



PROJECT ACTION SHEET

RESOURCE EVALUATION BRANCH

PROJECT NUMBER: 9229-C4-8B

COMPANY: CHEVRON CANADA

REPORT TITLE: FORT GOOD HOPE JOINT VENTURE

The following action has been taken:

Receipt acknowledged: YES DEC 20/84

Reports and maps date-stamped: "

Reports for review list edited: "

Inventory sheet made: "

Mylar: YES

Feb 90

REVIEW AND APPROVAL MADE BY: _____

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

COMMENTS: 3 COPIES REPORTS + MAPS

2 COPIES OF PAPER SECTIONS

1 SET OF MYLAR ONE DIGITAL TAPE.

Map on Nahanni
Map on Pre Cambrian Unconformity

TEAM NUMBER 9229 C4-8E AREA FORT GOOD HOPE

YEAR 88/89 E.A. 322

WELL NUMBER? SAME

REPORTS

OPERATIONS REPORT:

CHEVRON/FORT GOOD HOPE JOINT VENTURE
1988/89 GEOPHYSICAL REPORT

NUMBER 1

INTERPRETATION REPORT:

NUMBER

- COMBINED

MAPS

SHOTPOINT MAPS

NUMBER 2

- 1988-1989 SEASON

- MAGNETIC TAPE of DIGITAL SHOT POINT INFORMATION

INTERPRETATION

NUMBER 5

- KEE SCARP TIME PICK (MSEC)
- KEE SCARP TO NAHANNI TIME INTERVAL (MSEC)
- STRUCTURE ON THE KEE SCARP HORIZON (DEPTH BELOW 400 METER DEPTH)
- GILMORE LAKE TIME PICK (MSEC) CHARACTER ANOMALY
- IMPERIAL CLINOFORM TIME PICK (MSEC)
- FORT GOOD HOPE (NAHANNI) TIME PICK (MSEC)

LINE 16XA

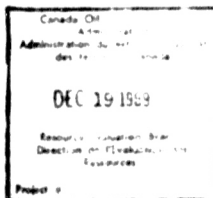
NUMBER 1

SECTIONS	MIGRATED	SECTIONS	NUMBER
2	20XA(2)	56XA	66XA
4B	24	57	66XB
7XB	26	58XA	68B
10A	30	60X	69Y
10B	32X	60XB	72XP
12X	33	61	73X
14	38X	61B	73XA
14X	40XA	62X(2)	73Y
14XA	44XB	62XB	75Y
14XB	46X	63B	75YA
16X	48X	63R	77Y
16XA(2)	51B	64XB	79
16X	52X	65B	79X
16XA	54XB	66X(2)	83X
			83Y
			85
			85Y(2)
			89Y
			97Y(2)
			105Y(2)

9 2 2 9 - 0 4 - 8 E

CHEVRON/FORT GOOD HOPE JOINT VENTURE

1988/89 GEOPHYSICAL REPORT



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TABLE OF CONTENTS

	Page
Abstract	2
List of Enclosures	3
List of Figures	3
Program Description	4
Statistical Summary	6
Field Procedures	9
Seismic Data Processing	11
Interpretation Notes	12

ABSTRACT

The Chevron/Fort Good Hope Joint Venture land parcel is located in the Mackenzie Valley approximately 90 km northwest of Norman Wells (Figure 1). This report covers the seismic operations in the second year of the initial four year exploration agreement. The objectives of the 1988/89 seismic program were:

- 1) to infill and expand on the regional seismic grid collected in the first year.
- 2) to detail anomalies identified on previously collected seismic data.

