

PETRO-CANADA

N. CAMERON HILLS C-24

9211-P28-4-1



Canada Oil and Gas
Lands Administration

Administration du pétrole
et du gaz des terres du Canada

D.A. 1364

Nova Scotia
Newfoundland
Gulf of St. Lawrence

☐ West Coast
☐ Northern
☐ Hudson Bay

☐ Exploratory
☒ Development
☐ Delineation
Service

☒
☐
☐
☐

AUTHORITY TO DRILL A WELL

APPLICATION

This application is submitted with Section 82 of the Canada Oil and Gas Drilling Regulations. When approved under Section 83 of the Regulations, it is the requisite authority for the commencement of drilling operations.

Well Name in Full: PETRO-CANADA N. CAMERON HILLS C-24
Operator: PETRO-CANADA Drilling Program No.: N/A
Contractor: TRI-CITY Permit or Lease No.: E.L. 164
Drilling Rig or Unit: #12 Estimated Well Cost: \$550,000
Location-Unit: C Section: 24 Grid Area: 60-10-116-45
Coordinates: Lat.: 60°03'12.284"N Long.: 116°50'02.867"W
Area: Cameron Hills, N.W.T. Field/Pool: Exploratory
Elevation: KB297.0 (est.) (ASL) 292.58 m (BRT)
Approx. Spud Date: August 30th, 1987 Estimated Days on Location: 16
Anticipated Total Depth: 956m KB Target Horizon(s) U. Keg River, Sulphur Point
UWI: 300C246010116450

EVALUATION PROGRAM

Ten-metre sample intervals
Five-metre sample intervals From surface casing to total depth (265-950m)
Canned sample intervals From surface casing to total depth (265-950m)
Conventional cores at Sulphur Point, Keg River
Logs and Tests DLL-MSFL, CNL-LDT, BHCS, Microlog. Dipmeter may be required.

CASING AND CEMENTING PROGRAM

		Setting Depth (m KB)		
O.D.	Weight:	Grade:	265m	Cementing Program (Volumes):
244.5mm	53.6 Kg/m	K-55, LT&C	265m	34't' (25m ³) Class 'G'+2% CaCl ₂
177.8mm	29.8 Kg/m	K-55, ST&C	956m	6't' (4.5m ³) Class 'G'+0.5% T-1.
				+0.5% F.L.; 14't' (13m ³) 1:1:2+0.5% T-1.

B.O.P. Equipment:
1-229mm, 21 MPA Annular preventer
1-229mm, 21 MPA Blind Rams 1-229mm, 21 MPA Pipe Rams

Other Information:

Signed: J.L. Bottin Title: Supervisor, Exploration Operations
Date: 1987-07-29 Company: Petro-Canada Inc.

APPROVAL

An approved copy of this notice is to be posted at each wellsite.

Signed: W. Thomas
Engineering Branch
Date: 20 Aug 87
File: 9211-P28-4-1

Department of Energy
Mines and Resources

Department of Indian Affairs
and Northern Development

Ministère de l'Énergie
des Mines et des Ressources

Ministère des Affaires indiennes
et du Nord Canadien

Canada

copied in 2

9211-P28-4-1

L

CANADA OIL AND GAS LANDS
ADMINISTRATION
ADMINISTRATION DU PÉTROLE ET DU
GAZ DES TERRES DU CANADA

1 JAN 4 1988

ENGINEERING AND CONTROL
BRANCH
TECHNIQUE ET DU CONTRÔLE

OTTAWA COPY

PETRO-CANADA INCORPORATED
PETRO-CANADA N. CAMERON HILLS C-24
FINAL WELL REPORT

Prepared by: M. Lemay
1987-11-13

PETRO-CANADA N. CAMERON HILLS C-24

FINAL WELL REPORT

A) INTRODUCTION

1. Summary
2. Location Map

B) GENERAL DATA

1. Well Name and Number
2. Well Location
3. Unique Well Identifier
4. Operator and Drilling Contractor
5. Drilling Unit
6. Position Keeping
7. Support Craft
8. Drilling Unit Performance
9. Difficulties and Delays

C) SUMMARY OF DRILLING OPERATIONS

1. Elevations
2. Total Depth
3. Date Spudded
4. Date Drilling Completed
5. Date of Rig Release
6. Well Status
7. Hole Sizes and Depth
8. Casing and Cementing Record
9. Sidetracked Hole
10. Drilling Fluids
11. Fishing Operations
12. Well Kicks
13. Formation Leak-Off Tests

FINAL WELL REPORT

C) SUMMARY OF DRILLING OPERATIONS (cont'd)

14. Time Breakdown
15. Deviation Survey
16. Abandonment Plugs
17. Composite Well Record

APPENDIX

Drilling Data

1. Deviation Log
2. Wellbore Schematic
3. Well Termination Record

PETRO-CANADA N. CAMERON HILLS C-24

FINAL WELL REPORT

A. INTRODUCTION

1. Summary

Petro-Canada N. Cameron Hills C-24 was the first well drilled by Petro-Canada in the Cameron Hills area of the N.W.T. The primary objective was the Upper Keg River formation and the Slave Point and Sulphur Point formations were secondary objectives.

The location coordinates for this well are 60° 03' 12.284 North Latitude, 116° 50' 02.867" West Longitude.

Petro-Canada Incorporated of Calgary operated the well. Tri-City Drilling (1968) Ltd. of Edmonton, the Contractor, used Tri-City Rig #12 (diesel mechanical) to drill this well.

The well was drilled to a total depth of 974 m. Drilling operations, including evaluation and abandonment, were completed in 19.2 days.

Petro-Canada N. Cameron Hills C-24 was spudded on 1987-08-26 at 0400 hours. A 311.2 mm pilot hole was drilled to 35 m and the hole was then reamed to 444.5 mm with a drill bit.. Conductor casing - 339.7 mm, 81.1 kg/m, K-55, ST&C - was set at 35 m and cemented with 9 t Class "G" + 3% CaCl₂.

