FINAL ENGINEERING REPORT

for

COLUMBIA ET AL KOTANEELEE YT I-48

Prepared by:

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

SEPTEMBER, 1980

G. R. Appleton

COLUMBIA ET AL KOTANEELEE YT I-48

Table of Contents

SUMMARY OF WELL DATA

Well Name & Number:	Columbia et al Kotaneelee YT I-48
Permittee:	Dome Petroleum Limited
Name of Operator:	Columbia Gas Development of Canada Ltd. #1000, 639 - 5th Avenue S.W. Calgary, Alberta T2P 0M9
Location:	Yukon Territory Unit I Section 48 Latitude: 60° 07' 35.917" Longitude:124° 07' 36.45" Universal Well Location Reference: Latitude: 60.12664 Longitude: 124.12679 Unique Well Identifier: 300I486010124000
Lease No.:	411-68
Drilling Contractor:	Nabors Rig No. 9
Drilling Authority No.:	929 1979-03-22
Classification:	Development Well
Elevations:	Ground - 827.34 K.B. - 834.95
Spudded:	April 18, 1979
Completed Drilling:	February 21, 1980
Total Depth:	4430m
Well Status:	Nahanni Gas Well
Rig Release:	April 11, 1980
Hole Size:	660 mm: 0 - 176 m 444 mm: 176- 3270 m 311 mm: 3270 - 4430 m 216 mm: 4430 m
Casing:	508 mm: Set at 216 m 340 mm: Set at 1052.5 m 244 mm: Set at 3259 m 178 mm: Set at 4428 m

SECTION II

Geological Summary

Due to the length of this report, it was submitted as received.

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 1

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date February 28, 1980

Test Interval _____ Formation _____

Testing Co. _____ Type of Test _____

Hole Size _____ Packer Size _____ Choke Size _____

Auxiliary Equipment _____

Time Record

Preflow _____ mins (1) ISI _____ (1) VO _____ mins (2) SI _____ mins

(2) VO _____ mins (3) FSI _____ mins

Gas Measurement

Preflow Description _____

Blow Description _____

Measured With _____

Fluid Recovery

Total Fluid _____ Mud _____

Oil _____ Water _____

No. of samples _____ From _____

Samples Sent To _____

Pressure Readings

IHP _____ (1) ISIP _____ (1) FP _____ to _____ (2) SIP _____

(2) FP _____ to _____ (3) FSIP _____ FHP _____ BHT _____ ° F

Remarks MISRUN.

Did not set tool due to problems with tubing string. Laid down tubing string before performing test.

Witness

Field Supervisor

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 2

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 4, 1980

Test Interval 4266 m - 4274 m Formation Arnica

Testing Co. Johnson Type of Test Johnson PCT

Hole Size 177.8 mm Packer Size _____ Choke Size _____

Auxiliary Equipment _____

Time Record

Preflow _____ mins (1) ISI _____ (1) VO _____ mins (2) SI _____ mins

(2) VO _____ mins (3) FSI _____ mins

Gas Measurement

Preflow Description Fair air blow, gas to surface in 10 mins, immediately after water cushion,

Blow Description Unable to keep tool open and unable to tell when tool was opening and closing as annulus pressure kept bleeding off. Unloaded water cushion within 10 mins. of initial open. Gas blow estimated at 1.0 MMcf/d through 1/2" surface choke. Heavy slugs of mud to surface immediately behind gas.

Measured With _____

Fluid Recovery

Total Fluid _____ Mud _____

Oil _____ Water _____

No. of samples 2 From Flare line

Samples Sent To _____

Pressure Readings

IHP _____ (1) ISIP _____ (1) FP _____ to _____ (2) SIP _____

(2) FP _____ to _____ (3) FSIP _____ FHP _____ BHT _____ ° F

Remarks Unable to maintain pressure on annulus as pressure bled off each time as attempt was made to gun tool. Height of fluid in annulus did not drop on tool opening but total of 4.3 m^3 mud was pumped into annulus in attempt to keep tool open. Unseated packer from 4239 m and reset at 4220 m, attempted to open tool. Annulus pressure bled off. Unable to keep tool open. Dropped bar and reversed. Circulated out gas and mud.

Witness

Field Supervisor J. MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 3

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 7, 1980

Test Interval 4266 m - 4274 m Formation Arnica

Testing Co. Johnson Testers Type of Test Single Packer MFE

Hole Size 178.5 mm Packer Size _____ Choke Size 1/2"

Auxiliary Equipment _____

Time Record

Preflow 70 mins (1) ISI 60 (1) VO _____ mins (2) SI _____ mins

(2) VO _____ mins (3) FSI _____ mins

Gas Measurement

Preflow Description Fair air blow, water cushion and gas to surface in 50 mins. When ~~Blow Description~~ cushion and mud were recovered, flowed for a fairly steady rate. Some fluid was gassified. Unable to measure. Gas flow estimated at 2 MMcfd.

Measured With _____

Fluid Recovery

Total Fluid _____ Mud _____

Oil _____ Water _____

No. of samples 1 From Gas Surface

Samples Sent To _____

Pressure Readings

IHP _____ (1) ISIP _____ (1) FP _____ to _____ (2) SIP _____

(2) FP _____ to _____ (3) FSIP _____ FHP _____ BHT _____ ° F

Remarks After closing tool for 1 hour on ISIP annulus started taking mud slowly. Attempted to open tool. Lost packer seat, annulus dropped rapidly. Pulled up to close tool. Tool washed out and unable to close same. Pumped down annulus at rate of 10 bbls per min in attempt to catch fluid. Pumped 120 bbls mud before annulus full. Dropped sinker bar, reversed gas from drill pipe. Packer appears to be holding up, cannot get down and release tool. Annulus became highly gassified while trying to fill pipe. Circulated with hydril closed from choke manifold and poorboy degasser. Circulated out gas kick.

Witness

Field Supervisor R.L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 4

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 8, 1980

Test Interval 4362 m - 4415 m Formation

Testing Co. Type of Test MFE

Hole Size Packer Size Choke Size

Auxiliary Equipment

Time Record

Preflow mins (1) ISI (1) VO mins (2) SI mins

(2) VO mins (3) FSI mins

Gas Measurement

Preflow Description Weak initial puff increasing to moderate.

Blow Description Weak, steady gas blow throughout.

Measured With

Fluid Recovery

Total Fluid 3 000 m Mud

Oil Water

No. of samples From

Samples Sent To

Pressure Readings

IHP (1) ISIP (1) FP to (2) SIP

(2) FP to (3) FSIP FHP BHT °F

Remarks MISRUN.

Clocks didn't run. Charts not available. Found tools plugged with cement, shale and mud.

Witness

Field Supervisor R.L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 5

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 20, 1980

Test Interval 4390 m - 4402 m Formation Arnica

Testing Co. Johnson Type of Test MFE

Hole Size Casing 178.5 mm Packer Size Permanent Baker Model "D" Choke Size 3/4"

Auxiliary Equipment

Time Record

Preflow 285 mins (1) ISI 120 (1) VO 150 mins (2) SI mins

(2) VO mins (3) FSI 240 mins

Gas Measurement

Preflow Description Good air blow, cushion to surface 50 mins, gas to surface 60 mins.

Blow Description Rate after 1 hour 7.5 MMcf/D, after 3 hours decreased to 6.0 with trace of water. Remained steady for 105 mins, shut in for two hours. Open tool flowing at rate of 6.0 MMcf/D for 20 mins increasing to 6.8 MMcf/D in 90 mins and remained steady at 6.8 MMcf/D for remainder of test. No trace of water at surface at end.

Measured With Johnson Critical flow prover.

Fluid Recovery

Total Fluid 56 m 183 ft. Mud 28 m

Oil Water 28 m fresh

No. of samples 2 water - 2 gas From

Samples Sent To

Pressure Readings

IHP 50 284 (1) ISIP (1) FP 21 574 to (2) SIP 39 443

(2) FP to (3) FSIP FHP BHT ° F

Remarks Charts very poor. Charts started and stopped intermittently during test period. During 285 min preflow, could not get tool to cycle. Pulled tool and opened bypass, reset and tool would cycle.

6000' water cushion.

Tools were partially plugged with heavy mud and dried filtercake at end of test.

Witness

Field Supervisor R.L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 6

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 22, 1980

Test Interval 4266 m - 4274 m Formation Arnica

Testing Co. Johnson Type of Test PTC

Hole Size 178.5 mm Packer Size Baker Model "D" Choke Size 1¼"

Auxiliary Equipment 3000' water cushion with inhibitor

Time Record

Preflow _____ mins (1) ISI _____ (1) VO _____ mins (2) SI _____ mins

(2) VO 720 mins (3) FSI 45 mins

Gas Measurement

Preflow Description WAB, GTS in 65 mins., partial water cushion to surface 85 mins.

Blow Description Initial gas flow 740 Mcf increased to 920 Mcf in 110 mins. Increased to 1.2 MMcf in 585 mins., with water spray. Estimated water flow at 2 bbl/hr. Remained steady for remainder of test.

Measured With Johnson critical flow prover

Fluid Recovery

Total Fluid 627 m Mud _____

Oil _____ Water 627 m

No. of samples 4 From 2-flare, 2-drillpipe

Samples Sent To _____

Pressure Readings

IHP 47,630 (1) ISIP _____ (1) FP _____ to _____ (2) SIP 34,830

(2) FP 5,047 to 11,447 (3) FSIP 35,546 FHP 50,482 BHT 350 °F

Remarks Had trouble getting PCT tool open, once opened could not get tool to close. Pulled 35 000 daN over string weight to open bypass. Drill stem test - misrun. Tool plugged.

Witness _____ Field Supervisor R.L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 7

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 23, 1980

Test Interval 4266 m - 4274 m Formation Arnica

Testing Co. Johnson Type of Test MFE

Hole Size 178.5 mm Packer Size Baker Model "D" Choke Size 3/4"

Auxiliary Equipment 1200' water cushion with inhibitor

Time Record

Preflow _____ mins (1) ISI _____ (1) VO _____ mins (2) SI _____ mins

(2) VO 105 mins (3) FSI 375 mins

Gas Measurement

Preflow Description SAB, GTS in 15 mins., cushion to surface 18 mins.

Blow Description Flow rate after 30 mins. - 6.85 MMcfd, decreased after cushion cleaned up to 6.3 MMcfd and remained steady for remainder of flow period.

Measured With Johnson critical flow prover

Fluid Recovery

Total Fluid 142.5 m Mud 114 m

Oil _____ Water 28.5 m

No. of samples Two - 1 gas, 1 water From _____

Samples Sent To _____

Pressure Readings

IHP 46,479 (1) ISIP _____ (1) FP _____ to _____ (2) SIP _____

(2) FP 12,369 to 13,731 (3) FSIP 40,314 FHP 45,796 BHT 349 °F

Remarks Flowed for 1-3/4 hours, closed tool for shut in, could not get tool to reopen. Hoisted tools, bottom four stands plugged with very heavy gas cut mud. Bottom four feet of recovery and top of testing tools baked to a dry powder. Shut in pressure was a straight line, increase to recorded pressure.

Witness Field Supervisor

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

DRILL STEM TEST REPORT

DST No. 8

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date March 25, 1980

Test Interval 4050 m - 4073 m Formation Arnica

Testing Co. Johnson Type of Test MFE

Hole Size 178.5 mm Packer Size Baker Model "D" Choke Size 3/4"

Auxiliary Equipment 56 m high viscosity gelled mud, 466 m water cushion

Time Record

Preflow _____ mins (1) ISI _____ (1) VO _____ mins (2) SI _____ mins

(2) VO 105 mins (3) FSI 120 mins

Gas Measurement

Preflow Description WAB, gas to surface in 47 min. TSTM

Blow Description Increase slightly at end of test. No cushion to surface.

Measured With _____

Fluid Recovery

Total Fluid 522 m Mud 56 m gelled mud

Oil _____ Water 466 m

No. of samples 1 - bottom hole From _____

Samples Sent To _____

Pressure Readings

IHP 47630 (1) ISIP _____ (1) FP 10651 to 10793 (2) SIP 28429

(2) FP _____ to _____ (3) FSIP _____ FHP 46208 BHT _____ ° F

Remarks High viscosity gel clean and somewhat gassified. No plugging in any part of the tool or drill string. Shut in pressure very slow to buildup. Would appear to take 6-8 hours to get final buildup. All of the cushion was gassified.

Witness

Field Supervisor

R.L. Toole

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District 6020 Ticket No. 1718 Company COLUMBIA GAS DEVELOPMENTS OF CANADA LIMITED

Address 639-5th Ave. S.W. Test No. 1 J.T. No. 1

Calgary

Field DEVELOPMENT Well Name Columbia Et Al Kotaneelee

Province Yukon Number 1-4T-48

Co. Rep. Date February 24/80

Technician Formation Thickness

Interval T D 4430

C. Adams, and D. Collins

TEST DATA

Type of Test PCT DST.

Time Started in Hole	18:00 Hrs.	Tool Opened	Hrs.
First Flow	Min.	Initial Shut-In	Min.
Second Flow	Min.	Second Shut-In	Min.
Third Flow	Min.	Final Shut-In	Min.
Pulled Loose @	Hrs.	Out of Hole	09:00 Hrs.
Wt. Set/on Packers	N	Pulled Loose Wt.	N

Description of Blow During Test

FLUID RECOVERY Was Test Reverse Circulated Yes ☐ No ☐

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: Could not get to bottom. Not enough tubing. TEST MISRUN.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.220	
Jars	2.230	
PCT	5.660	
HRT	2.310	
Cross Over	.220	
Recorder	1.310	
Safety Joint	.530	
Packer	1.770	
TOTAL:	14.250	
Perf	1.829	
Recorder	1.800	
Recorder	1.710	
Recorder	1.805	
Bull Nose	.220	
TOTAL:	7.364	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19

Fluid Cushion Type Water Amt. 914m.

MUD AND HOLE DATA

Mud Type Gel W.L. 6.0

Filter Cake Visc. 50 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5" PH6

Drill Collar Size 3.5" IF &

Drill Collar Length 171.0 &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

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1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		AK1- 1847	AK1- 4522	AK1- 4520	
CAPACITY (kpa)		68 964	81 703	82 048	
INSTRUMENT DEPTH m.					
INSTRUMENT OPENING					
WELL TEMP. °C.					
INITIAL HYDROSTATIC	A				
FIRST FLOW	B				
	B-1				
INITIAL SHUT-IN	C				
SECOND FLOW	D				
	D-1				
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G				
FINAL HYDROSTATIC	H				

FLUID SAMPLE REPORT

Sample No.
Type PCT
Depth
Volume 2 000cc

Sample Pressure:
Kpa at Surface
Gravity API @ °C
Gas/Oil Ratio [1]

Recovery:
m³ Gas
cm³ Oil
cm³ Water
cm³ Mud
Total Liquid cm³

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$

E-1 & E-13A

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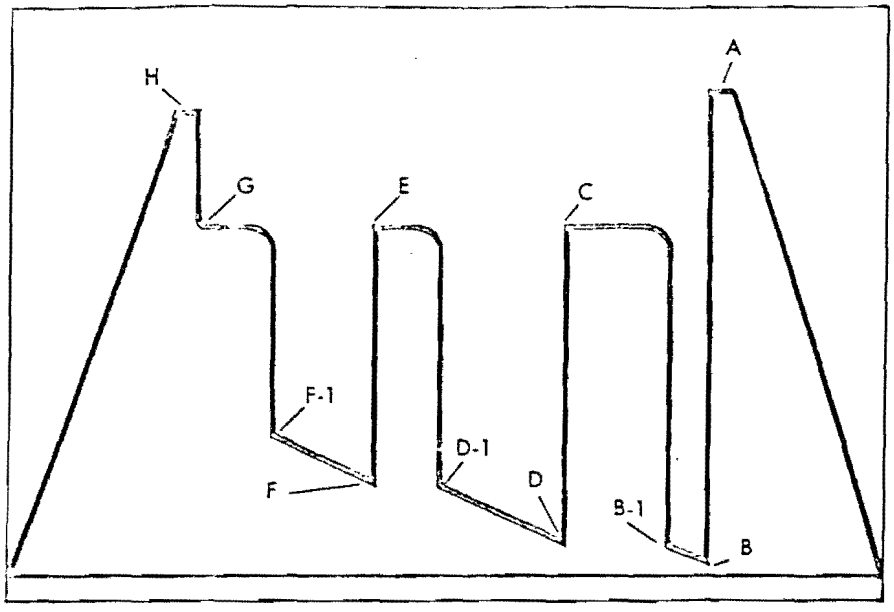
Testing Services
321 - 50TH AVENUE S.E. • CALGARY, ALBERTA T2G 2B3 • PH. (403) 255-1151

GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

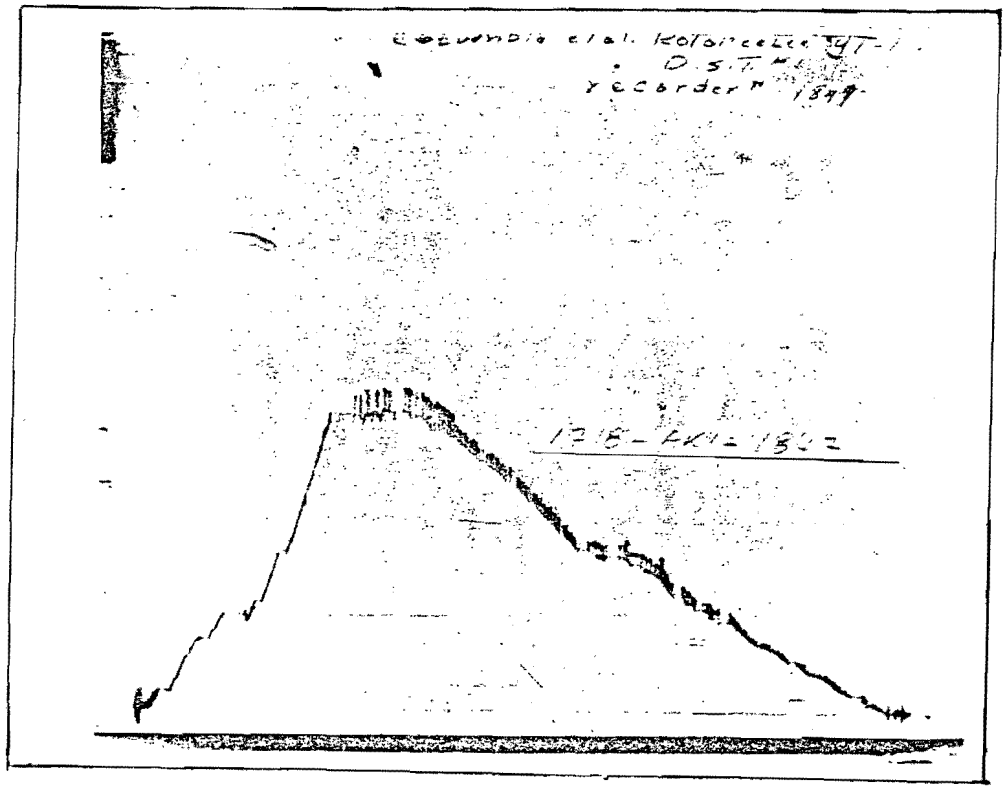
FIELD REPORT NO. _____ RECORDER NO. _____

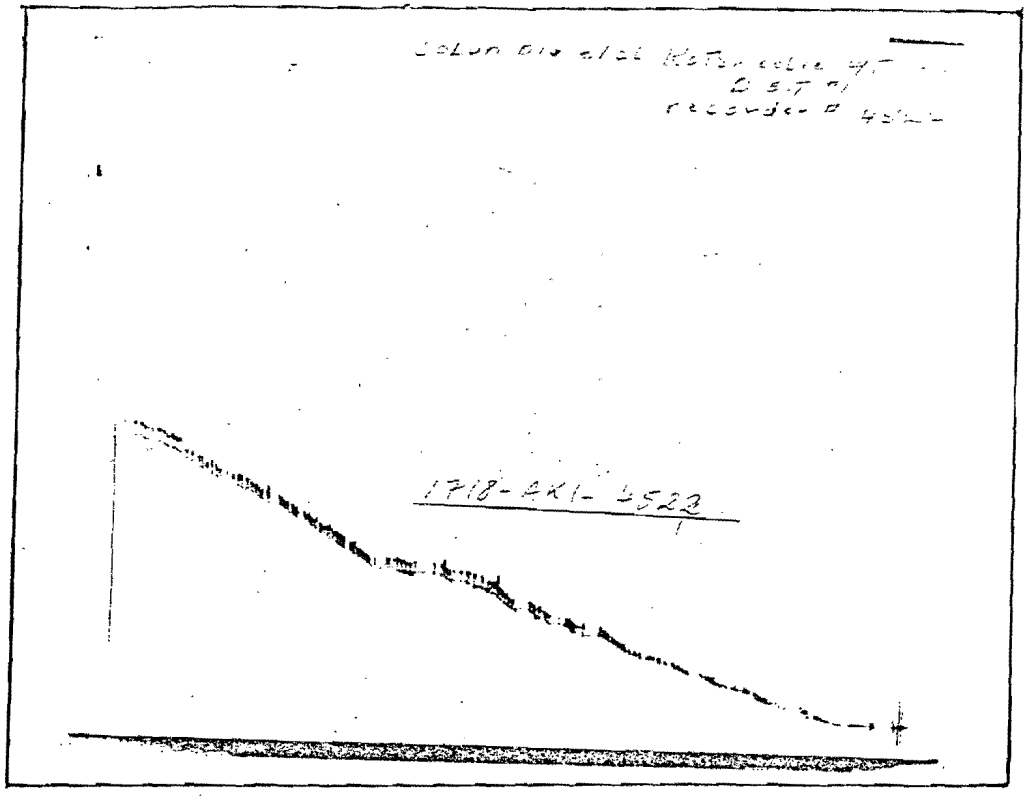


A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
Z — Special pressure points such as pumping pressures recorded for formation breakdown.

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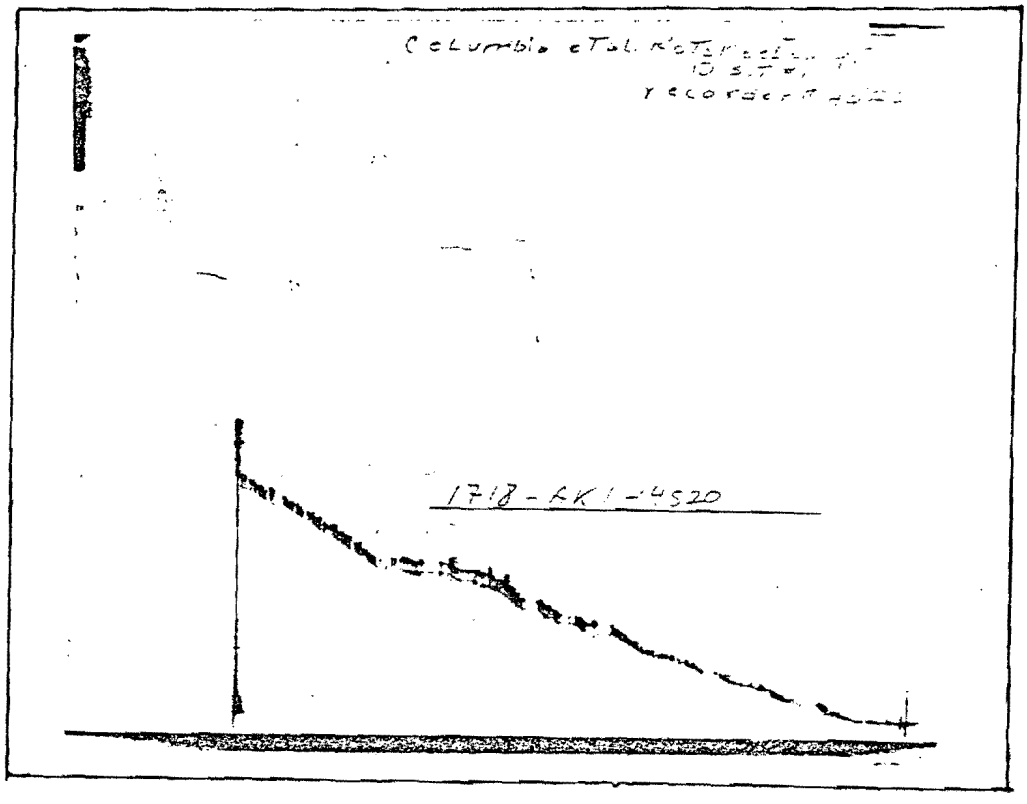
1718-AK1-4520

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A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District 6020 Ticket No. 1719

Company COLUMBIA GAS DEVELOPMENTS CANADA LIMITED

Address 639-5th Ave. S.W.
Calgary

Test No. 2 J.T. No. 2

Well Name Columbia Et Al Kotaneelee 2

Field Development

Number 1-4T-48

Province Yukon

Date March 1/80

Co. Rep.

Formation Arnica

Thickness TD 4415

Technician C. Adams, and D. Collins

Interval 4270-4415

TEST DATA

Type of Test	PCT DST.				
Time Started in Hole	21:30	Hrs.	Tool Opened	08:30	Hrs.
First Flow	45	Min.	Initial Shut-In	60	Min.
Second Flow	15	Min.	Second Shut-In		Min.
Third Flow		Min.	Final Shut-In	125	Min.
Pulled Loose @	15:00	Hrs.	Out of Hole	07:00	Hrs.
Wt. Set/on Packers	10 000 da N		Pulled Loose Wt.		N

Description of Blow During Test: Preflow: Fair air blow. Gas to surface in 10 minutes, immediately after water cushion.

FLUID RECOVERY — Was Test Reverse Circulated Yes ☒ No ☐

Total Fluid Recovered 85m.

Description of Fluid Recovered 85m of watery mud.

GAS BLOW MEASUREMENT

Measured With Willis Adjustable Choke. I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: TEST SATISFACTORY.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Collars		
Pump Out Sub	.22	
Drill Collar		
Jars	2.23	
PCT	5.66	
HRT	2.31	
Cross Over Sub	.22	
Recorder	1.31	
Safety Joint	.53	
Packer	1.77	
TOTAL:	14.25	
Perf	1.52	
Recorder	1.80	
Recorder	1.71	
Recorder	1.80	
Bull Nose	.22	
TOTAL:	7.05	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm

Fluid Cushion Type Water Amt. 914m

MUD AND HOLE DATA

Mud Type Gel W.L. 6.0

Filter Cake Visc. 65 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5" IF

Drill Collar Size 3.5" IF &

Drill Collar Length 171.0 &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

JT 1&E 4B REV 78

JT-1 & E-13A

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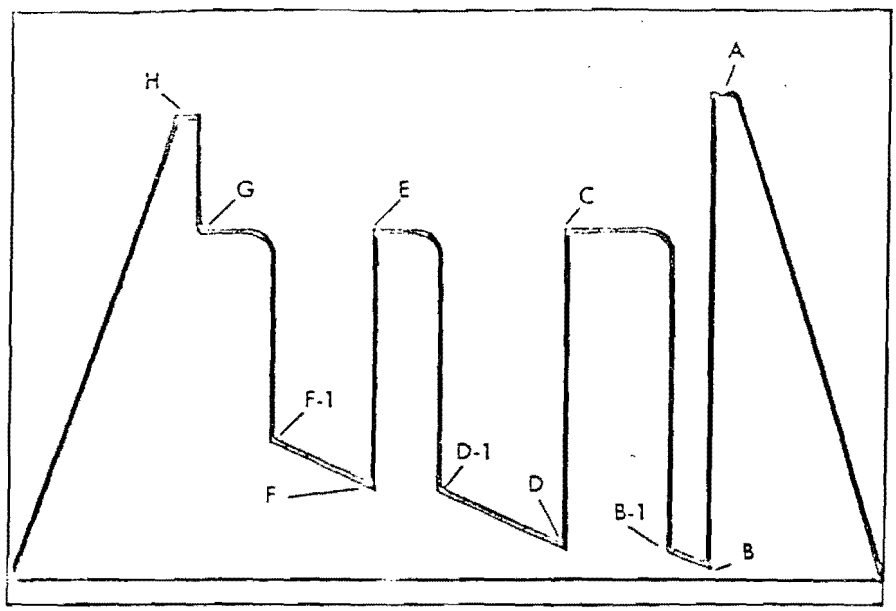
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

FIELD REPORT NO. _____ RECORDER NO. _____



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B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

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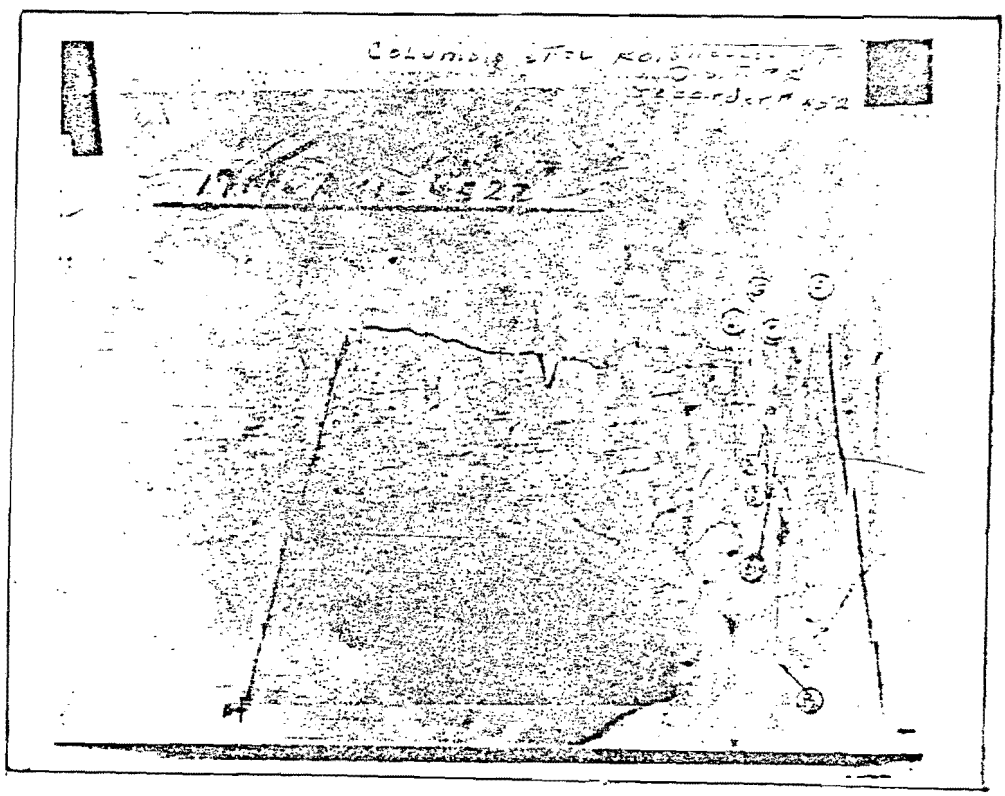

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1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		AK1- 4522	AK1- 1847	AK1- 4520
CAPACITY (kpa)		81 702	68 947	82 047
INSTRUMENT DEPTH m.				
INSTRUMENT OPENING				
WELL TEMP. °C.		182 °c		
INITIAL HYDROSTATIC	A	45 710	46 272	46 236
FIRST FLOW	B	8 676	9 074	Clock
	B-1	32 356	32 827	Stopped.
INITIAL SHUT-IN	C	38 875	Clock	
SECOND FLOW	D	35 195	Stopped.	
	D-1	35 783		
SECOND SHUT-IN	E			
THIRD FLOW	F			
	F-1			
FINAL SHUT-IN	G	38 989		
FINAL HYDROSTATIC	H	42 029		

FLUID SAMPLE REPORT

Sample No.
Type PCT
Depth
Volume

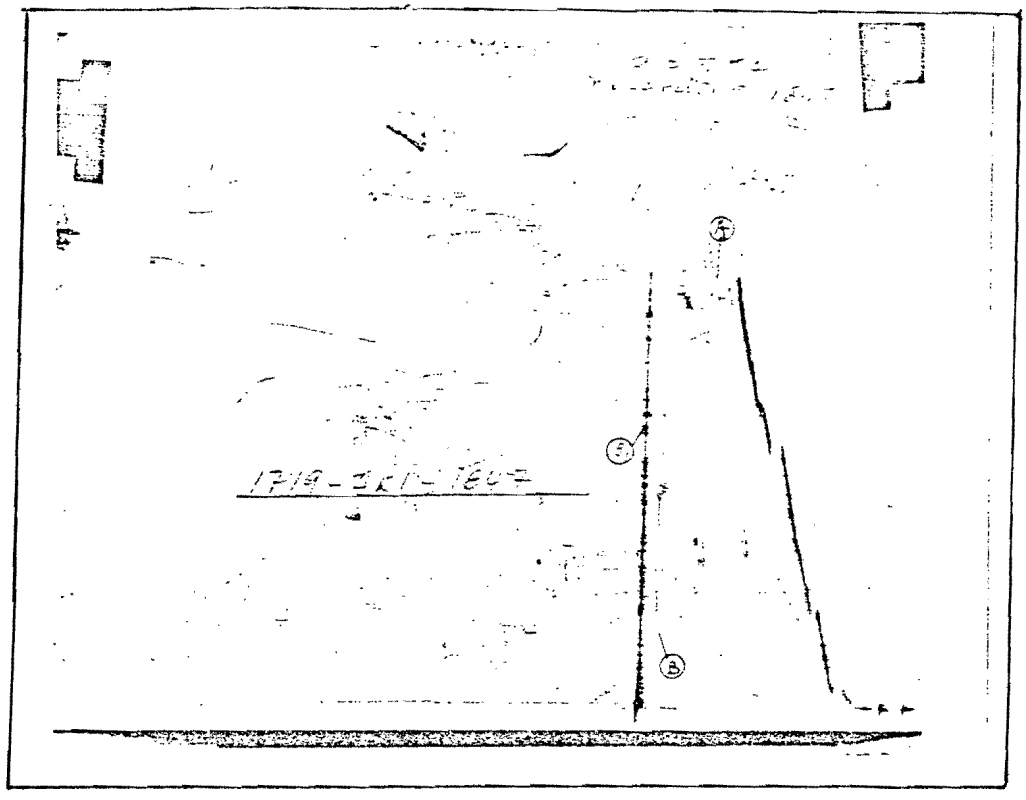
Sample Pressure:
Kpa at Surface
Gravity API @ °C
Gas/Oil Ratio [1]

Recovery:
m³ Gas
cm³ Oil
cm³ Water
cm³ Mud
Total Liquid cm³

REMARKS:

PRESSURE INCREMENTS ON RECORDER # AK1- 4522

POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$
INITIAL	SHUT-IN	T=38	FINAL	SHUT-IN	T=56			
0	32 356		0	35 783				
5	32 764	8.600	5	37 978	12.200			
10	33 433	4.800	10	38 647	6.600			
15	34 869	3.533	15	38 728	4.733			
20	36 427	2.900	20	38 769	3.800			
25	37 447	2.520	25	38 818	3.240			
30	38 051	2.267	30	38 843	3.867			
35	38 459	2.086	40	38 883	2.400			
40	38 679	1.950	50	38 916	2.120			
45	38 761	1.844	60	38 940	1.933			
50	38 818	1.760	70	38 957	1.800			
57	38 875	1.667	80	38 965	1.700			
			90	38 973	1.622			
			100	38 981	1.560			
			110	38 981	1.509			
			120	38 989	1.467			
			130	38 989	1.431			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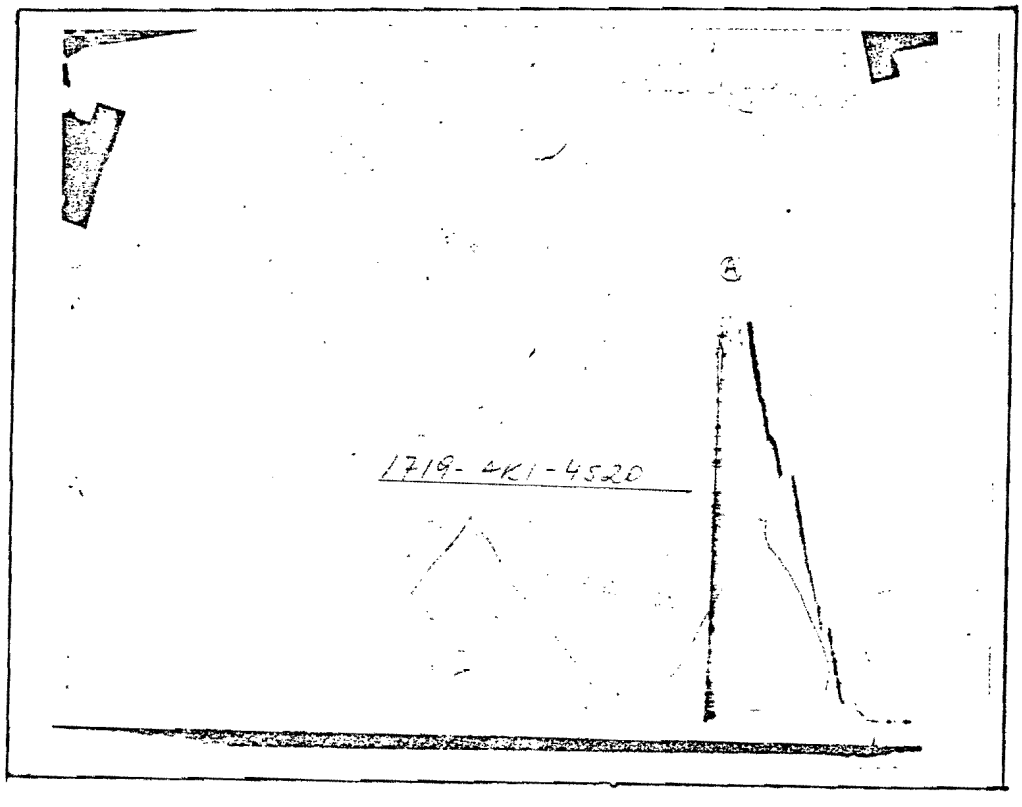
1719-4K1-4520