LIST OF ENCLOSURES

- Enclosure 1 - 1:100 000 Shot Point Base Map
- Enclosure 2 - One magnetic tape with digital Shot Point information
- Enclosure 3 - 70 Migrated Seismic Sections
- Enclosure 4 - Line 16XA with interpreted horizons and velocity information
- Enclosure 5 - Time Structure Map on the Kee Scarp (scale = 1:100 000)
- Enclosure 6 - Time Interval Map from Kee Scarp to Nahanni (scale = 1:100 000)
- Enclosure 7 - Structure Map on Kee Scarp (scale = 1:37 500)
- Enclosure 8 - Time Structure Map on Gilmore Lake Character Anomaly
(scale = 1:100 000)
- Enclosure 9 - Time Structure Map on Imperial Clinoform Character Anomaly
(scale = 1:100 000)

LIST OF FIGURES

- Figure 1 Landblock Location Map
- Figure 2 Joint Venture Exploration Area
- Figure 3 2000% Recording Parameters
- Figure 4 3000% Recording Parameters

PROGRAM DESCRIPTION

Program Number: 9229-C4-8E

Type of Survey: Reflection CDP Seismic, Dynamite Source

Period of Field Operation: 1988-11-15 to 1989-04-11

Locality of Work: West of Mackenzie River near Fort Good Hope, N.W.T.
65° 26' N to 66° 12' N
128° 36' W to 130° 15' W
(locality maps attached. See figures 1 and 2)

Interest Holders: Chevron Canada Resources
Community of Fort Good Hope

Program Operator: Chevron Canada Resources

Contractors:

- Chevron Exploration and Production Services (seismic data acquisition)
 - Sub-contractors: - Carn Construction (bulldozing)
 - Pearson Construction (bulldozing)
 - Sans Sault Construction (bulldozing)
 - Hugh Denham Corporation (drilling)
- Western Geophysical Company (seismic data acquisition and drilling)
 - Sub-contractors: - Borek Construction (bulldozing)
- Tue Ni Li Company Ltd. (Northern contract labour company)
- Star Tech Incorporated Ltd. (surveying and gravity data acquisition under Program #9229-C4-7E)
- Polar Nights Ltd. (slashing)
- J.R.D. Construction (heavy equipment for Base Camp)
- Park Ambulance Service (medics)
- Canadian Helicopters (helicopter support)
- Norwell Food Services (catering)

- Kor Industries (expediting in Norman Wells)
- Little Dipper Cartage (expediting in Ft. Good Hope and a pick-up truck at Base Camp)
- MATCO Transportation (trucking - Norman Wells to Edmonton)
- Westcan Distributing (expediting in Edmonton)

STATISTICAL SUMMARY

Significant Dates:

<u>Date</u>	<u>Operation</u>
November 15	Western advance personnel mobilize to Base Camp
November 17	Seismic Land Use Permit N88B022 received
November 20	Western starts line clearing and surveying
November 25	Western starts drilling
December 17	Shut down and demobilization for Christmas break
December 28	Mobilization of Western line clearing personnel and surveyors
December 29	Western resumes line clearing and surveying
December 30	Chevron surveyors start work
December 31	Western starts recording (south of Base Camp on line 20XA)
January 2	First camp (Chevron Cat Camp) crosses the Mountain River; Chevron starts line clearing operations
January 4	Western resumes drilling; Chevron starts drilling
January 6	Western Cat Camp crosses the Mountain River
January 10	First camp (Western Cat Camp) crosses the Hume River
January 15	Chevron starts recording (line 26)
January 20	Chevron Recording Camp moves north across the Mountain River
February 2	Western Recording Camp moves north across the Mountain River
March 21	Western finishes clearing line
March 24	Western surveyors finish field work
March 25	Western finished drilling
March 30	Chevron recording camp moves south across the Mountain River
March 31	Western completes recording; Last camp (Western Recording Camp) moves south across the Mountain River

April 1	Last active Western Camp (Recording Camp) shut down and parked at Base Camp
April 2	Last of Western personnel flown south from Base Camp
April 5	Chevron finishes cutting line
April 6	Chevron surveyors finish field work; Chevron completes drilling
April 7	Last shot fired - Chevron completes recording
April 8	Last active camp (Chevron Recording Camp) moved to Base Camp
April 11	Last of Chevron personnel flown south from Base Camp

Number of Personnel:

Approximately 50 field personnel were employed daily during November and December 1988.
An average of 140 field personnel were employed daily from January through April 1989.