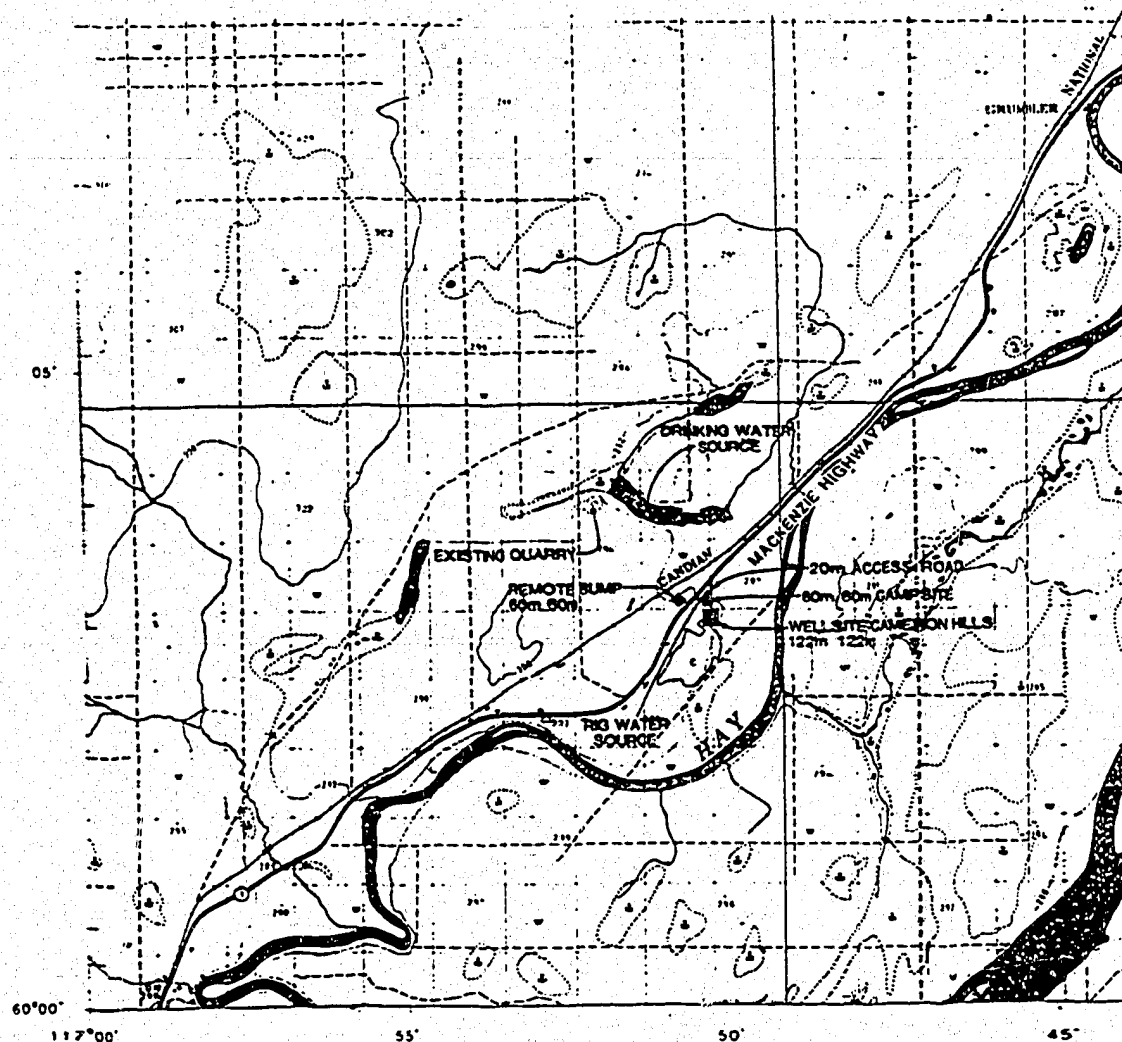
A 311.2 mm hole was drilled to 273 m. Surface casing - 244.5 mm, 53.6 kg/m, K-55, LT&C - was set at 273 m and cemented with 23 t Class "G" + 2% CaCl₂.

A 222.2 mm hole was drilled using a gel-chemical drilling fluid system. At 735 m, a 10 m core (158.8 mm) was cut in the Sulphur Point. After reaming the cored interval, 222.2 mm hole was drilled ahead.

At 868 m, an 18 m core (158.8 mm) was cut in the Upper Keg River formation. After reaming the cored interval, 222.2 mm hole was drilled ahead.

The licensed total depth of 956 m was exceeded (after receiving verbal approval from COGLA) and the well was drilled to 974 m. The well was open-hole logged, a velocity survey was run, and one DST was performed in the Sulphur Point formation. *

The well was plugged and abandoned and rig released on 1987-09-14 at 0900 hours.



Scale 1:50,000

0 100 200 300 400 500 600 700 800 900 1000

0 100 200 300 400 500 600 700 800 900 1000



Petro Canada Inc.

CAMERON HILLS

C-24

60° 3'09.25"N, 116° 50'0.90"W

B. GENERAL DATA

1. Well Name and Number: Petro-Canada N. Cameron Hills C-24
Grid Area: 60° 10' 4" 116° 45'
2. Well Location: North Latitude: 60° 03' 12.284"
West Longitude: 116° 50' 02.867"
3. Unique Well Identifier: 300C246010116450
4. Operator: Petro-Canada Incorporated
P.O. Box 2844
Calgary, Alberta
T2P 3E3

Contractor: Tri-City Drilling (1968) Ltd.
14305 - 120 Avenue
Edmonton, Alberta
T5L 2R8
5. Drilling Unit: Name: Tri-City Rig #12
Type: Double Diesel Mechanical
6. Position Keeping: Not applicable to this well.
7. Support Craft: Not applicable to this well.
8. Drilling Unit Performance: Not applicable to this well.
9. Difficulties and Delays: No difficulties or delays were encountered that were not directly associated with downhole operations.

C. SUMMARY OF DRILLING OPERATIONS

1. Elevations: Ground: 292.58 m
Kelly Bushing: 296.58 m
2. Total Depth: Drilled: 974 m
Logged: 974 m
3. Date and Hour Spudded: 87-08-26 0400 hours
4. Date Drilling Completed: 87-09-10 0745 hours
5. Date of Rig Release: 87-09-14 0900 hours
6. Well Status: Abandoned
7. Hole Sizes and Depths:

Class	Bit Numbers	Size (mm)	Depth (m)		Meters Drilled	Remarks
			In	Out		
Conductor	1A	311.2	0	35	35	Ream 35 m
	2A	444.5	0	35	35	
Surface	1B	311.2	35	70	35	
	2B	311.2	70	145	75	
	3B	311.2	145	181	36	
	4B	311.2	181	273	92	
Main	1C	222.2	273	685	412	Ream 10 m
	2C	222.2	685	735	50	
	3C	158.8	735	745	10	
	4CRR	222.2	745	749	4	
	5C	222.2	749	868	119	Ream 18 m
	6C	158.8	868	886	18	
	7C	222.2	886	903	54	
	8C	222.2	903	974	71	

8. Casing and Cementing Details

Hole Classification	Conductor	Surface	Main
Hole Size: (mm)	444.5	311.2	222.2
Casing Size: (mm)	339.7	244.5	Abandoned
Weight: (kg/m)	81.1	53.6	-
Grade:	K-55	K-55	-
Coupling:	ST&C	LT&C	-
Number of Joints:	3	21	-
Number of Centralizers:		5	-
Date of Run:	87-08-27	87-08-31	-
Shoe Depth: (m)	35	273	-
Tonnes of Cement:	9	23	-
Type of Cement:	Class G	Class G	-
Additives:	3% CaCl ₂	2% CaCl ₂	-
Height of Cement:	Surface	Surface	-
Based on:	Returns	Returns	-

9. Sidetracked Hole - None

10. Drilling Fluid

The conductor hole to 35 m and surface hole to 273 m were drilled using a gel/lime slurry. The main hole to TD at 974 m was drilled using a gel/chemical system.

Summary of Mud Properties

Section	Interval (m)	Weight (kg/m ³)	Funnel Vis (s/l)	Water Loss (Avg. cm ³)	pH (Avg)	Cl ⁻ (10 ³ mg/l)
Conductor	0-35	-	-	-	-	-
Surface	35-273	1130	70	-	10	-
Main	273- 974	1125	55	9.5	10.5	0.3

11. Fishing Operations - None

12. Well Kicks - None

13. Formation Leak-off Tests

A formation integrity test was run on 87-09-02 after drilling out the surface casing shoe at 273 m and drilling to 276 m. Water was used for this test (2678 kPa hydrostatic at shoe) and a surface pressure of 3325 kPa was held for 10 minutes with no formation breakdown. The total pressure at the shoe (6003 kPa) is equivalent to a leak-off gradient of 21.75 kPa/m (2220 kg/m³ EMD).