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RESERVOIR PRESSURE PLOT

RECORDER No. AK1-4522 CAPACITY _____ kPa FIELD REPORT No. 1719

MAXIMUM RESERVOIR PRESSURE _____ kPa

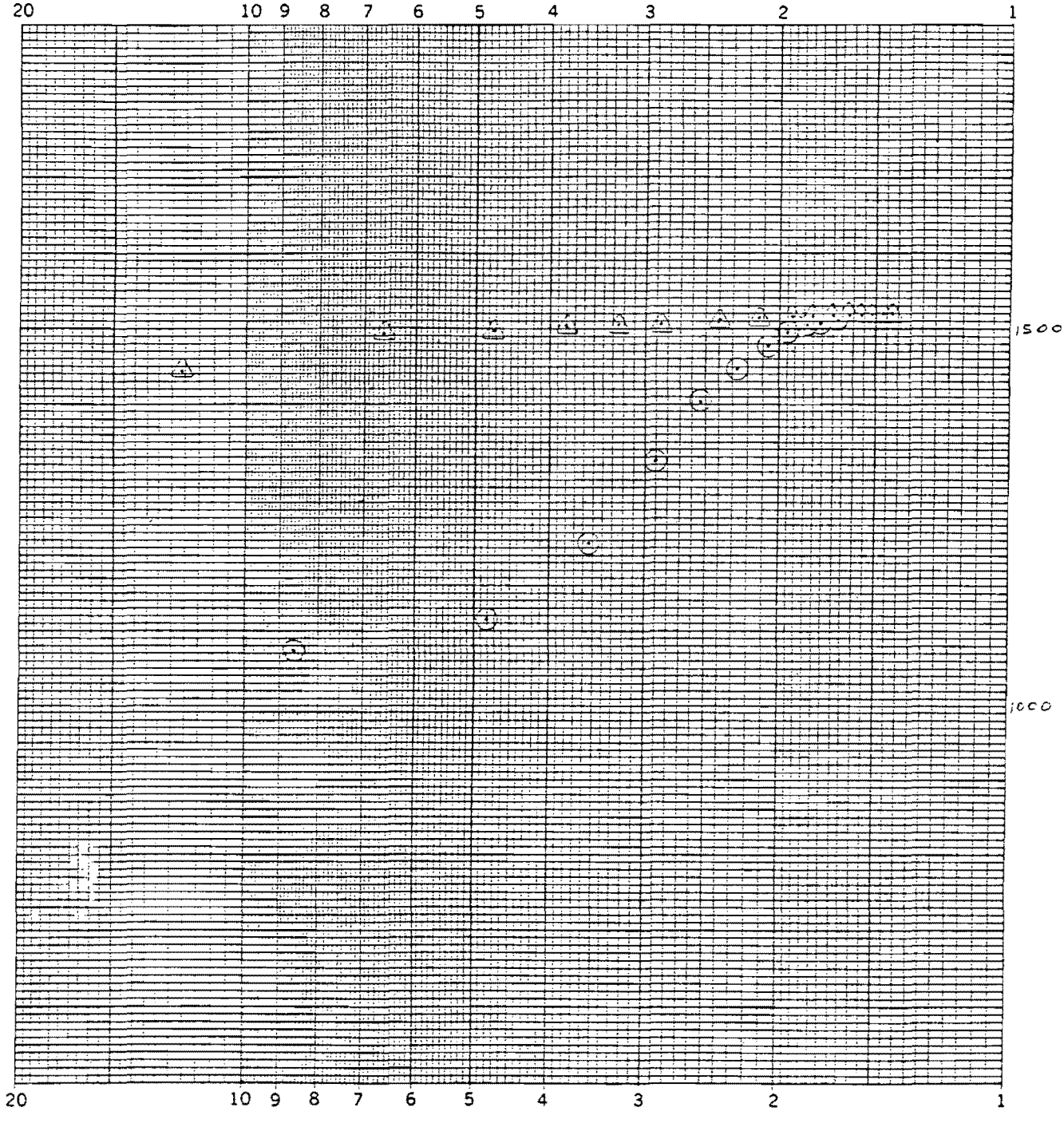
SLOPE OF SHUT-IN CURVE M _____ kPa/LOG CYCLE _____

SLOPE M1 = P_1 ..... P_{10} ..... = kPa/LOG CYCLE _____

SLOPE M2 = P_1 ..... P_{10} ..... = kPa/LOG CYCLE _____

EXTRAPOLATED INITIAL SHUT-IN PRESSURE = _____ kPa _____ ○ = INITIAL SHUT-IN _____

EXTRAPOLATED FINAL SHUT-IN PRESSURE = _____ kPa _____ △ = FINAL SHUT-IN _____



PRESSURE kPa $\times 10^6$

$$\frac{T + \Delta t}{\Delta t}$$

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District	6020	Ticket No.	1720
Company	COLUMBIA GAS DEVELOPMENT CANADA LIMITED		
Address	639-5th Ave. S.W.	Test No.	3
	Calgary	J.T. No.	3
Field	DEVELOPMENT	Well Name	Columbia Et Al Kotaneelee
Province	Yukon	Number	1-4T-48
Co. Rep.		Date	March 6/80
Technician	C. Adams, and D. Collins	Formation	Arnica
		Interval	
		Thickness T D	4415

TEST DATA

Type of Test	Positest DST.				
Time Started in Hole	10:30	Hrs.	Tool Opened	18:35	Hrs.
First Flow		Min.	Initial Shut-In	75	Min.
Second Flow		Min.	Second Shut-In		Min.
Third Flow		Min.	Final Shut-In	57	Min.
Pulled Loose @	19:47	Hrs.	Out of Hole	02:00	Hrs.
Wt. Set/on Packers	10 000 da	N	Pulled Loose Wt.	2 000 da	N

Description of Blow During Test: Preflow: Fair air blow, gas to surface in 50 minutes when cushion and mud were recovered. Fairly strong blow. Unable to measure. Gas flow estimated at 56.300×10^3 m^3.

FLUID RECOVERY — Was Test Reverse Circulated Yes ☒ No ☐

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: Packer seat was lost during initial shut-in after 46 minutes.
TEST SATISFACTORY.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Collars		
Pump Out Sub	.220	
Drill Collar		
Jars	2.230	
Cross Over Sub	.220	
MFE	2.470	
By-Pass	.870	
Pressure Recorder	1.310	
Drill Collar		
Positest	1.770	
Perfs	1.520	
Pressure Recorder	1.800	
Pressure Recorder	1.710	
Recorder	1.800	
Bull Nose	.220	
TOTAL:	16.140	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm

Fluid Cushion Type Water Amt. 914m

MUD AND HOLE DATA

Mud Type Gel W.L.

Filter Cake Visc. 65 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5" IF

Drill Collar Size 3.5" IF &

Drill Collar Length 171.0 &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

JT 1&E 48 REV 78

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JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		AK1- 1847	AK1- 4522	AK1- 4520	
CAPACITY (kpa)		68 947	81 702	82 047	
INSTRUMENT DEPTH m.					
INSTRUMENT OPENING					
WELL TEMP. °C.		174.9°c			
INITIAL HYDROSTATIC	A	Clock	46 024	46 330	
FIRST FLOW	B	Stopped.	12 793	12 836	
	B-1		15 908	15 857	
INITIAL SHUT-IN	C		39 127	39 391	
SECOND FLOW	D				
	D-1				
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G				
FINAL HYDROSTATIC	H		45 749	46 031	

FLUID SAMPLE REPORT

Sample No.
Type
Depth
Volume

Sample Pressure:
Kpa at Surface
Gravity API @ °C
Gas/Oil Ratio [1]

Recovery:
m^3 Gas
cm^3 Oil
cm^3 Water
cm^3 Mud
Total Liquid cm^3

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T+\Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T+\Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T+\Delta t}{\Delta t}$

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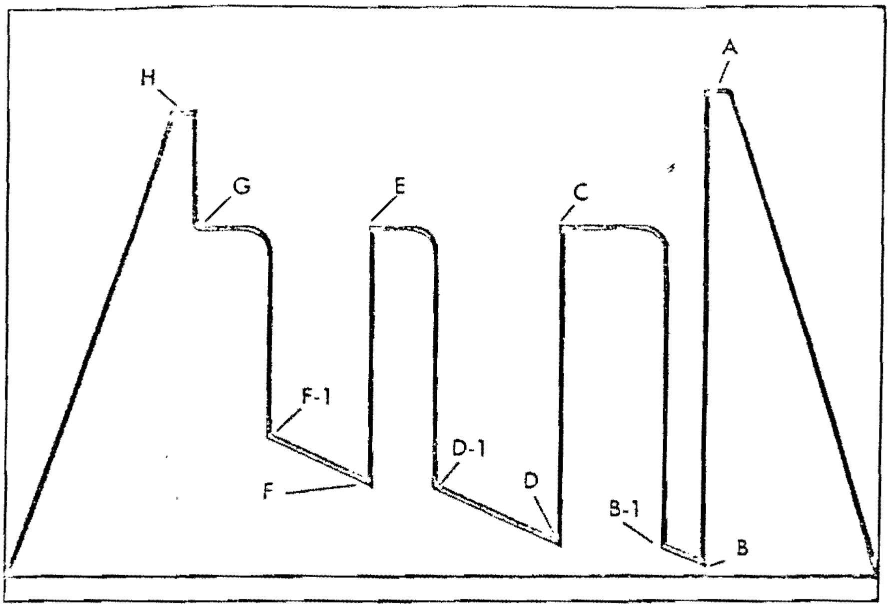
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

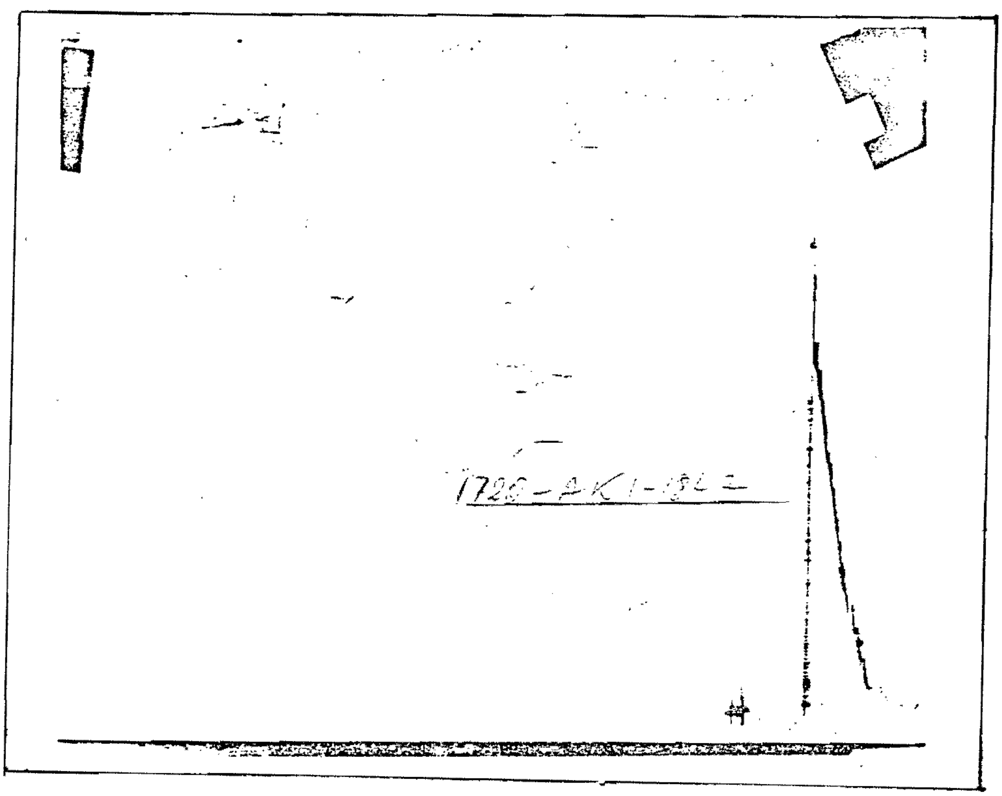
FIELD REPORT NO. RECORDER NO.

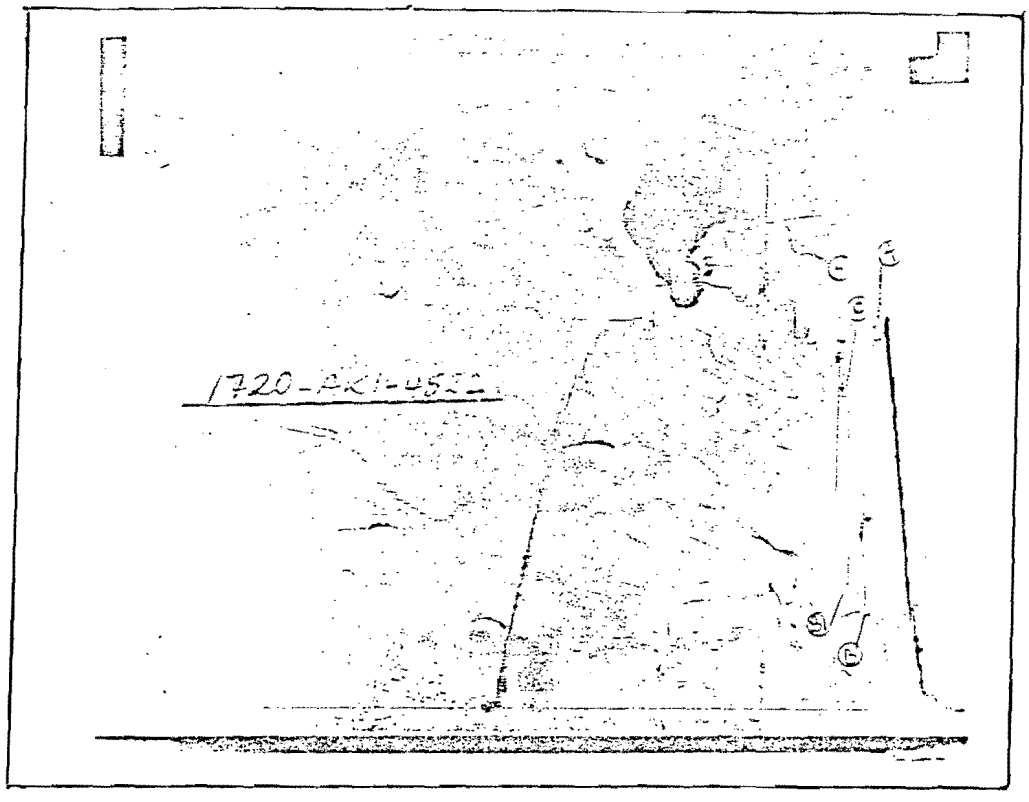


A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
Z — Special pressure points such as pumping pressures recorded for formation breakdown.




1720-PK1-0522


1720-PK1-0523

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District 6020 Ticket No. 1721 Company COLUMBIA GAS DEVELOPMENT CANADA LIMITED

Address 639-5th Ave. S.W. Test No. J.T. No. 4

Calgary Well Name Columbia Et Al Kotaneelee 4

Field Yukon Number 4T-1-48

Province Yukon Date March 8/80

Co. Rep. Robert Toole Formation Thickness

Technician Interval 4362-4415 TD 4415

C. Adams

TEST DATA

Type of Test PCT DST.

Time Started in Hole	02:30 Hrs.	Tool Opened	10:53 Hrs.
First Flow	Min.	Initial Shut-In	Min.
Second Flow	Min.	Second Shut-In	Min.
Third Flow	Min.	Final Shut-In	Min.
Pulled Loose @	22:30 Hrs.	Out of Hole	06:30 Hrs.
Wt. Set/on Packers	8 000 da N	Pulled Loose Wt.	6 000 da N

Description of Blow During Test Preflow: Weak initial puff increasing to moderate.
Final Flow: Weak, steady gas blow throughout.

FLUID RECOVERY Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered 3 000m.

Description of Fluid Recovered 3 000m of water cushion.

GAS BLOW MEASUREMENT

Measured With I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: Clocks didn't run. Charts not available. Found tools plugged with cement, shale, and mud. TEST MISRUN.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.25	
Drill Collars		
Cross Over Sub	.23	
MFE and Sample Chamber	2.91	
By-Pass	.91	
Pressure Recorder	1.42	
Pressure Recorder	1.77	
Pressure Recorder	1.80	
Temperature Recorder	1.80	
Cross Over Sub		
Stinger	2.88	
TOTAL:	13.97	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm.

Fluid Cushion Type Water Amt. 3000m.

MUD AND HOLE DATA

Mud Type Gel W.L.

Filter Cake Visc. 65 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5 IF

Drill Collar Size 3.5 IF &

Drill Collar Length 57m. &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

J.T. 1 & E 4B REV. 78

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JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		AK1- 1847	AK1- 4522	AK1- 4520	Temp. 16295	
CAPACITY (kpa)		68 984	81 703	82 048		
INSTRUMENT DEPTH m.		4354.0	4356.0	4358.0	4360.0	
INSTRUMENT OPENING		Inside	Inside	Inside	Inside	
WELL TEMP. °C.		177° c				
INITIAL HYDROSTATIC	A					
FIRST FLOW	B					
	B-1					
INITIAL SHUT-IN	C					
SECOND FLOW	D					
	D-1					
SECOND SHUT-IN	E					
THIRD FLOW	F					
	F-1					
FINAL SHUT-IN	G					
FINAL HYDROSTATIC	H					

FLUID SAMPLE REPORT

Sample No.
Type MFE
Depth 4352.00
Volume 2 500cc

Sample Pressure:
Kpa at Surface

Density
Gas/Oil Ratio [1]

Recovery:
m^3 Gas
cm^3 Oil
cm^3 Water
cm^3 Mud
Total Liquid cm^3

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$

J.T.-1&E-5B REV. 78

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District	6020	Ticket No.	1722
Company	COLUMBIA GAS DEVELOPMENTS LIMITED		
Address	639-5th Ave. S.W.	Test No.	J.T. No.
	Calgary	Well Name	Columbia Et Al Kotaneelee 5 5
Field	Wildcat	Number	4T-1-48
Province	Yukon	Date	March 18/80
Co. Rep.	Robert Toole	Formation	Arnica
Technician	C. Adams	Interval	4362-4415
		Thickness	TD 4415

TEST DATA

Type of Test	PCT DST.		
Time Started in Hole	18:30 Hrs.	Tool Opened	01:55 Hrs.
First Flow	285 Min.	Initial Shut-In	150 Min.
Second Flow	150 Min.	Second Shut-In	Min.
Third Flow	Min.	Final Shut-In	240 Min.
Pulled Loose @	16:20 Hrs.	Out of Hole	06:00 Hrs.
Wt. Set/on Packers	8 000 da N	Pulled Loose Wt.	6 000 da N

Description of Blow During Test: Preflow: Good air blow, Water cushion to surface in 50 mins. Final Flow: Gas to surface in 60 minutes.

FLUID RECOVERY Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With Willis Adjustable Choke. I.D.

Time	m^3/fce. Choke m	KPa Pressure	$m^3 \times 10^3$ Flow Rate
60	24	1931	211.31
180	24	1517	169.04

REMARKS: On valve open good initial puff. Unload 6 000' water cushion, and established a gas flow rate. TEST CONCLUSIVE.

	RESISTIVITY		SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.25	
Drill Collars		
Cross Over Sub	.23	
MFE	2.91	
By-Pass	.91	
Pressure Recorder	1.42	
Pressure Recorder	1.77	
Pressure Recorder	1.80	
Cross Over Sub		
Stinger	2.88	
TOTAL:	12.17	

TOTAL LENGTH	
Elevation G.L.	K.B.
Bottom Hole Choke Size	19mm.
Fluid Cushion Type	Water Amt. 1828m.

MUD AND HOLE DATA

Mud Type	Gel W.L. 6.0
Filter Cake	Visc. 65 Wt. 1 170
Time Taken	
Contractor	Nabors Rig No. 9
Drill Pipe Size	3.5 PH
Drill Collar Size	3.5 IF &
Drill Collar Length	57m. &
Main Hole Size	178mm. Rat Hole

Distribution of Reports

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JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		AK1- 4522	AK1- 4520	AK1- 1847	
CAPACITY (kpa)		81 703	82 048	68 984	
INSTRUMENT DEPTH m.		4358.0	4356.0	4364.0	
INSTRUMENT OPENING		Inside	Inside	Inside	
WELL TEMP. °C.		177° c			
INITIAL HYDROSTATIC	A	48 544	Clock	48 668	
FIRST FLOW	B	20 509	Stopped	20 653	
	B-1	Clock		6 941	
INITIAL SHUT-IN	C	Stopped		Not Valid	
SECOND FLOW	D			2 821	
	D-1			7 154	
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G			39 568	
FINAL HYDROSTATIC	H				

FLUID SAMPLE REPORT

Sample No.
Type MFE
Depth 4352.00
Volume 2 500cc

Sample Pressure:
Kpa at Surface
Density
Gas/Oil Ratio [1]

Recovery:
m^3 Gas
cm^3 Oil
cm^3 Water
cm^3 Mud
Total Liquid cm^3

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$

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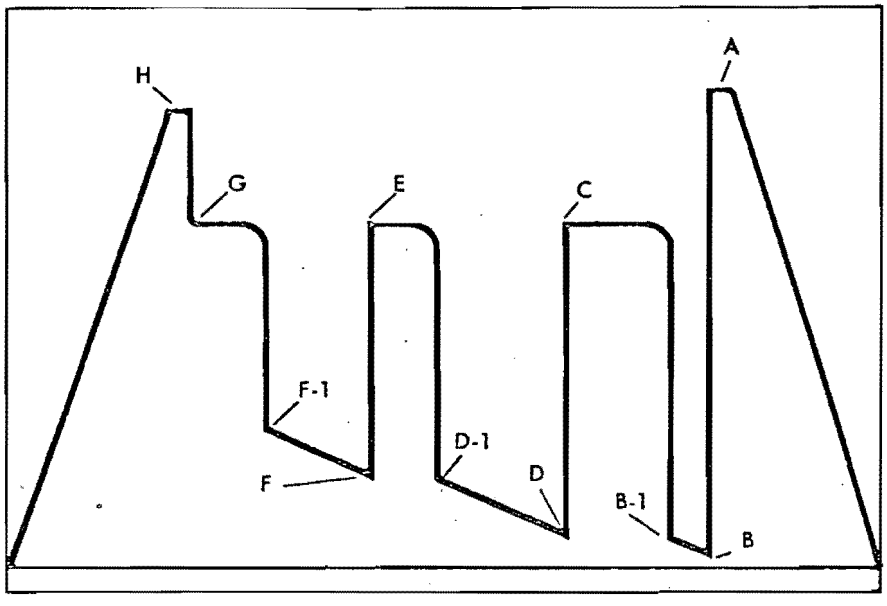
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

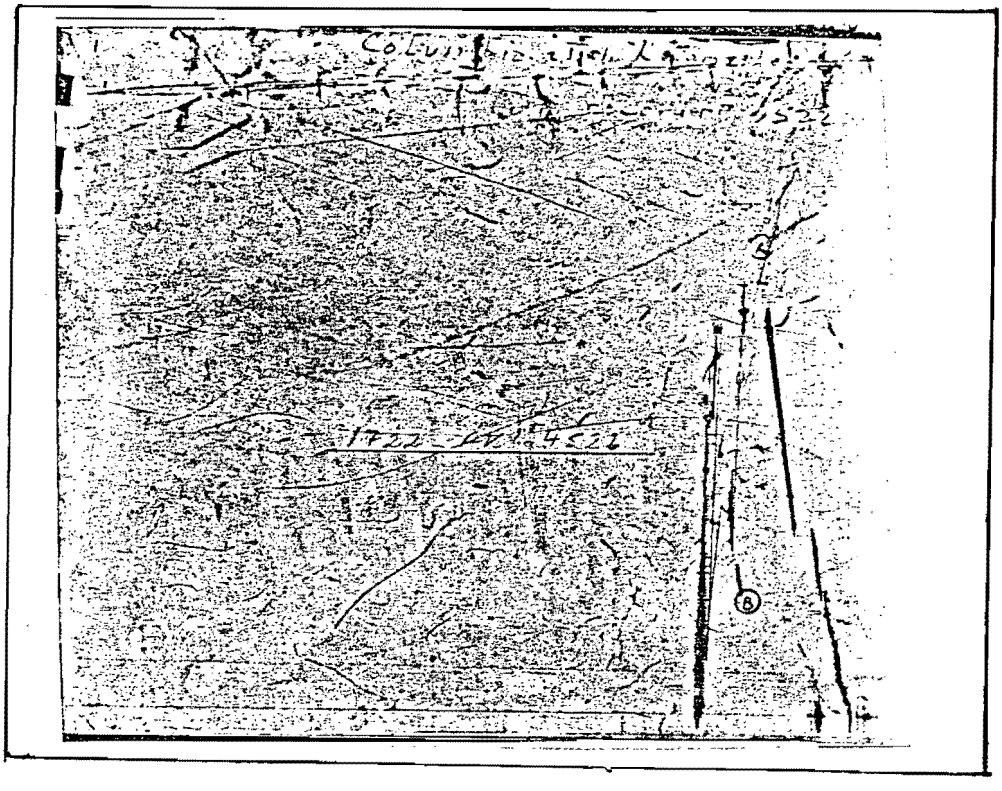
FIELD REPORT NO. _____ RECORDER NO. _____

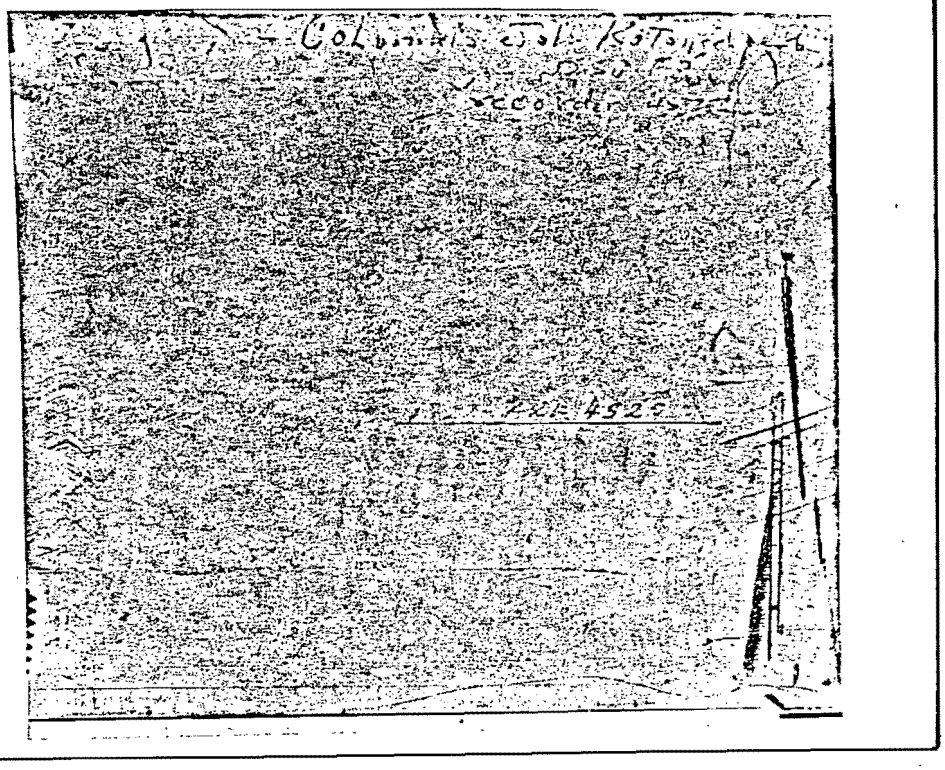


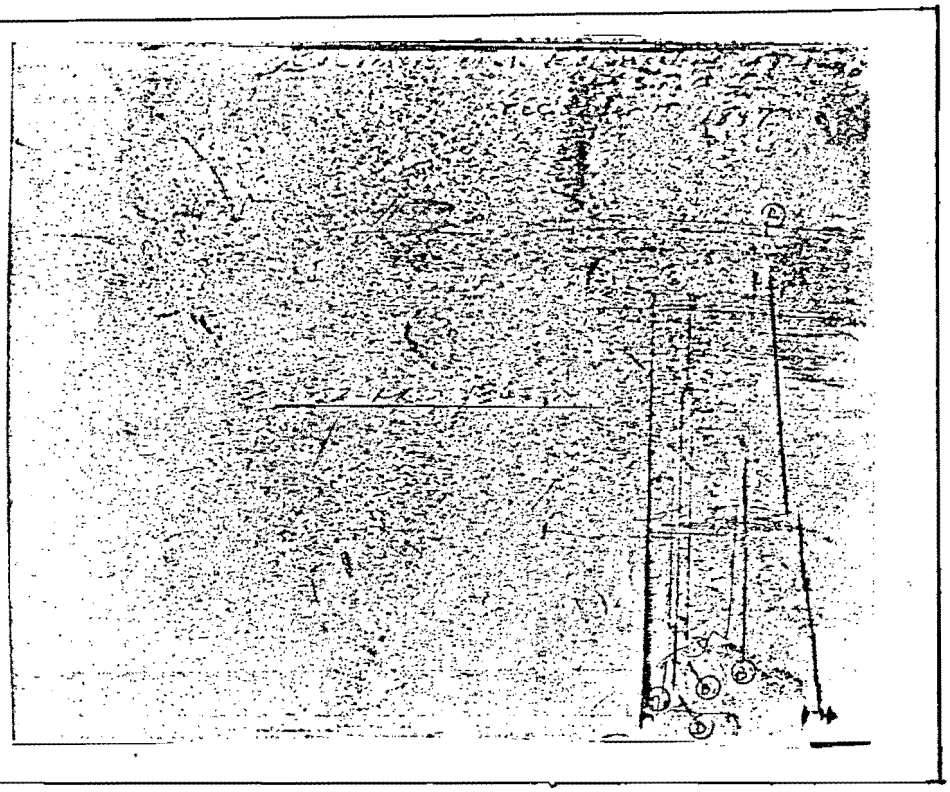
A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
Z — Special pressure points such as pumping pressures recorded for formation breakdown.







JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District	6020	Ticket No.	1723
Company	COLUMBIA GAS DEVELOPMENT CANADA LIMITED		
Address	639-5th Ave. S.W.	Test No.	J.T. No.
	Calgary	Well Name	Columbia Et Al Kotaneelee 6 — 6
Field	Wildcat	Number	4T-1-48
Province	Yukon	Date	March 21/80
Co. Rep.	Robert Toole	Formation	Arnica
Technician	C. Adams	Interval	4266-4274
		Thickness TD	4415

TEST DATA

Type of Test	PCT DST		
Time Started in Hole	16:00 Hrs.	Tool Opened	01:20 Hrs.
First Flow	Min.	Initial Shut-In	Min.
Second Flow	Min.	Second Shut-In	Min.
Third Flow	Min.	Final Shut-In	Min.
Pulled Loose @	19:00 Hrs.	Out of Hole	24:00 Hrs.
Wt. Set/on Packers	7 000 da N	Pulled Loose Wt.	6 000 da N

Description of Blow During Test: Preflow: Weak air blow. Gas to surface in 65 minutes. Final Flow: Water cushion in 85 minutes. Initial gas flare.

FLUID RECOVERY — Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: Tool plugging. TEST MISRUN.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.23	
Drill Collars		
PCT	7.90	
HRT	.31	
Cross Over Sub	2.30	
Pressure Recorder	2.36	
Pressure Recorder	2.64	
Pressure Recorder		
Cross Over Sub	2.86	
Stinger		
	18.60	
TOTAL:		
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm.

Fluid Cushion Type Water Amt. 984m.

MUD AND HOLE DATA

Mud Type	Gel	W.L.	
Filter Cake		Visc. 65	Wt. 1 170
Time Taken			
Contractor	Nabors	Rig No.	9
Drill Pipe Size	3.5 IF		
Drill Collar Size	3.5 IF	&	
Drill Collar Length	57m.	&	
Main Hole Size	177mm.	Rat Hole	

Distribution of Reports

J.T. 1 & E 4B REV. 78

JOHNSTON
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JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		RPG3- 29864	RPG3- 35049	RPG3- 32204	
CAPACITY (kpa)		68 948	58 605	68 948	
INSTRUMENT DEPTH m.					
INSTRUMENT OPENING		Inside	Inside	Inside	
WELL TEMP. °C.		177° c			
INITIAL HYDROSTATIC	A	47 452	47 530	47 243	
FIRST FLOW	B				
	B-1				
INITIAL SHUT-IN	C				
SECOND FLOW	D				
	D-1				
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G				
FINAL HYDROSTATIC	H				

FLUID SAMPLE REPORT

Sample No.
Type PCT
Depth
Volume 2 000 cc
Sample Pressure:
Kpa at Surface
Density
Gas/Oil Ratio [1]

Recovery:
m^3 Gas
cm^3 Oil
cm^3 Water
cm^3 Mud
Total Liquid cm^3

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$

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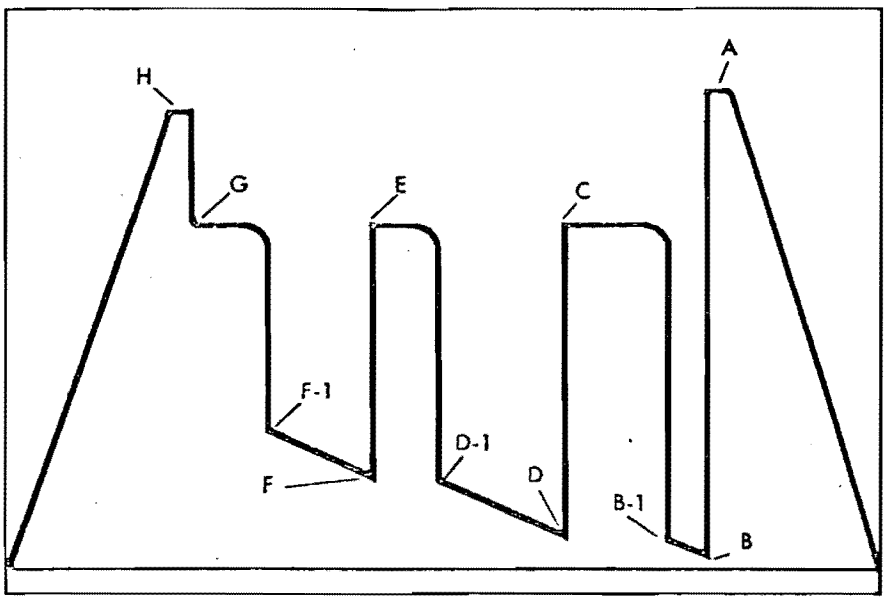
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

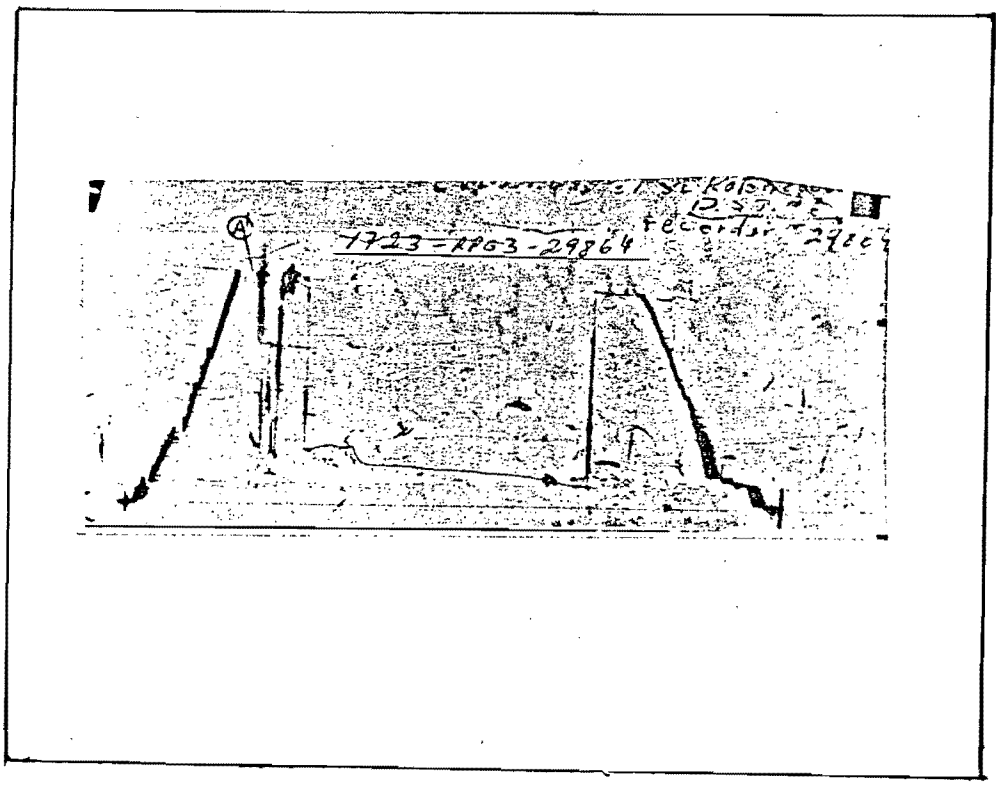
FIELD REPORT NO. _____ RECORDER NO. _____

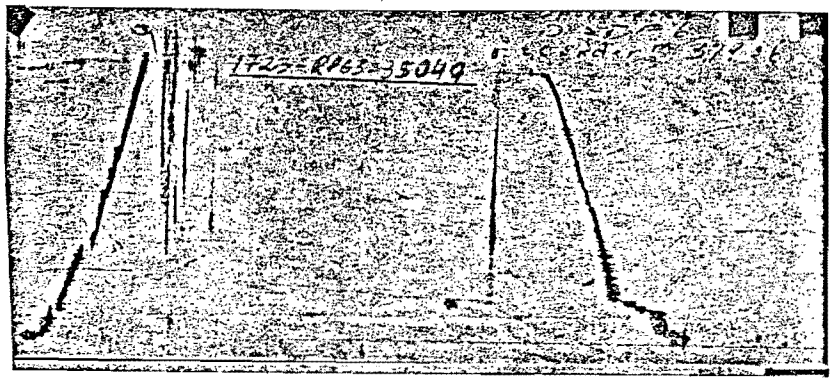


A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
Z — Special pressure points such as pumping pressures recorded for formation breakdown.