Production Data:

<u>Crew</u>	<u>Production</u>	<u>Days Worked*</u>
Western 367	600.71 km 11920 shot points	91
Chevron 6	<u>730.38 km</u> <u>13362 shot points</u>	<u>83</u>
Totals	1331.09 km 25282 shot points	174

* Total number of days worked by the recording crews.

Average Daily Production - 7.65 km/day
145 shots/day

Production Notes:

The recording crews did not experience any significant down time. There were, however, other factors which had a negative effect on production:

- Heavy snowfalls in November created a thick blanket of snow which slowed the entry of frost into the ground.
- The abundance of lakes and swamps in the northern part of the Prospect forced Western to make many detours along the lines in this area.
- Difficult drilling conditions near the Mountain River delayed the progress of the drill crews.

FIELD PROCEDURES AND RECORDING EQUIPMENT

Surveying:

Survey Monuments:

- Global Positioning System (GPS) targets surveyed using a Trimble GPS meter (model #4000, single frequency)
- horizontal accuracy and repeatability of ± 0.1 m
- vertical accuracy and repeatability of ± 0.5 m

Seismic Survey System:

- standard EDM survey equipment
- vertical accuracy of ± 0.5 m
- horizontal accuracy of ± 5 m

Recording Equipment:

Recording System:

- Both Chevron 6 and Western 367 used the Texas Instruments DFS-V with 120 channels and a 2 ms sample rate

Geophones:

- 9 geophones per group
- all geophones had winter bases
- Western 367 used Mark Products geophones (Model #1011) with a resonant frequency of 14 Hz
- Chevron 6 used Geosource geophones (Model #SM7) with a resonant frequency of 30 Hz

Recording Parameters:

All recording was done using a dynamite source at 120 group split spread, a 20 m group interval, and a far offset of 1210 m. Single hole shot points were drilled between groups at intervals of either 60 m (for 2000% coverage) or 40 m (for 3000% coverage). Detailed parameter sheets are attached as Figures 3 and 4.

SEISMIC DATA PROCESSING

The standard processing flow for all lines included the following:

- 1) EDIT - geometry assignment
- 2) WAVPLY - instrument dephase
- 3) AMPCOR - amplitude correction
- 4) DECON - spiking deconvolution
- 5) UPSHOT - field statics
- 6) CALFIL - spectral whitening
- 7) ASKHST - residual statics
- 8) NMOR - normal moveout removal
- 9) MUTE - first break removal
- 10) STACK - CDP stack
- 11) FILTER - bandpass filter
- 12) SCALE - constant amplitude adjustment
- 13) COHPIC - coherency enhancement
- 14) TAPERS - amplitude equalization
- 15) REDATM - migration

Copies of all migrated sections are included with this report (Enclosure 3).

INTERPRETATION NOTES

The seismic maps enclosed with this report include data recorded by Chevron from December 1987 to April 1989 and data purchased by Chevron as part of the 1984/85 Sigma participation survey. The Sigma group shoot information has been included to give a more continuous grid of coverage.

The seismic coverage on the land block extends only as far south as the north side of the Imperial Hills.

Seismic Markers

The seismic correlations used for this portion of the report are illustrated on the representative regional dip line 16XA included as Enclosure 4. This is a 2000% dynamite line which extends from the Mackenzie River in the northeast, to the edge of the landblock in the southwest. The interpreted section highlights the main horizons of interest, the approximate interval velocities throughout the immediate area, and is a good example of the various data qualities encountered across the block.

The Middle Cretaceous Marker (red) is simply a correlated seismic reflection which has not been tied directly to any well data. This marker is used primarily as a velocity change boundary for migration and depth conversion.

