







SEISMOGRAPH SURVEY

OF THE

COLVILLE LAKE AREA, N.W.T.


52-6-6-6
FOR



ASHLAND OIL CANADA LTD.

CALGARY, ALBERTA

JANUARY, 1974

PERMITS: 6180-6183, 6340-6348, 6351, 6352


PROJECT NO 52-6-6-73-1

Work carried out by G.S.I. Party 489 for Sigma Explorations
Ltd. acting for Ashland Oil Canada Ltd. March 1973

BY

COMER & WILSON LTD.

GEOPHYSICAL CONSULTANTS

CALGARY, ALBERTA

TABLE OF CONTENTS

	Page
I WRITTEN REPORT	
Introduction	1
Field Operations	1
Data Processing	1
Interpretation	2
Conclusions	3
II MAPS (In Pocket) Scale 1" = 2 miles	
1. Time Structure Map - Base Paleozoic Carbonates	
2. Time Structure Map - Precambrian	
3. Isochron - Base Paleozoic Carbonates to Precambrian	
NOTE: Elevation Map is in Gravity Report	

INTRODUCTION

This report includes the interpretation of all data received up to the present time. Most of the data was obtained through a participation survey conducted by Sigma Explorations Ltd. during the winters of 1970-1971, 1971-1972 and 1972-1973. Additional detail lines were shot during 1972-1973 by Sigma as operator for the exclusive use of Ashland. This report covers specifically the field operations for these detail lines.

FIELD OPERATIONS

Lines 1, 2, 3 and G.S.I. 8 were the lines shot for Ashland by G.S.I. Party 489 during March 1973. This was a conventional dynamite crew using the following parameters:

Instruments	DFS-3, 48 trace
Spread	5280-220-220-5280
Shotpoint Spacing	660'
Station Spacing	220'
Stack	800%
Charge	10#
Hole Depth	60'
Geophones	9 @ 27'

DATA PROCESSING

Data were processed by G.S.I. in Calgary using a normal processing sequence including deconvolution. Structural sections were prepared corrected to a datum of +1,000' ASL with a correction velocity of 18,000'/sec.

INTERPRETATION

Three maps are submitted:

1. Time Structure Map - Base Paleozoic Carbonates
2. Time Structure Map - Precambrian
3. Isochron Map - Base Paleozoic Carbonates to Precambrian

Underneath a thin layer of surficial material, Devonian Carbonates outcrop over the whole area. Thus the first correlative event is at the base of this thick (3,000' \pm) carbonate section (which also includes Silurian and Ordovician). The Cambrian section is generally clastics with some salt included. The top of the Precambrian is picked on the basis of a fairly good reflection with distinct unconformable beds below. Strong seismic events indicate that this Precambrian sedimentary section is many thousand feet thick. In general, data quality is fair and the maps are considered reliable.

The area is characterized by long stretches of line with very little structural relief except for small high angle faults. In the south two wells have been drilled on strong surface features, however we do not have a direct seismic tie to the Mobil Bellot Hills M-63 test so that the surface-seismic relationship has not been established.

Line 6 is down the axis of the Colville surface feature and is broken into numerous small blocks. Correlation across all these faults is questionable. A major east-west fault is noted on Line 21 at the intersection of Line 6 and probably controls the south boundary of this structure. The data which ties to the Union Colville D-45 test in the southeast is poor.

The most interesting structural anomaly was noted originally on Line 26 in the northwest corner of the area and was the reason for adding the detail shooting. The final interpretation shows a closed structure bounded on the west by a fault with a maximum of 0.100 secs. (900') throw, and dip closure to the

north and east of 0.140 secs. (1,260'). We have proven 0.080 secs. (720') south dip but would anticipate the same amount of closure as to the north and east.

The isochron map over this structure shows approximately 0.035 secs. thinning. There are two possible geological explanations:

1. The structural deformation has taken place post-Devonian, causing the salt to be squeezed out of the Cambrian section over the structure.
2. The Paleozoic section is draped over an existing basement high.

The remainder of the isochron map is featureless except for some variations on the most southerly line.

CONCLUSIONS

A structure with approximately 1,000' of closure has been mapped in the northwest section of the area. A test should be located at SP 17 on line G.S.I.
8. If this test is encouraging further seismic will be necessary to explore the remainder of the blocks.

Respectfully submitted,
COMER & WILSON LTD.

R.L. Comer
R.L. Comer P. Geoph.