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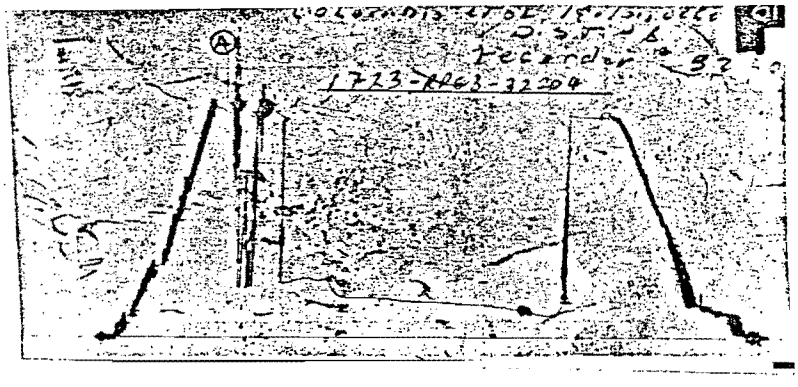
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JOHNSTON TESTERS
Schlumberger

1223 DOME TOWER • 333 - 7th AVENUE S.W. • CALGARY, ALBERTA T2P 2Z1 • PH. (403) 266-7511

April 3, 1980

COLUMBIA GAS DEVELOPMENT LIMITED
1000 Standard Life Building
639 - 5th Avenue S.W.
Calgary, Alberta

ATTENTION: MR. GORD APPLETON

SUBJECT: COLUMBIA ET AL KOTANEELEE 4T-1-48 DST 7

Gentlemen:

The enclosed test appears to be a good mechanical drill stem test during which the tools did function properly. The formation produced enough reservoir fluid for proper identification. Reservoir pressure draw-down was sufficient and adequate shut-in build-ups did occur for reliable quantitative analysis. Reservoir parameters were calculated by the Horner method.

1. FLOW RATE:

A flow rate of 177.5 x 10^3 M3/day of gas was noted during this test.

2. RESERVOIR PRESSURE:

Mechanical stabilization of the shut-in pressure build-up indicates a reservoir pressure of 40 047 KPa at recorder depth.

3. PERMEABILITY:

The calculated flow capacity of 119.3 mD. m indicates an average effective permeability to gas of 14.91 mD. for the assumed 8 meter interval. The calculations were based on a slope of 27 780 246 KPa^2/log cycle obtained from the shut-in build-up plot. It was assumed for these calculations:

A) Gas Gravity: 0.70
B) Viscosity: 2.555 E-5 Pa.s
C) Gas Deviation : 1.09

These figures were obtained from the available technical literature.

4. WELLBORE DAMAGE:

The calculated damage ratio of 8.62 indicates that wellbore damage is present at the time and conditions of this test. The calculated skin factor is + 51.08. These values are considered high. Although damage is present, the skin value is also affected by tubulent flow due to the high flow rate downhole.

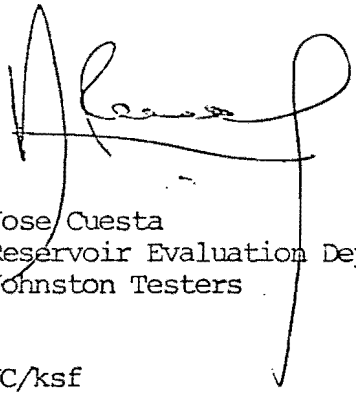
5. RADIUS OF INVESTIGATION:

The calculated radius of investigation of this test is 95.9 meters based on an assumed porosity of 10%, compressibility of 0.016 1/MPa, and other assumptions made in number three above.

6. GENERAL COMMENTS:

The formation exhibits the characteristics of relatively good permeability effective to the reservoir fluid and indicates the presence of wellbore damage.

Sincerely,



Jose Cuesta
Reservoir Evaluation Department
Johnston Testers

JC/ksf

COLUMBIA GAS DEVELOPMENTS
Columbia Et Al Kotaneelee
4T-1-48
DST 7 JT 7
March 23, 1980
Ticket No. 1724
4277-4274

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District 6020	Ticket No. 1724	Company	COLUMBIA GAS DEVELOPMENT LIMITED
Address 639-5th Ave. S.W.			Test No. 7 / J.T. No. 7
Calgary		Well Name	Columbia Et Al Kotaneelee
Field Wildcat		Number	4T-1-48
Province Yukon		Date	March 23/80
Co. Rep. Robert Toole		Formation	Arnica
Technician C. Adams		Interval	4266-4274
		Thickness	TD 4415

TEST DATA

Type of Test	PCT DST.		
Time Started in Hole	07:00 Hrs.	Tool Opened	13:00 Hrs.
First Flow	105 Min.	Initial Shut-In	Min.
Second Flow	400 Min.	Second Shut-In	Min.
Third Flow	Min.	Final Shut-In	Min.
Pulled Loose @	21:00 Hrs.	Out of Hole	05:00 Hrs.
Wt. Set/on Packers	7 000 da. N	Pulled Loose Wt.	6 000 da N

Description of Blow During Test: Preflow: Strong air blow. Gas to surface in 15 minutes. Cushion to surface in 18 minutes.

FLUID RECOVERY — Was Test Reverse Circulated Yes ☐ No ☒

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With I.D.

Time	m^3 Sfce. Choke	KPa Pressure	$m^3 \times 10^3$ Flow Rate
30	24	1758	192.99
	24	1655	177.50

REMARKS: After 2 hours tool would not recycle. Plugged solid with mud and shale. TEST CONCLUSIVE.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.23	
Drill Collars		
Cross Over Sub	.25	
MFE	2.80	
Sample Chamber		
By-Pass	.91	
Pressure Recorder	2.10	
Pressure Recorder	2.36	
Pressure Recorder	2.64	
Cross Over Sub		
Stinger	2.86	
TOTAL:	14.15	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm

Fluid Cushion Type Water Amt. 914.0m

MUD AND HOLE DATA

Mud Type Gel W.L. 6.0

Filter Cake Visc. 65 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5 IF

Drill Collar Size 3.5 IF &

Drill Collar Length 57.0m &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

J.T. 1 & E 4B REV. 78

JOHNSTON
Schlumberger

JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		RPG- 29864	RPG- 35049	RPG- 32204	
CAPACITY (kpa)		68 948	58 605	68 948	
INSTRUMENT DEPTH m.		4260.0	4262.0	4264.0	
INSTRUMENT OPENING		Inside	Inside	Inside	
WELL TEMP. °C.		177° c			
INITIAL HYDROSTATIC	A	46 859	Stylus	47 093	
FIRST FLOW	B	9 643	Loose.	9 099	
	B-1	14 470		14 429	
INITIAL SHUT-IN	C	40 047		40 010	
SECOND FLOW	D				
	D-1				
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G				
FINAL HYDROSTATIC	H	46 831		46 767	

FLUID SAMPLE REPORT

Sample No.
Type MFE
Depth 4248.00
Volume 2 500cc

Sample Pressure:
Kpa at Surface
Density
Gas/Oil Ratio [1]

Recovery:
m³ Gas
cm³ Oil
cm³ Water
cm³ Mud
Total Liquid cm³

REMARKS:

PRESSURE INCREMENTS ON RECORDER # RPG- 29864

POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE KPa	$\frac{T + \Delta t}{\Delta t}$
INITIAL	SHUT-IN	T=105						
0	14 478							
5	23 872	22.000						
10	30 071	11.500						
15	32 256	8.000						
20	38 718	6.250						
25	39 736	5.200						
30	39 849	4.500						
40	39 905	3.625						
50	39 919	3.100						
60	39 948	2.750						
70	39 948	2.500						
80	39 962	2.313						
90	39 962	2.167						
100	39 976	2.050						
120	39 990	1.875						
140	39 990	1.750						
160	40 032	1.656						
180	40 032	1.583						
200	40 032	1.525						
220	40 032	1.477						
240	40 032	1.438						
260	40 032	1.404						
280	40 032	1.375						
300	40 047	1.350						
320	40 047	1.328						
340	40 047	1.309						
360	40 047	1.292						
380	40 047	1.276						
400	40 047	1.263						

JOHNSTON
Schlumberger

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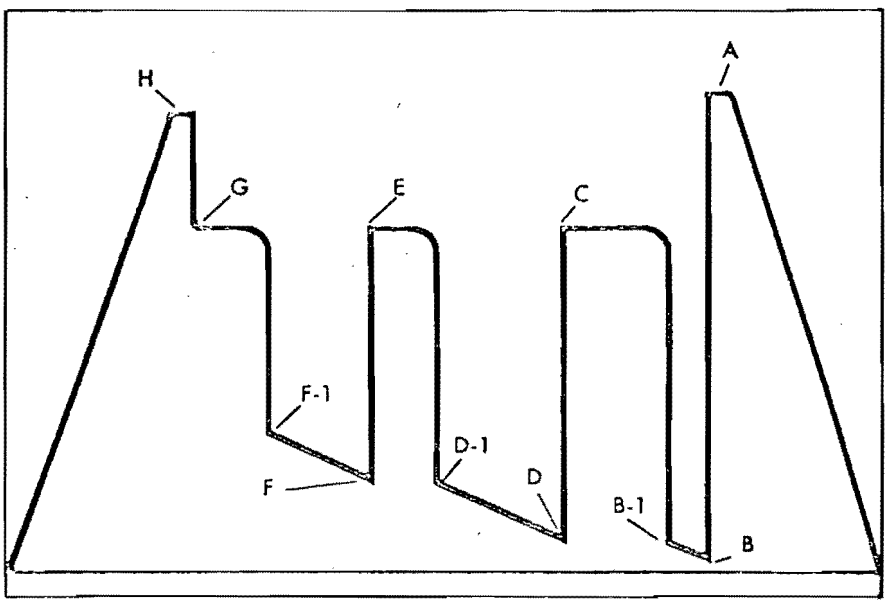
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

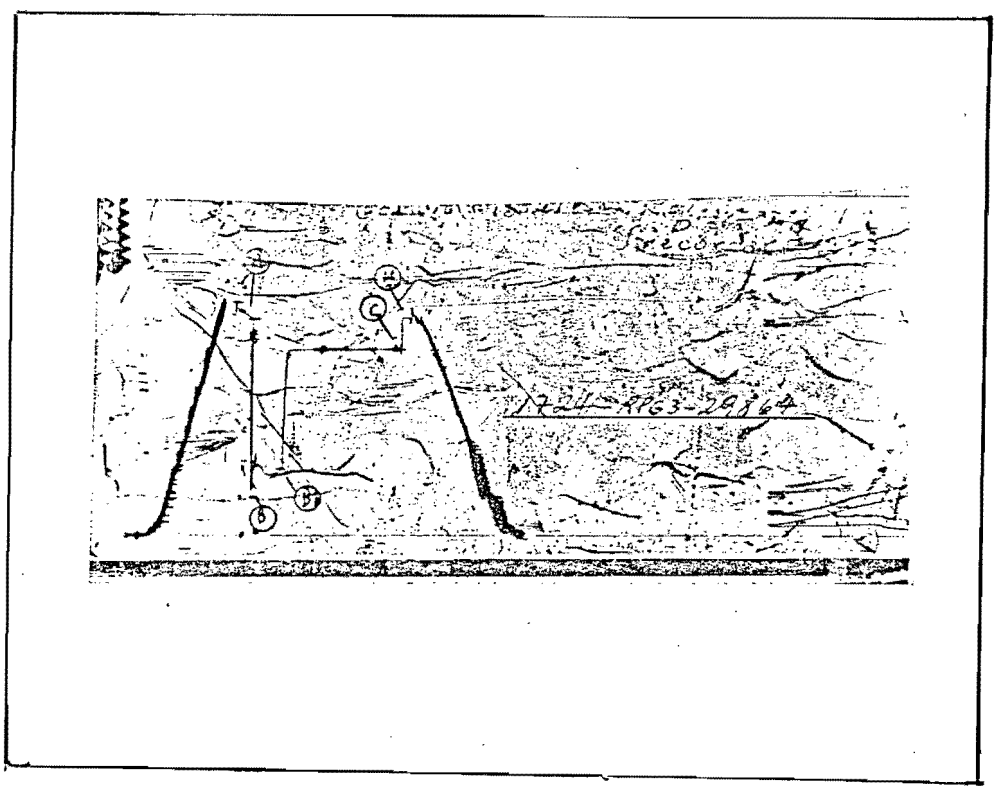
FIELD REPORT NO. _____ RECORDER NO. _____

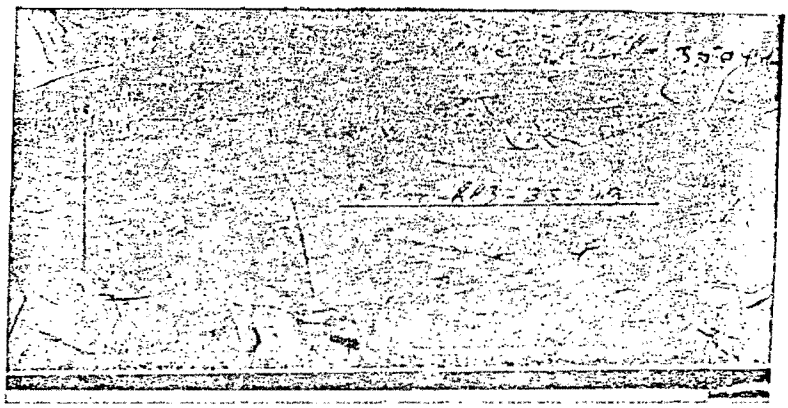


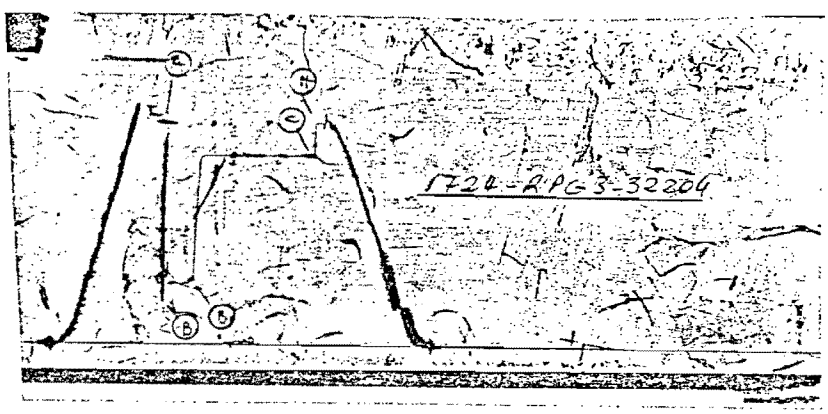
A. Initial Hyd. Mud
B. First Flow
C. Initial Shut-In
D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
Z — Special pressure points such as pumping pressures recorded for formation breakdown.






F24-RPG3-32204

JOHNSTON

Schlumberger

RESERVOIR PRESSURE PLOT

RECORDER No. 90264 CAPACITY [illegible] 73 kPa FIELD REPORT No. 1724

MAXIMUM RESERVOIR PRESSURE 40047 kPa

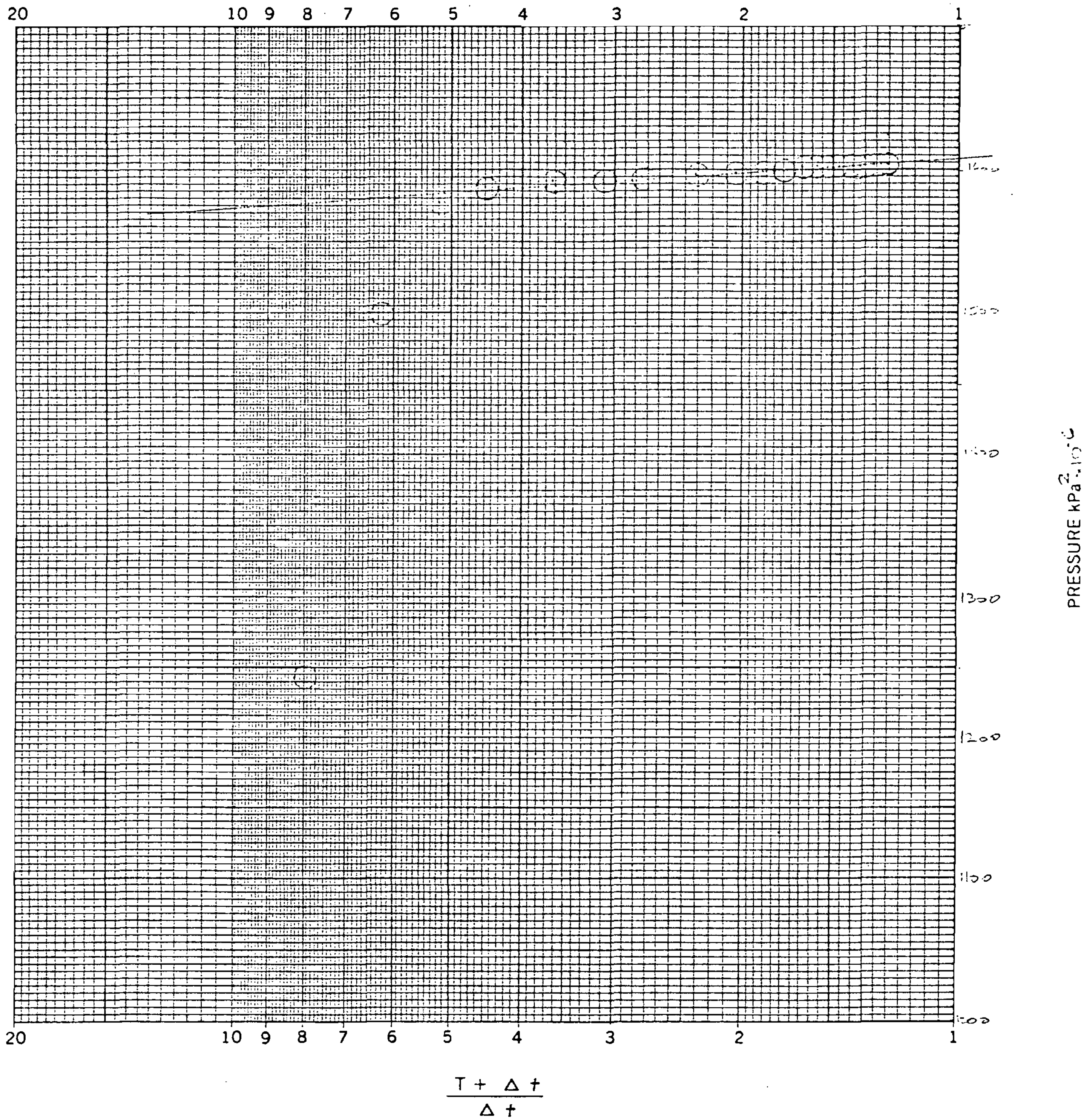
SLOPE OF SHUT-IN CURVE M 27 730 246 kPa²/LOG CYCLE

SLOPE M1 = P_1 .... P_{10} .... = kPa/LOG CYCLE

SLOPE M2 = P_1 .... P_{10} .... = kPa/LOG CYCLE

EXTRAPOLATED INITIAL SHUT-IN PRESSURE = 40047 kPa (580380) = INITIAL SHUT-IN [illegible] 120'

EXTRAPOLATED FINAL SHUT-IN PRESSURE = ______ kPa ______ Δ = FINAL SHUT-IN ______



GAS PARAMETERS CALCULATIONS

WELL NAME : COLUMBIA ET AL KOTANEELEE 4T-1-48 DST 7

HORNER PLOT SLOPE	(KPA2/LOG CYCLE)	27 780 246
GAS DEVIATION FACTOR	[1]	1.09
TEMPERATURE	(DEGREES KELVIN)	450
VISCOSITY	(PA.S)	2.555 E-5
FLOW TIME	(MINUTES)	105
POROSITY	[1]	.10
COMPRESSIBILITY	(1/MAPA)	0.016
WELL BORE RADIUS	(MILLIMETRES)	89
PAY THICKNESS	(METRES)	8
FLOW RATE	(M3/DAY)	177 500
FLOWING PRESSURE	(KPA)	14 478
RESERVOIR PRESSURE	(KPA)	40 047
ELEVATION	(METRES)	----
DEPTH	(METRES)	----

TRANSMISSIBILITY	(DA.M/(PA.S))	4669.68
FLOW CAPACITY	(MDA.M)	119.31
PERMEABILITY	(MD)	14.91
DAMAGE RATIO	[1]	8.62
FLOW DAMAGE REMOVED	(M3/DAY)	1529.934 E-3
SKIN FACTOR	[1]	51.08
RADIUS OF INVESTIGATION	(METRES)	95.88
POTENTIOMETRIC SURFACE	(METRES)	----

JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

District	6020	Ticket No.	1725	Company	COLUMBIA GAS DEVELOPMENT LIMITED
Address	639-5th Ave. S.W. Calgary			Test No.	J.T. No.
		Well Name	Columbia Et Al Kotaneelee	8	8
Field	Wildcat	Number	4T-1-48		
Province	Yukon	Date	March 24/80		
Co. Rep.	Robert Toole	Formation	Arnica	Thickness	
Technician	C. Adams	Interval	4050-4073	TD	4415

TEST DATA

Type of Test: PCT DST.

Time Started in Hole	22:00 Hrs.	Tool Opened	03:15 Hrs.		
First Flow	20 Min.	Initial Shut-In	Min.		
Second Flow	Min.	Second Shut-In	Min.		
Third Flow	Min.	Final Shut-In	Min.		
Pulled Loose @	09:00 Hrs.	Out of Hole	16:00 Hrs.		
Wt. Set/on Packers	7 000 da N	Pulled Loose Wt.	6 000 da N		

Description of Blow During Test: Preflow: Good initial puff. Weak blow. Gas to surface in 27 minutes. T.S.T.M.

FLUID RECOVERY — Was Test Reverse Circulated: Yes ☐ No ☒

Total Fluid Recovered

Description of Fluid Recovered

GAS BLOW MEASUREMENT

Measured With I.D.

Time	Sfce. Choke	Pressure	Flow Rate

REMARKS: TEST SATISFACTORY.

RESISTIVITY			SALT CONTENT
Recovery Water	@	°C	ppm.
Mud Pit sample filtrate	@	°C	ppm.

TOOL SEQUENCE

Tool	Length	O.D.
Pump Out Sub	.23	
Drill Collars		
Cross Over Sub	.25	
MFE	2.80	
Sample Chamber		
By-Pass	.91	
Pressure Recorder	2.10	
Pressure Recorder	2.36	
Pressure Recorder	2.64	
Cross Over Sub		
Stinger	2.86	
TOTAL:	14.15	
TOTAL LENGTH		

Elevation G.L. K.B.

Bottom Hole Choke Size 19mm.

Fluid Cushion Type Water Amt. 614.0m.

MUD AND HOLE DATA

Mud Type Gel W.L. 6.0

Filter Cake Visc. 65 Wt. 1 170

Time Taken

Contractor Nabors Rig No. 9

Drill Pipe Size 3.5 IF

Drill Collar Size 3.5 IF &

Drill Collar Length 57.0m &

Main Hole Size 178mm. Rat Hole

Distribution of Reports

J.T. 1 & E 4B REV. 78

JOHNSTON
Schlumberger

JOHNSTON TESTERS

1223 DOME TOWER
333 - 7 AVENUE S.W., CALGARY, ALBERTA T2P 2Z1

PRESSURE DATA

INSTRUMENT No.		RPG- 29864	RPG- 35049	RPG- 32204	
CAPACITY (kpa)		68 948	58 605	68 948	
INSTRUMENT DEPTH m.		4044.0	4046.0	4048.0	
INSTRUMENT OPENING		Inside	Inside	Inside	
WELL TEMP. °C.		176° c			
INITIAL HYDROSTATIC	A	45 492	Pressure	Recorder	
FIRST FLOW	B	10 142	Invalid.	Malfunction.	
	B-1	10 228	Recorder		
INITIAL SHUT-IN	C	27 085	Malfunction.		
SECOND FLOW	D				
	D-1				
SECOND SHUT-IN	E				
THIRD FLOW	F				
	F-1				
FINAL SHUT-IN	G				
FINAL HYDROSTATIC	H	44 322			

FLUID SAMPLE REPORT

Sample No.	113 138
Type	MFE
Depth	
Volume	2 500cc
Sample Pressure: Kpa at Surface	
Density	
Gas/Oil Ratio	(1)
Recovery:	
m³ Gas	
cm³ Oil	
cm³ Water	
cm³ Mud	
Total Liquid cm³	

REMARKS:

PRESSURE INCREMENTS ON RECORDER

POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$	POINT MINUTES	PRESSURE	$\frac{T + \Delta t}{\Delta t}$

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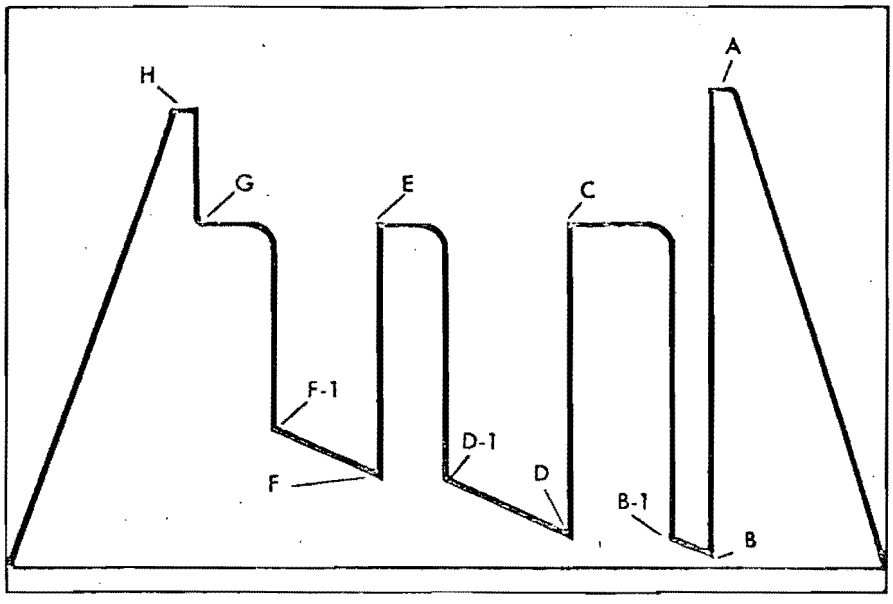

A. Initial Hyd. Mud
B. First Flow
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D. Second Flow
E. Second Shut-In
F. Third Flow
G. Final Shut-In
H. Final Hyd. Mud

The following points are either fluctuating pressures or points indicating other packer settings (testing different zones).

A-1, A-2, A-3, etc. Initial Hyd. Pressures
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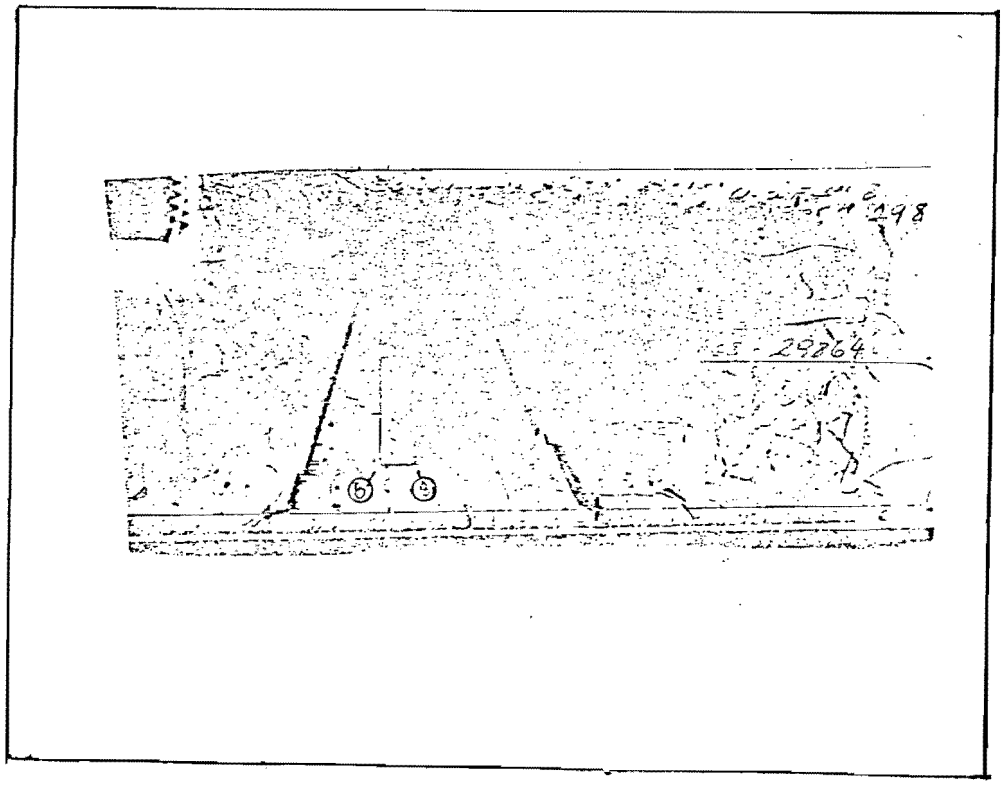
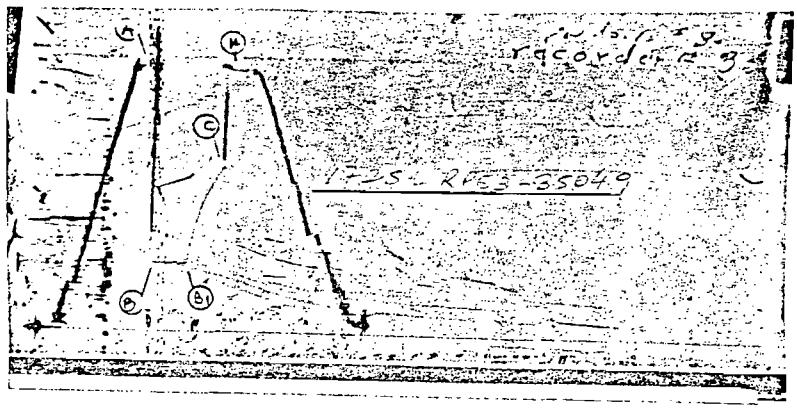
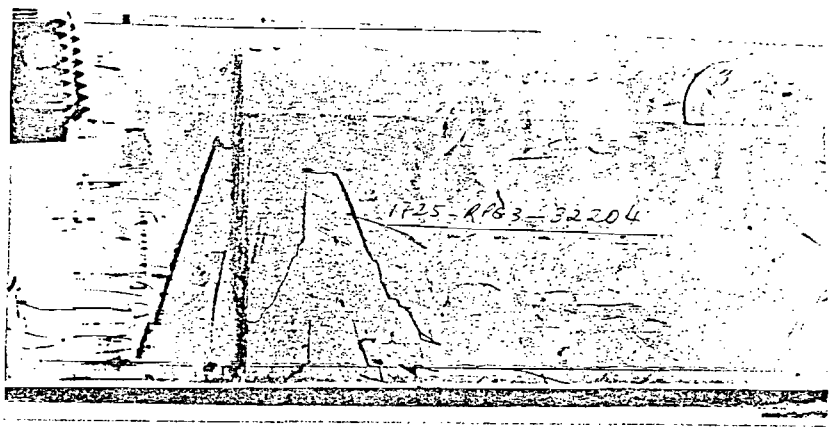



IP25-RP83-35049


IP25-RP83-32204

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

CASING SUMMARY

Casing Size 508 mm Casing Type Surface

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date 79 05 04

	CSG WT	GR	RGE	THD	T&C	MAKE	JTS RUN	DEPTH LANDED	FT. RUN IN WELL
Shoe	MAKE: Baker			TYPE: Float				216.06	.68
Shoe JT.	140 kg/m	H-40	3	Butt	ST&C	Mann	1	215.38	11.05
Float Collar	MAKE: Baker			TYPE: Float				204.33	.54
Casing	140 kg/m	H-40	3	Butt	ST&C	Mann	18	203.79	205.33
Casing									
Casing									
Casing									
Casing									

Landing Jt (when used) Length.....	
Overall Length of Casing String.....	217.60
Feet up from K.B. (subtract).....	1.54
Setting Depth: Driller 216 m Tally	216.06

Centralizers NIL

Scratchers NIL

Weld/Thread Lock (No. Joints) 3 connections

Cementing Co. Nowsco Cementer: Don Trotter

Cement Volume 54.06 m^3

Additives 2% $CaCl_2$

Displacement Calculated 3.3 m^3 Measured 3.3 m^3

Top Plug NIL Bottom Plug NIL Other

Circ. Time Before Cement 30 minutes Bbls. Wash 3.2 m^3 water

Start Mix 14:15 ~~AM~~ PM 85 min: Displace 10 min:

C.I.P. 15:50 ~~AM~~ PM FCP 2800 kPa BPP 2800 kPa

Remarks Float held OK had cement returns at surface when approximately 50 m^3 was mixed.

Total length of 127 mm drill pipe stinger, 197.33 m below top of casing top of float collar at 203.79 R.K.B.

V. Arndt

Fld. Supervisor

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

CASING SUMMARY

Casing Size 339.7 Casing Type Surface

Well COLUMBIA ET AL KOTANEELEE YT I-48 Date 79 06 22

	CSG WT	GR	RGE	THD	T&C	MAKE	JTS RUN	DEPTH LANDED	FT. RUN IN WELL
Shoe	MAKE: Baker			TYPE: Float					0.60
Shoe JT.	107.1	N80	III	Butt	--	JAP	1		12.07
Float Collar	MAKE: Baker			TYPE: Float					0.49
Casing	107.1	N80	III	Butt	--	JAP	87		1,039.76
Casing									
Casing									
Casing									
Casing									

Landing Jt (when used) Length.....	
Overall Length of Casing String.....	1,052.92
Feet up from K.B. (subtract).....	- 0.42
Setting Depth: Driller 1054 Tally	1,052.50

Centralizers Gist type weld on - 4 short on shoe, 4 short, 4 long on float collar.

Scratchers Petal baskets at 477 m, 465 m & 453 m.

Weld/Thread Lock (No. Joints) 2 bakerlok and weld.

Cementing Co. Nowsco Cementer: Trotter

Cement Volume 61.68 tonnes neat oil well "G" +8% gel tail with 20 tonnes neat oil well "G"

Additives

Displacement Calculated 63 bbls Measured 63 bbls

Top Plug Bottom Plug Other

Circ. Time Before Cement Bbls. Wash 10 bbls water 10 bbls

Start Mix 22:45 ~~AM~~ PM 90 min: Displace 10 min:

Plug Down 2:05 AM ~~PM~~ FWP 7000 kPa psi BPP -- psi

Remarks Returns lost at end of gel cement. Cement from surface with 1" pipe, 150 feet down with 3.62 tonnes neat oil well "G", cement returns. All cement in place at 06:00 hours, 79 06 23.