The Imperial Marker (yellow) is an unconformity surface which marks the base of the Cretaceous section and top of the middle Devonian Imperial Formation. This pick can, in most cases, be clearly seen to the west as an unconformity; however, to the east the boundary becomes much more difficult to resolve. The complications in picking the Imperial are due to the small acoustic impedance contrast at this level and the shallow depth of the horizon.

The Kee Scarp Marker (blue) is a strong continuous event over most of the landblock. Correlation of the Kee Scarp seismic event is very difficult when it has been faulted and/or is very shallow.

The Nahanni Marker (purple) is also a strong continuous event over most of the landblock. Correlation of the Nahanni event is also difficult in areas where it has been faulted and/or is very shallow.

The Saline River Marker (pink) is a clear strong reflection to the east but weakens and disappears to the west. The presence or absence of a reflection at this horizon level may be related to the presence or absence of low velocity salt in the Saline River.

The Basal Cambrian Marker (green) is interpreted as the unconformity at the top of the disturbed Proterozoic section. The quality of this reflection event varies considerably over the survey area.

Time to Depth Conversion

The interval velocities used for the time to depth conversion are:

Surface to Middle Cretaceous	3 200 m/sec
Middle Cretaceous to Imperial	3 505 m/sec
Imperial to Kee Scarp	4 265 m/sec
Kee Scarp to Nahanni	5 485 m/sec
Nahanni to Saline River	6 185 m/sec
Saline River to Basal Cambrian	4 265 m/sec
Basal Cambrian to end of section	6 400 m/sec

These interval velocities were arrived at through the averaging of available sonic log velocity data from wells in the area.

Kee Scarp Time Structure Map (Enclosure 5)

The main features of interest on the time structure map of the Kee Scarp are located in the southern part of the block near the Mountain River. The map shows a large anticlinal trend commonly referred to as the Whirlpool Anticline. This trend runs northeast-southwest from the East Mountain outcrop to West Mountain, and southwest to the Whirlpool #1 and Hume River L-09 wells.

Northwest of the Whirlpool trend is what appears to be a separate high centered near the intersection of lines 63 and 22B. Data quality towards the eastern side of this high is poor which makes it difficult to confirm whether it is a separate closed feature or not.

Two other structural features can be mapped north of the Mountain River; however, the data quality between the eastern landblock boundary and the Mackenzie River is generally poor.

Kee Scarp to Nahanni Time Interval Map (Enclosure 6)

Time interval mapping is most reliable in the areas which are unaffected by large thrust structures. In the highly faulted regions or where data quality is poor, time interval mapping is subject to errors.

In the undisturbed areas over most of the landblock the Kee Scarp to Nahanni time interval shows little variation. To the east, however, towards the A-53, D-05 and O-53 wells there is a thickening of the Kee Scarp to Nahanni interval which may represent the buildup of the Kee Scarp Mountain River reef.

Kee Scarp Structure Map (Enclosure 7)

The Kee Scarp structure map was created using depths derived from depth migrated seismic sections. This map shows the same features which were described in the discussion on the Kee Scarp Time Structure Map. Structure contours were used to determine depths to the Kee Scarp and to get the most accurate possible estimate of the area of structural closure.

Gilmore Lake Character Anomaly/Time Structure Map (Enclosure 8)

The Gilmore Lake Character Anomaly map illustrates the areal extent of a high amplitude seismic event at the pre-Cretaceous unconformity. This event is interpreted to be low velocity clastics of the Cretaceous Gilmore Lake formation. The time structure contours indicate the structural relief on this character anomaly.

Imperial Clinoform Character Anomaly/Time Structure Map (Enclosure 9)

The Imperial Clinoform Character Anomaly map illustrates the areal extent of a high amplitude seismic event at the pre-Cretaceous unconformity. This event is interpreted to be either low velocity clastics or carbonates of the Devonian Imperial formation. The time structure contours indicate the structural relief on this character anomaly.

