. From 120° W. eastward, in Block 2, the map shows considerable magnetic relief, and maximum and minimum features alternate without forming many well marked trends.

We question the reliability of some of the small sharp magnetic anomalies shown in Block 1. Some of these probably result from near-surface magnetic effects with the added possibility of spurious variations caused by turbulence of the air or the magnetic field.

Respectfully submitted,



J. Spivak,
Professional Engineer,
Alberta.

by.

M. S. Reford.

124 "O

123°oo

122-00

121000

120°00'

119°00'

118°00'

117° 00'

1

114

BLOCK No.

NORTHWES

TERRITORIES

ES BLOCK No.2

5. Nahanni

TISH

COLUMBIA

ALBERTA

INDEX MAP
SHOWING LOCATION OF
BLOCKS COVERED BY
AIRBORNE MAGNETOMETER SURVEY

SCALE: 1 INCH = 16 MILES