Kuechle/Gilbertson
Fld. Supervisor

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

CASING SUMMARY

Casing Size 244.5mm (9 5/8") Casing Type Intermediate

Well Columbia et al Kotaneelee YT I-48 Date December 19, 1979

	CSG WT	GR	RGE	THD	T&C	MAKE	JTS RUN	DEPTH LANDED	Meters ~~XXX~~ RUN IN WELL
Shoe	MAKE: Baker			TYPE: Float			1	3265.239	.540
Shoe JT	69.9kg/m	MN80	3	8 rd	LT&C	TAK	1	3253.504	11.735
Float Collar	MAKE: Baker			TYPE: Float			1	3253.004	.500
Casing	69.9kg/m	MN80	3	8 rd	LT&C	TAK	128	1715.974	1537.030
~~Casing~~ XO Nipple and collar		MN80		8 rd Buttr.	LT&C		1	1715.324	.650
Casing	64.7kg/m	MN80	3	Buttr.	LT&C	TAK	45	1187.149	528.175
~~Casing~~ Baker 2 stage	cementer			"			1	1186.599	.550
Casing 64.7	64.7kg/m	MN80	3	"	LT&C	TAK	101	Surface	1187.759

Landing Jt (when used) Length.....	
Overall Length of Casing String.....	3266.939
~~Feet~~ M up from K B (subtract).....	1.700
Setting Depth: Driller 3259 m Tally	3265.239

Centralizers 15 Weatherford Hinge type on bottom of string; 3 below and two above 2 stage cementer

Scratchers None

Weld/Thread Lock (No. Joints) 2 bottom joints

Cementing Co Nowsco Well Service Ltd. Cementer: Bruce Kelly

Cement Volume Stage #1 - 44.0 Tonnes, Stage #2 - 12.0 Tonnes

Additives 0.75% T10 + 0.4% R55 in both stages

Displacement Calculated 125.0 + 45.4 ~~XXX~~ m^3 Measured No-pumped w/rig pump bbls

Top Plug X Bottom Plug X Other Shifting dart

Circ Time Before Cement 6 hours total Bbls. Wash 11.92m^3 fresh water

Start Mix 2256+0231 AM PM ____ min: Displace 70 mins. plus 22 mins. min:

Plug Down 0100+0317 AM PM FWP ____ psi BPP 20000 kPa + 20000 kPa ~~XXX~~

Remarks Unable to work casing while cementing and circulating. Plugs displaced with rig pump. Float shoe at 3259m measured by drillers tally on drill out

J. MacDonald/R. L. Toole
Fld Supervisor

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

CASING SUMMARY

Casing Size 177.8 mm Casing Type Production

Well Columbia et al Kotaneelee YT I-48 Date February 18,19 1980

	CSG WT	GR	RGE	THD	T&C	MAKE	JTS RUN	DEPTH LANDED	FT RUN IN WELL
Shoe	MAKE: Baker			TYPE: Float				4433.127	.530
Shoe JT	47.6	SM80	3	8rd	LT&C	Sum	1	4421.134	11.993
Float Collar	MAKE: Baker			TYPE: Float				4420.584	.550
Casing	47.6	SM80	3	8rd	LT&C	Sum	95	3293.992	1126.592
Cement Stage Collar	Plus 2 changeover subs							3292.867	1.125
Casing	47.6	SM80	3	8rd	LT&C	Sum	71	2449.713	843.154
Casing	43.1	MN80	3	BUTT	LT&C	BSC	176	293.256	2156.457
Casing	52.1	N80	3	BUTT	LT&C		25		294.756

Landing Jt (when used) Length.....	
Overall Length of Casing String.....	4435.157
Feet up from K B (subtract).....	1.500
Setting Depth: Driller 4428.500 Tally	4433.657

Centralizers 2 on shoe joint & 1 on next jt; 70 standoff bands on each of next 70 jts; 2 centralizers below & 3 above DV tool

Scratchers

Weld/Thread Lock (No. Joints) 2 bottom joints and stage cement tool

Cementing Co Nowsco Well Services Cementer: Lyle Schmidt

Cement Volume Stage#1 11.5 T OWG w 30% silica flour, 25% antralite, 1.5% T10, .75% D21 + 1.75%

Additives R55 retarder. Stage #2 2 T OWG, .6% R55, .75% T10, .03% D19

Displacement Calculated Stage#1-84.26m^3 / Stage#2-63.08m^3 bbls Measured Pumped w/rig pump bbls

Top Plug Bottom Plug Baker Stage Plugs Other Stage tool dart

Circ Time Before Cement 11 hrs - Wait on cementers 4 hrs Bbls. Wash 8.26m^3 x 3.18m^3

Start Mix 2300 AM PM min: Displace 70 + 59 min:

Plug Down 0030 AM PM FWP 5000 kPa psi BPP 11000 kPa psi

Remarks Casing circulated ok prior to cementing. First stage slurry volume - 11.13m^3

Calculated cement top at 3485.8 m

Second stage plug down at 1430 February 19, 1980

Toole & MacDonald

Fld Supervisor

REPORT

and

PLAN

of

SUB-SURFACE

SURVEY

COLUMBIA GAS DEVELOPMENT CORP. LTD.

COLUMBIA ET AL KOTANEELEE 1-48

Date FEB. 26, 1980

UNITED DIRECTIONAL DRILLING LTD.

COLUMBIA GAS DEVELOPMENT CORPORATION LIMITED
COLUMBIA ET AL KOTANELEE 1-48
KOTANELEE
YUKON TERRITORIES
MAGNETIC DIRECTIONAL MULTISHOT

DATE OF SURVEY
VERTICAL SECTION DIRECTION
CLOSURE

UNITED DIRECTIONAL DRILLING LTD
RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUB SEA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG DEG PER 10 MTRS	TOTAL RECTANGULAR COORDINATES NORTH/SOUTH	EAST/WEST	VERTICAL SECTION
0.	0.	859.30	ASSUMED VERTICAL TO 108M			0. N	0. E	0.
216.0	215.99	643.31	1 3	N 32 E	.05	1.68 N	1.05 E	1.46
224.0	223.99	635.31	2 5	N 47 W	2.68	1.84 N	.98 E	1.63
253.0	252.94	606.36	3 55	N 33 W	.68	3.03 N	.06 E	2.97
282.0	281.88	577.42	4 0	N 35 W	.06	4.69 N	1.06 W	4.80
311.0	310.81	548.49	4 0	N 33 W	.05	6.37 N	2.19 W	6.66
339.0	338.74	520.56	4 0	N 34 W	.03	7.99 N	3.27 W	8.45
368.0	367.67	491.63	4 0	N 38 W	.10	9.63 N	4.46 W	10.27
396.0	395.60	463.70	3 55	N 36 W	.06	11.17 N	5.62 W	12.00
425.0	424.53	434.77	4 0	N 35 W	.04	12.80 N	6.79 W	13.81
454.0	453.46	405.84	4 0	N 35 W	.00	14.46 N	7.95 W	15.65
483.0	482.39	376.91	4 0	N 33 W	.05	16.14 N	9.08 W	17.50
511.0	510.32	348.98	4 0	N 36 W	.07	17.75 N	10.18 W	19.28
540.0	539.25	320.05	4 5	N 40 W	.10	19.36 N	11.44 W	21.09
569.0	568.17	291.13	4 25	N 39 W	.12	21.01 N	12.81 W	22.96
597.0	596.09	263.21	4 5	N 47 W	.24	22.53 N	14.22 W	24.71
626.0	625.02	234.28	4 0	N 49 W	.06	23.90 N	15.73 W	26.33
654.0	652.95	206.35	4 0	N 51 W	.05	25.16 N	17.23 W	27.83
683.0	681.88	177.42	4 5	N 52 W	.04	26.43 N	18.63 W	29.37
712.0	710.80	148.50	4 30	N 53 W	.15	27.75 N	20.55 W	30.97
740.0	738.71	120.59	4 25	N 56 W	.09	29.01 N	22.32 W	32.53
768.0	766.62	92.68	4 55	N 57 W	.18	30.27 N	24.22 W	34.11
797.0	795.51	63.79	5 0	N 60 W	.09	31.58 N	26.36 W	35.78
825.0	823.41	35.89	4 50	N 50 W	.31	32.95 N	28.32 W	37.47
854.0	852.30	7.00	5 0	N 51 W	.06	34.53 N	30.24 W	39.37
883.0	881.19	-21.89	5 0	N 52 W	.03	36.10 N	32.22 W	41.27
911.0	909.06	-49.76	6 0	N 53 W	.36	37.73 N	34.35 W	43.26
940.0	937.90	-78.60	6 0	N 54 W	.04	39.53 N	36.78 W	45.47
969.0	966.73	-107.43	6 25	N 54 W	.14	41.38 N	39.32 W	47.74
998.0	995.54	-136.24	7 0	N 56 W	.22	43.32 N	42.10 W	50.14

COLUMBIA GAS DEVELOPMENT CORPORATION LIMITED
COLUMBIA ET AL KOTANEELEE 1-48
KOTANEELEE
YUKON TERRITORIES
MAGNETIC DIRECTIONAL MULTISHOT

DATE OF SURVEY
VERTICAL SECTION DIRECTION
CLOSURE

UNITED DIRECTIONAL DRILLING LTD
RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUB SEA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG DEG PER 10 MTRS	TOTAL RECTANGULAR COORDINATES NORTH/SOUTH	EAST/WEST	VERTICAL SECTION
1026.0	1023.32	-164.02	7 5	N 57 W	.05	45.21 N	44.96 W	52.52
1036.0	1033.25	-173.95	6 55	N 64 W	.87	45.81 N	46.02 W	53.30
1046.0	1043.18	-183.88	7 0	N 66 W	.26	46.32 N	47.12 W	54.00
1050.0	1047.15	-187.85	7 0	N 65 W	.31	46.53 N	47.56 W	54.27
1085.0	1081.85	-222.55	7 54	N 70 W	.32	48.25 N	51.75 W	56.72
1113.0	1109.56	-250.26	8 30	N 71 W	.22	49.58 N	55.52 W	58.70
1142.0	1138.23	-278.93	9 0	N 72 W	.18	50.98 N	59.70 W	60.83
1170.0	1165.85	-306.55	9 48	N 74 W	.31	52.31 N	64.07 W	62.92
1227.0	1221.88	-362.58	11 24	N 71 W	.30	55.49 N	74.06 W	67.83
1256.0	1250.30	-391.00	11 24	N 70 W	.07	57.40 N	79.47 W	70.67
1284.0	1277.72	-418.42	12 0	N 71 W	.23	59.29 N	84.82 W	73.49
1313.0	1306.09	-446.79	12 0	N 75 W	.29	61.06 N	90.58 W	76.26
1341.0	1333.51	-474.21	11 18	N 70 W	.44	62.75 N	95.97 W	78.88
1370.0	1361.94	-502.64	11 30	N 67 W	.22	64.85 N	101.30 W	81.90
1398.0	1389.41	-530.11	10 48	N 62 W	.43	67.17 N	106.19 W	85.06
1427.0	1417.90	-558.60	10 54	N 60 W	.13	69.82 N	110.96 W	88.52
1455.0	1445.38	-586.08	11 6	N 59 W	.10	72.53 N	115.57 W	92.01
1484.0	1473.83	-614.53	11 12	N 55 W	.27	75.58 N	120.27 W	95.85
1513.0	1502.28	-642.98	11 18	N 56 W	.08	78.79 N	124.93 W	99.84
1541.0	1529.76	-670.46	10 54	N 46 W	.70	82.16 N	129.11 W	103.90
1570.0	1558.22	-698.92	11 12	N 57 W	.73	85.60 N	133.44 W	108.06
1598.0	1585.67	-726.37	11 36	N 52 W	.38	88.81 N	137.94 W	112.03
1627.0	1614.11	-754.81	10 54	N 52 W	.24	92.30 N	142.40 W	116.25
1655.0	1641.60	-782.30	11 0	N 59 W	.48	95.30 N	146.78 W	119.99
1684.0	1670.08	-810.78	10 54	N 57 W	.14	98.22 N	151.45 W	123.70
1712.0	1697.55	-838.25	11 24	N 57 W	.18	101.17 N	155.99 W	127.41
1741.0	1725.96	-866.66	11 42	N 55 W	.17	104.42 N	160.80 W	131.47
1769.0	1753.37	-894.07	11 48	N 51 W	.29	107.85 N	165.35 W	135.65
1798.0	1781.77	-922.47	11 36	N 50 W	.10	111.59 N	169.89 W	140.14
1826.0	1809.22	-949.92	11 6	N 50 W	.18	115.13 N	174.11 W	144.38

COLUMBIA GAS DEVELOPMENT CORPORATION LIMITED
COLUMBIA ET AL KOTANEELEE 1-48
KOTANEELEE
YUKON TERRITORIES
MAGNETIC DIRECTIONAL MULTISHOT

DATE OF SURVEY
VERTICAL SECTION DIRECTION CLOSURE

UNITED DIRECTIONAL DRILLING LTD
RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUB SEA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG DEG PER 10 MTRS	TOTAL RECTANGULAR COORDINATES NORTH/SOUTH	EAST/WEST	VERTICAL SECTION
1855.0	1837.64	-978.34	11 54	N 46 W	.39	119.00 N	178.40 W	148.96
1883.0	1865.08	-1005.78	11 6	N 46 W	.29	122.88 N	182.41 W	153.49
1912.0	1893.54	-1034.24	11 6	N 50 W	.27	126.61 N	186.56 W	157.91
1940.0	1921.05	-1061.75	10 18	N 47 W	.35	130.05 N	190.46 W	161.99
1970.0	1950.58	-1091.28	10 6	N 46 W	.09	133.71 N	194.31 W	166.27
1997.0	1977.24	-1117.94	7 48	N 44 W	.86	136.67 N	197.29 W	169.72
2026.0	2005.98	-1146.68	7 48	N 40 W	.19	139.59 N	199.92 W	173.07
2054.0	2033.72	-1174.42	7 42	N 41 W	.06	142.47 N	202.37 W	176.33
2083.0	2062.48	-1203.18	7 12	N 37 W	.25	145.38 N	204.74 W	179.62
2112.0	2091.26	-1231.96	6 48	N 40 W	.19	148.15 N	206.94 W	182.74
2140.0	2119.09	-1259.79	6 0	N 32 W	.43	150.66 N	208.78 W	185.54
2169.0	2147.95	-1288.65	5 12	N 38 W	.34	152.98 N	210.39 W	188.11
2197.0	2175.83	-1316.53	5 6	N 32 W	.20	155.04 N	211.83 W	190.39
2226.0	2204.71	-1345.41	5 42	N 11 W	.71	157.54 N	212.79 W	193.03
2254.0	2232.58	-1373.28	5 12	N 5 E	.57	160.17 N	212.94 W	195.64
2283.0	2261.46	-1402.16	5 12	N 5 E	.00	162.79 N	212.71 W	198.18
2311.0	2289.32	-1430.02	6 18	N 6 E	.39	165.58 N	212.44 W	200.88
2340.0	2318.16	-1458.86	5 54	N 8 E	.16	168.64 N	212.07 W	203.82
2368.0	2346.01	-1486.71	5 54	N 7 E	.04	171.50 N	211.69 W	206.56
2397.0	2374.88	-1515.58	5 6	N 2 E	.32	174.26 N	211.47 W	209.24
2425.0	2402.77	-1543.47	4 54	N 3 W	.17	176.70 N	211.49 W	211.64
2454.0	2431.66	-1572.36	4 54	N 1 W	.06	179.18 N	211.57 W	214.09
2482.0	2459.57	-1600.27	4 36	N 5 W	.16	181.49 N	211.69 W	216.39
2511.0	2488.48	-1629.18	4 36	N 12 E	.47	183.79 N	211.55 W	218.63
2539.0	2516.38	-1657.08	4 48	N 23 E	.33	185.96 N	210.86 W	220.64
2568.0	2545.27	-1685.97	5 6	N 30 E	.23	188.20 N	209.74 W	222.64
2596.0	2573.16	-1713.86	5 30	N 43 E	.45	190.26 N	208.20 W	224.39
2625.0	2602.01	-1742.71	6 0	N 47 E	.22	192.31 N	206.15 W	226.04
2653.0	2629.84	-1770.54	6 30	N 50 E	.21	194.32 N	203.86 W	227.62
2682.0	2658.64	-1799.34	7 0	N 43 E	.33	196.67 N	201.40 W	229.49

UNITED DIRECTIONAL DRILLING LTD
RECORD OF SURVEY

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2711.0	2687.43	-1828.13	6 48	N 45 E	.11	199.18 N	198.98 W	231.52
2739.0	2715.23	-1855.93	6 54	N 46 E	.06	201.52 N	196.60 W	233.40
2768.0	2744.00	-1884.70	7 42	N 43 E	.31	204.15 N	194.02 W	235.53
2796.0	2771.69	-1912.39	9 12	N 41 E	.55	207.21 N	191.27 W	238.05
2825.0	2800.28	-1940.98	10 12	N 38 E	.39	210.98 N	188.17 W	241.21
2853.0	2827.86	-1968.56	9 36	N 40 E	.25	214.72 N	185.14 W	244.35
2882.0	2856.48	-1997.18	9 6	N 39 E	.18	218.36 N	182.15 W	247.39
2910.0	2884.08	-2024.78	10 6	N 43 E	.43	221.88 N	179.08 W	250.30
2939.0	2912.67	-2053.37	9 12	N 42 E	.32	225.46 N	175.79 W	253.24
2967.0	2940.34	-2081.04	8 30	N 43 E	.26	228.63 N	172.88 W	255.84
2996.0	2969.07	-2109.77	7 0	N 41 E	.53	231.54 N	170.26 W	258.23
3024.0	2996.88	-2137.58	6 30	N 33 E	.38	234.15 N	168.28 W	260.45
3053.0	3025.70	-2166.40	6 12	N 26 E	.29	236.94 N	166.70 W	262.91
3081.0	3053.55	-2194.25	5 54	N 34 E	.32	239.49 N	165.23 W	265.16
3110.0	3082.40	-2223.10	5 48	N 35 E	.05	241.93 N	163.56 W	267.25
3138.0	3110.25	-2250.95	6 0	N 36 E	.08	244.27 N	161.89 W	269.26
3167.0	3139.10	-2279.80	5 42	N 27 E	.33	246.78 N	160.34 W	271.45
3195.0	3166.96	-2307.66	5 42	N 35 E	.28	249.16 N	158.91 W	273.54
3224.0	3195.83	-2336.53	5 0	N 31 E	.27	251.42 N	157.44 W	275.50
3253.0	3224.72	-2365.42	5 12	N 27 E	.14	253.67 N	156.19 W	277.50
3316.0	3287.42	-2428.12	6 0	N 30 E	.14	259.07 N	153.25 W	282.28
3349.0	3320.20	-2460.90	7 15	N 28 E	.39	262.40 N	151.41 W	285.23
3415.0	3385.74	-2526.44	6 15	N 32 E	.17	269.12 N	147.55 W	291.16
3492.0	3462.20	-2602.90	7 15	N 33 E	.13	276.75 N	142.68 W	297.79
3520.0	3489.99	-2630.69	6 53	N 33 E	.13	279.64 N	140.80 W	300.30
3573.0	3542.61	-2683.31	6 53	N 33 E	.00	284.97 N	137.34 W	304.92
3636.0	3605.00	-2745.70	9 0	N 39 E	.36	291.97 N	132.19 W	310.89
3720.0	3687.97	-2828.67	9 0	N 42 E	.06	301.96 N	123.65 W	319.19
3860.0	3826.38	-2967.08	8 15	N 44 E	.06	317.32 N	109.35 W	331.75
4035.0	3999.63	-3140.33	8 0	N 44 E	.01	335.11 N	92.17 W	346.19

COLUMBIA GAS DEVELOPMENT CORPORATION LIMITED
COLUMBIA ET AL KOTANEELEE I-48
KOTANEELEE
YUKON TERRITORIES
MAGNETIC DIRECTIONAL MULTISHOT

DATE OF SURVEY
VERTICAL SECTION DIRECTION CLOSURE

UNITED DIRECTIONAL DRILLING LTD
RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUB SEA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG DEG PER 10 MTRS	TOTAL RECTANGULAR COORDINATES NORTH/SOUTH	EAST/WEST	VERTICAL SECTION
4158.0	4121.70	-3262.40	6 0	N 44 E	.16	345.89 N	81.76 W	354.93
4415.0	4377.67	-3518.37	4 15	N 44 E	.07	362.41 N	65.81 W	368.33

** THE CALCULATIONS ARE BASED ON THE MINIMUM RADIUS OF CURVATURE METHOD **

THIS SURVEY WAS CALCULATED BY MACHINE COMPUTER UTILIZING PROGRAM FURNISHED BY SPERRY-SUN WELL SURVEYING COMPANY, HOUSTON, TEXAS. CALCULATIONS ARE BASED, HOWEVER, UPON INPUT DATA FURNISHED BY THE CUSTOMER WHO ASSUMES RESPONSIBILITY AND HOLDS SPERRY-SUN WELL SURVEYING COMPANY HARMLESS FROM LIABILITY.

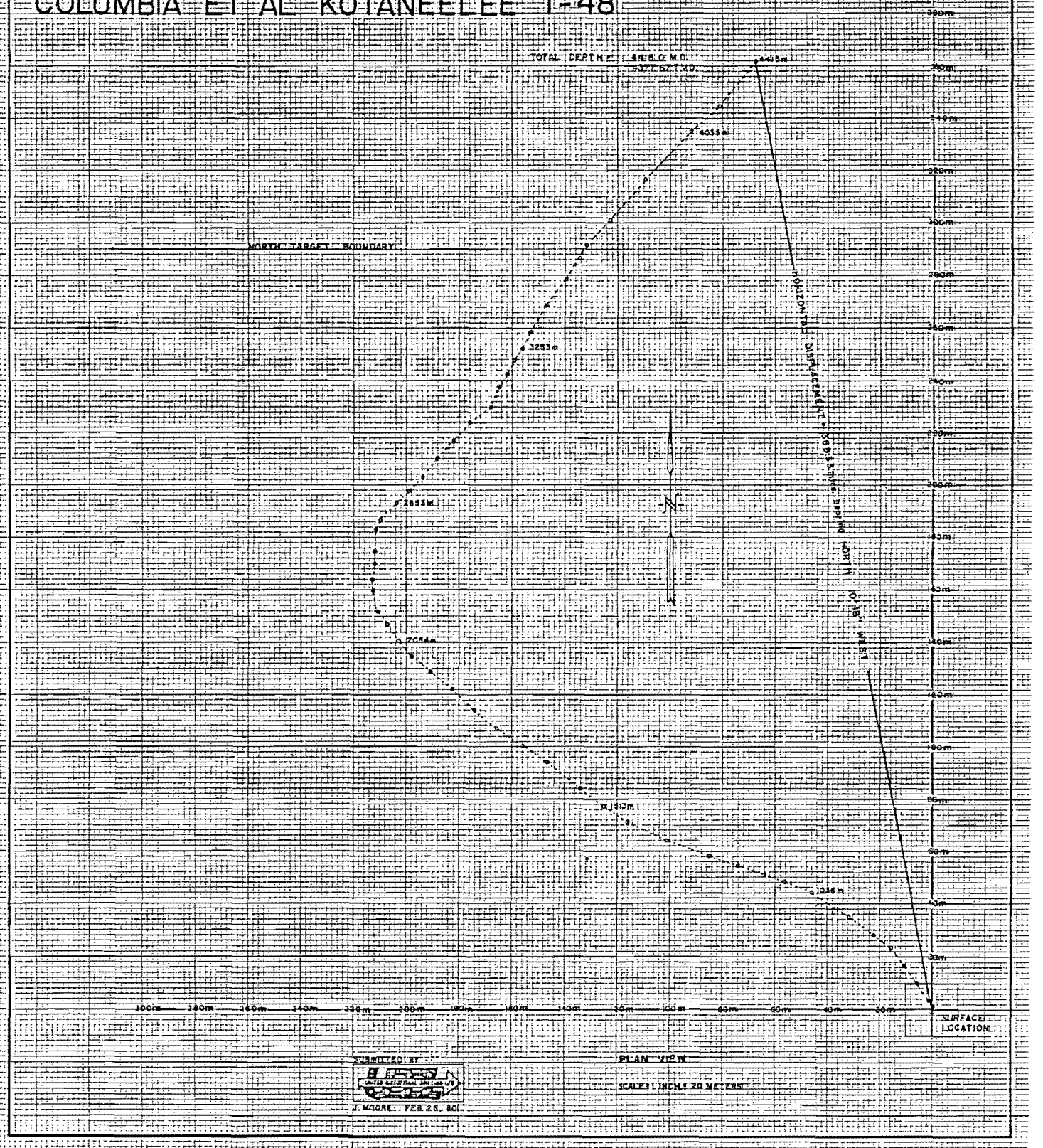
HORIZONTAL DISPLACEMENT = 368.33 MTRS AT NORTH 10 DEG. 18 MIN. WEST (TRUE)

START OF SURVEY WAS 859.30 MTRS ABOVE SEA LEVEL

DIRECTIONAL SURVEY FOR:

COLUMBIA GAS DEVELOPMENT CORP. LTD.

COLUMBIA ET AL KOTANEELEE I-48



SUBMITTED BY

J. MOORE - FEB 26, 80

PLAN VIEW

SCALE: 1 INCH = 20 METERS

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

1000 STANDARD LIFE BUILDING
639 - 5TH AVENUE S.W.
CALGARY, ALBERTA, CANADA T2P 0M9
(403) 261-8680

DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION			
April 9, 1980					
Day 357	(Cont'd)	Time	Choke	Tubing Pressure	Rate MMCFD
		0830	30/64	3742	18.8
		1230	30/64	3747	18.8
		1230	37/64	3222	23.5
		1630	37/64	3275	23.5
		1630	64/64		
		1700	64/64	1995	34.0
		2000	64/64	2035	34.0
		Shut well in, tubing pressure in 5 minutes. 4427 m. Tubing pressure one hour late, 4424 m. Fluid rate remained constant through all flow rates of 4.75 barrels per mmcf. Well shut in.			
April 10, 1980					
Day 358		Tearing out rotary tools. Laid derrick down.			
April 11, 1980					
Day 359		RIG RELEASED TO STANDBY RATES WITH FULL CREWS AT 1980-04-08-20:00 MST.			
		RIG PLACED ON STANDBY AT 1980-04-11-08:00 MST.			
April 12, 13 and 14, 1980		Tearing out rotary tools. Rig on standby. Boiler down. Moved out rig building and matting and stored at airstrip. Cleaned up lease.			
		Camp shut down 1980-04-14.			

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DAILY OPERATIONS REPORT

WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
April 5, 1980		
Day 353	(Cont'd)	No recovery. Ran impression block, no marks on face of block, appeared
		to be fill on top of plug. Waited four hours for hydrostatic baler.
		Made two runs with baler, first run recovered fairly thick emulsion,
		appeared to be mill seal. Second run recovered water diesel emulsion.
		Had iron marks on bottom of baler which could be identified as top of
		plug.
April 6, 1980		
Day 354		Tieing well into flare line. Ran wireline fishing tools, baler and
		impression block. Ran overshot and prong, engaged plug, flared one-
		half barrel to free plug, recovered plug at 2400 hours. Well shut in
		with 1000 psi (6950 kPa). Pressure tested annulus to 3000 psi
		(21 000 kPa) for six hours, OK.
April 7, 1980		
Day 355		Building new flare stack. Hooked up flow line to tank. Tubing
		pressure 10 350 kPa (1500 psi). Opened well to tank through choke,
		unloaded diesel to tank. Tubing pressure 19 500 kPa (2050 psi).
		Opened well to flare stack, well unloading water and plugs of mud
		through 1/2-inch choke. Flowed well through 1-inch choke at rate of
		25 mmcfd flowing tubing pressure 11 800 kPa (1700 psi). Flow line
		temperature 72°C. Well appeared stable and clean. Shut well in,
		bottom of flare stack cracked open for 3 feet. Shut in tubing
		pressure 31 000 kPa (4500 psi). Shut in tubing pressure at 0600 same.
April 8, 1980		
Day 356		Flowing well. Built new flare stack and set up same. Flowed well to
		flare stack. Flowed well through separator at rate of 34 mmcfd.
		Flowing tubing pressure - 2038 psi through 1-inch choke. Fluid rate
		4.75 barrels per million.
April 9, 1980		
Day 357		Tearing out rotary tools. Flowed well at the following rates from
		0800 - 2100:

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
April 1, 1980		
Day 349	(Cont'd)	tubematic and tubetest. Made up 2-7/8-inch assembly and 3½-inch bottom hole assembly. Ran and tested 3½-inch Hydril tubing to 45 000 kPa.
April 2, 1980		
Day 350		Rigging up to set plug. Picked up and ran 375 joints 3½-inch CS Hydril tubing. Pressure tubing to 45 000 kPa (6500 psi). Displaced tubing with 80 barrels diesel oil. Rigged up to set F plug in F nipple at 110 m.
April 3, 1980		
Day 351	4026 m	PB TD Installing wellhead. Set 2.81-inch plug in "F" nipple at 110 m. Did not hold. Redressed and reset - OK. Spaced out tubing. Lifted blow out preventers, installed tubing bonnet, installed wrap around tubing packing. Set bonnet and bolted down same. Installed Tubetest test plug in top of bonnet to pressure test top tubing connection and bonnet connection. Pressure to 30 000 kPa. "F" plug set in "F" nipple let go. "O" ring on test plug probe blew out allowing diesel from tubing to escape. Started pumping water with partial injection in to tubing and freeze tubing with liquid propane. Started freezing at 2030 hours, well froze off at 2300 hours. Packed wellhead with dry ice and let set until 0600. Removed test plug, installed TIW valve, rigged up to install master wellhead valve. Removed TIW valve and installed lower master valve.
April 4, 1980		
Day 352	4026 m	PB TD Waiting for wireline equipment. Installed wellhead, master valve and nippled up wellhead to Portatest. Waited on Bonnett's Wireline. Rigged up wireline unit, ran in 2.81-inch F plug not in F nipple at 110 m. Found plug in F profile in Baker sliding sleeve trying to retrieve plug. Unable to do so. Waited for additional wireline tools.
April 5, 1980		
Day 353		Running in with overshot without prong. Ran wireline fishing tools to retrieve 2.81-inch F plug from Baker sliding sleeve. Ran outside overshot with prong and with selector prong and pointed prong.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 28, 1980		
Day 345	4026 m	PB TD. Hoisting. Hoisted overshot, recovered setting tool and collar locator. Slipped and cut line, ran in with mill. Milled for packer slips at 2229 m. Chased packer down to 2730 m. Milled for 10 mins. Chased packer to 3751 m. Milled for 10 minutes. Chased packer to 4020 m. Circulated mud from choke and degasser. Mud highly gassified. Tripped out.
March 29, 1980		
Day 346	4026 m	PB TD. Running in hole with mill. Finished out with mill. Retainer jammed in mill. Rigged up Schlumberger, ran gauge ring, junk basket to 4020 m. Recovered rubber and pieces of cement retainer. Ran and set Halco cement retainer at 3620 m. Ran in with stinger on drill pipe, circulated on top of retainer, mixed and squeezed 6.6 tonnes Oilwell cement through perforations at 3625 - 3627 m. Backwashed 4 barrels of cement. Tripped out with stinger, picked up mill and junk basket. Ran in hole.
March 30, 1980		
Day 347	4026 m	PB TD. Laying down drill pipe. Ran in with mill and junk sub. Circulated and water back mud. Drilled out packer. Finished running to bottom and circulated bottoms up. Dumped and cleaned suction tanks, premixed 600 barrels $CaCl_2$ water. Displaced mud in hole to 1160. $CaCl_2$ water inhibited with 90 gallons Corban. Laid down drill pipe.
March 31, 1980		
Day 348	4026 m	PB TD. Making up perforating gun. Laid down drill pipe and drill collars. Rigged up Schlumberger and perforated the following intervals: 3654 - 3681 m; 3745.5 to 3756 m; 3801 - 3807 m; 3826.5 to 3840 m. All intervals perforated with 4 Hyper jet shots per metre, 180° phasing.
April 1, 1980		
Day 349		Running 3½-inch Hydril tubing. Perforate interval 3761 - 3781 m by Schlumberger with 4 Hyper jet shots per metre. Had 3 misfires. Set Baker Model F-1 production packer on Schlumberger wireline at 3616 m. Rigged out Schlumberger. Rigged up Weatherford, power tongs,

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 23, 1980		
Day 340		Running with drill stem test #7. Ran drill stem test #6. Hoisted service tools, ran in hole with drill stem test #7.
March 24, 1980		
Day 341		Running in to perforate. Ran in for drill stem test #7. Ran test, hoisted, laid down tools. Rigged up Schlumberger, ran in with perforating gun, 4050 - 4073 m. Mud Weight: 1165; Viscosity: 46.
March 25, 1980		
Day 342		Running drill stem test #8. Rigged up Schlumberger, perforate interval, 4050 to 4073 m with 4-Hyper jet shots/m 90° phasing. Ran and set Baker Model "D" packer on Schlumberger wireline at 4030 m. Made up testing tools, ran in for drill stem test #8. Test interval 4050 to 4073 m. Headed up. Tested. Mud Weight: 1165; Viscosity: 47.
March 26, 1980		
Day 343		Pulling out Schlumberger wireline. Ran drill stem test #8. Hoisted, recovered charts, laid down testing tools. Rigged up Schlumberger. Ran and set Baker bridge plug at 4027 m. Pulled wireline setting tool, snagged on blow out preventers, pulled out of wireline, rope socket, setting tool and collar locator, fell down hole. Waited on fishing tools. Ran in Schlumberger wireline with overshot. Recovered fish. Ran in with Schlumberger perforating gun. Perforate interval 3625 - 3627 m with 4 jet shots per foot. 90° phasing for cement squeeze.
March 27, 1980		
Day 344	4026 m PB TD	Pulling out with fish. Laid down perforating gun, ran in with Haliburton EZE drill cement retainer to act at 3621 m on Schlumberger wireline. Misfire, no set, pulled EZE drill. Started hanging up at 2200 m. Worked up to 688 m. Pulled out of rope socket. Ran in with drill pipe and overshot, engaged fish, tripped out slowly. Recovered setting tool and packer. Bottom slips gone. Rigged up Schlumberger. Ran in with EZE drill cement retainer. Stuck at 2810 m. Pulled out of rope socket. Ran in drill pipe and overshot, circulated, engaged fish. Pulled out, standby with fish. Mud Weight: 1140; Viscosity: 42.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 18, 1980		
Day 335		Running in hole for drill stem test. Ran perforating gun, misrun.
		Checked gun, ran in perforate interval 4390 - 4402 m with 4-hype jet
		shots per metre. Pulled wireline, line stranded. Repaired
		Schlumberger wireline. Ran Baker Model D packer and set at 4362 m on
		Schlumberger wireline. Rigged out Schlumberger, installed flow nipple,
		made up test tools and ran in hole for drill stem test #4. Mud
		Weight: 1170; Viscosity: 46.
March 19, 1980		
Day 336		Cleaning testing tools. Finished in with testing tools and headed up.
		Ran drill stem test #4 through perforated interval from 4390 to 4402 m.
		Pulled out testing string. Cleaned up testing tools. Drill Stem Test
		#4, misrun. Tools plugged with cement and dried mud. All three clocks
		stopped.
March 20, 1980		
Day 337		Running drill stem test #5. Serviced testing tools and unplugged
		sand. Cut and slipped 200' drilling line. Ran in 30 stands,
		circulated out heavy mud from drill pipe and drill collars. Made up
		testing tools. Ran in hole with 6000' water cushion. Ran drill stem
		test #5. Flowing at a rate of 6.0 mmcfd, measured with critical flow
		prover and 1-inch choke at 220 psi.
March 21, 1980		
Day 338		Hoisting Schlumberger line. Ran drill stem test #5. Unlatched from
		packer and hoisted. Repaired travelling blocks. Driller ran into
		Crown timber stopper. Hoisted test tools. Broke down tools. Rigged
		up Schlumberger perforate interval 4266 to 4274 m with 4 Hyper jet
		shots per foot with 90° phasing. Ran and set Baker Model D Packer
		on Schlumberger wireline at 4240 m. Mud Weight: 1170; Viscosity:
		45.
March 22, 1980		
Day 339		Running drill stem test #6. Rigged out Schlumberger. Waited on
		pressure recorders. Ran in for drill stem test #6, 4266 to 4274 m.
		Tested.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 14, 1980		
Day 331 (Cont'd)		torque to bottom (15 turns back torque). String weight set at 9200 daN. Ran in with string shot. Shot top of jars at 4383 m. Pulled out of hole, pressure annulus to 8 000 kPa, pipe backed off. Circulated and conditioned mud. Pulled out of hole, laid down 150 joints Grade "E" drilling pipe. Mud Weight: 1170; Viscosity: 51.
March 15, 1980		
Day 332		Cleaning out 88.9 mm drill pipe. Finished pulling out of hole 88.9 mm drill pipe. Pipe backed off at 3990 m, left 8 stands drill pipe and bottom hole assembly in hole. Talley grade "G" drill pipe. Ran in hole with 88.9 mm drill pipe, checked every connection. Picked up 88.9 mm Grade "G" drill pipe. Picked up Kelly, broke circulation. Screwed into fish, jarred twice at 180 000 daN, brakes would not hold. Changed brake blocks. Worked stuck pipe, came free, string weight 105 000 daN. Chained out, wet trip.
March 16, 1980		
Day 333		Circulating and conditioning mud. Continued to chain out, wet trip, finished pulling out of hole, had complete string, 2 cones missing off bit. Rigged out Homco. Rigged to run 0.57 m junk mill. Bottom hole assembly - 0.57 m junk mill, bit sub, 1 stand 120 mm drill collars, 88.9 mm drill pipe to surface. Ran in hole with 88.9 mm to 4200 m. Broke circulation. Washed to bottom, tagged total depth at 4421 m (by drill pipe talley). Recovered tools of rubber and some shale. Circulated and conditioned mud. Mud Weight: 1155; Viscosity: 45.
March 17, 1980		
Day 334		Running to perforate. Circulated, conditioned mud. Rig serviced, blow out preventers checked, crown saver checked, all OK. Hoisted pipe, broke out bit sub and mill. Ran correlation log total depth Schlumberger, 4408 m. Ran in hole with 101 mm "O" phase, 4 shots per metre casing gun.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 10, 1980		
Day 327	(Cont'd)	at bottom of jars. Mud Weight: 1190; Viscosity: 49.
March 11, 1980		
Day 328	4415 m	PB TD. Jarring up on fish. Circulated. Tripped out, chained out,
		left 10 drill collars in hole. Ran in hole with new set of 4-3/4
		Bowen jars, 8-4-3/4-inch drill collars. Tagged top of fish.
		Circulated. Screwed into fish, jarred three times, jars stopped
		working. Worked fish to 130 000 daN. Started driving down on fish.
		Jars started working. Had to set 40 000 daN on jars to reset.
		Appeared to have jarred fish up 10 inches. Mud Weight: 1160;
		Viscosity: 55.
March 12, 1980		
Day 329		Pulling wireline. Jarred and worked pipe. Rigged up Homco wireline.
		Ran in with sinker bar. Worked debris from bottom of first collar
		below jars to top of first collar above bit (4386 m - 4395 m). Ran
		in with 1600-grain shot, collar locator failed. Pulled out, repaired
		collar locator. Ran in to 4386 m with 1600-grain shot, misrun.
		Prima cord melted. Reran string shot 9 turns back torque, shot,
		pipe backed off up hole. Mud Weight: 1160; Viscosity: 55.
March 13, 1980		
Day 330		Pulling sinker bars. Pulled wireline. Screwed back in and jarred
		to 130 000 daN. Made up 2400-grain shot, set shot at bottom drill
		collar below jars, fired shot, no results. Jarred on stuck pipe,
		made up string shot to back off above drill collars, ran in, misrun,
		shot melted. Made up new conductor head on wireline, ran in with
		string shot to back off drill pipe above drill collar in order to
		change out drill pipe. Pipe bridged at 3650 m. Ran in with sinker
		bar, unable to drive wad of tape down (from prima cord).
March 14, 1980		
Day 331		Running Homco wireline. Cable on measuring device gave trouble.
		Pulled out of hole with sinker bars. Repaired counter head, reran
		sinker bars, got to 4392 m. Pulled out of hole. Made new rope
		socker, ran 2400-grain string shot, put back torque in pipe, worked

