

Canada Oil and Gas Lands  
Administration  
Administration du pétrole et du gaz  
des terres du Canada

19 1989

Resource Evaluation Branch  
Direction de l'évaluation des  
Ressources

Project #

PROJECT ACTION SHEET

RESOURCE EVALUATION BRANCH

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9229-C4-5E

COMPANY:

CHEVRON CANADA RESOURCES

REPORT TITLE:

1988 GEOPHYSICAL REPORT

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REVIEW AND APPROVAL MADE BY:

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\*\*\*\*RETURN APPROVED REPORTS TO MIKE McLINTON\*\*\*\*\*

COMMENTS:

3 COPIES OF REPORT + MAP.

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1988 GEOPHYSICAL REPORT

PROGRAM 9229-C4-5E

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TABLE OF CONTENTS

	<u>Page</u>
Foreward	3
Introduction	4
List of Figures and Enclosures	5
Program Description	6
Gravity Data Acquisition	7
Surveying	8
Gravity Data Reductions	9
Interpretation	10

FOREWARD

This geophysical report is the final component of program number 9229-C4-5E. A previous report including geophysical programs 9229-C4-3E, 9229-C4-4E and 9229-C4-5E, dated 1989-04-01, did not include the Fawn Lake gravity survey (9229-C4-5E). Therefore, this report should be considered as an addendum to the April submission.

INTRODUCTION

Chevron Canada Resources conducted a gravity survey over an outcropping Middle Devonian reef in the Northwest Territories, Canada during September 1988. This reef is the Horn Plateau Formation and lies near Fawn Lake approximately 175 km west of Yellowknife. A total of 711 gravity stations were collected along 7 radial cutlines, 1 off-centered cutline and 1 circular outline around the periphery of the outcrop edge. The station spacing was every 50 m along the cutlines. The object of the survey was to determine if the reef produced a recognizable gravitational response.

LIST OF FIGURES AND ENCLOSURES

Figure 1      Survey Location Map

Enclosure 1    1:10 000 Bouguer and Station Location Map

PROGRAM DESCRIPTION

Program Number: 9229-C4-5E  
Type of Survey: Gravity  
Period of Data Acquisition: 88-09-16 to 88-09-27  
Survey Area: 62° 06' - 69° 09' N  
                  117° 39' - 117° 44' W  
                  (Figure 1)  
Operator: Chevron Canada Resources  
                  (gravity data acquisition)  
  
                  Chevron Exploration and  
                  Production Services (gravity data  
                  reductions)  
  
Airborne Resource Developments Ltd.  
(Consultants)  
  
Macdonald Seismic Services Ltd.  
(Consultants)

GRAVITY DATA ACQUISITION

Production Summary

<u>Dates</u>	<u>Description</u>
1988-09-16 to 1988-09-27	711 gravity stations acquired on 9 cutlines at a 50 m station interval (Enclosure 1).

The gravity data were not tied to the federal government network since no federal gravity bases were near the survey area.

Base of Operations

A temporary tent camp was established at the intersection of cutlines 1, 3, 5 and 6. This intersection also functioned as a gravity and survey base station.

Mobilization

Mobilization to the survey area was by helicopter from Yellowknife, N.W.T. Transportation along the cutlines was conducted by foot from the tent camp.

Personnel

The total number of personnel including office staff in Fort Good Hope was 10 people. This included 6 field and 2 office workers who were native residents at Fort Good Hope. There were also 2 non-native field supervisors.

Equipment

2 LaCoste and Romberg Model G gravity meters.

SURVEYING

A federal government survey benchmark was not available in the general area, therefore, an approximate coordinate and elevation was taken from a 1:250 000 NTS map. An elevation of 228 m was assigned to the temporary base at the intersection of lines 1, 3, 5 and 6. Positions for all gravity stations were referenced to the base using conventional transit survey methods. The maximum error associated with these EDM techniques is  $\pm$  0.5 m vertical.

GRAVITY DATA REDUCTIONS

All gravity data have been reduced with a Bouguer density of 2.30 g/cm<sup>3</sup> corresponding to an effective average density of surface glacial drift and near-surface Devonian shales. Inner terrain corrections were computed in the field using Hammer charts but were not incorporated into the Bouguer values because they were considered inaccurate. However, an elevation model was used to calculate inner terrain corrections for zones C and D (17-170 m) in the office. Terrain effects beyond zone D were negligible.

INTERPRETATION

Formation Densities

Stratigraphy	Density (g/cc)
Devonian - Ft. Simpson Formation	2.40
- Horn Plateau Formation	2.50
- Lonely Bay Formation	2.67

Geology

The Horn Plateau Formation is a Middle Devonian limestone reef that conformably overlies the Lonely Bay Formation and is encased by shales of the Ft. Simpson Formation in the subsurface. At Fawn Lake, the Horn Plateau reef has an exposed diameter of 650 m with a total reef width of approximately 1300 metres. These rock units are components of the Great Slave shelf of the Northwest Territories.

Maps

The enclosed Bouguer Anomaly Map illustrates 9 cutlines with 50 m station spacings. Cutline 9 approximates the circular diameter of the outcropping reef. Total reef width is about twice the diameter of cutline 9.

Gravity

The Bouguer data presented in figure 1 have not been tied to the federal gravity network but are internally consistent. The Bouguer Anomaly Map portrays the strike of the gravity field to be NE-SW. The linear trend of the Bouguer data is indicated by the paralleling of line 5 and the 83.0 mgal contour. Departures from the planar characteristics of the data are evident in the northeast and northwest areas of the map.

Bouguer contours in the northeast region alter their orientation from a northeast to an easterly direction. Toward the northwest, the decreasing Bouguer values show reversal and increase in the far northwest corner. Both of these anomalous features can be attributed to deep effects. The steepening gradients along the east-central map edge are likely computer artifacts resulting from a lack of gravity data.

Gravity data near the reef outcrop show high frequency undulations reflected by the 83.0 contour. These subtle effects are likely caused by an erroneous Bouguer density or uncompensated topographic effects in zone B caused by outcropping topography.