14. Time Breakdown

	Conductor	Surface	Main	Total
Drill	10.25	44.75	117.50	172.50
Trip	3.00	6.00	19.50	28.50
Ream/Clean	5.75		6.25	12.00
Conditioning	4.00	0.75	9.00	13.75
Rig Service	0.75	1.50	4.75	7.00
Mechanical Downtime	3.00	1.50	2.00	6.50
Survey	1.00	2.50	3.50	7.00
CSG-CMT-WOC	14.50	17.75		32.25
Head up/P Test	11.25	29.00		40.25
Coring			45.75	45.75
Logging			27.00	27.00
DST			20.00	20.00
Drill Cement	6.75	2.50		9.25
Slip & Cut Line			1.25	1.25
Circulate Samples			5.50	5.50
Abandonment			32.50	32.50
TOTAL	60.25	106.25	294.50	461.00

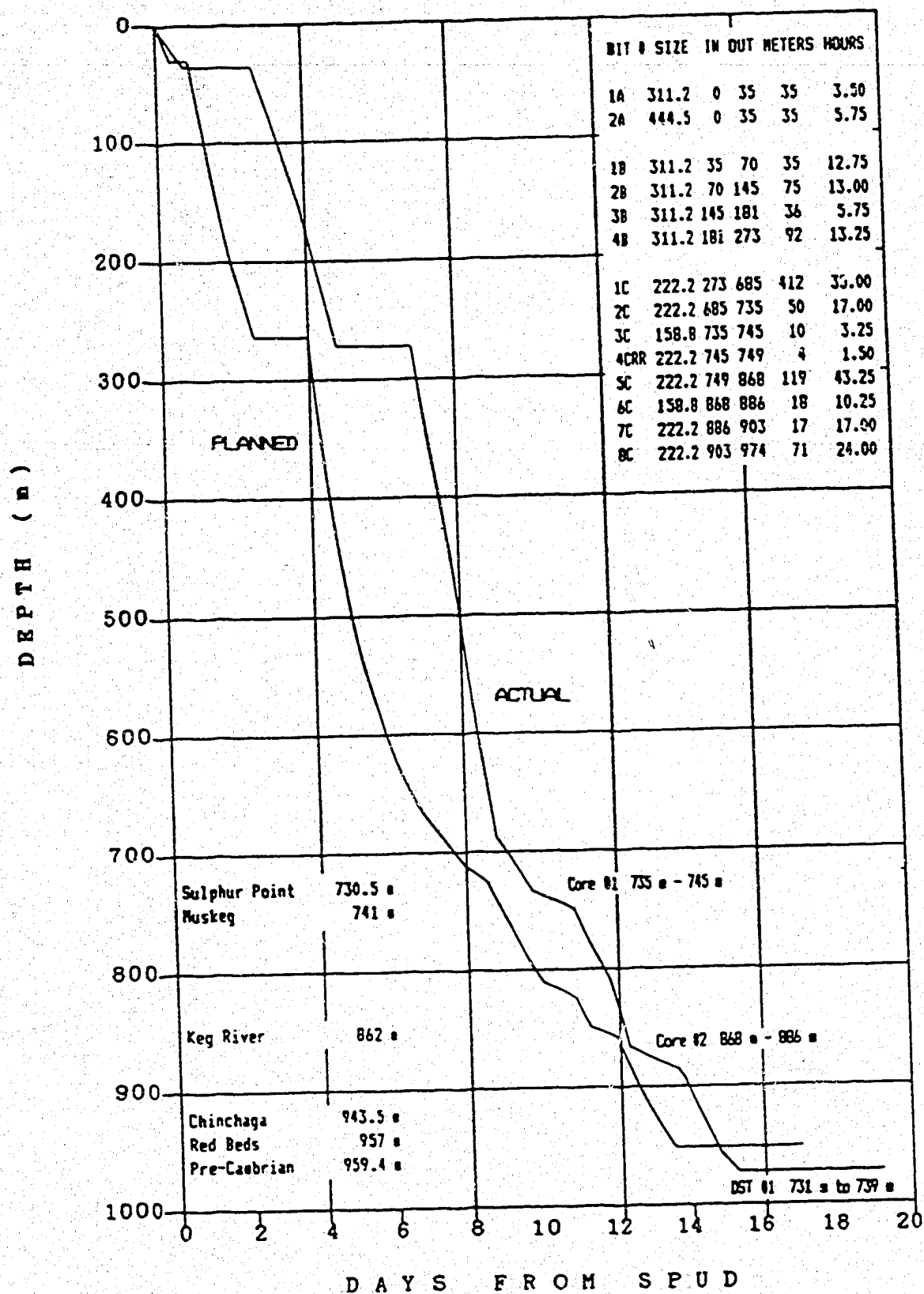
15. Deviation Survey

No directional survey was made of this well. Maximum deviation was 1-1/2° at 684 m, 961 m and 974 m (T.D.). The maximum possible displacement of the bottom hole location with respect to the surface location is only 10 m.

16. Abandonment Plugs

Type of Plug	Interval (m)	Felt at (m)	Cement + Additives	Fluid between Plugs
1. Cement	974 - 815 815 - 650	No feel 627	10.6 t "G" 13.0 t "G" + 2% CaCl ₂	- Gel/Chemical Mud
2. Cement	303 - 243	240	4.1 t "G" + 2% CaCl ₂	Gel/Chemical Mud
3. Cement	15 - 5	No feel	0.5 t "G"	-