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 7, 1980		
Day 324		Circulating gas kick, conditioning mud. Recovered drill stem test charge from drill stem test #2, redressed tools. Ran in for drill stem test #3. Opened tool on preflow. Took ISIP. Packer unseated, tool washed out. Reversed circulation. Circulated down drill pipe through choke and poorboy degasser. Circulated out gas kick after tools failed. Mud Weight: 1130; Viscosity: 41.
March 8, 1980		
Day 325	4415 m	PB TD. Pulling perforating gun. Circulated through manifold and poorboy, conditioned gas cut mud. Pulled drill stem test #3, laid down testing tools. Rigged up Schlumberger, ran in with perforating gun. Ran correlation casing collar strip log. Hole bridged 50 m off bottom (rubbers from packers). Pulled out of hole. Mud Weight: 1160; Viscosity: 42.
March 9, 1980		
Day 326		Working stuck pipe, rigging up Schlumberger. Pulled perforating gun. Rigged out Schlumberger. Ran in hole with bit, drill collars, jars to 4405 m. Started taking weight, picked up, stuck in hole, worked pipe, no circulation. Pulled to 140 000 daN (315,000#). Jars do not work, pressure to 21 000 kPa (3000 psi), no circulation. Worked stuck pipe, waited on backoff tools and freepoint indicator. Rigged up freepoint indicator. Mud Weight: 1190; Viscosity: 49.
March 10, 1980		
Day 327		Circulating. Made up rope socket adapter for Homco freepoint. Ran freepoint indicator to 4405 m. Failed on bottom due to high temperature. Ran 800 grain shot to clear bit and tried to break circulation. Made up 400-grain string shot. Ran into 3800 m. Schlumberger line jumped shive. Welder made clamp to hold Schlumberger line. Schlumberger drum drive chain broke which caused drum to free weld throwing slack into line and jump shieve. Repaired chain. Finished running in with string shot. Could not get below middle of second drill collar below jars. Fired shot at first drill collar below jars. No back off. Ran 400 grain string shot and backed off

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
March 1, 1980		
Day 318	4402 m	PB TD. Waiting on 3-1/2-inch drill pipe. Hoisted drill collars, laid down testing tools. Laid down 5-inch Kelly, slipped and cut line. Rigged up to pick up 3-1/2-inch drill pipe. Waited on 3-1/2-inch drill pipe.
March 2, 1980		
Day 319	4402 m	PB TD. Picking up 3-1/2-inch drill pipe. Waited on drill pipe and unloaded trucks. Picked up 3-1/2-inch Kelly and drive bushing. Ran in drill collars and bottom hole assembly. Measured drill pipe. Picked up 3-1/2-inch drill pipe.
March 3, 1980		
Day 320	4415 m	PBTD 13 m. Circulating and conditioning mud. Measured and picked up 3-1/2-inch drill pipe. Drilled cement bridge at 4402 m to 4403 m. Circulated down to 4415 m. Conditioned mud, levelled out weight and viscosity. Mud Weight: 1160; Viscosity: 40.
March 4, 1980		
Day 321		Running drill stem test #2. Circulated and conditioned mud. Pumped pill, tripped out to test. Made up drill stem test tool and ran in for drill stem test #2 through perforations, 4266 m - 4274 m. Ran 937 m water cushion and inhibitor. Headed up to test and set packer at 4239 m. Mud Weight: 1160; Viscosity: 40.
March 5, 1980		
Day 322	4415 m	PB TD. Conditioning mud. Ran drill stem test #2. Held safety meeting on H_2S hazard. Dropped dart and reversed mud and gas out of drill pipe. Was able to pump very slowly and with pressure on annulus to prevent tool from opening. Rig serviced, circulated and conditioned mud. Hoisted 9 stands. Well swabbed, ran back in hole. Mixed gell and weight material and pumped through pump out sub. Mud Weight: 1100; Viscosity: 33.
March 6, 1980		
Day 323		Redressing testing tools. Circulated and conditioned mud. Hoisted testing tools, chained out, hoisted slowly. Broke down testing tools, packer seal ring failed. Packer failed on test. Mud Weight: 1160; Viscosity: 50.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 25, 1980		
Day 313	4402 m	PB TD. Tripping out to run logs. Repaired pumps 1 and 2. Circulated and conditioned mud. Mud weight and viscosity very low. Raised mud weight from 1100 to 1180. Viscosity from 30 to 38. Cleaned out to 4402 m. Dyna drill packed in. Repaired #1 pump, circulated with reduced rate #2 due to pop valve being welded into pump. Tripped out with tubing. Had 12 bad breaks when breaking out tubing. Mud Weight: 1180; Viscosity: 36.
February 26, 1980		
Day 314	4402 m	Pulling gauge ring. Rigged up Schlumberger, ran cement bond log, 4386.5 - 3247 (Schlumberger wireline depth) without gamma ray. Two Schlumberger gamma ray tools failed, one at 3900 and the other at 2800 m. Ran correlation log from Schlumberger wireline, total depth of 4386.5 m to bottom of intermediate casing (CNL correlation). Ran gauge ring and junk basket to 4390 (Schlumberger wireline depth).
February 27, 1980		
Day 315	4402 m	PB TD. Running in for drill stem test, inspecting tubing on way in. Pulled gauge ring. Installed wireline lubricator, ran perforating un, perforated from 4266 m to 4274 m with 4 Hyper jet shots per metre with 4-inch casing carrier gun by Schlumberger. Rigged out lubricator, nippled up flowline. Picked up testing tools and 9 additional drill collars (4-3/4). Ran in 3-1/2-inch tubing, inspected tubing threads with Hydril representative. Mud Weight: 1170; Viscosity: 39.
February 28, 1980		
Day 316	4402 m	PB TD. Running in hole, inspecting tubing with Hydril representative. Ran in tubing, broke clean each joint and inspected threads for galling with Hydril representative. Have laid down 77 joints out of string with total of 95 bad joints.
February 29, 1980		
Day 317	4402 m	PB TD. Laying down 3-1/2-inch tubing. Ran in 3-1/2-inch Hydril tubing. Checked all joints with Hydril representative. Laid down tubing string due to excessive thread galling.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 19, 1980		
Day 307	(Cont'd)	Pumped 20 barrels mud with 10 ppb of mica ahead of first stage.
		Good returns throughout. Mud Weight: 1193; Viscosity: 30.
February 20, 1980		
Day 308	4420.6 PBTD	Tearing out blow out preventers. Allowed Stage #2 cement dart to
		fall. Opened tool and circulated freely through parts. Cemented
		second stage, 2.0 Tonnes of Oilwell Class "G" cement with 0.6% R-55
		0.75% T-10 and 0.3% D-19. Plugged down at 1445. Rigged out Nowsco.
		Set casing slips with full string weight of 175,000 daN. Laid down
		500 ton slips and elevators, picked up blow out preventers stack and
		cut off casing. Set blow out preventers stack down and started to
		dismantle stack. Assisted rig jackers to jack rig level. Mud
		Weight: 1190; Viscosity: 42.
February 21, 1980		
Day 309	4420.6 m	PB TD. Nippling up blow out preventers. Broke down and removed
		blow out preventers. Cut off and dressed top of 177.8 mm casing.
		Installed tubing head and 152.4 mm and 34 720 kPa blow out preventers
		stack. Removed centrifuge from mud house.
February 22, 1980		
Day 310	4420.6	PB TD. Preparing tubing to run in hole. Nippled up blow out
		preventers and installed flare line. Rigged up floor to run tubing.
		Picked up bottom hole assembly. Measured tubing. Cleaned and washed
		tubing threads.
February 23, 1980		
Day 311	4420.6	PB TD. Running 3-1/2" tubing. Cleaned tubing threads and hand
		tubing power tongs. Ran 3-1/2" tubing, 240 joints in.
February 24, 1980		
Day 312	4420.6	PB TD. Repairing pump. Ran tubing. Rigged up and drilled DV tool
		at 3291 m by tubing tally. Ran tubing. Rigged out tubeomatic.
		Cleaned out bridge at 4373 m, circulated and cleaned out and repaired
		pump. Cleaned out to 4382 m and repaired pump.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 14, 1980		
Day 302	4430 m	15 m. Tripping out with Core #16. Hoisted, measured out, rig serviced. Conservation Board checked. Picked up core barrel. Ran in hole. Cut Core #16, 4425 - 4430 m. Worked tight hole off bottom from 4430 - 4420 m. Conditioned mud. Hoisted, trip slow due to cathead trouble and recovered core. Measured out of hole at 4415 m. Corrected depth to 4425 m. Cut 5 m of core, recovered 3.32 m. Background Gas: 20-45 units; Trip Gas: 800; Cuttings Gas: 1-2 units; Flowline Temperature: 43.7°C; Mud Weight: 1210; Viscosity: 43; Lithology: 100% Dolomite.
February 15, 1980		
Day 303	4430 m	Nil. Running continuous dipmeter. Recovered core, serviced core barrel. Rigged up to log by Schlumberger, total depth to bottom of 9-5/8" surface casing at 3259 m. Ran the following logs: BHCS, CNL-FDC, DI-SFL, Variable Density Log. Schlumberger Wireline Total Depth: 4420 m.
February 16, 1980		
Day 304	4430 TD	Preparing to lay down drill pipe. Ran Schlumberger continuous dipmeter. Ran velocity survey. Laid down core barrel. Ran in hole. Circulated, conditioned mud. Pulled off bottom, rigged up to lay down drill pipe. Mud Weight: 1215; Viscosity: 48.
February 17, 1980		
Day 305	4430 TD	Preparing to run 7-inch casing. Hoisted into 9-5/8-inch casing, rig serviced. Laid down drill pipe and drill collars. Rigged up weatherford tongs. Pulled wear ring. Wear ring bent and jammed in casing bowl. Had to modify pulling tool. Finished rigging up to run casing.
February 18, 1980		
Day 306	4430 TD	Running casing. Ran 7-inch casing.
February 19, 1980		
Day 307	4430 TD	Waited on cement. Ran 178 mm casing, 368 joints. Circulated casing and waited on Nowsco. Cemented Stage I with 11.5 Tonnes cement and displaced. Waited on cement, dropped dart to open DV at 07:15.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 9, 1980		
Day 297	4197 m	32 m. Drilling. Tripped out with core barrel and recovered core #15, 4158.2 to 4165.2 m. Cut 7 m, recovered 6.47 m. Rig serviced. Ran in hole with bit #107. Reamed out rathole and drilled. Replaced low chain in drawworks. Drilled. Background Gas: 32; Cutting: 1; Flowline Temperature: 51.9°C; Trip: 240; Mud Weight: 1200; Viscosity: 48; Lithology: 100% Dolomite.
February 10, 1980		
Day 298	4233 m	36 m. Drilling. Drilled, repaired compound lubricator chain. Drilled to 4227 m. Tripped for bit, rig serviced, slipped and cut line. Drilled to 3233 m. Mud Weight: 1205; Viscosity: 58; Lithology: 100% Dolomite; Background Gas: 96; Cutting: 1-4; Flowline Temperature: 53.0°C; Connection: 40 @ 2196 m.
February 11, 1980		
Day 299	4312 m	79 m. Tripping, looking for washout. Drilled and rig serviced. Lost 1 500 kPa pressure, tripped out, looked for washout. Background Gas: 30; Cuttings: 1-3; Trip: 120; Flowline Temperature: 49.4°C; Mud Weight: 1190; Viscosity: 42; Lithology: 100% Dolomite.
February 12, 1980		
Day 300	4342 m	30 m. Drilling. Tripped out slow, checked for washout, located hole in slip area of pipe 40 singles from surface. Tripped out, charged reamer cutters, laid down 15 joints Grade "G" and picked up 15 joints Grade "E". Picked up new jars and tripped back in hole. Drilled and rig serviced. Background Gas: 20; Cutting: 1-2; Trip: 1600; Flowline Temperature: 43.4°C; Mud Weight: 1190; Viscosity: 44; Lithology: 100% Dolomite.
February 13, 1980		
Day 301	4415 m	73 m. Tripping out to core. Drilled and rig serviced. Dropped survey, rig serviced, measured out to core. Background Gas: 14; Cutting: 1-2; Connection: 14; Flowline Temperature: 47.6°C; Mud Weight: 1200; Viscosity: 42; Lithology: 100% Dolomite.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 5, 1980		
Day 293	(Cont'd)	maximum. No jar actions. Circulated, lowered mud weight from 1225 to 1205. Spotted 100 barrel diesel oil with 110-gal. mil-free. Displaced oil and spotted 35 barrel outside around drill collars. Oil in place at 0400. Pipe freed at 0415. Circulated and rotated pipe. Circulated diesel fuel to surface. Had 20 mins. of gas cut mud. Pulled up into 9-5/8" casing and circulation. Tore out rotary drive shaft. Bearings piled up. Background Gas: 18-26; Cutting: 1-3; Flowline Temperature: 49.2°C; Mud Weight: 1205; Viscosity: 42; Lithology: 100% Dolomite.
February 6, 1980		
Day 294	4126 m	Nil. Milling on iron. Took out rotary drive shaft. Chained out of hole, made up bottom hole assembly. Ran in 40 stands. Slipped and cut line, worked on mud manifold line, waited on rotary drive, installed rotary drive. Ran in hole with mill. Milled on iron (iron - part of nose cone from last bit). Mud Weight: 1205; Viscosity: 43.
February 7, 1980		
Day 295	4155 m	29 m. Drilling. Circulated bolt. Tripped out with mill. Recovered very small amount of junk in sub. Charged bottom hole assembly and ran in hole with bit #106. Worked junk sub prior to starting to drill. Drilled and rig serviced. Lost 10 m^3 of mud to formation starting at 4143 m. Presently adding mica to mud system. Background Gas: 72; Cuttings Gas: 3; Trip Gas: 280; Flowline Temperature: 47.6°C; Mud Weight: 1205; Viscosity: 60; Lithology: 100% Dolomite.
February 8, 1980		
Day 296	4165 m	10 m. Tripping out Core #15. Drilled, circulated and surveyed. Tripped out to core. Rig serviced, picked up and serviced core barrel. Picked up near jars and tripped in, slipped and cut line, broke circulation and dropped ball. Cute Core #15 from 4158.2 m to 4165.2 m - 7 m. Core jammed, hole very tight, worked pipe to top of new hole (7 m). Tripped out with core. Background Gas: 6; Cutting: 1-3; Flowline Temperature: 48.9°C; Peak: 3321 units at 4959 m. Mud Weight: 1195; Viscosity: 53; Lithology: 100% Dolomite; Survey:- 4158 m - 6°

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
February 1, 1980		
Day 289	4035 m	50 m. Tripping in to cut Core #12. Drilled, repaired air compressor,
		rig serviced. Tripped out, picked up core barrel. Slipped and cut
		line. Ran in hole. Background Gas: 14-100; Cutting: 2-4;
		Flowline Temperature: 47.4°C; Connection: 40; Mud Weight: 1215;
		Viscosity: 44; Lithology: 100% Dolomite; Survey:- Todco 4035 m - 8°
February 2, 1980		
Day 290	4040 m	5 m. Coring. Ran in hole with core barrel. Cut Core #12, 4035 m to
		4036.6 m. Jammed at 4036.6 m. Hoisted core. Recovered core.
		Recovered 1.6 m. Serviced core barrel. Ran in hole for Core #13.
		Cut core #13 at 4036.6 m. Background Gas: 32-64; Cutting: 4;
		Flowline Temperature: 41; Tripping: 1280-830; Mud Weight: 1220;
		Viscosity: 43; Lithology: 100% Dolomite.
February 3, 1980		
Day 291	4046 m	6 m. Hoisting. Cut Core #13. Stuck core barrel pulling up to make
		connection. Stuck 1 m off bottom. Jarred loose core barrel. Hole
		tight for 10 m. Pulled and recovered core #13, 4036.6 m to 4043.6 m.
		Cut 7 m, recovered 7 m. Serviced core barrel, slipped and cut line.
		Ran in hole for Core #14. Reamed and cleaned 5 m to bottom. Cut
		Core #14, 4043.6 m to 4046 m. Cut 2.4 m. Jarred loose core barrel.
		Stuck on bottom. Worked up through tight hole for 8 m. Hoisted core
		#14. Background Gas: 32; Cutting: 4; Flowline Temperature: 43.0°C;
		Trip: 450; Mud Weight: 1215; Viscosity: 43; Lithology: 100%
		Dolomite.
February 4, 1980		
Day 292	4102 m	56 m. Drilling. Hoisted, recovered Core #14. Cut 2.4 m. Recovered
		2.4 m. Serviced core barrel, picked up bottom hole assembly. Ran in
		hole. Drilled, rig serviced, drilled. Background Gas: 20-80;
		Cutting: 2-5; Flowline Temperature: 49.9; Trip: 170; Mud Weight:
		1225; Viscosity: 43; Lithology: 100% Dolomite.
February 5, 1980		
Day 293	4126 m	24 m. Tearing out rotary drive shaft. Drilled. Differential stuck at
		4122 m when making connection. Free circulation, worked pipe to

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 27, 1980		
Day 284	(Cont'd)	Recovered 1.93. Mud Weight: 1215; Viscosity: 42.
January 28, 1980		
Day 285	3916 m	3.4 m. Thawing out Kelly. Hoisted Core #9. Recovered Core #9 and serviced core barrel. Ran in hole for Core #10. Cut Core #10. Jammed at 3916 m. Hoisted, recovered core #10, serviced core barrel. Picked up bottom hole assembly, ran in hole, core #10, 3912.6 m to 3916 m. Cut 3.4 m, recovered 2 m, dense right at bottom. Thawed out Kelly. Background Gas: 40-80; Cutting: 7-8; Flowline Temperature: 48.4; Trip: 292; Mud Weight: 1225; Viscosity: 43; Lithology: 100% Dolomite.
January 29, 1980		
Day 286	3950 m	34 m. Logging. Thawed out Kelly and stand pipe. Drilled. Hoisted to log. Logging by Schlumberger. Background Gas: 25-150 units; Cuttings Gas: 6-10 units; Flowline Temp rature: 47°C; Connections Gas: 5 units; Trip Gas: 688; Mud Weight: 1215; Viscosity: 43; Lithology: 100% Dolomite.
January 30, 1980		
Day 287	3956 m	6 m. Coring. Logging by Schlumberger. Strung new drilling line, ran in hole for core #11. Cut Core #11. Repaired washout in pump manifold mud line. Cored. Background Gas: 34-80 units; Cuttings Gas: 6 units; Flowline Temperature: 42.2°C; Trip Gas: 830; Mud Weight: 1205; Viscosity: 44; Lithology: 100% Dolomite.
January 31, 1980		
Day 288	3985 m	29 m. Drilling. Cut Core #11. Jammed at 3956.8 m. Hoisted, recovered core #11. Cut 7.6 m. Recovered 7.6 m. Serviced core barrel, picked up bottom hole assembly, ran in hole. Drilled. Background Gas: 30-40; Cutting Gas: 3-4; Flowline Temperature: 42.8°C; Trip Gas: 460; Mud Weight: 1215; Viscosity: 41; Lithology: 100% Dolomite.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 23, 1980		
Day 280	3774.6 m	4.6 m. Running in hole. Cut Core #6. Jammed at 3771.6 m. Hoisted.
		Recovered Core #6, 3759 - 3771.6 m. Cut 12.6 m, recovered 11.4.
		Serviced core barrel. Ran in for Core #7. Cut Core #7, jammed at
		3774.6 m. Hoisted. Recovered Core #7, 3771.6 - 3774.6 m, cut 3 m.
		Recovered 2.2 m. Serviced core barrel. Ran in hole to cut Core #8.
		Background Gas: 80 units; Trip Gas: 800; Mud Weight: 1200;
		Viscosity: 44; Lithology: 100% Dolomite.
January 24, 1980		
Day 281	3782.4 m	7.8 m. Cleaning to bottom. Ran in hole for Core #8. Cut Core #8.
		3774.6 m. Jammed at 3782.4 m. Lost 15 m^3 mud while coring.
		Circulated lost circulation material. Hoisted. Recovered Core #8,
		3774.6 - 3782.4 m. Cut 7.8 m, recovered 3.3 m. Stand back core
		barrel. Picked up bottom hole assembly. Ran in hole. Cleaned to
		bottom. Background Gas: 15-36 units; Cuttings Gas: 4 units;
		Flowline Temperature: 36.8°C; Mud Weight: 1215; Viscosity: 43.
		Lithology: 100% Dolomite.
January 25, 1980		
Day 282	3866 m	84 m. Drilling. Drilled, rig serviced, drilled. Lost 8 m^3 mud
		while drilling from 3802 m to 3810 m. Background Gas: 14 units
		(12-150); Cuttings Gas: 2-4 units; Flowline Temperature: 53°C;
		Connections Gas: 30-60 units; Mud Weight: 1200; Viscosity: 42;
		Lithology: 100% Dolomite.
January 26, 1980		
Day 283	3905 m	41 m. Drilling. Drilled, ran survey, tripped out, slipped and cut
		line, rig serviced, tripped in. Drilled and rig serviced. Background
		Gas: 20-150 units; Cutting: 2-10; Flowline Temperature: 52°C;
		Trip Gas: 640; Mud Weight: 1215; Viscosity: 45; Lithology:
		100% Dolomite; Survey: 3860 m - 8½°N44E.
January 27, 1980		
Day 284	3912.6 m	7.6 m. Recovering core. Drilled, hoisted. Cut Core #9, 3910.4 m to
		3912.6 m. Lost 6 500 kPa pump pressure. Circulated bottoms up.
		Hoisted wet string checking for washout. Core #9 cut, 2.2 m

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 17, 1980		
Day 274	(Cont'd)	pressure 4 000 kPa, circulated carbide to establish depth of washout.
		Mud Weight: 1200; Viscosity: 39.
January 18, 1980		
Day 275	3684 m	12 m. Reaming under gauge hole at 3682.8 m. Hoisted to find washout.
		Pulled 15 stands, found 8" split on bottom of 15th stand. Ran back in.
		Drilled, rig serviced. Hoisted for bit, changed bottom hole assembly,
		ran in. Trip slow due to high winds. Reamed under gauge hole from
		3682 m. Mud Weight: 1200; Viscosity: 42; Lithology: 85% Dolomite;
		15% Quartz.
January 19, 1980		
Day 276	3697 m	13 m. Drilling. Reamed under gauge hole from 3682.8 to 3684 m.
		Drilled, rig serviced. Tripped for bit, changed reamer cutters,
		surveyed. Reamed under gauge hole from 3693 to 3694 m. Drilled,
		rig serviced. Mud Weight: 1195; Viscosity: 41; Lithology:
		80% Dolomite, 10% Shale, 10% Quartz; Survey:- 3694 m - Misrun.
January 20, 1980		
Day 277	3724 m	27 m. Running in with core barrel. Drilled. Dropped survey, tripped
		out to cut core, picked up new core barrel and jars, ran in, slipped
		and cut line. Finished in hole. Background Gas: 150 units;
		Cuttings Gas: 5 units; Flowline Temperature: 41.3°C; Mud Weight:
		1195; Viscosity: 42; Lithology: 100% Dolomite; Survey:- 3620 m - 9°.
January 21, 1980		
Day 278	3741 m	17 m. Repairing rotary clutch. Finished in with core barrel. Reamed
		2 m to bottom. Cut Core #4, 3724 m - 3741 m. Hoisted Core #4.
		Rigged core, serviced core barrel. Ran in Core #5. Repaired rotary
		chain. Core #4 - Cut 17 m, recovered 17 m. Mud Weight: 1200;
		Viscosity: 42; Lithology: 95% Dolomite, 5% Shale.
January 22, 1980		
Day 279	3770 m	29 m. Cutting Core #6. Repaired rotary clutch. Cut Core #5 - 3741
		- 3759 m. Hoisted and recovered Core #5. Serviced core barrel, ran
		in hole. Cut Core #6 - 3759 - 3770 m. Core #5 - cut 18 m, recovered
		18 m. Mud Weight: 1210; Viscosity: 42; Lithology: 100% Dolomite,
		trace Quartz and shaley Dolomite.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 13, 1980		
Day 270	(Cont'd)	1210; Viscosity: 41; Lithology: 95% Dolomite, 5% Shale, trace Calcite
		Pyrite, Quartz, Chert. Background Gas: 11 units; Cuttings Gas: 3
		units; Trip Gas: 640; Flowline Temperature: 44.4°C.
January 14, 1980		
Day 271	3666 m	1 m. Cutting Core #2. Cut core #1 to 3665 m. Barrel jammed on
		connection. Measured out for talley check difference +1.15 m.
		Core #1 - 3660 m to 3665.7 m. Recovered 4.09 m. Recovered and boxed
		core. Serviced core barrel. Tripped in with diamond core bit #2.
		Circulated barrel and dropped ball and cut core #2. Background Gas:
		8 units; Trip Gas: 608; Flowline Temperature: 31.8°C; Mud Weight:
		1210; Viscosity: 43; Lithology: 95% Dolomite, 5% Shale.
January 15, 1980		
Day 272	3670.6 m	3.4 m. Cutting Core #3. Cut core #2, Barrel jammed. Tripped out
		with core. Core #2, 3665.8 to 3668.8 m. Cut 3 m and recovered 1.80 m.
		Serviced barrel. Ran in hole with drill collars, slipped and cut line.
		Finished in with core barrel. Circulated core barrel and washed to
		bottom. Appeared to have washed over, 1 m of core lost from Core #2
		and cut Core #3. Background Gas: 24 units; Cuttings Gas: 4 units;
		Trip Gas: 480; Flowline Temperature: 32.7°C; Mud Weight: 1220;
		Viscosity: 40; Lithology: 80% Dolomite, 20% Shale, cavings.
January 16, 1980		
Day 273	3672.1 m	1.5 m. Reaming at 3659 m. Cut Core #3. Hoisted core barrel.
		Recovered core. Standback core barrel and ran in hole with bottom hole
		assembly. Reamed in starting at 3654 m. Core #3 - 3668.8 - 3672.1 m
		Cut 3.3. Recovered 1.7. Background Gas: 12 units; Cuttings Gas: 1
		unit; Flowline Temperature: 34.7°C; Trip Gas: 736; Mud Weight:
		1220; Viscosity: 42; Lithology: 90% Dolomite, shaley dolomite, 10%
		Quartz.
January 17, 1980		
Day 274	3672 m	Nil. Circulating, checking for washout. Reamed to bottom. Lost
		5 000 kPa pump pressure. Checked all mud lines and valves for washout.
		Hoisted wet string, checked for washout. Ran in hole. Circulated,

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 10, 1980		
Day 267	3647 m	19 m. Tripping. Milled on junk. Rig serviced, tripped out and cleaned junk sub, picked up, ran in hole with bit #97 rerun. Worked junk sub on bottom prior to drilling. Drilled to 3639 m. Surveyed at 3636 m. Rig serviced, circulated sample, drilled to 3647 m. Bit torqued up. Tripped for new bit. Background Gas: 15 units; Cuttings Gas: 6 units; Connection Gas: 57 units; Trip Gas: 600 units; Flowline Temperature: 45.0°C; Mud Weight: 1220; Viscosity: 45; Lithology: 100% Shale, trace Dolomite, Calcite and Pyrite; Survey:- 3636 m - 9°N39E.
January 11, 1980		
Day 268	3653 m	6 m. Tripping. Tripped out of hole, changed bit and cleaned out junk sub. Recovered several small pieces of broken insert. Ran in hole with collars, slipped and cut line, finished running in hole. Washed to bottom and worked junk sub. Drilled from 3647 m - 3653 m. Very high torque in string after drilling 3 m. Bit appeared to be locked up. Tripped out to check bit, bit OK. RWP stabilizer marked and gauged. Laid down stabilizer and picked up 3-point reamer. Ran in hole. Background Gas: 12 units; Cuttings Gas: 8 units; Trip Gas: 1050; Flowline Temperature: 38.5°C; Mud Weight: 1220; Viscosity: 48; Lithology: 100% Shale, trace Pyrite and Calcite.
January 12, 1980		
Day 269	3660 m	7 m. Running in to cut Core #1. Finished in hole. Drilled to 3660 m. Circulated bottom hole sample. Pumped pill and measured out to core. Talley +1.45 m. Picked up and serviced core barrel. Ran in hole with drill collar. Slipped and cut line. Tripped in with core barrel. Background Gas: 14 units; Cuttings Gas: 11 units; Trip Gas: 640; Flowline Temperature: 37.4°C; Mud Weight: 1220; Viscosity: 47; Lithology: 90% Dolomite, 10% Shale.
January 13, 1980		
Day 270	3665 m	5 m. Coring. Ran in hole with core barrel, circulated barrel and dropped ball. Repaired rotary chain. Cut core #1 from 3660 m to 3665 m. Coring very slowly from 63 to 285 m per metre. Mud Weight:

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
January 4, 1980		
Day 261	(Cont'd)	Weight: 1150; Viscosity: 50; Lithology: 80% Shale, 20% Dolomite, Survey:- 3520 m - 6-7/8°N33E
January 5, 1980		
Day 262	3569 m	37 m. Drilling. Drilled, rig serviced, drilled. Background Gas: 10 units; Cuttings Gas: 2 units; Connections Gas: 5 units; Flowline Temperature: 52.4°C; Mud Weight: 1155; Viscosity: 48; Lithology: 85% Shale, 15% Dolomite.
January 6, 1980		
Day 263	3599 m	30 m. Drilling. Drilled to 3570 m, Surveyed, tripped for bit, ran in hole with junk sub, worked junk sub on bottom and drilled to 3599 m. Background Gas: 15; Cuttings Gas: 4; Connection Gas: 15; Trip Gas: 1000; Flowline Temperature: 49.8°C; Mud Weight: 1235; Viscosity: 50; Lithology: 100% Shale, trace Dolomite and Pyrite; Survey:- 3573 m - 6-7/8°N33E
January 7, 1980		
Day 264	3628 m	29 m. Tripping and repairing high chain. Drilled, rig serviced, repaired camp and oiler chain, drilled to 3628 m. Rig serviced and tripped for bit. Repaired high drive chain. Background Gas: 14; Cuttings Gas: 6; Flowline Temperature: 52.4°C; Mud Weight: 1210; Viscosity: 45; Lithology: 100% Shale, trace Calcite and Pyrite.
January 8, 1980		
Day 265	3628 m	Nil. Tripping out. Installed new high clutch chain. Finished tripping out of hole. Three cones lost in hole from bit. Waited on mill. Ran in hole with 213 mm Flatface mill and junk sub. Milled on junk and tripped out with mill. Mud Weight: 1215; Viscosity: 52;
January 9, 1980		
Day 266	3628 m	Nil. Milling. Tripped out with mill and recovered junk from junk sub. Installed new drive chain in #3 compound. Ran in hole with bit #97. Worked junk into junk sub. Unable to get all junk off bottom and unable to drill new hole. Tripped out with bit and recovered junk from sub. Ran in hole with 213 mm flatface mill and junk sub and milled on junk. Mud Weight: 1210; Viscosity: 54.