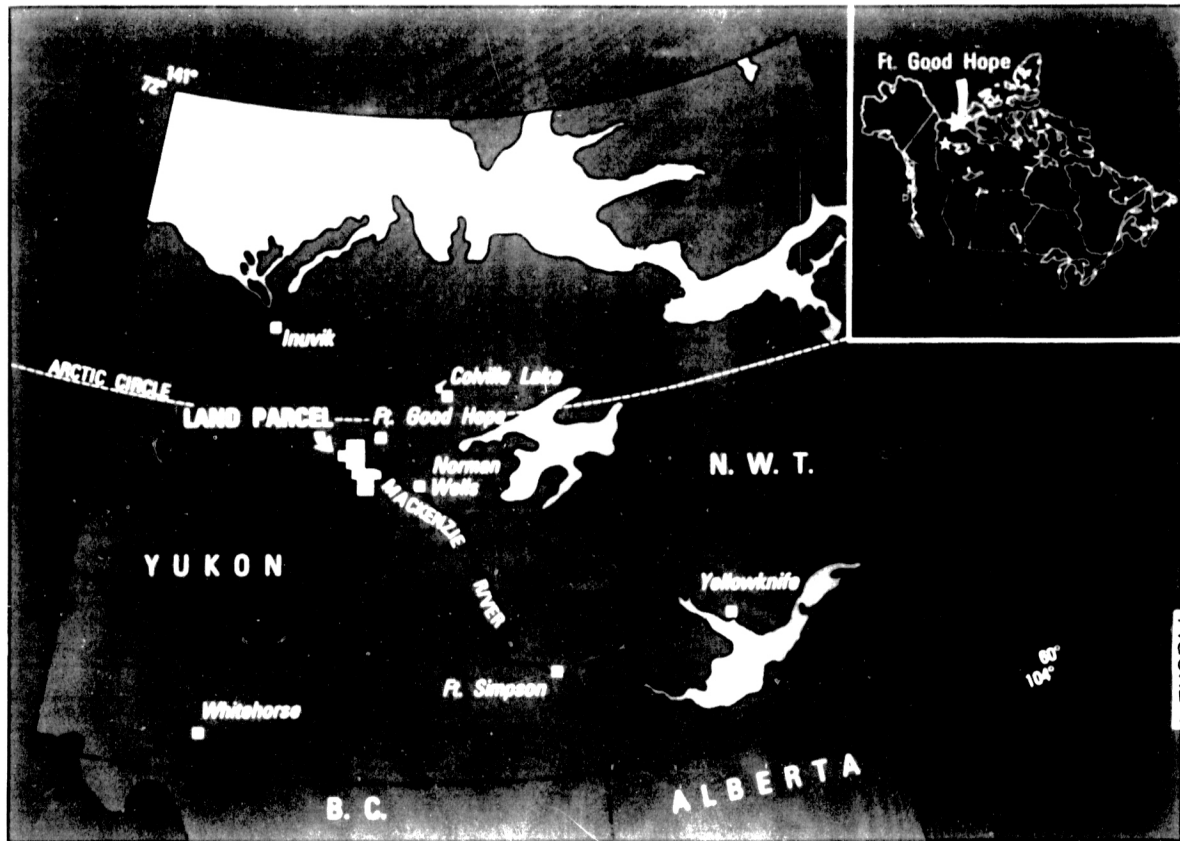
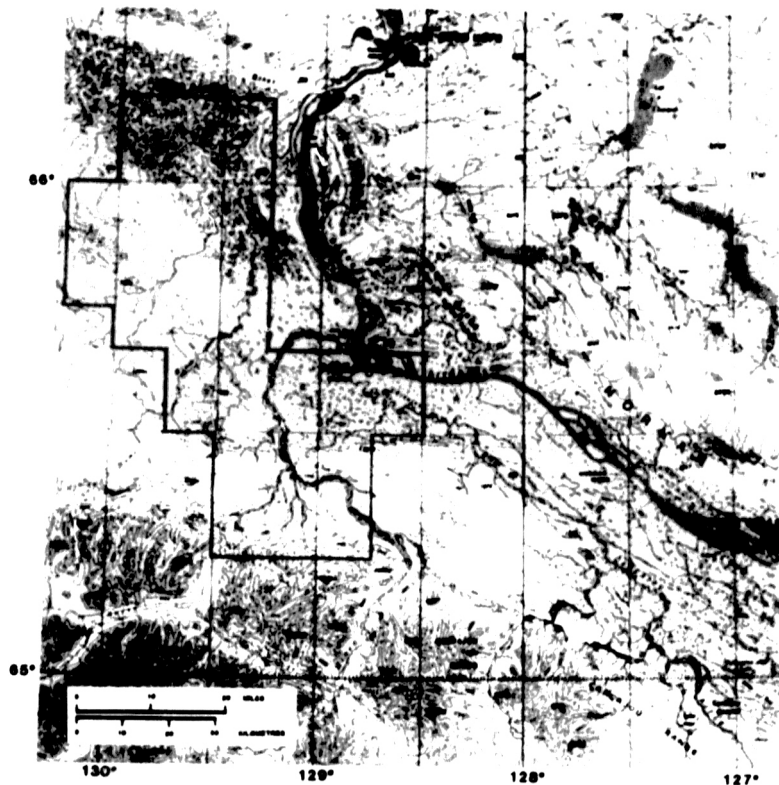