PETRO-CANADA N. CAMERON HILLS C-24 COMPOSITE WELL RECORD



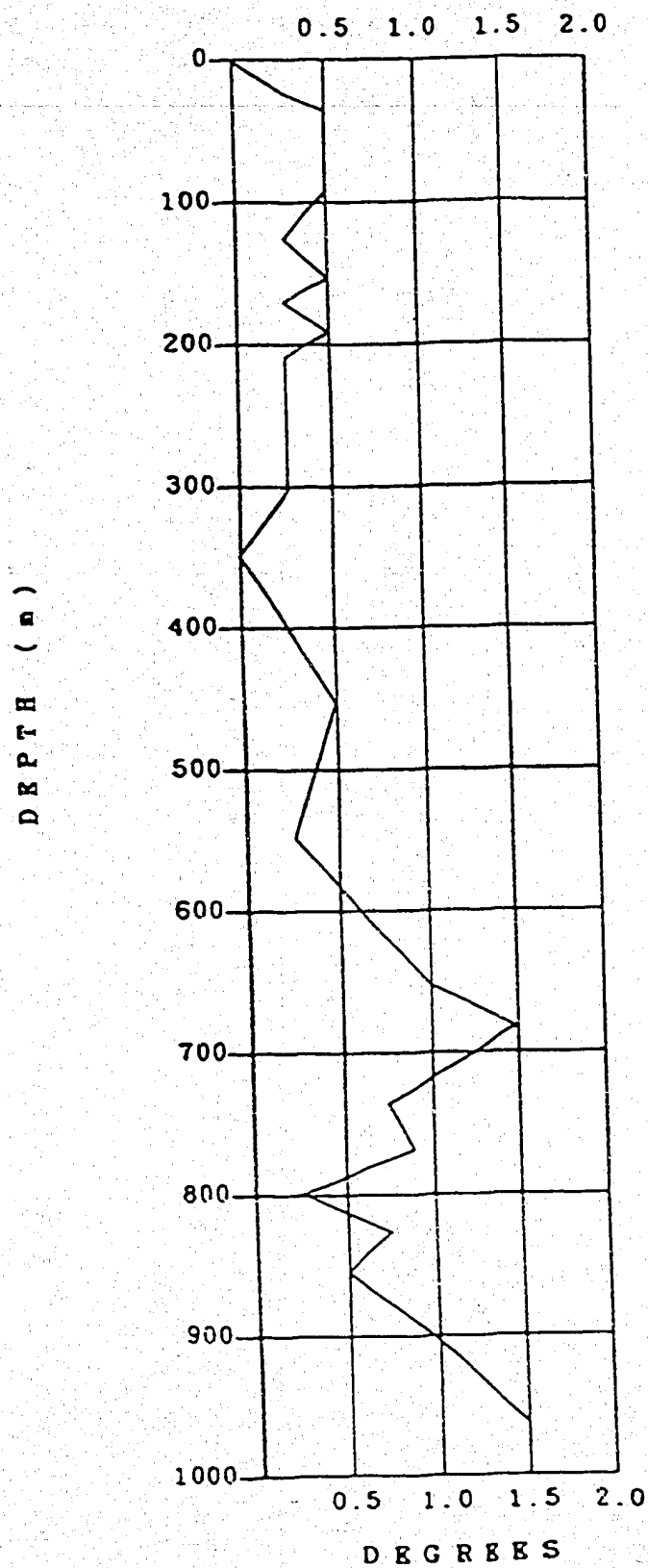
PETRO-CANADA N. CAMERON HILLS C-24

FINAL WELL REPORT

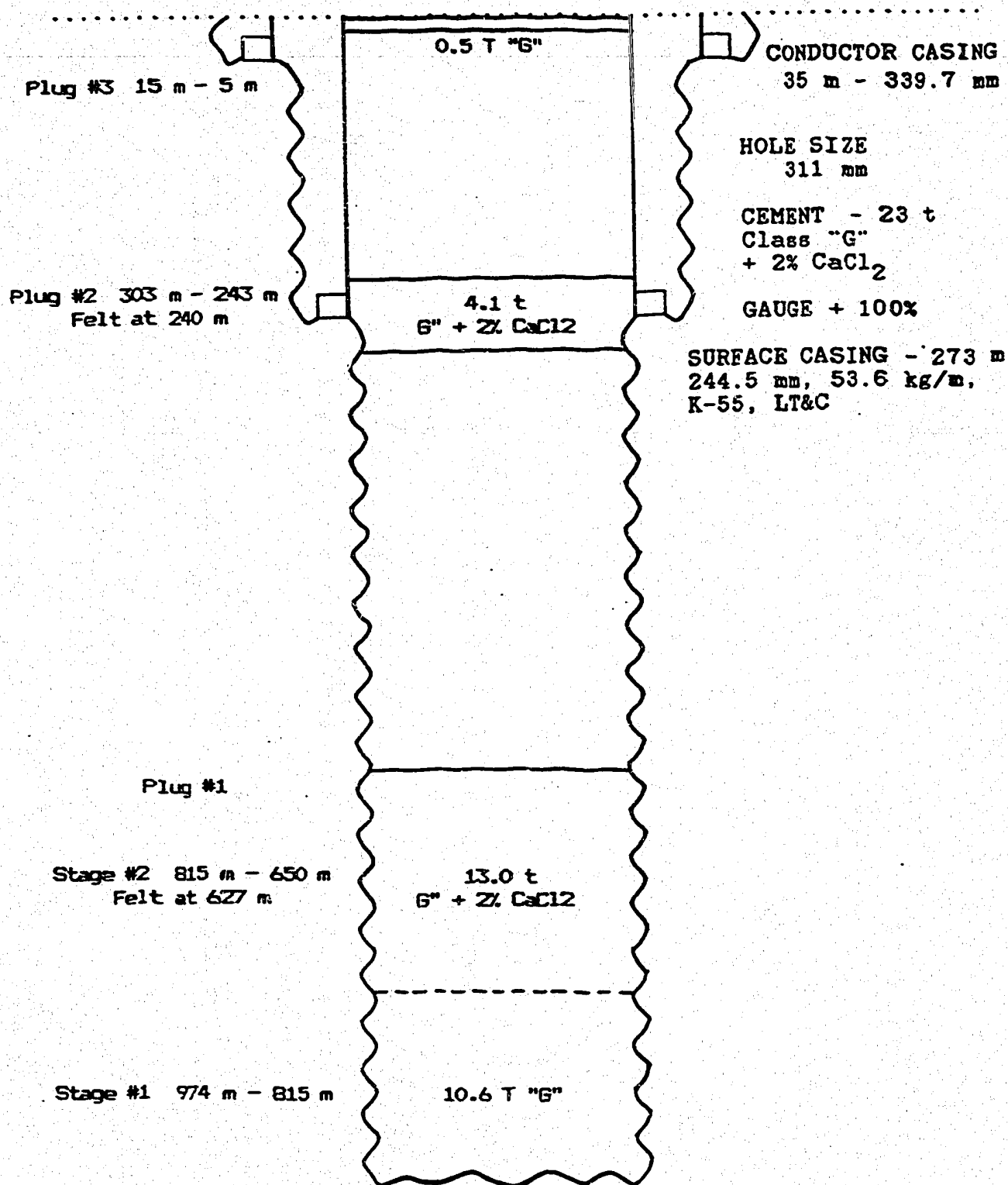
A P P E N D I X

PETRO-CANADA N. CAMERON HILLS C-24

DEVIATION LOG



PETRO-CANADA N. CAMERON HILLS C-24 WELLBORE SCHEMATIC





Nova Scotia ☐
Newfoundland ☐
Gulf of St. Lawrence ☐

West Coast ☐
Northern ☒
Hudson Bay ☐

Well Status
Suspended ☐
Completed ☐
Abandoned ☒

WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations.

WELL DATA

Well Name: PETRO-CANADA N CAMERON HILLS C-24 Area: CAMERON HILLS, N.W.T.
Grid Area: 60-10-116-45 Field/Pool: EXPLORATORY
Permit or Lease No.: EL 164 Final Coordinates: Lat: 60°03'12.284" N Long: 116°50'02.867" W
Drilling Unit: TRI-CITY #12 Elevations RT/KB: 296.58m 3xGL 292.58m
Spud Date: 87-08-26 Rig Released: 87-09-14 Total Depth: 974m
UWI: 300C24010116450

CASING AND CEMENTING

O.D.	Weight	Grade	Depth Set	Cement and Additives
339.7mm	81.1 kg/m	K-55	35m	9t (6.8m ³) CLASS "G"+3% CaCl ₂
244.5mm	53.6 kg/m	K-55	273m	23t (17.4m ³) CLASS "G"+2% CaCl ₂

PLUGGING PROGRAM

Approval of the following program was obtained by (person) YUGON HOPE from
(person) K. SINGH of the Canada Oil and Gas Lands Administration by means of
TELEPHONE on SEPTEMBER 12 19 87

Type of Plug:	Interval:	Felt:	Cement and Additives:
CEMENT	974-815m	NO	10.6t (8.0m ³) CLASS "G"
CEMENT	815-650m	627m	13t (9.8m ³) CLASS "G"+2% CaCl ₂
CEMENT	303-243m	240m	4.1t (3.1m ³) CLASS "G"+2% CaCl ₂
CEMENT	15-5m	NO	0.5t (0.4m ³) CLASS "G"

Lost Circulation/Overpressure Zones: NONE

Equipment left on Seafloor (Describe): N/A

Provision for Re-entry (Describe and attach sketch): N/A

Cores: Type: RATHOLE Intervals: 735-745m (100% RECOVERY)
RATHOLE 868-886m (100% RECOVERY)

Other Downhole Completion/Suspension Equipment:

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

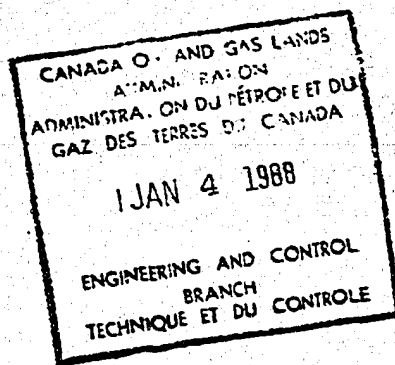
Signed: SAID SHAMLOO P. Eng.
Name:

Title: MANAGER, DRILLING ENGINEERING
Date: OCTOBER 13, 1987

Acknowledged by: [Signature]
Engineering Branch
Date: 26 Oct 87
File: 9211-P28-4-1

9211-P28-4-1

OTTAWA COPY



GEOLOGICAL REPORT

PETRO-CANADA N. CAMERON HILLS C-24

LAT. $60^{\circ} 03' 12.284''$ N

LONG. $116^{\circ} 50' 02.867''$ W

PREPARED FOR

PETRO-CANADA INC.