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
December 30, 1979		
Day 256	3422 m	38 m. Drilling. Drilled, rig serviced, surveyed, drilled. Background Gas: 24 units; Cuttings Gas: 8 units; Flowline Temperature: 53.4°C; Mud Weight: 1150; Viscosity: 45; Lithology: 100% Shale, trace Dolomite and Claystone; Survey:- 3415 m - 6½°N32E
December 31, 1979		
Day 257	3437 m	15 m. Drilling. Drilled, rig serviced, tripped for bit, drilled. Background Gas: 60 units; Cuttings Gas: 2 units; Flowline Temperature: 51.2°C; Peak Gas: 3436 m - 480 units; Mud Weight: 1160; Viscosity: 41; Lithology: 90% Shale, 10% Dolomite, trace Calcite and Pyrite.
January 1, 1980		
Day 258	3449 m	12 m. Drilling. Drilled, rig serviced, tripped for bit, circulated, waited on incoming crew, finished in hole, drilled. Background Gas: 40 units; Cuttings Gas: 5 units; Connection Gas: 40 units; Trip Gas: 200 units; Flowline Temperature: 50.4°C; Mud Weight: 1160; Viscosity: 45; Lithology: 90% Shale, 10% Dolomite, trace Quartz, Calcite and Pyrite.
January 2, 1980		
Day 259	3484 m	35 m. Drilling. Drilled, rig serviced, drilled. Background Gas: 38 units; Cuttings Gas: 8 units; Flowline Temperature: 52.8°C; Mud Weight: 1150; Viscosity: 45; Lithology: 80% Shale, 20% Dolomite, trace Pyrite.
January 3, 1980		
Day 260	3515 m	31 m. Drilling. Drilled, rig serviced, surveyed, drilled. Background Gas: 30 units; Cuttings Gas: 5 units; Flowline Temperature: 54°C; Mud Weight: 1150; Viscosity: 50; Lithology: 20% Shale, 60% Dolomite, 20% Siltstone; Surveys:- 3492 m - 7½°N33E
January 4, 1980		
Day 261	3532 m	17 m. Drilling. Drilled, rig serviced, dropped survey, tripped for bit, laid down 6 joints "G" drill pipe, picked up 6 joints "E" drill pipe, drilled. Background Gas: 20; Cuttings Gas: 2; Flowline Temperature: 47°C; Connection Gas: 3; Trip Gas: 2060; Mud

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DAILY OPERATIONS REPORT

WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
December 25, 1979		
Day 251	(Cont'd)	Cuttings: 20; Connection: 20; Flowline Temperature: 48.9°C;
		"D" Exponent: 1.86; Mud Weight: 1235; Viscosity: 47; Lithology
		100% Shale, trace Siltstone and Pyrite; Survey:- 3316 m - 6°N30E
December 26, 1979		
Day 252	3331 m	7 m. Tripping in hole with new bit. Drilled and rig serviced.
		Lost 700 kPa pump pressure, checked surface equipment. Chained out
		of hole, checked all pipe and drill collar connections. Jars had
		pieces of metal stuck in mandel pump through jars sitting in table
		to check, no apparent leak. Charged out jars. Ran in hole with drill
		collars and circulated to check for pressure drop. Ran in hole with
		30 stands and checked again. No pressure decline, ran in hole with
		45 - check - no decline. Background Gas: 34; Cutting: 48;
		Flowline Temperature: 50.2°C; Mud Weight: 1220; Viscosity: 48;
		Lithology: 100% Shale, trace Pyrite and Siltstone.
December 27, 1979		
Day 253	3348 m	17 m. Drilling. Finished tripping in hole. Drilled and rig serviced.
		Background Gas: 9; Cuttings; 5; Flowline Temperature: 52.6°C;
		Mud Weight: 1200; Viscosity: 44; Lithology: 50% Shale, 25%
		Claystone, 20% Dolomite, 5% Pyrite, trace Calcite.
December 28, 1979		
Day 254	3363 m	15 m. Drilling. Drilled survey, rig serviced, surveyed, drilled.
		Background Gas: 10; Cuttings Gas: 5; Flowline Temperature: 53;
		Mud Weight: 1180; Viscosity: 53; Lithology: 100% Shale;
		Survey:- 3349 m - 6-1/8°N28E
December 29, 1979		
Day 255	3384 m	21 m. Drilling. Drilled, tripped for bit, rig serviced, pit drill,
		drilled. Background Gas: 18 units; Cuttings Gas: 4 units;
		Flowline Temperature: 53.8°C; Mud Weight: 1175; Viscosity: 46;
		Lithology: 70% Shale, 20% Dolomite, 10% Claystone.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
December 21, 1979		
Day 247		Picking up drill string. Installed casing spool and nippled up blow out preventers, pressure tested casing spool seal assembly to 9 000 kPa, OK. Pressure tested blind rams to 20 000 kPa, OK. Laid down casing elevators, rigged to pick up drill collar. Picked up 178 mm drill collar. Mud Weight: 1310; Viscosity: 63.
December 22, 1979		
Day 248	3270 m	Nil. Waiting on welder. Picked up and measured drill pipe. Ran in hole. Tagged top of DV tool at 1184 m. Drilled out DV tool. Picked up drill pipe and ran in hole. Tagged top of cement at 3245 m. Pressure tested hydril, 2 sets pipe rams, kellycock, blow out preventer valves to 20 000 kPa. All held OK. Found leaks in weld in flare line at flange going into manifold. Waited for welder to repair flare line. Circulated and conditioned mud. Unable to fly due to fog at Fort Nelson. Mud Weight: 1290; Viscosity: 56.
December 23, 1979		
Day 249	3271 m	1 m. Tripping for bottom hole assembly change. Waited on welder. Repaired flare line to manifold. Pressure tested flare line and manifold valves to 31 000 kPa, all OK. Drilled out float collar, shoe collar and float shoe. Float shoe is at 2259 drillers talley, reamed out rat hole. Drilled to 3271 m and circulated out cement. Ran formation leak off test with Nowsco. Formation fraction gradient is 14.85 kPa per metre. Tripped out. Mud Weight: 1250; Viscosity: 53.
December 24, 1979		
Day 250	3298 m	27 m. Drilling. Tripped out of hole, changed bottom hole assembly, picked up 7 159 mm drill collars and tripped in hole. Rig serviced and drilled. Background Gas: 90 units; Cuttings Gas: 57 units; Flowline Temperature: 48.9°C; Mud Weight: 1250; Viscosity: 48; Lithology: 90% Shale, 10% Siltstone.
December 25, 1979		
Day 251	3324 m	26 m. Drilling. Drilled and rig serviced. Surveyed misrun and re-surveyed. Rig serviced and drilled. Background Gas: 30;

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
December 15, 1979		
Day 241	3270 m	Nil. Retrieving multi shot survey. Ran continuous dipmeter from 3263 m to 1064. Rigged out Schlumberger, ran in hole with cleanout string and ran multi shot survey on trip in. Tripped in very slow due to extremely high wind. Circulated through bridge at 3200 m. 3 m fill on bottom, one hour of gas cut mud when bottoms up. Lost one arm of the dipmeter. Mud Weight: 1310; Viscosity: 63.
December 16, 1979		
Day 242	3270 m	Nil. String to 10 lines for casing job. Dropped multi shot survey, pulled 40 stands and surveyed 3270 m to 2100 m. Recovered survey, ran to bottom. Circulated and waited for high wind to subside. Reran multi shot survey from 3270 m to 1054 m. Mud Weight: 1310; Viscosity: 56.
December 17, 1979		
Day 243	3270 m	Nil. Rig to run 9-5/8" casing. Strung to 10 lines. Laid down drill pipe. Laid down 8 - 9" drill collars. Pulled wear ring. Rigged to run casing.
December 18, 1979		
Day 244	3270 m	Nil. Running casing. Rigged up to run 9-5/8" casing. Ran 9-5/8" casing.
December 19, 1979		
Day 245	3270 m	Nil. Waiting on cement. Ran and circulated 244 mm casing as per casing and cementing summary. Circulated casing prior to cementing. Rigged up cementers. Cement Stages Nos. 1 & 2 as per cementing report. Plugged down on Stage No. 2 at 03:30 12/19/79. Waited on cement to slack off. Mud Weight: 1310; Viscosity: 63.
December 20, 1979		
Day 246		Installing casing spool. Waited on cement, changed seats and valves in No. 1 pump. Changed heads and liners to 140 mm. Broke out and raised blow out preventers. Installed casing slips and slacked off. Cut off casing and dressed top. Started to install casing spool.

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DATE	DEPTH	DETAIL OF OPERATION
December 10, 1979		
Day 236	3203 m	23 m. Drilling. Drilled, rig serviced, drilled. Background Gas: 144 units; Cuttings Gas: 18; Flowline Temperature: 57.5°C; Shale Density: 2.58; "D" Exponent: 1.70; Connection Gas: 2010; Peak Gas: 3200+ @ 3185 m. Mud Weight: 1298; Viscosity: 58; Lithology: 100% Dolomitic Shale, came in at 3180 m.
December 11, 1979		
Day 237	3219 m	16 m. Drilling. Drilled, rig serviced, dropped Todco survey, tripped for bit, drilled. Worked through keyseat at 2100 m on way out. Hole good on trip in 1 m of fill. Background Gas: 88 units; Cuttings Gas: 4 units; Flowline Temperature: 58°C; Shale Density: 2.57; "D" Exponent: 1.66; Mud Weight: 1310; Viscosity: 56; Lithology: 100% Dolomite Shale (grey, whitish shale); Survey:- 3205 m - 6° (Todco)
December 12, 1979		
Day 238	3256 m	37 m. Drilling. Drilled, rig serviced, repaired pump, circulated sample, drilled. No crew change due to weather. Background Gas: 480 units; Cuttings Gas: 4 units; Flowline Temperature: 57.6°C; "D" Exponent: 1.32; Mud Weight: 1300; Viscosity: 54; Lithology: 100% Shale, slightly silty and dolomitic.
December 13, 1979		
Day 239	3270 m	14 m. Rigging up Schlumberger to log. Drilled to casing point at 3270 m. Circulated, conditioned mud, surveyed, hoisted, slipped line on drum. Line anchor came off. Finished out of hole. Mud Weight: 1300; Viscosity: 54; Lithology: Shale; Survey:- 3270 m - 6° (Todco)
December 14, 1979		
Day 240	3270 m	Nil. Calibrating dipmeter. Logged by Schlumberger. Ran the following logs: DLL with SP and Gamma Ray - Total Depth to surface casing BHC Sonic Gamma Ray Caliper - Total Depth to surface casing CNL FDC GR Caliper - Total Depth to surface Wireline Total Depth: 3263 (new line).

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
December 4, 1979		
Day 230 (Cont'd)		Quartz, Pyrite; Surveys:- 3032 m - 6-3/4°N35E; 3050 m - 6-2/3°N32E.
December 5, 1979		
Day 231	3079 m	16 m. Drilling. Drilled, rig serviced, circulated, surveyed trip out, tight hole at 2078 m and 1736 m. Changed bit, ran in hole. Bridged at 3011 m, cleaned out 7 m. Cleaned out 7 singles to bottom 3039 m to 3075 m. Background Gas: 72 units; Cuttings Gas: 2 units; Trip Gas: 2880; Flowline Temperature: 58°C; Shale Density: 2.53; Mud Weight: 1275; Viscosity: 51; Lithology: 90% Shale, 10% Marle; Survey:- 3072 m - 6¼°N28E.
December 6, 1979		
Day 232	3112 m	33 m. Drilling. Drilled, rig serviced, surveyed, drilled. Mud Weight: 1260; Viscosity: 55; Lithology: 80% Shale, 20% Marle; Surveys:- 3088 m - 6½°N30E; 3107 m - 6¼°N32 E.
December 7, 1979		
Day 233	3141 m	29 m. Drilling. Drilled, rig serviced, surveyed, drilled. Background Gas: 136; Cuttings Gas: 4; Connection at 3110, 3200; Flt.: 58.8°C; Shale Density: 1.65; Mud Weight: 1255; Viscosity: 56; Lithology: 60-70% Shale, 30-40% Limestone; Survey:- 3135 m - 6N28E.
December 8, 1979		
Day 234	3163 m	22 m. Tripping. Drilled, rig serviced, surveyed, tripped for bit. Background Gas: 134 to 832; Cutting: 1-6; Peak Gas: 3000 at 3157; Flowline Temperature: 59.2°C; Shale Density: 2.56; Mud Weight: 1250; Viscosity: 52; Lithology: 90% Shale, 10% Marle.
December 9, 1979		
Day 235	3180 m	17 m. Drilling. Finished out of hole, recovered survey. Slipped and cut drilling line, ran in hole, cleaned 8 m to bottom. Drilled, circulated gas cut mud from bottom up for ½ hour. Drilled and circulated gas cut mud after drilling break. 2 m at 3176 m, drilled. Background Gas: 100 to 1120; Penetration: 23 to 49 min/m; Flowline Temperature (after trip): 55.7; Shale Density: 2.55; "D" Exponent: 1.64; Connection: 3200 at 3176; Mud Weight: 1250; Viscosity: 52; Lithology: 100% Shale; Surveys:- 3160 m - Misrun; 3164 m - 6°N32E.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 30, 1979		
Day 226	(Cont'd)	10% Claystone, trace Quartz and Sandstone. Surveys:- 2939 m - 9½°N41E;
		2948 m - 9½°N42E; 2959 m - 8-7/8°N40E.
December 1, 1979		
Day 227	2992 m	27 m. Drilling. Drilled, rig serviced, surveyed. Worked tight hole
		on connection at 2989 m. High torque and slightly sticky. Background
		Gas: 192; Cuttings Gas: 4; Connection Gas: 80 units @ 2971 m,
		3200 units @ 2989 m; Flowline Temperature: 58.3°C; Shale Density:
		2.54; "D" Exponent: 1.69; Mud Weight: 1270; Viscosity: 57;
		Lithology: 90% Shale, 10% Claystone, trace Siltstone and Quartz;
		Survey:- 2976 m - 8-1/8°N40E.
December 2, 1979		
Day 228	3000 m	8 m. Cleaning to bottom. Drilled, rig serviced, circulated and
		worked hole for survey. Surveyed at 2995 m - misrun. Drilled to
		3000 m, circulated and reran survey at 2995 m. Tripped for bit and
		bottom hole assembly change. Background Gas: 56 units; Cuttings
		Gas: 3-5 units; Connection Gas: 136 at 2998 m; Flowline
		Temperature: 58.1°C; Shale Density: 2.55 @ 2997 m; "D" Exponent:
		1.70 - 1.82. Mud Weight: 1255; Viscosity: 62; Lithology: 95%
		Shale; 5% Claystone; trace Dolomite and Pyrite; Survey:- 2995 m -
		7½°N43E.
December 3, 1979		
Day 229	3032 m	32 m. Drilling. Drilled, rig serviced, surveyed. Worked tight
		connection at 3007 m for 1-3/4 hours. Background Gas: 100 units;
		Cuttings Gas: 2 units; Connection Gas: 140 @ 3025 m; Flowline
		Temperature: 57.8°C; Shale Density: 2.54; "D" Exponent: 1.68;
		Mud Weight: 1260; Viscosity: 51; Lithology: 90% Shale, 10%
		Claystone, trace Dolomite and Quartz; Survey:- 3013 m - 7°N36E.
December 4, 1979		
Day 230	3063 m	31 m. Drilling. Drilled, rig serviced, surveyed. Background Gas: 90;
		Cuttings Gas: 2; Connection Gas: 280, 288, 730; Flowline Temperature:
		57.9°C; Shale Density: 2.53; "D" Exponent: 1.64; Mud Weight: 1265;
		Viscosity: 54; Lithology: 90% Shale, 10% Claystone, trace Dolomite,

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 26, 1979		
Day 222	(Cont'd)	Surveyed at 2864 m, drilled to 2868 m. Background Gas: 64; Cuttings Gas: 4; Trip Gas: 3200; Flowline Temperature: 52.9°C; Shale Density: 2.50; "D" Exponent: 1.60; Mud Weight: 1275; Viscosity: 64; Lithology: 70% Shale; 30% Siltstone; trace of Sand, Pyrite and Limestone; Surveys:- 2855 m - 10½°N37E; 2864 m - 10½°N37E
November 27, 1979		
Day 223	2895 m	27 m. Surveying at 2893 m. Drilled, circulated, worked sloughing hole for survey. Surveyed at 2874 m. Drilled and worked pipe. Circulated for survey. Ran survey at 2883 m. Drilled and circulated for survey. Surveyed at 2893 m. Background Gas: 56 units; Cuttings Gas: 1 unit; Flowline Termpature: 56.6°C; Shale Density: 2.55; "D" Exponent: 1.65; Mud Weight: 1280; Viscosity: 65; Lithology: 100% Shale; Surveys"- 2874 m - 10¼°N37E; 2883 m - 9-7/8°N36E; 2893 m - 10°N38E.
November 28, 1979		
Day 224	2925 m	30 m. Drilling. Drilled, circulated for surveys, ran wireline surveys. Surveyed at 2921 m, misrun. Background Gas: 65; Cuttings Gas: 3; Flowline Temperature: 58.3°C; Shale Density: 2.54; "D" Exponent: 1.63; Mud Weight: 1270; Viscosity: 67; Surveys:- 2902 m - 9-3/4°N38E; 2910 m - 9-3/4°N42E; 2920 m - Misrun
November 29, 1979		
Day 225	2940 m	15 m. Drilling. Drilled, rig serviced, surveyed at 2929 m. Drilled to 2935 m. Circulated and measured out for bit. Tally OK + 0.48 difference. Slipped and cut line, tripped in hole, washed 10 m of fill to bottom. Drilled to 2940 m. Cost adjustment tools lost in hole. Mud Weight: 1280; Viscosity: 68; Lithology: 90% Shale; 10% Claystone; Survey:- 2929 - 9½°N42E
November 30, 1979		
Day 226	2965 m	25 m. Drilling. Drilled and rig serviced. Surveyed. Repaired leak in swivel. Repaired rotary chain and drilled to 2965 m. Background Gas: 60 units; Cuttings Gas: 3 units; Connection Gas: 65 units; Flowline Temperature: 58.4°C; Shale Density: 2.56; "D" Exponent: 1.75; Mud Weight: 1270; Viscosity: 72; Lithology: 90% Shale,

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DAILY OPERATIONS REPORT

WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 22, 1979		
Day 218	2773 m	18 m. Drilling. Drilled to 2761 m. Circulated, surveyed and tripped for bit. Ran in drill collar, rig serviced. Changed oil on No. 1 motor. Finished tripping in hole. Circulated out gas cut mud. Drilled to 2773 m. Mud Weight: 1290; Viscosity: 65; Lithology: 90% Shale; 5% Claystone; 5% Dolomite; Survey:- 2760 m - 7½°N42E
November 23, 1979		
Day 219	2804 m	31 m. Drilling. Drilled, repaired #1 pump, adjusted #1 and #3 motor clutches. Rig serviced and drilled. Instructed crew in use of Scott Air pack. Background Gas: 40 units; Connection Gas: 30 units; Shale Density: 2.51; Flt.: 54.5°C; Mud Weight: 1275; Viscosity: 58; Lithology: 100% Shale, trace Pyrite and Limestone.
November 24, 1979		
Day 220	2828 m	24 m. Tripping for bit at 2828 m. Rig serviced, adjusted #2 motor clutch. Drilled to 2828 m. Circulated prior to survey, dropped survey. Tripped out for bit. Background Gas: 52 units; Cuttings Gas: 2 units; Shale Density: 2.5; Flowline Temperature: 56.1°C; Mud Weight: 1300; Viscosity: 58; Lithology: 100% Shale, trace of claystone and limestone; Survey: 2825 m - misrun.
November 25, 1979		
Day 221	2847 m	19 m. Tripping for bottom hole assembly change. Finished tripping in with new bit. No fill. Drilled and surveyed at 2834 m. Drilled and surveyed at 2845 m. Rig serviced. Circulated and mixed trip pill. Tripped out to change bottom hole assembly due to excessive hole deviation. Background Gas: 144; Cuttings Gas: 3-4; Flowline Temperature: 54.9°C; Shale Density: 2.51; "D" Exponent: 1.605; Mud Weight: 1280; Viscosity: 60; Lithology: 85% Shale, 10% Siltstone; 5% Limestone; Surveys:- 2834 m - 10-3/4°N40E; 2845 m - 11°N37E.
November 26, 1979		
Day 222	2868 m	21 m. Drilling. Made up new bottom hole assembly and bit. Ran in to bottom. No fill. Drilled and rig serviced. Surveyed at 2855 m. Drilled to 2867 m. Worked tight hole, reamed and redrilled 10 m.

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 16, 1979		
Day 212	(Cont'd)	too soft. Ran mill tooth bit. Mud Weight: 1295; Viscosity: 62;
		Lithology: 80% Shale, 20% Siltstone, Trace Pyrite, Limestone, Domomite.
		Survey:- 2617 m - 5½°N42E
November 17, 1979		
Day 213	2653 m	24 m. Drilling. Drilled, rig serviced, repaired swivel, worked tight
		hole on connections at 2628 and 2638 m. Pulled 5 stands to repair
		swivel at 2651 m. No tight hole or fill when back on bottom. Mud
		Weight: 1295; Viscosity: 60; Lithology: 80% Shale; 10% Siltstone;
		10% Marle.
November 18, 1979		
Day 214	2667 m	14 m. Drilling. Drilled, hoisted swivel, repaired same. Drilled,
		rig serviced, surveyed. Tripped to bit. Changed bottom hole assembly.
		Drilled. Repaired swivel. Drilled. Trip Gas: 2660 units; Cuttings
		Gas: 17 units; Mud Weight: 1295; Viscosity: 59; Lithology: 40%
		Shale; 60% Siltstone, Trace Marle; Survey:- 2659 m - 7°N51E
November 19, 1979		
Day 215	2701 m	34 m. Drilling. Drilled, rig serviced, surveyed, drilled. Hole good
		on connections. Cuttings Gas: 3 units; Mud Weight: 1295;
		Viscosity: 60; Survey:- 2676 m - 7°N49E
November 20, 1979		
Day 216	2723 m	22 m. Drilling. Drilled, rig serviced. Circulated, surveyed, tripped
		for bit. Drilled, rig serviced. Cuttings Gas: 9 units; Connection
		Gas: 15 units; Trip Gas: 3200 units; Mud Weight: 1290; Viscosity:
		57; Lithology: 70% Shale, 30% Siltstone; Survey:- 2711 m - 6-3/4°+
		N49E
November 21, 1979		
Day 217	2755 m	32 m. Drilling. Drilled, rig serviced, repaired leaking swivel,
		blow out preventers drilled. Background Gas: 14 units; Cuttings Gas:
		2 units; Connection Gas: 11 units; Mud Weight: 1305 m; Viscosity:
		67; Lithology: 100% Shale, trace of Siltstone.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 12, 1979		
Day 208	(Cont'd)	with overshot. Mud Weight: 1280; Viscosity: 62.
November 13, 1979		
Day 209	2610 m	Nil. Preparing to trip out. Ran in hole with 11 3/4" overshot on bent single and knuckle joint. Circulated above fish and attempted to work overshot on top of fish. Unable to locate top of fish. Tripped out with fishing string and laid down tools. Ran in hole with 12¼" bit. Drilled along fish and passed end of fish to 2584 m, 1 m below fish. Circulated hole, cleaned and prepared to trip out. Mud Weight: 1300; Viscosity: 58.
November 14, 1979		
Day 210	2610 m	Nil. Cleaning out at 2598 m. Pulled out of hole with bit. Found bit was drilling on top of fish. Ran in hole with 11 3/4" overshot. No fill on top of fish. Circulated bottoms up. Latched onto fish. Pulled fish free with 1 000 daN over normal hole drag. Pulled out of hole, chained out, recovered fish. Laid down overshot, stabilizer, handle tools, rig serviced and cleaned out plugged Monel drill collar. Ran in with bit and slick clean out string. Cleaned out from 2595 m to 2598 m. Very rough and high torque. Mud Weight: 1300; Viscosity: 58.
November 15, 1979		
Day 211	2612 m	2 m. Drilling. Cleaned to bottom from 2598 m to 2610 m. Circulated, worked pipe, cleaned hole. 7-stand dummy trip, 1½ m of fill. Cleaned fill and circulated hole. Tripped out, picked up bottom hole assembly, one 9" drill collar, slipped and cut line, ran in hole, blow out preventer check. Cleaned 2½ m fill, high torque, very rough. Drilled. Trip Gas: 3200 units; Cuttings Gas - 14 units; Mud Weight: 1295; Viscosity: 60; Lithology: 70% Shale, 30% Siltstone.
November 16, 1979		
Day 212	2629 m	17 m. Drilling. Drilled and repaired pump. Rig serviced, dropped survey, tripped for bit. Cleaned 2 m fill to bottom. Drilled. Worked pipe. High torque after connection. Drilled. Trip Gas: 2800 Units; Cuttings Gas 7: 26 units; Pulled bit #27, button, formation

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 9, 1979		
Day 205	2610 m	Nil. Preparing to circulate on top of fish. Circulated and conditioned hole. Hoisted, picked up overshot, ran in hole. Circulated on top of fish, no fill, circulated bottoms up. Worked over fish. Chained out, no fish. Lip guide on overshot skirt bent in. Recut lip guide. Ran in hole with overshot. Trip in good, no tight spots. No fill on top of fish. Rig inspection by G. Blue, DINA - OK. Mud Weight: 1280; Viscosity: 66.
November 10, 1979		
Day 206	2610 m	Nil. Tripping in hole. Finished in hole with overshot. Tried to work overshot over fish. Fish appears under a ledge or in a cavity. Could feel top of fish with overshot but could not get overshot over fish. Hoisted. Reworked overshot skirt. Bent joint of 5" drillpipe and ran overshot below bent joint. Ran in hole slow. Circulated and tried to engage fish. Overshot kept slipping off, could not get overshot to line up with fish to engage grapple. Hoisted overshot, ran in hole with 8½" bit with 7" drill collars in attempt to clean out along fish. No fill on top of fish. Mud Weight: 1285; Viscosity: 63.
November 11, 1979		
Day 207	2610 m	Nil. Hoisting fishing string. Ran in hole with 8½" bit, rig serviced. Drilled past fish from 2572 m to 2580 m. Circulated and worked bit along fish. Pulled above fish, tried to work 8½" bit above fish. Tripped out. Made up fishing string, slipped and cut line. Ran in hole to top of fish and circulated. Tried to screw into fish - no success. Circulated. Tripped out. Mud Weight: 1280; Viscosity: 59.
November 12, 1979		
Day 208	2610 m	Nil. Tripping in hole. Finished tripping out with fishing string. Broke down and inspected drill collars. Made up and ran in with 11 3/4" OD Bowen overshot with knuckle joint directly above. Ran in hole to top of fish at 2572 m and attempted to work over it. Overshot kept falling off top of fish and was unable to latch on. Washed to run 11 3/4" overshot 2 m past top of fish. Tripped out and made up new fishing string with a bent single below knuckle joint. Ran in hole

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 5, 1979		
Day 201	(Cont'd)	Reamed and cleaned 2½ m to bottom after survey. Reran survey at 2569 m. Cleaned 1 m back to bottom, drilled to 2577 m. Made 10-stand dummy trip. Hole tight at 6 stands off bottom. Ran back in and reamed and cleaned to bottom. Background Gas: 68 units; Connections: 132 units; Trip Gas: 1640; Mud Weight: 1260; Viscosity: 102; Lithology: 90% Shale, 50% Limestone, 5% Dolomite, trace Sand and Pyrite; Surveys:- 2569 m - 5°N22E
November 6, 1979		
Day 202	2604 m	27 m. Drilling. Drilled and rig serviced. Drilled to 2591 m, circulated work pipe and reamed prior to survey. Surveyed at 2588 m. Drilled and worked pipe 2 m and drilled to 2604 m. Background Gas: 6 units; Connection Gas: 25 units; Dummy Trip Gas: 3000+; Mud Weight: 1275; Viscosity: 95; Lithology: 70% Limestone, 30% Shale, trace Dolomite, Pyrite, Marle; Survey:- 2588 m - 5¼°N37E
November 7, 1979		
Day 203	2610 m	6 m. Cleaning out at 2585 m. Drilled, rig serviced. Cleaned and reamed new hole from 2600 m to 2610 m. Hole very tight, laid down one joint, reaming back to bottom from 2600 m to 2610 m. Laid down two more singles due to very tight hole. Cleaned to bottom from 2575 m to 2585 m. Hole free to 2585 m. Hole started unloading at 0300. Shale square and rounded, large to fine. Background Gas: 8 units; Mud Weight: 1280; Viscosity: 63; Lithology: 70% Shale, 20% Limestone, 10% Marle.
November 8, 1979		
Day 204	2610 m	Nil. Circulating and conditioning hole above fish. Cleaned out from 2575 m - 2585 m. Lost partial pump pressure. Hoisted, checked for washout. Found washout between top stabilizer and 9" drill collar, left in hole - 12¼ bit, bottom hole stabilizer, 9" Monel drill collars, 12¼ string stabilizer. Threads washed out. Laid down bottom drill collar. Ran in with bit and clean out string. Cleaned 10 m to top of fish. Top of fish at 2572 m. Circulated, conditioned hole. Hole unloaded large amounts of shale. Mud Weight: 1280; Viscosity: 58.

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
November 1, 1979		
Day 197	(Cont'd)	pipe and pulled pipe free. Reamed from 2490 to 2502 m. Increased pump volume to 58 SPM. Hole is cleaning well with many small rounded shale pebbles. Mud Weight: 1280; Viscosity: 75; Lithology: 90% Shale; 10% Siltstone, with traces of Calcite and Pyrite; Survey:- 2511 m - Misrun.
November 2, 1979		
Day 198	2534 m	20 m. Drilling at 2534 m. Cleaned and reamed from 2502 m to 2514 m. Rig serviced and surveyed. Drilled and cleaned out rubble on connections. Background Gas: 672; Trip Gas: 1440; Connection Gas: 800; Mud Weight: 1265; Viscosity: 65; Lithology: Dolomite 45%; Shale 40%; Limestone 10%; Pyrite 5%, trace Calcite and Sandstone; Survey:- 2512 m - 4-7/8°N06E
November 3, 1979		
Day 199	2549 m	15 m. Tripping for bit. Drilled to 2543 m. Cleaned out rubble and made connection 2½ hours. Hole is tight. Ran wireline survey at 2541 m, circulated prior to dummy trip. Made 7-stand dummy trip. Cleaned to bottom after dummy trip, 2 hours. Drilled to 2549 m. Pumped pill and tripped out for new bit. Background Gas: 288; Dummy Trip: 2464 units; Mud Weight: 1270; Viscosity: 58; Lithology: 85% Shale; 10% Pyrite; 5% Limestone, trace Calcite and Dolomite; Survey:- 2541 m - 4½°N15°E
November 4, 1979		
Day 200	2549 m	Nil. Reaming. Finished tripping out. Rig serviced, changed bit, ran in hole with drill collar. Changed pads on low clutch, slipped and cut line. Ran in hole to casing shoe and repaired rotary clutch. Ran in hole to 2433 m and circulated out gas cut mud. Cleaned and reamed from 2545 m to 2549 m. Trip Gas: 2536 units; Mud Weight: 1275; Viscosity: 53; Lithology: 85% Shale, 10% Pyrite, 5% Limestone, trace Calcite and Dolomite.
November 5, 1979		
Day 201	2577 m	28 m. Reaming to bottom. Rig serviced and drilled, repaired rotary chain, reamed and circulated for survey. Ran survey at 2569 m, misrun.

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 29, 1979		
Day 194	2490 m	17 m. Drilling. Drilled and rig serviced, surveyed at 2474 m. Drilled, worked pipe prior to survey. Reamed and cleaned hole 5 hours. Ran survey at 2483 m. Reamed and cleaned to bottom 1 hour after survey. Peak gas at 2474 m - 5000 units. Mud Weight: 1275; Viscosity: 80; Lithology: 90% Shale; 5% Calcite; 5% Pyrite; Surveys:- 2474 m - 4-7/8°N02E; 2483 m - 4-7/8°N07W
October 30, 1979		
Day 195	2499 m	9 m. Tripping in with new bit. Drilled to 2495 m. Made 6-stand dummy trip, rig serviced, reamed and cleaned back to bottom from 2492 m to 2495 m - 5 hours. Drilled from 2495 m to 2499 m. Circulated and worked pipe prior to hoisting, ran survey. Tripped out for bit. Changed out and ran in with new stabilizer. Connections Gas @ 2495 m - 3200 units. Mud Weight: 1260; Viscosity: 58; Lithology: 60% Shale; 40% Siltstone with traces of Calcite, Pyrite and Limestone. Survey:- 2497 m - 4½°N05E
October 31, 1979		
Day 196	2514 m	15 m. Drilling. Finished tripping back in hole. Broke circulation and started reaming from 2492 m. Became stuck while reaming. Worked pipe one hour and pipe came free. Reamed from 2492 m to 2499 m, three hours. Drilled and rig serviced, cleaned and reamed hole after each 2 m drilled. High torque while reaming and low torque while drilling. Trip Gas: 3200 units; Connection Gas: 2800 units; Mud Weight: 1280; Viscosity: 61; Lithology: 90% Shale; 10% Siltstone, with trace of Calcite and Pyrite.
November 1, 1979		
Day 197	2514 m	Nil. Reaming at 2502 m. Rig serviced, reamed and worked pipe. Cleaned out for survey. Dropped survey, pulled 6 stands for dummy trip. Ran wireline overshot to recover survey. Overshot came apart. Unable to recover survey tool. Tripped out, recovered survey. Misrun. Tripped back in with new bit, broke circulation and started to ream to bottom at 2490 m. Became stuck at 2494 m with partial mud returns. Regained circulation and circulated out gas cut mud. Worked

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 25, 1979		
Day 190	2443 m	6 m. Tripping out for bottom hole assembly change. Made up bottom hole assembly, changed out jars, slipped and cut drilling line, ran in to 2416 m, reamed out dogleg from 2416 m to 2425 m. Ran survey at 2423 m. Reamed to 2437 m. Ran survey at 2432 m, drilled from 2437 m - 2443 m. Dropped survey and tripped out for bottom hole assembly change. Mud Weight: 1280; Viscosity: 56; Lithology: 95% Shale; 5% Pyrite; Surveys:- 2424 m - 4-3/4°; 2432 m - 4°
October 26, 1979		
Day 191	2448 m	5 m. Drilling. Finished tripping out, rig serviced, changed bottom hole assembly, ran in with new bit. Reamed to bottom from 2416 m. Drilled from 2443 - to 2446 m and worked pipe through fragmented section. Reamed and redrilled to bottom. Drilled and reamed from 2446 m to 2448 m. High torque while reaming and low torque while drilling. Top of limestone marker at 2447 m and in first hole at 2445 m. Mud Weight: 1290; Viscosity: 58; Lithology: 20% Limestone, 70% Shale, 10% Pyrite.
October 27, 1979		
Day 192	2461 m	13 m. Drilling. Drilled from 2448 m to 2456 m. Dummy tripped 5 stands, reamed from bottom from 2448 m. Rig serviced and surveyed. Cleaned to bottom after survey and drilled to 2461 m. Mud Weight: 1280; Viscosity: 75; Lithology: 25% Limestone; 70% Shale; 5% Pyrite; Survey: 2452 m - 4¼° (No direction)
October 28, 1979		
Day 193	2473 m	12 m. Drilling. Drilled, worked pipe, circulated and reamed. Cleaned hole for survey, surveyed. Rig serviced. Tripped for bit at 2466 m. Ran in hole and cleaned 2 m to bottom. Drilled, rig serviced, worked pipe after drilling each 2 m after hole. Hole in better condition. Gas units at 2469 m increased from 55 to 960 units. Mud Weight: 1280; Viscosity: 70; Lithology: 70% Shale; 20% Siltstone; 5% Calcite; 5% Pyrite; Survey: 2464 m - 4-3/4°N03E.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 20, 1979		
Day 185	(Cont'd)	Hole sloughed in with bit at 2409 m. Unable to circulate. Jarred
		down 12 feet. Found slight free spot. Unable to pull up, got partial
		circulation at very low rate. Worked stuck pipe till free. Mud
		Weight: 1165; Viscosity: 62; Lithology: 90% Shale; 10% Siltstone;
		Trace Pyrite; Survey:- 2392 m - 5-3/4°N05E
October 21, 1979		
Day 186	2416 m	Nil. Circulating and cleaning hole. Hoisted, rig serviced, laid
		down bottom hole tools, one 9" drill collar, picked up 5 singles. Ran
		in hole to bridge at 2396 m. Circulated, raised mud weight from 1165
		to 1250 m. Hole unloading huge amounts of shale. Cleaned bridge 2396
		to 2409 m. Very sticky and light. Circulated to clean shale out of
		hole 1" deep over two shakers. Mud Weight: 1250; Viscosity: 58.
October 22, 1979		
Day 187	2424 m	8 m. Drilling. Reamed and cleaned sloughing hole from 2390 to 2416 m.
		Raised mud weight to 1300 (11#/gl). Drilled, worked hole every three
		metres. Huge amounts of shale over shaker 1 - 1½" deep while cleaning
		to bottom. Shale returns normal over last six hours. Mud Weight:
		1320; Viscosity: 58; Lithology: Shale - 80%; Siltstone - 10;
		Pyrite - 10%.
October 23, 1979		
Day 188	2429 m	5 m. Drilling. Drilled. Made 8 stand dummy trip, no fill, hole
		good. Circulated. Dropped survey and hoisted. Laid down bent Monel
		drill collars, picked up one 9" drill collar. Ran in hole, cleaned
		1 m of fill. Drilled. Mud Weight: 1310; Viscosity: 58;
		Lithology: 80% Shale; 10% Siltstone; 10% Iron Pyrite.
October 24, 1979		
Day 189	2437 m	8 m. Tripping in with new bottom hole assembly. Drilled, rig
		serviced, circulated, and worked tight hole. Dropped survey, tripped
		out and picked up new bottom hole assembly. Hole has changed angle
		from 5-3/4° at 2392 m to 3° at 2436 m. Mud Weight: 1285; Viscosity:
		68; Lithology: 80% Shale; 15% Siltstone; 5% Pyrite; Survey:-
		2436 m - 3°

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 15, 1979		
Day 180	(Cont'd)	rig serviced. Tripped. 12¼ string TBR reamed in from 1936 to 1995 m.
		Mud Weight: 1160; Viscosity: 58; Lithology: Limestone, Siltstone,
		and Marle. Surveys:- 2306 m - 6-1/8°N12E; RR 2306 m - 6-1/8°N17E;
		2313 m - 6-1/8°N12E
October 16, 1979		
Day 181	2313 m	Nil. Reaming in at 2295 m. Pulled out of hole. Waited on bottom hole
		stabilizer. Made up bottom hole assembly and ran in hole. Reamed in
		bottom hole assembly from 2132 to 2295 m. Mud Weight: 1165;
		Viscosity: 52.
October 17, 1979		
Day 182	2356 m	43 m. Drilling. Reamed to bottom. Drilled, surveyed and rig serviced.
		Mud Weight: 1170; Viscosity: 77; Lithology: 70% Shale; 20%
		Siltstone; 10% Marle. Surveys:- 2320 m - 6¾°N14E; 2339 m - 6-1/8°N08E
		2348 m - 6-1/8°N08E
October 18, 1979		
Day 183	2371 m	15 m. Drilling. Drilled and surveyed. Rig serviced, checked crown
		saver, hoist, laid down 18 singles. Rig serviced, checked blow out
		preventers, changed bottom hole assembly, ran in hole, no fill.
		Drilled and surveyed. Mud Weight: 1160; Viscosity: 54; Surveys:-
		2355 m - 6-1/3°N06E; 2363 m - 6-1/3°N05E; Lithology: 70% Shale;
		30% Siltstone; Trace Calcite.
October 19, 1979		
Day 184	2390 m	19 m. Drilling. Drilled, surveyed, drilled. Rig serviced, hoisted
		for bit, changed bottom hole stabilizer, ran in hole, no fill.
		Drilled, surveyed, rig serviced, drilled. Mud Weight: 1170;
		Viscosity: 62; Lithology: 90% Shale; 10% Siltstone, Trace Calcite
		and Marle; Surveys:- 2370 m - 6-3/4°N05E; 2375 m - 6¼°N06E; 2386 m -
		6-1/8°N05E.
October 20, 1979		
Day 185	2416 m	26 m. Changing bottom hole assembly. Drilled, surveyed, rig serviced.
		Worked loose stuck pipe at 2409 m. Worked pipe, circulated. Tripped
		to change bottom hole assembly. Pulled up to make connection at 2416 m.