FIGURE 1

JOINT VENTURE EXPLORATION AREA



REVISED

SHOOTING PARAMETERSDATE JAN. 11, 1989PROSPECT FORT GOOD HOPECOVERAGE 2000 %SPREAD PARAMETERS

No. OF TRACES 120
 GROUP INTERVAL 20 m
 SHOT POINT INTERVAL 60 m
 MIN. OFFSET TO CENTRE OF NEAR GROUP 30 m
 MAX. OFFSET TO CENTRE OF FAR GROUP 1210 m
 SPLIT SPREAD OR END ON SPLIT
 No. GEOPHONES/GROUP 9
 GEOPHONE SPACING 222 m
 SPREAD DIAGRAM

SHOT PARAMETERS

No. OF HOLES 1
 TOTAL PATTERN LENGTH N/A
 HOLE SPACING N/A
 HOLE DEPTH 10 m
 CHARGE SIZE 2 kg
 SHOT POINT LOCATION Between stations

RECORDING PARAMETERS

FILTERS LOW CUT 12 Hz SLOPE 18 dB/octave
 FILTERS HIGH CUT 128 Hz / 12 dB/octave
 SAMPLE INTERVAL 2 msec
 RECORD LENGTH 4 sec

COMMENTS NOTCH OUT

SHOOTING PARAMETERS

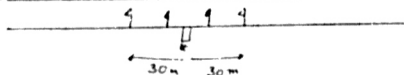
DATE Oct 23, 1983PROSPECT For Good HopeCOVERAGE 3000 %

SPREAD PARAMETERS

No. OF TRACES 120GROUP INTERVAL 20 mSHOT POINT INTERVAL 40 mMIN. OFFSET TO CENTRE OF NEAR GROUP 30 mMAX. OFFSET TO CENTRE OF FAR GROUP 1210 mSPLIT SPREAD OR END ON SPLITNo. GEOPHONES/GROUP 9GEOPHONE SPACING 220 m

SPREAD DIAGRAM

SHOT PARAMETERS

No. OF HOLES 1TOTAL PATTERN LENGTH N/AHOLE SPACING N/AHOLE DEPTH 10mCHARGE SIZE 2 KgSHOT POINT LOCATION Between stations

RECORDING PARAMETERS

FILTERS LOW CUT 12 Hz SLOPE 18 dB/octaveFILTERS HIGH CUT 128 Hz / 72 dB/octaveSAMPLE INTERVAL 2 msecRECORD LENGTH 4 secCOMMENTS NOTCH OUT