September 14, 1987

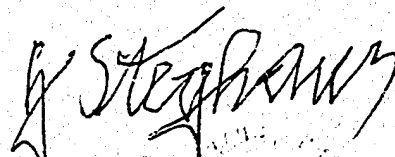
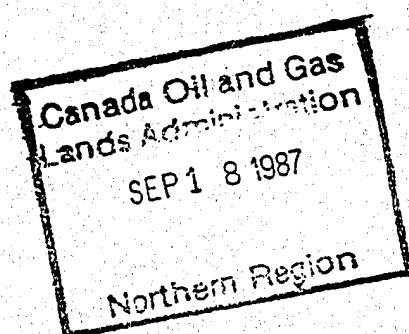

H. Steghaus, Ph. D., P. Geol.

TABLE OF CONTENTS

	<u>Page No.</u>
PERTINENT DATA	1
GEOLOGICAL MARKERS	2
SAMPLE DESCRIPTION	3
CORE DESCRIPTIONS	13
CORING RECORDS	16



PERTINENT DATA

WELL NAME: Petro-Canada N. Cameron Hills C-24

LOCATION: Lat. $60^{\circ} 03' 12.284''$ N
Long. $116^{\circ} 50' 02.867''$ W

ELEVATIONS: Ground: 292.28 m K.B.: 296.42 m

TOTAL DEPTH: Driller: 974 m Logger: 974.1 m

WELL TYPE: Exploratory

STATUS: Dry and Abandoned

OPERATOR: Petro-Canada Inc.

CONTRACTOR: Tri-City Drilling Ltd., Rig No. 12

SPUD DATE: August 26, 1987 04:00 h

RIG RELEASED: September 14, 1987 09:00 h

DITCH SAMPLES: Company: 250-974 m Government: 250-974 m

CORED INTERVALS: 735.0 - 745.0 m
868.0 - 886.0 m

D.S.T.: None while on location.

CASING RECORD: 244.5 mm at 273 m

GEOLOGICAL MARKERS

MARKERS	PROGNOSIS m	SAMPLE m	LOG m	SUBSEA m	THICKNESS m
Hay River	290	300	302.5	-6.1	287.5
Beaverhill Lake	---	590	590.0	-293.6	64.5
Muskwa	---	655	654.5	-358.1	18.0
Slave Point	666	675	672.5	-376.1	36.5
Fort Vermilion	---	711	709.0	-412.6	19.0
Watt Mountain	712	729	728.0	-431.6	2.5
Sulphur Point	718	734	730.5	-434.1	10.5
Muskeg	728	741	741.0	-444.6	121.0
Keg River	806	865	862.0	-565.6	81.5
Chinchaga	921	945	943.5	-647.1	13.5
Ebbut Red Beds	936	MISSING			
Precambrian	946	960	957.0	-660.6	

SAMPLE DESCRIPTION

PETRO-CANADA
N. CAMERON HILLS C-24

245 - 250 m

Limestone, buff and argillaceous to tan, microcrystalline, pyritic; stringers of shale, light green, calcareous; Brachiopod fragments and some Crinoid ossicles.

250 - 255 m

Limestone as above, few pieces gray and argillaceous; stringers of shale, black; Crinoid ossicles and Brachiopod fragments common, some Tentaculites.

255 - 260 m

Limestone, tan to cream, microcrystalline, slightly pyritic; trace black shale (stringers); some Brachiopod fragments.

260 - 265 m

Limestone, buff to tan, micro- to cryptocrystalline, slightly pyritic, few pieces silty; stringers of shale, gray to light greenish gray, part silty, calcareous; rare Anphipora and Brachiopod fragments.

265 - 270 m

Limestone, tan to buff, cryptocrystalline, slightly pyritic; stringers of shale, light gray to light green, calcareous; some Brachiopod fragments.

270 - 273 m

Limestone, buff to tan, micro- to cryptocrystalline, slightly pyritic, part argillaceous; stringers of shale, gray and black, calcareous; some Brachiopod and few Tentaculites fragments.

273 - 290 m

Limestone, buff, micro- to cryptocrystalline, slightly silty, part argillaceous and slightly darker.

PETRO-CANADA
N. CAMERON HILLS C-24

290 - 295 m

Limestone, buff to tan, micro- to crypto-crystalline, part argillaceous; few Brachiopod fragments.

HAY RIVER 300 m

295 - 300 m

Siltstone, buff, highly calcareous; shale, light gray, calcareous, part silty; some Crinoid ossicles.

300 - 305 m

Shale, light gray, highly calcareous, part silty.

305 - 310 m

Shale as above; limestone, light brownish gray to buff, micro- to very finely crystalline, silty; few Ostracods.

310 - 320 m

Shale, light gray, highly calcareous, part silty; stringers of limestone as above; few Ostracods.

320 - 330 m

Shale as above, grading to marlstone; limestone, buff to light gray, micro-crystalline, part silty, part argillaceous.

330 - 335 m

Shale, light gray, highly calcareous, part silty; stringers of limestone, buff to tan and light gray, microcrystalline, part silty; few Ostracods and Crinoid ossicles.

335 - 345 m

Shale, gray, highly calcareous, grading to argillaceous limestone, slightly silty, microcrystalline; few Crinoid ossicles

345 - 350 m

Shale, gray, highly calcareous, grading to marlstone, part silty; few Ostracods.

350 - 355 m

Shale, gray, calcareous, slightly pyritic, part silty, few Crinoid ossicles.

PETRO-CANADA
N. CAMERON HILLS C-24

355 - 360 m	Shale as above; limestone, buff to light brown, micro- crystalline, part argillaceous; few Brachiopod fragments.
360 - 375 m	Shale, gray to light gray, highly cal- careous; few Tentaculites at 365 m.
375 - 385 m	Shale, gray, highly calcareous; few Tentaculites.
385 - 390 m	Shale, gray, highly calcareous, slightly pyritic.
390 - 395 m	Shale as above; stringers of limestone, buff, micro- crystalline.
395 - 400 m	Shale, gray, calcareous to highly cal- careous, few pieces silty.
400 - 410 m	Shale as above; limestone, buff, microcrystalline.
410 - 415 m	Shale, gray, calcareous, slightly pyritic; some limestone, buff to tan, microcrystal- line, few pieces silty.
415 - 425 m	Shale, brown to gray, micromicaceous, fissile, calcareous.
425 - 430 m	Shale, gray, part slightly greenish, finely pyritic, part micromicaceous, calcareous.
430 - 435 m	Shale as above, some pieces brownish; stringers of limestone, buff, micro- crystalline.
435 - 440 m	Shale, dark brown to dark gray, micro- micaceous, fissile, calcareous.
440 - 445 m	Shale, gray, micromicaceous, calcareous; stringers of limestone, buff, microcrys- talline.

PETRO-CANADA
N. CAMERON HILLS C-24

445 - 455 m	Shale, brown to gray, micromicaceous, fissile, calcareous.
455 - 465 m	Shale, gray to dark gray, part micromicaceous, fissile, calcareous, slightly pyritic.
465 - 480 m	Shale, dark gray to gray, slightly micromicaceous, slightly calcareous to calcareous, slightly pyritic at 480 m.
480 - 485 m	Shale, gray, calcareous, part micromicaceous, slightly pyritic; stringers of siltstone, gray, calcareous.
485 - 490 m	Shale, brown to dark gray, micromicaceous, fissile, calcareous, few pieces silty.
490 - 505 m	Shale, gray, more or less micromicaceous, calcareous, slightly pyritic.
505 - 515 m	Shale, gray, part greenish, variably calcareous, slightly micromicaceous and pyritic; some Brachiopod fragments.
515 - 520 m	Shale, gray, calcareous, slightly micromicaceous; limestone, buff, crypto- to micro-crystalline; trace pyrite.
520 - 545 m	Shale, gray, calcareous, part slightly micromicaceous.
545 - 560 m	Shale, gray to dark gray, slightly calcareous, slightly pyritic, some pieces micromicaceous.
560 - 585 m	Shale, gray, calcareous, part slightly micromicaceous.

PETRO-CANADA
N. CAMERON HILLS C-24

BEAVERHILL LAKE 590 m

585 - 590 m

Shale as above;
Shale, dark brown, bituminous, calcareous;
limestone, buff to gray, microcrystalline.

590 - 600 m

Shale, gray to dark gray, fissile, slightly
calcareous, slightly micromicaceous;
shale, black to dark brown, bituminous,
calcareous;
some limestone, buff, crypto- to micro-
crystalline.