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 11, 1979		
Day 176	2280 m	11 m. Running in hole with dyna drill. Reamed to bottom 2262 to 2269 m. Drilled, 0830 - 1030. Drilled and reran surveys, 1030 - 2030. Pumped pill, tripped out, changed bottom hole assembly, ran in hole. Mud Weight: 1180; Viscosity: 62; Rerun Surveys:- 2251 m - 6°N04°E; 2232 m - 5-3/4°N12°W; 2260 m - 5¼°N09°E; 2270 m - 5°N08°W; 2280 m - 6°N08°W.
October 12, 1979		
Day 177	2292 m	12 m. Running in with dyna drill. Cleaned to bottom, 3 m. Ran in steering tool. 1000-1115 Dyna drill. 1115-1230 repaired steering tool. 1230-1600 Dyna drill. 1600-1745 repaired steering tool. 1745-1815 Dyna drill. 1815-2015 repaired steering tool. 2300-0800 Pumped pill and pulled out. Changed steering tool seating sleeve. Changed bits and ran in. Homco tools lost in hole; UDDA Monel drill collars and Nabors drill collars lost in hole. Mud Weight: 1175; Viscosity: 62; Lithology: Shale - 50%; Marle - 50%.
October 13, 1979		
Day 178	2300 m	8 m. Running in hole with dyna drill. Finished in hole, no fill. Ran steering tool and oriented. 1045-1245 Dyna drilling. 1245-1400 repaired steering tool. 1400-2400 Dyna drilling. 2400-0200: Circulated, pulled steering tool. 0200-0800 Tripped for bit, serviced dyna drill, started back in hole. Bit #62 appears to have been balling up and skidding on bottom. Mud Weight: 1160; Viscosity: 55; Lithology: Shale, Siltstone, Marle. Surveys: Readout 2292 m - 5°N2°E
October 14, 1979		
Day 179	2304 m	4 m. Tripping in with bit and reaming string. Finished in with dyna drill, no fill. Ran steering tool and dyna drill. Dyna drill packed up. Pulled dyna drill, slipped and cut line. Ran in hole with reaming string. Mud Weight: 1160; Viscosity: 51; Surveys:- 2298 m - 5°N1°E
October 15, 1979		
Day 180	2313 m	9 m. Tripping out. Ran in hole to 2258 m. Rig serviced. Reamed from 2258 to 2304 m. Drilled. Ran survey. Drilled. Surveyed and

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 7, 1979		
Day 172	(Cont'd)	in wireline head. Ran in hole with steering tool and drilled with
		dyna drill. Bit is worn out. Prepared to trip for bit at 2233 m.
		Mud Weight: 1160; Viscosity: 75; Lithology: 60% Cherty Limestone;
		20% Shale.
October 8, 1979		
Day 173	2254 m	21 m. Drilling with dyna drill. Pulled steering tool and tripped out
		for bit. No tight spots. Tripped in and circulated to bottom. Made
		connection and ran steering tool. Drilled with dyna drill. Made
		connection and surveyed at 2238 m. Drilled with dyna drill. Mud
		Weight: 1170; Viscosity: 64; Surveys:- 2238 m - 5.8°N07°W;
		Lithology: 30% Dolomite; 20% Limestone; 50% Shale, Trace Chert,
		Calcite.
October 9, 1979		
Day 174	2269 m	15 m. Tripping out with dyna drill. Drilled with dyna drill from
		2254 to 2269 m. Circulated for survey and connection. Surveyed at
		2260 m. Pulled steering tool and repaired Schlumberger line. Tool
		not working properly. Reran steering tool. Unable to re-orient tool.
		Pulled out steering tool to check. Tool appears to be OK. Ran back
		in and attempted to orient tool. Unable to. Tripped out with
		steering tool and tripped out with dyna drill and bit. No tight spots.
		Mud Weight: 1165; Viscosity: 65; Lithology: 40% Dolomite; 30%
		Limestone; 30% Shale, Trace Calcite, Pyrite and Siltstone; Surveys:-
		2260 m - 5¼°N10°E
October 10, 1979		
Day 175	2269 m	Nil. Reaming at 2262 m. Finished tripping out with dyna drill.
		Laid down dyna drill and rigged out Schlumberger. Made up bottom hole
		assembly and ran in hole to 2210 m. Reamed from 2210 to 2262 m. Mud
		Weight: 1175; Viscosity: 75.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
October 3, 1979		
Day 168	2183 m	21 m. Drilling. Drilled, rig serviced, surveyed. Mud Weight: 1180; Viscosity: 55; Lithology: 70% Siltstone, 30% Silty, Limestone, with trace of Marl. Surveys:- 2160 m - 5-3/4°N39W; 2168 m - 5-3/4°N34W; 2179 m - 5-3/4°N33W
October 4, 1979		
Day 169	2201 m	18 m. Tripping in at 2000 m, Drilled, rig serviced, surveyed at 2189 m. Drilled to 2201 m and tripped out. Laid down bottom hole assembly. Rigged up Schlumberger shives, picked up dyna drill and ran in, Mud Weight: 1170; Viscosity: 52; Lithology: 70% Limestone; 10% Chert; 10% Siltstone; 10% Shale. Surveys:- 2189 m - 5¼°N34W
October 5, 1979		
Day 170	2217 m	16 m. Tripping out of hole at 2000 m. Finished trip to bottom. Circulated down last 7 m, no fill. Rigged steering tool and ran in. Oriented tool and drilled with dyna drill. Tripped out and backed in with steering tool for connection, Drilled to 2217 m. Drilling rate slowed down. Worked dyna drill in attempt to restart bit. Pulled out of hole with steering tool. Schlumberger line jumped off shive, repaired same, tripped out with dyna drill to check bit. MudWeight: 1175; Viscosity: 70; Lithology: 80% Limestone; 10% Shale, Surveys:- 2206 m - 5°N29W
October 6, 1979		
Day 171	2228 m	11 m. Drilling. Tripped out and laid down dyna drill. Dyna drill needs repairs. Changed bottom hole assembly and ran in hole with new bit. Drilled, rig serviced, surveyed. TBR is 7 stands above top of drill collar in at 1990 m. Mud Weight: 1170; Viscosity: 65; Lithology: 50% Siltstone; 30% Shale; 20% Limestone; Surveys:- 2218 m - 6°N14°W
October 7, 1979		
Day 172	2233 m	5 m. Preparing to trip. Drilled to 2230, Tripped out for bit. Slipped and cut line. Picked up and ran in hole with dyna drill. Ran in and oriented steering tool. Started to drill with dyna drill. Steering tool not working. Pulled out steering tool and repaired short

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 28, 1979		
Day 163	2041 m	29 m. Tripping. Drilled and rig serviced. Ran survey at 2018 m. Misrun. Reran survey at 2018 m. Drilled to 2040 m. Surveyed at 2037 m. Drilled to 2041 and prepared to trip out for bottom hole assembly change. Mud Weight: 1185; Viscosity: 70; Lithology: Shale, siltstone. Surveys:- 2018 m - 7½°N43°W; 2037 m - 8°N39°W
September 29, 1979		
Day 164	2067 m	26 m. Drilling. Tripped out and rig serviced. Changed bottom hole assembly. Slipped and cut line, tripped in with new bit. Cleaned 1 m of fill on bottom. Drilled to 2048 m and surveyed at 2045 m. Drilled and surveyed at 2055 m. Drilled and surveyed at 2064 m. Background Gas: 29; Penetration Rate: 4 m/hr; Flowline Temperature: 43.5°; Peak Gas: 33; Shale Density: 2.59; Cuttings Gas: 11; "D" Exponent: 1.56; Trip Gas: 600 units; Mud Weight: 1180; Viscosity: 118; Lithology: Shale - 70%, Siltstone - 30%; Surveys:- 2045 m - 7-3/4°N39°W; 2055 m - 7¼°N39°W; 2064 m - 7½°N35°W.
September 30, 1979		
Day 165	2113 m	46 m. Drilling. Drilled, rig serviced, surveyed. Installed new rotary chain. Mud Weight: 1170; Viscosity: 80; Lithology: 70% Shale, 20% Siltstone; 10% Marle, Trace Calcite; Surveys:- 2074 m - 7°N35°W; 2083 m - 6-3/4°N41°W; 2093 m - 6-3/4°N38°W; 2102 m - 7°N34°W.
October 1, 1979		
Day 166	2145 m	32 m. Drilling. Drilled, rig serviced, surveyed. Tripped out for bit 26 2125 m. Ran in hole, no fill. Drilled ahead. Mud Weight: 1170; Viscosity: 67; Lithology: 90% Shale, 10% Dolomite, Trace Calcite and Siltstone. Surveys:- 2112 m - 6-3/4°N33°W; 2123 m - 6¼°N35°W; 2131 m - 6-1/8°N35°W; 2141 m - 6-1/8°N35°W.
October 2, 1979		
Day 167	2162 m	17 m. Drilling. Drilled, rig serviced, surveyed. Tripped for new bit at 2154 m. Ran in hole and washed to bottom from 2144 m. No fill. Hole in good condition. Mud Weight: 1180; Viscosity: 62; Lithology: 60% Shale, 40% Limestone. Surveys:- 2151°m - 6-1/8°N36°W

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 23, 1979		
Day 158	(Cont'd)	Fish pulled free. Pulled out of hole with fish, laid down 9" drill collars, scarred from screwing in. Mud Weight: 1195; Viscosity: 80.
September 24, 1979		
Day 159	1997 m	Cleaning to bottom at 1967 m. Inspected dropped drill collar string by Tuboscope. All connections good. Picked up bottom hole assembly. Ran in hole to bridge at 1918 m. Cleaned out from 1918 to 1963 m. Sturkc pipe. No circulation. Worked pipe free. Cleaned out from 1963 to 1969 m. Have been down to 1972 m three times. Loose hole after picking up. Have to start cleaning out at 1967 m. Large amounts of splintered shale over shaker. Mud Weight: 1210; Viscosity: 74.
September 25, 1979		
Day 160	1997 m	Cleaning out with dyna drill. Reamed in from 1963 to 1969 m. No progress. 10 - 20% cement in samples. Circulated, conditioned mud and hole. Six stand dummy trip - no fill to 1963 m. Tripped out and rig serviced. Picked up dyna drill with 2° kick sub. Ran in, oriented dyna drill. Cleaned out with dyna drill from 1963 to 1975 m. Four times, no progress. Mud Weight: 1200; Viscosity: 93.
September 26, 1979		
Day 161	1997 m	Reaming at 1972 m. Reamed hole with dyna drill from 1963 to 1976 m. Dyna drill quit working. Tripped out and laid down dyna drill. Tripped in with 2 cone bit to clean to bottom. Reamed from 1956 to 1972 m. Mud Weight: 1195; Viscosity: 92; Lithology: Shale.
September 27, 1979		
Day 162	2012 m	15 m. Drilling. Reamed from 1972 to 1997 m. Circulated bottoms up. Tripped out of hole. Rig serviced. Picked up bottom hole assembly. Ran into 1889 m. Broke circulation and washed to bottom at 1997 m. No fill. Hole is in good condition. Drilled from 1997 to 2012 m. Mud Weight: 1200; Viscosity: 78.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 20, 1979		
Day 155	1981 m	12 m. Circulate to trip to change bottomhole assembly. Circulated 0900 to 1900. Tripped out, changed bit, ran in hole. Cleaned 2 m fill. Ran steering tool, 1900 to 0700 dyna drilling. 0700 to 0800 - Circulated prior to trip to change bottomhole assembly. Mud Weight: 1170; Viscosity: 75. Surveys:- 1968 m - 8.9°N45°W
September 21, 1979		
Day 156	1987 m	6 m. Tripping to change bottomhole assembly. Pulled steering tool. Tripped out, laid down dyna drill, picked up 3 point reamer and ran in. Reamed and wiped hole from 1942 m to 1962 m with string reamer. 1700 to 1730 surveyed. 1730 to 0400 drilled and 0400 to 0800 circulated, surveyed, tripped to change bottomhole assembly. Mud Weight: 1160; Viscosity: 58. Surveys:- 1981 m, 8¼°N43°W, 1987 m, 7.9°N39°W
September 22, 1979		
Day 157	1997 m	10 m. Picking up drill collars. Tripped out, rigged out Schlumberger. Changed reamer cutters, slipped and cut line. Ran in hole. Reamed with string reamer past kickoff from 1950 to 1960 m. Drilled. Surveyed and rig serviced. Circulated prior to tripping. Tripped out to change bottom hole stabilizer. Picked up bottom hole assembly and 9" drill collars. Mud Weight: 1155; Viscosity: 62; Lithology: 100% Shale. Surveys:- 1996 m - 7.8°N 39W, 1987 m - 7.9°N 39W.
September 23, 1979		
Day 158	1997 m	Laying down 9" drill collars. Picked up new 9" drill collars, set in slips, put on dog collar. Removed pick up sub, slips in dog collar let go. Drill Collar string went down hole. Fish in hole. Bit, bottom hole stabilizer, 9" Monel drill collars, 12¼ stabilizer, 9" shock sub, 3 - 9" drill collars, 12¼ 3-point reamer, 9" jars, 1-9" drill collar - finished picking up 2-9" drill collars. Ran 3 - 9" drill collar in derrick. Ran in hole open end, circulated through bridge from 1675 to 1690 and 1809 to 1819. Ran into top of fish at 1937 m. Circulated on top of fish and raised mud weight to 1190 gm/m^3. Screwed into fish. Was able to circulate very slowly for 3/4 hour - fish plugged. Worked fish up through singles, then able to pull stand.

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 14, 1979		
Day 149	PBTD 1900	Waiting on cement. Ran string shot to 2467 m, no backoff. Reran 1600 grain shot and backed off at 2467 m. Rigged out Schlumberger, chain out, stand back drill collars. Ran open end. Circulated. Ran cement plug from 2010 to 1900 with 400 sacks of neat Oilwell "G" cement. Started mixing at 2308. Plug in place at 23:55. Average weight: 16.1. Pulled 7 stands, circulated and conditioned mud. Pulled out of hole, laying down excess drill pipe. Mud Weight: 1170; Viscosity: 92.
September 15, 1979		
Day 150	1900 m	Waiting on cement. Laid down 60 joints 5" drill pipe. Magniflux 6" - 9" drill collars (1 box scarred up from fishing). Checked all stabilizers and kelly.
September 16, 1979		
Day 151	1900 m	Waiting on cement. Transferred mud in tanks and cleaned same.
September 17, 1979		
Day 152	1944.5 m	Waiting on cement. Laid down 7" drill collars. Picked up 9" drill collars. Circulated cement from 1933 m to 1937 m. Drilled cement 1937 m to 1942 m. Cement soft. Waited on cement. Circulated and conditioned mud. Drilled cement, 1942 m to 1944.5 m. Cement somewhat harder. Still too soft to dyna drill. Circulated and waited on cement. Mud Weight: 1155; Viscosity: 58.
September 18, 1979		
Day 153	1953 m	9 m. Running in hole with dyna drill. Circulated and conditioned mud. Drilled cement from 1944 m - 1950 m. Cement soft to firm. 1950 m - Cement firm to very hard. Circulated, conditioned hole and mudded and pumped pill. Tripped out. Installed torque drive plate in No. 3 motor. Picked up dyna drill and bottomhole assembly. Ran in hole with dyna drill. Mud Weight: 1162; Viscosity: 82.
September 19, 1979		
Day 154	1969 m	16 m. Dyna drilling. Cleaned 2 m of fill with dyna drill. Ran steering tool - oriented dyna drill. Drilled with dyna drill. Mud Weight: 1165; Viscosity: 82.

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WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 10, 1979		
Day 145	(Cont'd)	at 2487 m. Worked bit into top of wash pipe and cleaned out to 2497 m.
		Mud Weight: 1165; Viscosity: 74. Lithology: 100% Shale.
September 11, 1979		
Day 146	2507 m	Nil. Repairing drive chain, running in hole. Circulated inside fish
		with bit. Pulled out of hole, picked up 228 mm Bowen jars, bumper sub
		and Bowen inside spear. Ran in hole, circulated into top of fish.
		Latched onto and worked fish. Jars are very weak, did not get good
		jarring action. Moved fish up 1 m on first jar. Jars not working
		properly. Jarred down and turned string with right hand torque to
		release spear. Appeared to be still latched onto fish. Hoisted and
		found no recovery. Laid down Bowen spear, bumper sub and Bowen jar.
		Picked up 170 mm Lee Mason jars and Homco inside spear. Started in
		hole. Repaired high clutch drive chain, Mud Weight: 1165;
		Viscosity: 74.
September 12, 1979		
Day 147	2507 m	Nil. Cleaning to top of fish. Ran in hole with Homco inside spear.
		Circulated out gas cut mud. Worked into top of fish and jar up.
		Tripped jars 11 times. Unable to move fish up. Spear grapple pulled
		out of fish and was unable to get spear to hold. Tripped out with
		spear. Shut down floor motors and changed clutch spiders on two
		engines. Serviced fishing tools, slipped and cut line. Ran in hole
		with 311 mm bit. Reamed from 2480 to 2486 m. Bit torques up while
		reaming but pulled up freely. Mud Weight: 1165; Viscosity: 90
September 13, 1979		
Day 148	2507 m	Nil. Pulling freepoint to run backoff shot. Reamed from 2486 to
		2488 m. Circulated and conditioned hole, Tripped out and picked up
		fishing string and ran in to 2488 m. Circulated, worked stuck pipe.
		While circulating at 2482 m hole sloughed in. Unable to circulate
		or work jars or bumper sub. Pulled to 140 000 daN. Rigged up and
		ran freepoint, found bottom 9" drill collars and fishing tools stuck.
		Top of 9" drill collars at 2459 m. Mud Weight: 1170; Viscosity: 98

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 6, 1979		Washover shoe: 0.66)
Day 141	(Cont'd)	Washover pipe: 8.17) 8.83 m = 28.97'
		Mud Weight: 1170; Viscosity: 79.
September 7, 1979		
Day 142	2507 m	Nil. Circulating and conditioning mud, waiting on tools. Waited on
		fishing tools to arrive from Fort Nelson. Ran in hole open ended,
		circulated and conditioned mud above fish. Mud Weight: 1170;
		Viscosity: 80; Lithology: 100% Shale
September 8, 1979		
Day 143	2507 m	Nil. Breaking out and laying down fish. Circulated and conditioned
		hole above fish. Tripped out, picked up bumper sub, bowen jars and
		overshot. Picked up 10 - 178mm drill collars. Ran in hole to 2475 m.
		Broke circulation and tried to wash to 2478 m. Hole was tight and
		appeared to have 3 m of fill above fish. Tripped jars three times to
		come free with overshot. Tripped out of hole and found fish in overshot
		consisting of cut lip, crossover sub, 2 - 229 mm drill collars.
		Broke out and laid down fish. Overshot skirt has markings on it that
		appear to have been made by setting down on washpipe. Mud Weight:
		1178; Viscosity: 80.
September 9, 1979		
Day 144	2507 m	Nil. Tripping out with fish. Laid down two 229 mm drill collars.
		Waited on bit sub to arrive from Fort Nelson. Ran in hole with bit,
		located top of wash pipe at 2481 m. No fill on top of wash pipe.
		Circulated and conditioned gassy mud. Tripped out of hole. Picked
		up Bowen inside spear and ran in hole. Circulated above fish and
		worked onto fish and pulled free with 10 daN over normal weight and
		tripped out of hole. Mud Weight: 1165; Viscosity: 74.
September 10, 1979		
Day 145	2507 m	Nil. Circulating inside wash pipe at 2497 m. Tripped out with
		spear, no recovery. Ran back in with spear, located top of wash pipe
		at 2482 m. Circulated and attempted to work spear into wash pipe,
		unable to get into wash pipe because of shale. Tripped out with
		spear, no recovery. Ran in with 216 mm bit, located top of wash pipe

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
September 2, 1979		
Day 137	(Cont'd)	Viscosity: 105; Lithology: 100% Shale.
September 3, 1979		
Day 138	2507 m	Nil. Circulating and conditioning hole. Waited on fishing tools, very heavy fog. Rigged up Schlumberger. Ran in with chisel bar and sinker point. Top of monel plugged with shale. Unable to go past 2498 m. Ran Homco freepoint indicator. Collars are free at bottom of stabilizer at 2478.6 m. Attempted to back off one drill collar below stabilizer at 2487 m. Unable to. Reran string shot and backed off at bottom of stabilizer at 2478.6 m. Circulated and conditioned gas cut mud. Total length of fish: bit, bit sub, monel, cut lip sub, crossover, 2 drill collars - 28.82 m (94.55'). Mud Weight: 1160; Viscosity: 85.
September 4, 1979		
Day 139	2507 m	Nil. Washing over fish at 2482 m. Circulated and conditioned mud and hole. Tripped out slowly. Chained out. Waited on sub from Fort Nelson. Picked up three joints of wash pipe and ran in hole. Circulated out gas cut mud. Washed over from top of fish at 2478.6 m to 2482 m. Mud Weight: 1165; Viscosity: 80.
September 5, 1979		
Day 140	2507 m	Nil. Tripping for new washover shoe. Washover fish from 2482 m to 2484 m. Rubble falling in and has to be re-drilled. Tripped for washover shoe. Ran in hole and washover from 2484 m to 2486 m and tripped to change washover shoe. Mud Weight: 1170; Viscosity: 75; Lithology: 100% Shale.
September 6, 1979		
Day 141	2507 m	Nil. Waiting on fishing tools. Finished out of hole. Ran in hole with new washover shoe. Washed over fish from 2486 m to 2492 m. Pipe torque up and pressured up very suddenly at 2492 m and became stuck. Jarred up on pipe and moved it up 6 inches. Continued jarring up and pipe came free. Laid down one single and circulated pipe back down hole. Unable to make progress. Tripped out and found washover shoe and one joint washover pipe left in hole. Washover shoe: 0.66;

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August 30, 1979		
Day 134	2473 m	2 m. Working and cleaning tight hole @ 2473 m. Rig serviced, drilled. Worked tight hole from 2471 m - 2473 m. Hoisted, changed bottomhole assembly, ran in. Reamed and cleaned 5 m fill, worked tight hole. Mud Weight: 1170; Viscosity: 80; Survey:- 2471 m - Misrun.
August 31, 1979		
Day 135	2489 m	16 m. Drilling. Drilled to 2478 m. Surveyed at 2475 m - misrun. Ran second survey - O.K. Drilled and rig serviced, made connection at 2487 m. Hole is sloughing at bottom. Reamed back to 2487 m, ran survey @ 2484 m - misrun. Wireline broke, recovered same, rig serviced and drilled to 2489 m. Background Gas: 352 units (160-352); Drilling Rate: 1 m/hr (0.9 - 1.7 m/hr); Flowline Temperature: 47.4°C; Shale Density: 2.6; Cuttings Gas: 10 units; "D" Exponent: 1.44 (1.35 - 1.45); Peak Gas: 352 units; Lithology: 100% Shale with very good trace pyrite and good trace calcite. Mud Weight: 1165; Viscosity: 110; Surveys:- 2475 m - 8½°N68°W; 2484 m - Misrun. Lithology: 100% Shale with trace Pyrite and Calcite.
September 1, 1979		
Day 136	2507 m	18 m. Tripping out. Drilled and rig serviced. Surveyed at 2494 m, drilled, circulated and worked tight hole. Surveyed at 2504 m. Drilled to 2507 m. Lost 6000 kPa of pressure. Tripped out to check for workout. Mud Weight: 1170; Viscosity: 115; Surveys:- 2494 m - 8°N66°W; 2507 m - 7°N25°E (questionable); Lithology: 100% Shale, trace Pyrite and Calcite.
September 2, 1979		
Day 137	2507 m	Nil. Waiting on back off tools. Finished out of hole, found drill collar, backed off. Left bit, bit sub and monel drill collar in hole (total length 9.38 m - 30.7'). Slipped and cut line. Laid down one stabilizer, ran in hole with cut lip sub. Washed 4 m of fill to top of fish at 2497.5 m. Circulated to condition hole. Screwed into top of fish. Pump pressure went immediately to 14 000 kPa. Unable to circulate through bit and unable to rotate. Jarred up on fish. Unable to move more than 0.5 m. Top of fish at 2497.5 m. Mud Weight: 1170;

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August	25, 1979	
Day 129	(Cont'd)	Viscosity: 56; Surveys:- Scientific - 2431 m - 7.8°N69°W; 2439 m - 7.4°N59.3°W
August	26, 1979	
Day 130	2456 m	6 m. Running in hole. Reamed tight hole. Circulated, rig serviced. Surveyed. Drilled. Worked and reamed tight hole. Dropped survey. Pulled out of hole, rig serviced, picked up 9" drill collar. Slipped and cut drilling line. Ran in hole. Mud Weight: 1170; Viscosity: 61; Surveys:- 2448 m - 7.5°, 2455 m - 7-3/4°S66°W. Lithology: Shale - trace Pyrite and Calcite
August	27, 1979	
Day 131	2461 m	5 m. Reaming at 2460 m. Finished in hole. Cleaned and worked tight hole from 2442 m. Worked loose stuck pipe at 2454 m. Reamed and worked tight hole from 2443 m to 2456 m. Drilled new hole. Pulled up to make connection. Had to ream tight hole from 2450 m to 2456 m. High torque while reaming. Large amount of shale. Shale has decreased to minimal for last four hours. Hole very tight from 2456 m to 2460 m while reaming. Gas while reaming 540 units. Drilling , 620 units; Peak Gas @ 1664 m. Trip gas: 3200; Mud Weight: 1070; Viscosity: 80; Lithology: Shale, calcite and pyrite (5%)
August	28, 1979	
Day 132	2461 m	Nil. Reaming at 2461 m. Reamed tight hole at 2460 m. Dropped survey, tripped out, changed bottomhole assembly, rig serviced and run in. Reamed in from 2453 m - 2461 m. Mud Weight: 1160; Viscosity: 65; Surveys: 2460 m - 8.2°N56°W
August	29, 1979	
Day 133	24671 m	10 m. Drilling. Cleaned and reamed 2454 m - 2461 m. Drilled new hole 2461 m - 2467 m. Worked tight hole 2463 m - 2467 m. Drilled 2467 m - 2470 m. Worked and reamed tight hole 2461 m - 2470 m. Ran survey, Schlumberger and Wireline. Cleaned to bottom, 1 m. Drilled. K.B. Elevation: 834.95 m. Mud Weight: 1170; Viscosity: 95; Survey: 2468 m - 8°N78°W Lithology: Shale

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August	22, 1979	
Day 126	2440 m	12 m. Rigging steering tool. Picked up and ran in hole with Nave drill. Reamed with Nave drill from 2394 m to 2428 m. Rigged up circulating head. Circulated hole and rig serviced, surveyed and oriented tool. Drilled with Nave drill from 2428 m to 2440 m. Ran to run steering tool. Mud Weight: 1140; Viscosity: 72; Survey:- 2418 m - 9¼°N37°W; Lithology: 100% Shale.
August	23, 1979	
Day 127	2441 m	1 m. Running in with steering tool. Rigged up steering tool, circulated and re-spooled Schlumberger line. Ran in steering tool, drilled with Nave drill from 2440 m - 2441 m. Nave drill not working properly. Rigged out and pulled steering tool. Tripped out. Found Nave drill washed out above dump valve. Changed Schlumberger shive in derrick. Laid down Nave drill and picked up new one. Ran in hole and cleaned to bottom. Rigged steering tool and ran in with same. Conservation Board rig checked. Mud Weight: 1140; Viscosity: 72; Lithology: Shale.
August	24, 1979	
Day 128	2441 m	Nil. Tripped out. Attempted to nave drill. Drill stalled when bit on bottom. Pulled out of hole, O rings in dump valve cut off, blanked off dump valve ports. Ran in hole, had 200 kPa less pump pressure when on bottom. Cleaned to bottom with nave drill, 1 m. When bit on bottom nave drill stalls. Pump pressure 2 000 kPa below normal. Ran in hole with steering tool. Took 10' surveys. Dropped sperry sun single shot. Tripped out to find washout. Mud Weight: 1145; Viscosity: 72.
August	25, 1979	
Day 129	2450 m	9 m. Working and reaming tight hole. Finished out of hole. Laid down Nave drill and bottomhole assembly. Picked up drilling assembly. Ran in hole, checked pipe for washout, circulated every 10 stands. Reamed in on stabilizer from 2420 m to 2441 m. Circulated. Ran survey, Schlumberger and wireline scientific. Drilled. Worked and reamed tight hole from 2444 m to 2450 m. Ground: 827.3; Mud Weight: 1160;

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August 17, 1979		
Day 121	(Cont'd)	Circulated and conditioned hole, shale sloughing badly one inch above shaker. Raising mud weight to 9.6 ppg. Mud Weight: 1130; Viscosity: 64; Surveys: 2381 m (2354.53 TVD) 10°30'N42'W N 192.53 m W 241.37 m.
August 18, 1979		
Day 122	2395 m	5 m. Drilling with 8½" bit and dyna drill. Circulated and conditioned hole, mixed weight material. Tripped out, picked up dyna drill 2° bit sub and 6¼" drill collar. Rig serviced, oriented dyna drill (kicked off 40° left of lowside of hole). Drilled with dyna drill 216 mm hole (8½"). Mud Weight: 1148; Viscosity: 80.
August 19, 1979		
Day 123	2408 m	13 m. Reaming 8½" hole to 12¼" at 2407 m. Drilled 8½" hole with dyna drill. Surveyed. Tripped out, laid down dyna drill. Picked up pilot reamer. Rig serviced, ran in. Reamed 8½" hole with pilot ream. Mud Weight: 1140; Viscosity: 65; Surveys:- 2389 m - 9°30'; 2398 m - 9°30'
August 20, 1979		
Day 124	2428 m	20 m. Drilling 8-3/4" hole with dyna drill. Dropped survey and rig serviced. Pulled out of hole with hole opener, picked up 6-inch dyna drill and 2° kick sub, ran in hole. Cleaned to bottom, 1 m. Oriented dyna drill. Drilled with dyna drill. Surveyed. Drilled with dyna drill. Surveyed and rig serviced. Drilled. Mud Weight: 1160; Viscosity: 81; Surveys:- 2408 m - 9°; 2426 m - 8-3/4°
August 21, 1979		
Day 125	2428 m	Picking up bottomhole assembly, Rig serviced, tripped out dyna drill, picked up hole opener, ran in hole. Reamed 8-3/4 to 12¼ to 2427 m. Rig serviced, surveyed, tripped out with hole opener. Laid down hole opener, picked up 8-inch nave drill and bottomhole assembly. Mud Weight: 1155; Viscosity: 85; Surveys:- 2420 m - 9° (12¼"); 8-3/4" hole @ 2420 m - 8¼° Lithology: Shale

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August 13, 1979		
Day 117	2491 m	Circulating and conditioning mud on top of fish. Finished out and stand back washover pipe. Pipe cut lip sub and jars. Ran into top of fish. Circulated bottoms up, screwed into fish. Jarred on fish, no movement. Ran sinker bar and chisel point. Fish plugged 7.5 m into top of fish. Worked chiselpoint, no gain. Plugged very hard. Ran 200 grain shot to try and dislodge plug. Reran chisel and sinker bar. Plug unmoved. Ran 900 grain backoff shot. Backed off at top of fish at 2424 m. Circulated and conditioned mud. Mud Weight: 1110; Viscosity: 65.
August 14, 1979		
Day 118	2350 m	Waited on cement, conditioning mud. Circulated, rig serviced, hosted. Pulled 38 stands through keyseat from 1312 m - 1300 m. Finished out of hole. Rigged out fishing tools and laid down wash pipe. Ran in open end. Circulated and conditioned gas cut mud. Ran cement side track log with 225 sacks neat oilwell cement from 2424 m - 2350 m. Pulled 7 stands, circulated, waited on cement. Mud Weight: 1110; Viscosity: 55.
August 15, 1979		
Day 119	2350 m	Plug back depth. Waiting on cement. Circulated and conditioned. Hoisted open end drill pipe. Waited on cement. Mud Weight: 1110; Viscosity: 72.
August 16, 1979		
Day 120	2387 m	37 m. Waiting on cement. Waited on monel drill collar. Picked up monel drill collar and ran into casing shoe. Ran in and took multi shot survey. Retrieved survey and broke wire lines. Found top of cement plug at 2372 m. Drilled medium firm cement 2377 m to 2387 m. Circulated and conditioned mud. Tripped out and recovered survey. Mud Weight: 1110; Viscosity: 55.
August 17, 1979		
Day 121	2390 m	3 m. Circulating and raising mud weight. Tripped out, hole tight, 4 stands off bottom. Developed multi shot survey. Ran in hole, 12 m sticky fill. Circulated, cleaned to bottom, drilled to bottom.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August 8, 1979		
Day 112	2491 m	10 m. Stuck in hole. Reamed tight hole from 2472 m - 2481 m. Lots of small shale cuttings from shaker. Drilled from 2481 m - 2491 m. Started to make connection. Hole very tight and pipe became stuck. Unable to rotate or circulate. Jarred up and down in attempt to free pipe. Unable to free pipe. Waiting on backoff tools. Mud Weight: 1125; Viscosity: 67.
August 9, 1979		
Day 113	2491 m	Nil. Fishing and running freepoint tools. Waited on fishing tools to arrive. Rigged Homco and Schlumberger tools to run free point. Ran free point. Mud Weight: 1125; Viscosity: 67.
August 10, 1979		
Day 114	2491 m	Nil. Tripping out. Ran freepoint indicator and found jars free. Backed off at top of first drill collar above jars at 2424 m. Circulated on top of fish one-half hour and circulated to condition mud in hole. Viscosity of mud down to 45 on bottoms up and very gas cut. Tripped out, measured and chained out. Mud Weight: 1130; Viscosity: 105.
August 11, 1979		
Day 115	2491 m	Nil. Tripping in with washover string. Finished out of hole. Measurement is +114 m. Picked up three joints of 273 mm washpipe and ran in with 10 - 158 mm drill collars. Washed over top of fish and down to top of 3-blade stabilizer at 2447 m. Tripped out to check washover shoe. Hoisted washpipe. Shoe is still in good condition. Made up new washover shoe and ran back in hole. Mud Weight: 1110; Viscosity: 87.
August 12, 1979		
Day 116	2491 m	Tripping out with washpipe. Ran in hole. Washed over top of fish and milled on stabilizer blades. Milled approximately 150 mm of stabilizer blades. Hoisted out with washover pipe. Made up and ran in with new washover shoe. Milled on blade and cut off same. Circulated washover pipe. Tripped out with washover pipe. Mud Weight: 1110; Viscosity: 72.