600 - 610 m

Shale, gray, calcareous, pyritic, part
micromicaceous;
stringers of limestone, buff, micro-
crystalline, pyritic.

610 - 630 m

Shale, gray to dark gray, noncalcareous
to calcareous, slightly pyritic;
stringers of limestone, buff to tan, micro-
to cryptocrystalline, slightly pyritic.

630 - 650 m

Shale, dark gray to greenish gray,
slightly calcareous, part micromicaceous,
fissile;
Brachiopod fragment at 635 m.

MUSKWA 655 m

650 - 660 m

Shale, black to black-brown, slightly to
highly calcareous, bituminous.

660 - 665 m

Shale as above;
limestone, buff to tan, microcrystalline,
slightly pyritic, Brachiopods.

665 - 670 m

As above, limestone increasing.

PETRO-CANADA
N. CAMERON HILLS C-24

SLAVE POINT 675 m

- 670 - 675 m Limestone, buff to light brown, crypto- to microcrystalline, pyritic; some Brachiopod fragments and Crinoid ossicles.
- 675 - 680 m Limestone, brown to buff, crypto- to microcrystalline, slightly pyritic; few Brachiopod and Tentaculites fragments.
- 680 - 685 m Limestone, brown to buff, crypto- to microcrystalline, pyritic, trace very poor pin-point porosity producing pin-point yellow fluorescence; few Crinoid ossicles.
- 685 - 695 m Limestone, brown to cream, mottled, more or less dolomitic, micro- to finely crystalline, some very poor to poor intercrystalline and pin-point porosity, pin-point yellow fluorescence, weak milky cut, petroliferous odour.
- 695 - 705 m Limestone, brown to cream, part mottled, few pieces fragmental, microcrystalline, few closed microfractures, petroliferous odour.
- 705 - 710 m Limestone, brown to cream, part mottled, part pelletoidal, microcrystalline, trace very poor pin-point and intercrystalline porosity, trace faint condensate stain.

FORT VERMILION 711 m

- 710 - 715 m Limestone as above, part gypsiferous, part dolomitic, part cryptocrystalline; anhydrite, white to tan, microcrystalline.
- 715 - 725 m Anhydrite as above;
Limestone, brown to cream, crypto- to microcrystalline, gypsiferous.

PETRO-CANADA
N. CAMERON HILLS C-24

WATT MOUNTAIN 729 m

725 - 730 m

Anhydrite, white to tan, microcrystalline;
shale, green, waxy, part calcareous.

SULPHUR POINT 734 m

730 - 735 m

Limestone, cream to tan, microcrystalline,
part pelletoidal, some good intergranular
porosity, spotty yellow fluorescence,
weak milky cut, petroliferous odour.

Core No. 1: 735.0-745.0 m See core
description.

MUSKEG 740.95 m

745 - 755 m

Anhydrite, white to tan, crypto to micro-
crystalline;
dolomite, tan to brown, very finely to
microcrystalline.

755 - 765 m

Dolomite, tan to light brown, very finely
to microcrystalline;
anhydrite as above.

765 - 770 m

Anhydrite, white to tan, crypto- to micro-
crystalline;
some dolomite as above.

770 - 775 m

Anhydrite, white to buff and tan, micro-
to cryptocrystalline, some pieces
argillaceous.

775 - 780 m

Anhydrite, white to tan, microcrystalline;
little dolomite, brown to tan, very finely
crystalline.

780 - 785 m

Dolomite, tan to light brown, very finely
crystalline;
anhydrite as above.

PETRO-CANADA
N. CAMERON HILLS C-24

785 - 790 m	Anhydrite as above.
790 - 800 m	Dolomite, light brown to tan, very finely to microcrystalline; anhydrite, white to tan, microcrystalline.
800 - 805 m	Anhydrite as above.
805 - 810 m	Dolomite, tan to light brown, micro- to very finely crystalline.
810 - 820 m	Anhydrite, tan to white, crypto- to microcrystalline.
820 - 825 m	Anhydrite as above; dolomite, tan to light brown, finely to microcrystalline, some poor intercrystalline porosity.
825 - 840 m	Anhydrite, light brown to white, crypto- to microcrystalline.
840 - 850 m	Anhydrite as above; dolomite, tan to brown, micro- to very finely crystalline, anhydritic.
850 - 855 m	Anhydrite as above.
855 - 860 m	Anhydrite as above; dolomite, tan to brown, micro- to finely crystalline.

KEG RIVER 865 m

860 - 868 m	Dolomite, brown to buff, very finely to medium crystalline, some white vug or fracture fill.
-------------	--

Core No. 2: 868.0-886.0 m See core description.

PETRO-CANADA
N. CAMERON HILLS C-24

- 886 - 890 m Dolomite, tan to brown, finely to micro-crystalline, some gypsum vug or fracture fill, trace pin-point porosity.
- 890 - 910 m Dolomite, dark brown to tan, very finely to microcrystalline, some gypsum vug or fracture fill, few closed hairline fractures.
- 910 - 915 m Dolomite, black brown to tan, micro-to very finely crystalline, few pieces medium crystalline, part argillaceous.
- 915 - 930 m Dolomite, tan to dark brown, micro- to very finely crystalline, some coarse vug fill (part anhydrite); some black and dark gray shale partings.
- 930 - 935 m Dolomite, dark brown to tan, micro- to finely crystalline, fossiliferous, e.g. Crin, loose coarse gypsum crystals, probably vug lining.
- 935 - 940 m Dolomite, tan to black brown and argillaceous, micro to very finely crystalline, some loose coarse gypsum crystals, trace pin-point vuggy porosity; few black shale partings.
- CHINCHAGA 945 m
- 940 - 945 m Dolomite as above; anhydrite, tan to cream, crypto- to microcrystalline.
- 945 - 955 m Anhydrite, brown to cream, crypto- to microcrystalline; stringers of shale, green gray to gray, part slightly calcareous.

PETRO-CANADA
N. CAMERON HILLS C-24

PRECAMBRIAN 960 m

955 - 960 m

Sandstone, white to clear, quartzose, siliceous, part quartzitic, fine to coarse, some small quartz pebbles, angular to round, poor sorting; some white kaolin.

960 - 974 m

Siliceous sandstone as above, grading to quartzite, few pieces pink; some white kaolin.

CORE DESCRIPTIONS

PETRO-CANADA
N. CAMERON HILLS C-24

Core #1	735.0-745.0 m, Cut 10.0 m, Recovered 10.0 m
735.00-735.45 m 0.45 m	Limestone, gray to light brown, pelletoidal, framework/filler ratio 65/10, scattered gypsum crystals up to 10 mm; some closed fractures, more or less vertical; intermittently oil stained, dull brown fluorescence, strong petroliferous and H ₂ S odour.
735.45-736.20 m 0.75 m	Limestone, brown, pelletoidal and fragmental, framework/filler ratio 85/10; spotty fair intergranular porosity, spotty oil stains with dull brown fluorescence.
736.20-736.40 m 0.2 m	Limestone, brown, dense, clusters of pellets and small fragments, part angular.
736.40-737.15 m 0.75 m	Limestone, brown, micro- to cryptocrystalline; extensively fractured, fractures closed (green shale), some calcite filled vugs, tight.
737.15-737.90 m 0.75 m	Limestone, brown, microcrystalline, some clear dolomite vug and fracture fill, few pure thin shale layers.
737.90-740.65 m 2.75 m	Limestone, brown, microcrystalline, part pelletoidal, pellet content varying between 10-80%, dense, occasionally gypsum lumps decreasing in size from top to bottom of interval; extensively fractured, irregular pattern, fractures closed (shale filled).
740.65-740.95 m 0.30 m	Shale, green to gray, calcareous, slightly micropyrritic, variably "sandy", grading to fine grained "sandstone", grains Calcite; extensively slickensided.

PETRO-CANADA
N. CAMERON HILLS C-24

MUSKEG 740.95 m

740.95-741.15 m Dolomite, brown, microcrystalline, argilla-
0.20 m ceous.

741.15-741.45 m Anhydrite, brown and tan, bedded, micro-
0.30 m crystalline, dip approximately 10°.

741.45-745.00 m Anhydrite, brown to tan, microcrystalline,
 massive.

Core #2 868.0-886.0 m, Cut 18.0 m, Recovered 18.0 m

868.0-868.40 m Dolomite, brown, very finely to microcrystal-
0.40 m line, poor to fair vuggy porosity (leached
 Anhipora), vugs crystal lined, oil
 stained, slightly bleeding, yellow fluores-
 cence.

868.40-881.00 m Dolomite, dark brown to brown, micro- to
12.6 m very finely crystalline, occasionally
 anhydrite impregnated (replacement?), some
 anhydrite lumps throughout up to fist size;
 some low amplitude stylolites, vertical
 hairline fractures, occasionally irregular
 pattern, few fractures open and oily.

881.00-881.40 m Dolomite, finely to very finely crystalline;
0.40 m spotty vuggy and intercrystalline porosity
 with some dark residual oil, vugs very small.

881.40-882.15 m Dolomite, dark brown to brown, very finely
0.75 m to microcrystalline, part anhydritic and
 some small anhydrite lumps;
 some few amplitude stylolites and closed
 vertical hairline fractures.

882.15-884.15 m Dolomite, dark brown, very finely crystalline,
2.00 m part anhydrite impregnated;
 vertical hairline fractures, when open oil
 coated, bottom 0.5 m of interval rubble
 (irregular open and oil coated fractures);
 vuggy porosity, fair in top 0.5 m of interval,

PETRO-CANADA
N. CAMERON HILLS C-24

otherwise very poor, vugs up to 5 cm, gypsum lined (large crystals), some vugs oily, light brown fluorescence, white milky cut.

884.15-886.00 m
1.85 m

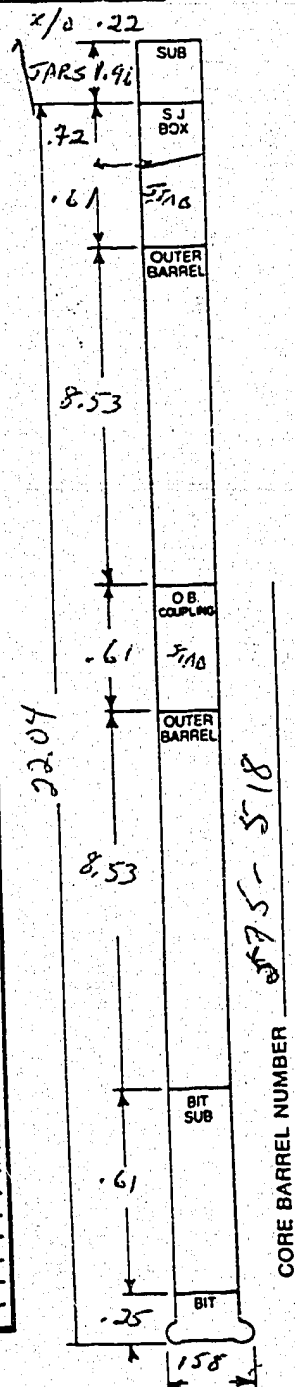
Dolomite, brown to tan, finely to very finely crystalline, some anhydrite impregnation and some anhydrite lumps; irregular hairline fractures, part open and oily.



CORING AND DRILLING RECORD

AREA: CAMERON MILLSDATE SEPT 5 1987OPERATOR PETROCAN WELL NO. C-24 LEASE N. CAMERONOPERATOR REP YUGEN HOPE FIELD WILDCATCONTRACTOR TRI CITY RIG NO. 12 PROV. N.W.T.

BIT SIZE		BIT NUMBER	CORE OR RUN NO	INTERVAL CORED DRILLED		(m) CORED / DRILLED	(m) RECD	RECD	HOURS ON BOTTOM	(m)/HR			
OD	ID			FROM	TO								
1.58	.89	B91689	1	735	745	10	10	100	2.5	3.6			
MUD								PRESSURE					
TYPE	VISC	WT	WL	% SAND	% OIL	l/min.	m ³ /min.	GPM	AVERAGE WEIGHT	AVER. RPM	ON BOTTOM	OFF BOTTOM	DROP
GEL CHEM	49	1135	8.8	.003	—	594	.59	133	3,000	820	2900		
START		DEPTH	TIME	MIN/METRE		START	DEPTH	TIME	MIN/METRE				
TIME	REPM			Actual	Lost	(m)	(m)		Actual	Lost			
0.25	0.25	25	05.22	1		11.75	94						
0.50	0.4	50	05.28	5		12.00	96						
0.75	0.6	75	05.32	4	12	12.25	98						
1.00	0.8	100	05.32	3	13	12.50	100						
1.25	1.0	125	05.39	4		12.75	102						
1.50	1.2	150	05.42	3		13.00	104						
1.75	1.4	175	05.45	3		13.25	106						
2.00	1.6	200	05.47	2	12	13.50	108						
2.25	1.8	225	05.56	3		13.75	110						
2.50	2.0	250	05.52	2		14.00	112						
2.75	2.2	275	05.55	3		14.25	114						
3.00	2.4	300	05.58	3	11	14.50	116						
3.25	2.6	325	06.01	3		14.75	118						
3.50	2.8	350	06.07	3		15.00	120						
3.75	3.0	375	06.07	3		15.25	122						
4.00	3.2	400	06.13	6	15	15.50	124						
4.25	3.4	425	06.18	5		15.75	126						
4.50	3.6	450	06.22	4		16.00	128						
4.75	3.8	475	06.28	6		16.25	130						
5.00	4.0	500	06.31	3	18	16.50	132						
5.25	4.2	525	06.38	7		16.75	134						
5.50	4.4	550	06.42	4		17.00	136						
5.75	4.6	575	06.47	3		17.25	138						
6.00	4.8	600	06.51	4	20	17.50	140						
6.25	5.0	625	06.55	4		17.75	142						
6.50	5.2	650	07.00	5		18.00	144						
6.75	5.4	675	07.06	6		18.25	146						
7.00	5.6	700	07.12	6	21	148							
7.25	5.8	725	07.16	4		150							
7.50	6.0	750	07.20	4		152							
7.75	6.2	775	07.24	4		154							
8.00	6.4	800	07.29	5	12	156							
8.25	6.6	825	07.43	7	(7) CAV	158							
8.50	6.8	850	07.44	6		160							
8.75	7.0	875	07.57	8		162							
9.00	7.2	900	08.01	10	(31)	164							
9.25	7.4					166							
9.50	7.6					168							
9.75	7.8					170							
10.00	8.0	745				172							
10.25	8.2					174							
10.50	8.4					176							
10.75	8.6					178							
11.00	8.8					180							
11.25	9.0					182							
11.50	9.2												

FORMATION: SULFUR POINTREMARKS: GEOLOGRAPH ERROR. ACTUALLY CUT 10 M.

CUSTOMER COPY

BY

W. STABEN



CORING AND DRILLING RECORD

AREA: CAMERON HILLS N.W.T.

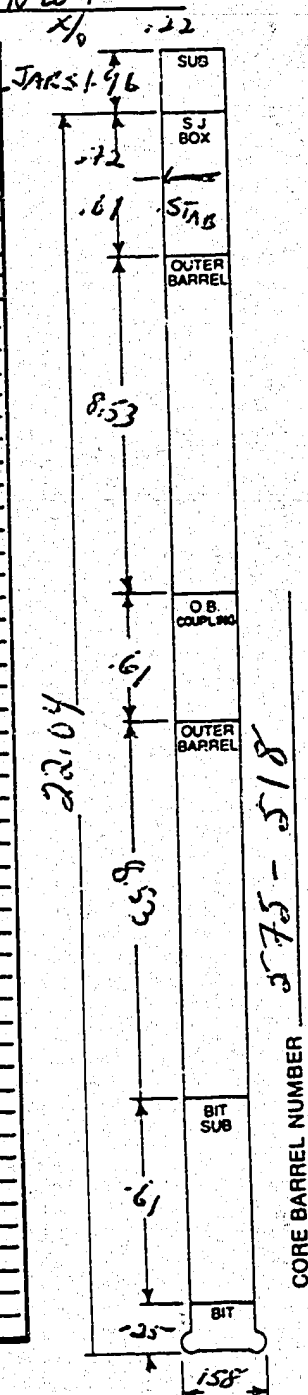
DATE SEPT 7 1987

OPERATOR: PETRO CAN WELL NO. C-24 LEASE: CAMERON

OPERATOR REP: YING-ON HOPE FIELD: WILDCAT

CONTRACTOR: TRI CITY RIG NO. 12 PROV. N.W.T.

BIT SIZE		BIT NUMBER	CORE OR RUN NO	INTERVAL CORED DRILLED		(m) CORED / DRILLED	(m) RECD	RECD	HOURS ON BOTTOM	(m)/HR
OD	ID			FROM	TO					
158	89	B41689	2	868	886	18			10 1/4	1.13
MUD										
TYPE	VISC	WT	W L	% SAND	% OIL	l/min.	m ³ /min.	GPM	AVERAGE WEIGHT	AVER. RPM
GEL CATEN	57	1140	8.5	.0025		594	.59	133	3000	140
PRESSURE										
								ON BOTTOM	OFF BOTTOM	DROP
								2200		560
MIN / METRE										
START (m)	DEPTH (m)	TIME	Actual	Lost	START (m)	DEPTH (m)	TIME	Actual	Lost	
0.25	0.2	25	20.59	24	11.75	9.4	25	0406	3	
0.50	0.4	50	21.16	17	12.00	9.6	50	0410	4	(14)
0.75	0.6	75	21.39	15	12.25	9.8	75	0414	4	
1.00	0.8	869	21.47	13 (32)	12.50	10.0	50	0418	4	
1.25	1.0	75	22.01	14	12.75	10.2	75	0421	3	
1.50	1.2	50	22.09	8	13.00	10.4	881	0426	5	(16)
1.75	1.4	75	22.14	10	13.25	10.6	25	0430	4	
2.00	1.6	870	22.30	11 (43)	13.50	10.8	50	0434	4	
2.25	1.8	25	22.37	17	13.75	11.0	75	0438	4	
2.50	2.0	50	22.35	8	14.00	11.2	882	0444	6	(18)
2.75	2.2	75	23.04	4	14.25	11.4	25	0449	5	
3.00	2.4	571	23.13	4 (43)	14.50	11.6	50	0453	4	
3.25	2.6	25	23.22	4	14.75	11.8	25	0458	5	
3.50	2.8	50	23.30	8	15.00	12.0	883	0504	6	(20)
3.75	3.0	75	23.40	10	15.25	12.2	25	0513	4	
4.00	3.2	822	23.49	9 (31)	15.50	12.4	50	0520	7	
4.25	3.4	25	23.59	10	15.75	12.6	25	0527	7	
4.50	3.6	50	00.08	9	16.00	12.8	884	0534	7	(30)
4.75	3.8	75	00.19	11	16.25	13.0	25	0542	8	
5.00	4.0	873	00.26	7 (37)	16.50	13.2	50	0550	8	
5.25	4.2	25	00.37	11	16.75	13.4	75	0600	10	
5.50	4.4	50	00.46	4	17.00	13.6	885	0610	10	(36)
5.75	4.6	75	00.53	7	17.25	13.8	25	0619	9	
6.00	4.8	874	01.00	7 (33)	17.50	14.0	50	0625	6	
6.25	5.0	25	01.12	12	17.75	14.2	75	0633	8	
6.50	5.2	50	01.20	8	18.00	14.4	886	0641	8	(31)
6.75	5.4	75	01.35	15	18.25	14.6				
7.00	5.6	875	01.42	10 (45)		14.8				
7.25	5.8	25	01.53	8		15.0				
7.50	6.0	50	02.03	10		15.2				
7.75	6.2	75	02.13	10		15.4				
8.00	6.4	876	02.22	9 (37)		15.6				
8.25	6.6	25	02.32	10		15.8				
8.50	6.8	50	02.42	10		16.0				
8.75	7.0	75	02.52	10		16.2				
9.00	7.2	877	03.02	10 (40)		16.4				
9.25	7.4	25	03.14	12 (38)		16.6				
9.50	7.6	50	03.22	12 (38)		16.8				
9.75	7.8	25	03.32	5		17.0				
10.00	8.0	878	03.32	5 (39)		17.2				
10.25	8.2	25	03.43	6		17.4				
10.50	8.4	50	03.47	4		17.6				
10.75	8.6	75	03.57	5		17.8				
11.00	8.8	879	03.56	4 (19)		18.0				
11.25	9.0	25	04.00	4		18.2				
11.50	9.2	50	04.03	3						



FORMATION: KEG RIVER

REMARKS: PREVIOUS ROCK BIT LEFT 1/2 OF ITS INSERTS IN HOLE

CUSTOMER COPY

BY

W STABEN



Canada Oil and Gas
Lands Administration

Administration du pétrole
et du gaz des terres du Canada

D.A. 1364

Nova Scotia ☐
Newfoundland ☐
Gulf of St. Lawrence ☐

West Coast ☐
Northern ☒
Hudson Bay ☐

Well Status
Suspended ☐
Completed ☐
Abandoned ☒

WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations.

WELL DATA

Well Name: PETRO-CANADA N CAMERON HILLS C-24 Area: CAMERON HILLS, N.W.T.
Grid Area: 60-10-116-45 Field/Pool: EXPLORATORY
Permit or Lease No.: EL 164 Final Coordinates: Lat: 60°03'12.284" N Long: 116°50'02.867" W
Drilling Unit: TRI-CITY #12 Elevations RT/KB: 296.58m SPGL: 292.58m
Spud Date: 87-08-26 Rig Released: 87-09-14 Total Depth: 974m

UWI: 300C246010116450

CASING AND CEMENTING

O.D.:	Weight:	Grade:	Depth Set:	Cement and Additives:
339.7mm	81.1 kg/m	K-55	35m	9t (6.8m ³) CLASS "G"+3% CaCl ₂
244.5mm	53.6 kg/m	K-55	273m	23t (17.4m ³) CLASS "G"+2% CaCl ₂

PLUGGING PROGRAM

Approval of the following program was obtained by (person) YUGON HOPE from
(person) KL SINGH of the Canada Oil and Gas Lands Administration by means of
TELEPHONE on SEPTEMBER 12 19 87

Type of Plug:	Interval:	Felt:	Cement and Additives:
CEMENT	974-815m	NO	10.6t (8.9m ³) CLASS "G"
CEMENT	815-650m	627m	13t (9.8m ³) CLASS "G"+2% CaCl ₂
CEMENT	303-243m	240m	4.1t (3.1m ³) CLASS "G"+2% CaCl ₂
CEMENT	15-5m	NO	0.5t (0.4m ³) CLASS "G"

Lost Circulation/Overpressure Zones: NONE

Equipment left on Seafloor (Describe): N/A

Provision for Re-entry (Describe and attach sketch): N/A

Cores: Type: RATHOLE Intervals: 735-745m (100% RECOVERY)

RATHOLE 868-886m (100% RECOVERY)

Other Downhole Completion/Suspension Equipment:

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed: SAID SHAMLOO P. Eng.
Name:

Title: MANAGER, DRILLING ENGINEERING
Date: OCTOBER 13, 1987

Acknowledged by: [Signature]
Engineering Branch

Date: 26 Oct 87
File: 9211-P28-4-1

Department of Energy
Mines and Resources

Ministère de l'Énergie,
des Mines et des Ressources

Department of Indian Affairs
and Northern Development

Ministère des Affaires indiennes
et du Nord canadien

Canada