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
August 2, 1979		
Day 106	2328 m	48 m. Working on pumps. Drilled, rig serviced, surveyed, repaired mud
		pumps. Drilled and worked on pumps. Connection Gas: 46 units;
		Background Gas: 8 units; Drilling Rate: 4.3 m/hr; Flowline
		Temperature: 45°C; Shale Density: 2.60; Peak Gas: 178 @ 2314 m;
		Cuttings Gas: 9 units; "D" Exponent: 1.50; Mud Weight: 1120;
		Viscosity: 48; Survey: 2308 m - 8-1/8°
August 3, 1979		
Day 107	2372 m	44 m. Tripping in with bit #38. Drilled, worked on pumps, rig
		serviced, dropped survey and tripped for bit, hole in good condition.
		Background Gas: 108 (60-118); Rate of Penetration: 1.6 m (1.6 to 5);
		Flowline Temperature: 48.5 (45.6 to 48); Shale Density: 2.60;
		Peak Gas: 118 @ 2370 m; Cutting: 4 units (4-11); "D" Exponent: 1.77
		(1.46 - 1.77); Mud Weight: 1110; Viscosity: 55; Surveys:- 2370 m
		- 9-3/4°, 2309 m - 10°
August 4, 1979		
Day 108	2434 m	62 m. Drilling. Finished tripping in hole. Mud Weight: 1120;
		Viscosity: 59.
August 5, 1979		
Day 109	2459 m	25 m. Tripping in with new bit. Drilled to 2459 m. Very high torque
		conditions. Small gas bubble circulated to surface. Attempted for
		two hours to restart bit. Very high torque. Mud Weight: 1125;
		Viscosity: 61; Survey:- 2451 m - 12°
August 6, 1979		
Day 110	2470 m	11 m. Reaming tight hole. Reamed tight hole to bottom. Drilled to
		2470 m from 2459 m. Excessive torque. Made connection and reamed to
		bottom. Lots of shale cuttings coming over shaker. No long
		splintering shale. Mud Weight: 1120; Viscosity: 62.
August 7, 1979		
Day 111	2481 m	11 m. Reaming to bottom. Tripped for bit. Mud Weight: 1125;
		Viscosity: 67.

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 28, 1979		
Day 101	2085 m	31 m. Trip in with new bit. Drilled, rig serviced, circulated bottom hole sample, surveyed, tripped out for bit @ 2116 m. Mud Weight: 1180; Viscosity: 58; Survey:- 2108 m - 10°
July 29, 1979		
Day 102	2173 m	57 m. Drilling. Finished running in hole, cleaned 1½ m of fill, drilled and rig serviced, blow out preventers, drilled. Background Gas: 13-40; Cuttings Gas: 25 (Range 13-37); Drilling Rate: 2 m (Range 2-35 m/hr); Flowline Temperature: 45.8°C; Peak Gas: 42 units; "D" Exponent: 1.67 (Range 1.59 to 1.75); Mud Weight: 1160; Viscosity: 57.
July 30, 1979		
Day 103	2208 m	35 m. Drilling. Drilled, rig serviced, surveyed. Tripped for bit at 2193 m. Cleared 1 m to bottom with bit #36 and drilled. Background Gas: 5 units (4-12); Drilling Rate: 2-2.5 m/hr; Flowline Temperature: 46.2°C; Peak Gas: 12 units; Cuttings Gas: 4 units (4-10 units); "D" Exponent: 1.665 (1.535-1.91); Trip Gas: 50 units above background; Mud Weight: 1148; Viscosity: 48; Survey: 2175 m - 10°
July 31, 1979		
Day 104	2256 m	48 m. Drilling. Drilled, rig serviced, surveyed. Background Gas: 32 units; Peak @ 2227 m; Rate of Penetration: 28 min/metre; Flowline Temperature: 47.8°C; "D" Exponent: 1.65; Lithology: 50% Shale, 20% Chert, 20% Dol. Chert, 10% Limestone; Mud Weight: 1140; Viscosity: 60; Survey: 2242 m - 9-3/4°
August 1, 1979		
Day 105	2280 m	24 m. Drilling. Drilled and rig serviced. Dropped survey and tripped out for bit at 2278 m. Survey - misrun. Slipped and cut line, tripped in with bit #37, no fill. Trip Gas: 465; Peak Gas: 32; Drilling Rate: 1.7 m/hr; Flowline Temperature: 42.8°C; "D" Exponent: 1.93; Lithology: 30% Limestone, 70% Shale; Mud Weight: 1130; Viscosity: 57; Survey: Misrun.

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 22, 1979		
Day 95	1884 m	30 m. Drilling. Tripped for plug jets, Cleaned 2 m to bottom. Slipped and cut line. Tight hole while drilling 1858 m - 1863 m. Slough shale. Drilling Rate: 2.8; Background Gas: 3 units; Cuttings Gas: 3 units; Flowline Temperature: 41.7°C; Shale Density: 1.6; "D" Exponent: 1.49; Lithology: 30% Limestone, 50% Siltstone, 20% Shale. Mud Weight: 1152; Viscosity: 46.
July 23, 1979		
Day 96	1925 m	41 m. Drilling. Drilling Rate: 1.40; Background Gas: 4 units; Cuttings Gas: 3 units; Flowline Temperature: 41.5°C; Shale Density: 2.58; "D" Exponent: 1.85; Lithology: 80% Siltstone, 20% Shale, trace Limestone. Repacked swivel. Drilled ahead. Mud Weight: 1150; Viscosity: 45; Surveys:- 1881 m - 11-3/4 N52W; 1915 m - 11-7/8°N50W
July 24, 1979		
Day 97	1950 m	25 m. Drilling. Tripped for bit. Cleaned 3 m to bottom. Drilled and worked sloughing section 1928 m - 1932 m. Mud Weight: 1152; Viscosity: 57; Survey:- 1923 m - 11-3/4°N46°W
July 25, 1979		
Day 98	2003 m	53 m. Drilling. Rig serviced, repaired rotary chain, surveyed and drilled. Mud Weight: 1160; Viscosity: 65; Survey:- 1966 m - 11½°N45°W
July 26, 1979		
Day 99	2026 m	23 m. Drilling. Surveyed, drilled, repaired rotary chain, tripped for bit, installed new rotary chain, inspected brake linkage (worn out), laid down bent monel drill collar. Ran in hole, no fill. Drilled. Mud Weight: 1160; Viscosity: 60; Survey:- 2005 m - 11° N37°W. Background Gas: 9 units; Cuttings Gas: 15 units; "D" Exponent: 1.73; Trip Gas: 39
July 27, 1979		
Day 100	2085 m	59 m. Drilling. Rig serviced. Background Gas: 15 units; Drilling Rate: 2.7 m/hr; Flowline Temperature: 45.9°C; Peak Gas: 30 @ 2072 m Mud Weight: 1160; Viscosity: 58. Survey: 2060 m - 10°

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WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 17, 1979		
Day 90	(Cont'd)	"D" Exponent: 1.49; Lithology: 100% Shale, trace calcite, pyrite, dolomite. Mud Weight: 1150; Viscosity: 58; Survey:- 1698 m - 11½°
July 18, 1979		
Day 91	1761 m	42 m. Drilling. Drilling Rate: 2.0; Background Gas: 11 units; Cuttings Gas: 3 units; Flowline Temperature: 42.4°C; Shale Density: 2.58; "D" Exponent: 1.57; Lithology: 80% Shale, 20% Siltstone, trace limestone. Drilled ahead. Mud Weight: 1150; Viscosity: 48; Survey:- 1736 m - 11-3/4°
July 19, 1979		
Day 92	1805 m	44 m. Drilling. Drilling Rate: 2; Background Gas: 6 units; Cuttings Gas: 3 units; Flowline Temperature: 43.2; Shale Density: 2.58; "D" Exponent: 1.58; Lithology: 40% Shale, 40% Siltstone, 20% Limestone. Drilled ahead. Mud Weight: 1150; Viscosity: 46; Survey: 1774 m - 11½°
July 20, 1979		
Day 93	1815 m	10 m. Tripping. Drilling Rate: 1.1; Background Gas: 5 units; Cuttings Gas: 3 units; Flowline Temperature: 43.7; "D" Exponent: 1.75; Shale Density: 2.58; Lithology: 20% Limestone, 50% Shale, 30% Siltstone. Drilled to 1815 m. Tripped for bit. Inspected drill collar and bottomhole assembly. Changed out stabilizer, jars, and shock sub. Hole good on trip out. Mud Weight: 1150; Viscosity: 46; Survey:- 1810 m - 11¼°N50°W
July 21, 1979		
Day 94	1854 m	39 m. Drilling. Ran in hole, picked up 11 singles - no fill. Worked on pump. Drilled ahead. Drilling Rate: 1.8; Background Gas: 6 units; Cuttings Gas: 3 units; Flowline Temperature: 40.9; Shale Density: 2.58; "D" Exponent: 1.74; Lithology: 100% Shale, trace siltstone. Mud Weight: 1150; Viscosity: 45; Survey:- 1843 m - 11¼ N51W

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 13, 1979		
Day 86	1541 m	38 m. Drilling. Drilling Rate: 1 m/hr; Cuttings Gas: 7 units; Background Gas: 1 unit; Flowline Temperature: 43°C; Shale Density: 2.575; "D" Exponent: 1.87; Lithology: 100% Shale, good traces of dolomite, siltstone and slight trace of chert. Mud Weight: 1120; Viscosity: 54; Surveys:- 1510 m - 11¼°N52W; 1528 m - 11¼°N48W.
July 14, 1979		
Day 87	1565 m	24 m. Drilling. Tripped for bit. Changed reamer cutters. Picked up two 9-inch drill collars. Slipped and cut drilling line. Ran in hole. Broke circulation and washed to bottom. No fill. Repacked swivel and wash pipe. Repaired #1 air compressor. Drilled ahead. Drilling Rate: 3.0; Background Gas: 6 units; Cuttings Gas: 4 units; Flowline Temperature: 38.3°C; Shale Density: 2.58; "D" Exponent: 1.47; Lithology: 80% Shale, 20% Sandstone, trace marl, pyrite. Mud Weight: 1125; Viscosity: 50; Surveys:- 1541 m - 11¼°; 1555 m - 11-3/4°N51W
July 15, 1979		
Day 88	1612 m	47 m. Drilling. Repaired wash pipe. Drilled ahead. Drilling Rate: 2.4; Background Gas: 7 units; Cuttings Gas: 8 units; Flowline Temperature: 43.4°C; Shale Density: 2.58; "D" Exponent: 1.54; Lithology: 100% Shale, trace dolomite, marl, calcite and pyrite. Mud Weight: 1140; Viscosity: 51; Surveys:- 1574 m - Misrun; 1583 m - 11-7/8°N50W
July 16, 1979		
Day 89	1671 m	59 m. Drilling. Drilling Rate: 2.10; Background Gas: 8 units; Cuttings Gas: 9 units; Flowline Temperature: 44.5; Shale Density: 2.58; "D" Exponent: 1.51; Lithology: 100% Shale, trace calcite, pyrite, dolomite and marl. Mud Weight: 1140; Viscosity: 51; Surveys:- 1620 m - 11½°; 1650 m - 11½°
July 17, 1979		
Day 90	1719 m	48 m. Drilling. Drilled ahead. Worked on both mud pumps. Drilling Rate: 2.7; Background Gas: 12 units; Cuttings Gas: 6 units; Flowline Temperature: 42.8°C; Shale Density: 2.58;

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 9, 1979		
Day 82	(Cont'd)	10% Siltstone, trace dolomite. Worked tight hole 1358 m to 1333 m. Circulated and washed back to bottom. Drilled to 1373 m. Circulated and worked tight hole prior to connection. Drilled to 1377 m. Mud Weight: 1102; Viscosity: 42.
July 10, 1979		
Day 83	1423 m	46 m. Drilling. Drilling Rate: 2.0; Background Gas: 6 units; Cuttings Gas: N/A; Flowline Temperature: 42.3°C; Shale Density: 2.58; "D" Exponent: 1.70; Lithology: 30% Siltstone, 70% Shale, trace pyrite. Drilled ahead. Rig jacked and levelled. Mud Weight: 1138; Viscosity: 46; Surveys:- 1382 m - 11-3/4°N64W; 1400 m - 11¼° N62W; 1420 m - 11¼°N60W
July 11, 1979		
Day 84	1457 m	34 m. Drilling. Drilling Rate: 4.0; Background Gas: 10 units; Cuttings Gas: 16 units; Flowline Temperature: 38.3°C; Shale Density: 2.57; "D" Exponent: 1.43; Lithology: 100% Shale, trace siltstone and pyrite. Dropped survey, barrel pumped down at excessive rate, drove survey barrel through Tatco ring. Broke wire line attempting to recover survey barrel. Pulled out of hole to recover same. Changed bits, picked up three 9-inch drill collars, two old stabilizers. Changed out jars. Ran in hole, broke circulation and washed to bottom. No fill. Mud Weight: 1145; Viscosity: 48; Survey:- 1439 m - 11¼° N55W
July 12, 1979		
Day 85	1503 m	46 m. Drilling. Drilling Rate: 3.0; Background Gas: 3 units; Cuttings Gas: 15 units; Flowline Temperature: 42.3°C; Shale Density: 2.58; "D" Exponent: 1.42; Lithology: 60% Shale, 40% Sandstone, trace dolomite, limestone and pyrite. Surveyed at 1457 m. Unable to recover survey barrel. Pulled out of hole and recovered same. Hole good on trip. Survey barrel went through Totco ring. Mud Weight: 1140; Viscosity: 54; Surveys:- 1457 m - Misrun; 1490 m - 11¼N52W

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WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
July 4, 1979		
Day 77	1240 m	19 m. Tripping. Drilled to 1240 m. Tripped for bit. Mud Weight: 1066; Viscosity: 45; Surveys: 1220 m - 11°N66°W, 1238 m - 11¼° N62°W
July 5, 1979		
Day 78	1270 m	30 m. Drilling. Drilling Rate: 1.5; Background Gas: 4 units; Cuttings Gas: 12 units; Flowline Temperature: 39.9°C; Shale Density: N/A; "D" Exponent: 1.35; Lithology: 100% Siltstone. Finished pulling out of hole. Checked blind rams, changed bits. Ran in hole. Drilled ahead. Mud Weight: 1070; Viscosity: 44; Survey:- 1257 m - 11¼°N65°W
July 6, 1979		
Day 79	1313 m	43 m. Drilling. Drilled ahead. Drilling Rate: 1.67; Background Gas: 9 units; Cuttings Gas: 2-6 units; Flowline Temperature: 38.3°C; Shale Density: N/A; "D" Exponent: 1.33; Lithology: 100% Siltstone. Mud Weight: 1078; Viscosity: 42; Survey:- 1269 m - 11½°N67°W
July 7, 1979		
Day 80	1347 m	34 m. Drilling. Drilling Rate: 1.53; Background Gas: 4 units; Cuttings Gas: 10 units; Flowline Temperature: 38.3°C; Shale Density: 2.57; "D" Exponent: 1.52; Lithology: 80% Siltstone, 20% Shale. Trace dolomite and pyrite. Mud Weight: 1090; Viscosity: 43; Surveys:- 1315 m - 11-3/4 N69W; 1334 m - 12½ N68W
July 8, 1979		
Day 81	1363 m	16 m. Working tight hole at 1358 m. Drilling Rate: 1.0; Background Gas: 7 units; Cuttings Gas: 14 units; Flowline Temperature: 38.3°C; Shale Density: 2.50; "D" Exponent: 1.69; Lithology: 50% Siltstone, 50% Shale. Mud Weight: 1085; Viscosity: 45; Survey:- 1352 m - 12°N68W
July 9, 1979		
Day 82	1377 m	14 m. Drilling. Drilling Rate: 1.71; Background Gas: 3 units; Cuttings Gas: 14 units; Flowline Temperature: 41.4; Shale Density: 2.50; "D" Exponent: 1.51; Lithology: 90% Shale,

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WELL: COLUMBIA ET AL KOTANELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 29, 1979		
Day 72	1092 m	17 m. Drilling. Waited on rotary drive, installed same, Reamed from
		casing shoe to 1075 m. Drilled ahead. Drilling Rate: 2.2;
		Background Gas: 2 units; Cuttings Gas: 7 units; Flowline
		Temperature 30°C; Shale Density: 2.35; "D" Exponent: 1.32;
		Lithology: 90% Shale, 10% Siltstone. Mud Weight: 1057; Viscosity: 46
June 30, 1979		
Day 73	1132 m	40 m. Drilling. Changed out rotary drag chain. Drilled ahead.
		Drilling Rate: 1.8; Background Gas: 1 unit; Cuttings Gas: 10 units;
		Flowline Temperature: 35.4°C; Shale Density: 2.40; "D" Exponent:
		1.40; Lithology: 80% Shale, 20% Siltstone. Mud Weight: 1065;
		Viscosity: 44; Surveys:- 1087 m - 7½ N66W; 1115 m - 7-3/4 N67W.
July 1, 1979		
Day 74	1156 m	24 m. Drilling. Recovered kelly corrosion ring. Drilled to 1154 m.
		Tripped for bit. Changed reamer cutters. Picked up 3rd stabilizer.
		Ran in hole, drilled ahead. Drilling Rate: 1.2; Background Gas:
		1 unit; Cuttings Gas: 2-9 units; Flowline Temperature: 31.3;
		Shale Density: 2.45; "D" Exponent: 1.43; Lithology: 100%
		Sandstone. Mud Weight: 1066; Viscosity: 44; Surveys:- 1125 m - 8°,
		1154 m - 8¼° N67W
July 2, 1979		
Day 75	1190 m	34 m. Drilling. Drilled ahead. Drilling Rate: 1.1; Background
		Gas: 2 units; Cuttings Gas: 4 units; Flowline Temperature 35°C;
		Shale Density: N/A; "D" Exponent: 1.51; Lithology: 100% Sandstone,
		Trace sandstone and shale. Mud Weight: 1078; Viscosity: 42;
		Survey: 1163 m - 8-1/8 N58W
July 3, 1979		
Day 76	1221 m	31 m. Drilling. Drilled ahead. Drilling Rate: 0.82; Background
		Gas: 1 unit; Cuttings Gas: 8 units; Flowline Temperature: 35.4°C;
		Shale Density: N/A; "D" Exponent: 1.50; Lithology: 100% Sandstone.
		Mud Weight: 1078; Viscosity: 44

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DAILY OPERATIONS REPORT

WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 24, 1979		
Day 67	1054 m	Waiting on rings for blow out preventers stack. Waited on cement, cut
		casing, installed casing bowl, nipple up and tested casing bowl.
June 25, 1979		
Day 68		Nipple up blow out preventers. Waited on blow out preventers ring
		gaskets. Installed spool single gate, spool double gate, spool,
		hydril. Rigged up kill line valves.
June 26, 1979		
Day 69		Running in hole with bottomhole assembly. Nippled up valves, killed
		lines and blow out preventers. Pressure tested casing, killed lines,
		blind rams, hydraulic controlled remote valve, manifold valves, choke
		and valves in manifold shucked to 20 700 kPa, 15 mins. Okay.
June 27, 1979		
Day 70	1072 m	18 m. Drilling. Drilling Rate: 1.0; Background Gas: 2 units;
		Cuttings Gas: 2 units; Flowline Temperature: 29.2°C; Shale
		Density: N/A; "D" Exponent: 1.60; Lithology: 40% Sandstone,
		40% Siltstone, 20% Shale. Ran in hole, tagged cement at 1032 m KB.
		Pressure tested bottom pipe rams to 14 700 kPa for 15 mins. Okay.
		Pressure tested top pipe rams to 20 700 kPa for 15 mins. Okay.
		Pressure tested mud lines, stand pipe, kill lines, Okay. Kelly cock
		would not test. Pressure tested hydril to 14 800 kPa for 15 mins.
		Okay. Checked crownomatic, engine kills, drilled out cement and shoe.
		Drilled 5 m, pressure tested formation. Leak off at 7 000 kPa with
		1025 m mud. Frac gradient 0.73 psi/ft. Attempted to jack rig.
		Matting sinking. Mud Weight: 1025; Viscosity: 35.
June 28, 1979		
Day 71	1075 m	3 m. Waiting on bearing for rotary clutch. Drilled to 1075 m.
		Dropped survey. Pulled out of hole. Picked up bottomhole assembly.
		Bearing gone in rotary clutch. Ran in hole to casing shoe. Waited
		on repairs. Mud Weight: 1055; Viscosity: 43; Survey:- 1075 m -
		7½N 71W

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 19, 1979		
Day 62	1054 m	Circulating on bottom. No tight spots on trips. Circulated and
		conditioned hole. Pulled out of hole, laid down 285 mm drill collar,
		stabilizer and shock sub. Picked up manel drill collar. Made up
		bottomhole assembly and ran in hole with Perry Sun multi shot survey.
		Retrieved survey. Ran back in and circulated and conditioned hole.
		Waited on logging tools. Mud Weight: 1080; Viscosity: 45;
		Survey: 1054 m - 7-1/8°
June 20, 1979		
Day 63	1054 m	Circulating and conditioning mud. Circulated and conditioned mud.
		Pulled out to log. Rigged up Schlumberger. Ran bore hole compensated
		sonic. DI-SFL. Gamma Ray did not work. Ran in hole with bit for
		wiper trip.
June 21, 1979		
Day 64	1054 m	Running 244 mm casing. Circulated and conditioned mud. Laid down
		3 joints of damaged casing. At 8:00 a.m. had run 25 joints of casing.
		Rig uneven - rig jackers have been called in. Mud Weight: 1080;
		Viscosity: 42.
June 22, 1979		
Day 65	1054 m	Running casing. Power unit on tongs broke down. Repairs flown in
		from Ft. Nelson. Pipe stuck at 0100 hours. Worked pipe free and
		ran casing. Mud Weight: 1080; Viscosity: 42.
June 23, 1979		
Day 66	1054 m	Tripping out with drill pipe. Ran 88 joints of 339 mm 107.1 kg/m N-80
		Buttress casing. Total length 1052.92 m. Landed at 1052.5 m.
		Cemented with 61.68 Tonnes of Oilwell "G" with 8% gel followed by
		20 Tonnes of neat Oilwell "G." Lost circulation at completion of gel
		cement. Cemented in place at 2:05 June 23. Cemented from surface
		with 46 m of 25.4 mm pipe. Used 3.62 Tonnes of neat Oilwell "G."
		Good returns throughout. Cemented to surface at 0600 hours. Ran
		3 baskets at 477 m, 465 and 453. Rigged out cementers.

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 15, 1979		
Day 58	(Cont'd)	Cuttings Gas: 7 units; Flowline Temperature: 41.2°C; Shale Density: 2.55; "D" Exponent: 1.70; Lithology: 70% Shale, 30% Siltstone, trace Limestone and Pyrite. Mud Weight: 1052; Viscosity: 43; Survey:- 962 m - 4-3/4°
June 16, 1979		
Day 59	992 m	16 m. Drilling. Drilling Rate: 1.6; Background Gas: 3-4 units; Cuttings Gas: 10 units; Flowline Temperature: 38.1°C; Shale Density: 2.47; "D" Exponent: 1.35; Lithology: 65% Shale, 30% Siltstone, 5% Chert, Trace Limestone, Pyrite and Sandstone. Finished out of hole, tight on 11 and 12 stands off bottom. Measured out, no correction. Picked up and made up 340 mm shoe joint. Turned reamer pins, ran in hole, slipped and cut drilling line. Washed 15 m to bottom, 1 metre of fill. Mud Weight: 1060; Viscosity: 45; Surveys: 976 m - 5-3/4°, 990 m - 4-3/4°
June 17, 1979		
Day 60	1026 m	34 m. Drilling. Drilling Rate: 1.45; Background Gas: 12 units; Flowline Temperature: 54.3°C; Shale Density: 2.45; "D" Exponent: 1.42; Lithology: 10% Sandstone, 70% Siltstone, 20% Shale, Trace Pyrite. Drilled ahead. Mud Weight: 1070; Viscosity: 44; Survey: 1009 m - 6°
June 18, 1979		
Day 61	1054 m	28 m. Circulating on bottom. Drilled to 1054 m. Circulated and conditioned mud. Dummy tripped to casing shoe. Hole tight from 650 to 500 m. Ran in hole to bottom and circulated. Drilling Rate: 0.75; Background Gas: 8-10 units; Cuttings Gas: 2 units; Flowline Temperature: 39.2°C; Shale Density: 2.50; "D" Exponent: 1.47; Lithology: 85% Shale, 10% Siltstone, 5% Sandstone, Trace Pyrite. Mud Weight: 1080; Viscosity: 45; Surveys:- 1029 m - 6½°, 1047 m - 7°

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 10, 1979		
Day 53	(Cont'd)	10-20% Siltstone, Trace Anhydrite, Trace Limestone, Trace Pyrite.
		Survey:- 866 m - 4½°
June 11, 1979		
Day 54	899 m	27 m. Drilling. Drilling Rate: 1.15; Background Gas: 2-3 units;
		Cuttings Gas: 5 units; Flowline Temperature: 35.7°C; "D"
		Exponent: 1.72; Lithology: 90% Sandstone, 10% Siltstone. Drilled
		ahead. Mud Weight: 1050; Viscosity: 41; Survey:- 844 m - 4½°
June 12, 1979		
Day 55	924 m	25 m. Drilling. Drilling Rate: 1.21; Background Gas: 2 units;
		Cuttings Gas: 7 units; Flowline Temperature: 38.5°C; Shale
		Density: 2.55; "D" Exponent: 1.62; Lithology: 10% Sandstone,
		60% Siltstone, 20% Shale, 10% Limestone, Trace Pyrite. Drilled
		ahead. Checked motor kills - okay. Mud Weight: 1075; Viscosity: 39;
		Surveys:- 903 m - 4¾°, 923 m - 5½°
June 13, 1979		
Day 56	934 m	10 m. Drilling. Drilled to 927 m, tripped for bit. Changed out
		reamer cutters, ran in hole, reamed one metre to bottom. Drilling
		Rate: 0.45; Background Gas: 1 unit; Cuttings Gas: 1 unit;
		Flowline Temperature: 33.2°C; Shale Density: 2.50; "D" Exponent:
		1.56; Lithology: 30% Sandstone, 40% Siltstone, 20% Shale, 5-10%
		Pyrite (trace of limestone). Mud Weight: 1045; Viscosity: 39;
		Survey:- 932 m - 5½°
June 14, 1979		
Day 57	954 m	20 m. Drilling. Straightened and tightened belts. Drilled ahead.
		Drilling Rate: 2.0; Background Gas: 6 units; Cuttings Gas: 8
		units; Flowline Temperature: 34.6°C; Shale Density: 2.43;
		"D" Exponent: 1.64; Lithology: 10% Sandstone, 50% Siltstone, 30%
		Shale, 10% Limestone, trace Pyrite and Fossils. Mud Weight: 1070;
		Viscosity: 42; Survey:- 942 m - 4¾°
June 15, 1979		
Day 58	976 m	22 m. Tripping for bit. Drilled to 976 m, circulated prior to trip.
		Pulled out of hole. Drilling Rate: 0.85; Background Gas: 2 units;

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
June 6, 1979		
Day 49	(Cont'd)	Sandstone, 10% Siltstone, 10-30% Shale. Mud Weight; 1055;
		Viscosity: 42; Survey:- 798 m - 4°
June 7, 1979		
Day 50	811 m	4 m. Drilling. Checked motor kills, drilled to 810 m. Dropped
		survey, tripped for bit. Inspected bottom hole assembly. Ran in hole.
		Picked up five 158 mm drill collars. Slipped 6.17 m drilling line.
		Finished running in hole. Cleaned 9 m to bottom. Hole good on trip.
		No mud lost last 24 hours. Laid down two 158 mm drill collars and one
		228 mm drill collar. Damaged sales. Drilling Rate: 1.2; Background
		Gas: 1-2 units; Cuttings Gas: 5 units; Flowline Temperature: 24°C;
		Shale Density: N/A; "D" Exponent: 1.74; Lithology: 60% Sandstone,
		20% Siltstone, 20% Shale. Mud Weight: 1040; Viscosity: 42;
		Survey:- 810 m - 4°
June 8, 1979		
Day 51	837 m	26 m. Drilling. Drilled ahead. No mud lost last 24 hours. Drilling
		Rate: 1.125; Background Gas: 2 units; Cuttings Gas: 6 units;
		Shale Density: 2.47; Flowline Temperature: 29.6°C; "D" Exponent:
		1.69; Lithology: 70% Sandstone, 20% Siltstone, 10% Shale. Mud
		Weight: 1060; Viscosity: 37; Survey: 828 m - 4°
June 9, 1979		
Day 52	859 m	22 m. Drilling. Drilling Rate: 0.6; Background Gas: 2-3 units;
		Cuttings Gas: 6 units; Flowline Temperature: 31.1°C; Shale
		Density: N/A; "D" Exponent: 1.69; Lithology: 50% Sandstone,
		50% Siltstone. Drilling ahead. No mud losses last 24 hours. Mud
		Weight: 1040; Viscosity: 43; Survey: 847 m - 4°
June 10, 1979		
Day 53	872 m	13 m. Drilling. Drilled to 867 m. Tripped for bit. Jacked and
		leveled mud tanks, turned pins on near bit reamer. Picked up one 9"
		drill collar, moved jars down 3 drill collars. Ran in hole, cleaned
		9 m to bottom. Drilled ahead. Drilling Rate: 2.0; Background Gas:
		1-2 units; Cuttings Gas: 6 units; Flowline Temperature: 27.4°C;
		Shale Density: N/A; "D" Exponent: 1.76; Lithology: 80% Sandstone,

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DATE	DEPTH	DETAIL OF OPERATION
June 1, 1979		
Day 44	(Cont'd)	Lithology: 90% Sandstone, 10% Siltstone. Mud Weight: 1080;
		Viscosity: 40; Surveys:- 713 m - Misrun, 723 m - 3-7/8°
June 2, 1979		
Day 45	748 m	20 m. Tripping for bit. Drilled ahead, no circulation last 24 hours.
		Drilling Rate: 1.5; Background Gas: 0; Cutting Gas: 0; Flowline
		temperature: 27.7°C; DxC: 10.73; Lithology: 70% Siltstone,
		30% Sandstone. Mud Weight: 1070; Viscosity: 42
June 3, 1979		
Day 46	769 m	21 m. Drilling. Tripped for bit. Changed out sleeve in non-rotating
		stabilizer. Ran in hole, hole good on trip. Screened out lost
		circulation material, no lost circulation last 24 hours. Drilling
		Rate: 1.1; Background Gas: 1.0; Cutting Gas: 1.0; Flowline
		temperature: 28.4°C; PxC: 1.61; Lithology: 70% Siltstone,
		30% Sandstone. Mud Weight: 1065; Viscosity: 45.
June 4, 1979		
Day 47	778 m	9 m. Drilling. Drilled, surveyed, repaired rotary guard. Tripped for
		bit, changed cutters on near bit reamer. Changed out shark sub. No
		fluid losses last 24 hours. Drilling Rate: 1.0; Background Gas: 1.0;
		Cutting Gas: 1.0; Flowline temperature: 25.5°C; DxC: 1.55;
		Lithology: 60% Sandstone, 40% Siltstone, Trace dolomite. Mud
		Weight: 1040; Viscosity: 40; Survey:- 770 m - 4½°
June 5, 1979		
Day 48	793 m	15 m. Drilling. Drilled ahead. No mud lost in last 24 hours.
		Drilling Rate: 0.7; Background Gas: 1 unit; Cuttings Gas: 1 unit;
		Flowline temperature: 25°C; Drilling Exponent: 1.84;
		Lithology: 90% Sandstone, 10% Siltstone; Mud Weight: 1040;
		Viscosity: 37; Survey:- 780 m - 4°
June 6, 1979		
Day 49	807 m	14 m. Drilling. Drilled ahead. Repaired valve on mud pump line.
		No mud lost last 24 hours. Drilling Rate: 0.72; Background Gas: 2
		units; Cuttings Gas: 4-6 units; Flowline Temperature: 28.4°C;
		Shale Density: 2.45; "D" Exponent: 1.84; Lithology: 60-80%

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
May 28, 1979		
Day 40	(Cont'd)	drilled ahead. Lost 9.16 m^3 in last 24 hours. Screened lost
		circulation material from system. Drilling Rate: 1.8 m/hr;
		"D" Exponent: 1.44; Flowline Temperature: 16°C; Lithology: 100%
		Sandstone. Mud Weight: 1080; Viscosity: 60.
May 29, 1979		
Day 41	669 m	22 m. Drilling. Checked motor kills, checked pipe rams, checked
		crownomatic. Drilled ahead. Lost approximately 6.2 m^3 mud in last
		24 hours. Mostly due to screening out lost circulation material.
		Drilling Rate: 0.8; "D" Exponent: 1.62; Flowline Temperature: 24°C;
		Cuttings Gas: Slight; Lithology: 30% hard siltstone, 70% sandstone,
		trace dolomite. Mud Weight: 1100; Viscosity: 60; Survey:- 653 m -
		3½°
May 30, 1979		
Day 42	691 m	22 m. Fishing survey line. Drilled ahead, cleared lost circulation
		material from pump. Checked crownomatic, built mud volume. Survey
		line broke on survey. Drilling Rate: 1.0; Background Gas: 1.0 unit;
		Cuttings Gas: 6 units; Flowline Temperature: 24.5°C; "D" Exponent:
		1.77; Lithology: 70% Sandstone, 20% Siltstone, 10% Limestone. Mud
		Weight: 1114; Viscosity: 70; Survey:- 672 m - 3-3/4°
May 31, 1979		
Day 43	713 m	22 m. Tripping for bit. Drilled to 695 m, lost partial circulation,
		regained full circulation. Total mud lost, 61 m^3. Drilled to 713 m,
		tripped for bit. Drilling Rate: 1.2; Background Gas: 1-2; Cuttings
		Gas: 2; Flowline temperature: 24.4; DxC: 1.72; Lithology: 70%
		Sandstone, 30% Siltstone. Fire around #-37 out. Forestry was out and
		reviewed fire. Mud Weight: 1090; Viscosity: 70.
June 1, 1979		
Day 44	728 m	15 m. Drilling. Tripped for bit. Hole tight, 629-713 m. Rolled
		pins in near bit reamer. Picked up 150 mm jars. Ran in hole. Reamed
		5 m of undergauge hole. Drilled ahead. Lost 14.2 m^3 last 24 hours.
		Drilling Rate: 1.7; Cuttings Gas: 0; Background Gas: 0; Flowline
		temperature: 24.4°C; Drilling Exponent: 1.74; Lithology:

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CALGARY, ALBERTA, CANADA T2P 0M9
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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
1980		
May 24, 1979		
Day 36	561 m	7 m. Drilling 444 mm hole, Drilled to 556 m. Lost 16.7 m^3 mud.
		Mixed lost circulation material. Drilled ahead. Repaired rotary chain.
		Tripped. Reamer and stabilizer balled. Hole good on trip. Lost
		approximately 28 m^3 in first 24 hours. Changed mud pumps. Mud Weight:
		1070; Viscosity: 100+; Survey:- 557 m - 3-3/4°
May 25, 1979		
Day 37	583 m	22 m. Drilling. Drilling Rate: 1.5; "D" Exponent: 1.59; Flowline
		Temperature: 60°F; Lithology: 100% Sandstone with trace of dolomite,
		calcite and soft limestone. Jacked rig. Cleaned lost circulation
		material from mud pumps. Drilled ahead. Past 24 hours lost 17.4 m^3
		drilling mud. Mud Weight: 1080; Viscosity: 100+; Survey:- 576 m -
		3-3/4°
May 26, 1979		
Day 38	612	29 m. Drilling. Cleaned lost circulation material from pump. Checked
		rig for level. Checked out crownamatic. Lost 7.41 m^3 in 24 hours.
		Drilling Rate: 1.2 m/hr. D Exponent: 1.69; Flowline Temperature:
		17°C; Lithology: 100% Sandstone, traces of calcium, chert. Mud
		Weight: 1070; Viscosity: 68; Survey: 595 m - 3-5/8°
May 27, 1979		
Day 39	634 m	22 m. Drilling. Drilled high torque due to rough formation.
		Screened out lost circulation material from mud. Lost 11.1 m^3 of mud
		in 24 hours. Drilling Rate: 1.2 m/hr. "D" Exponent: 1.69; Flowline
		Temperature: 17°C; Lithology: 100% sandstone with good traces of
		dolomite and chert, slight trace of calcium carbonate limestone.
		Mud Weight: 1080; Viscosity: 82; Surveys:- 615 m - 3-7/8°; 632 m -
		3¼°
May 28, 1979		
Day 40	647 m	13 m. Drilling. Drilled to 643 m, tripped for bit. Changed cutters
		and pins. Changed sleeve on non-rotating stabilizer. Picked up six
		158 mm drill collars. Slipped six 5 m drilling line. Ran in hole,
		laid down 15 joints drill pipe. Washed and reamed 30 m to bottom,

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DAILY OPERATIONS REPORT

WELL COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
May 19,	1979	
Day 31	(Cont'd)	shank bit. Ran in hole open ended. Added peach pits during trip.
		Finished pumping pill #11 - 24 m^3. Fair to good returns. Went from
		watery mud to mud. Hole is standing full. Mud Weight: 1020;
		Viscosity: 150.
May 20,	1979	
Day 32	484 m	Circulating and conditioning mud. Circulated LCM material. Fluid
		dropped in hole. Pulled out of hole. Went in with open ended pipe.
		Dropped 80 small gunny sacks with gravel and peach pits. Ran in hole
		with 17½" shank bit. Worked sacks to bottom. Mixed mud and lost
		circulation material. Drilled up sacks and circulated hole. Regained
		75% circulation. Continued circulating and adding lost circulation
		material. Loss reduced to 1.5 m^3 per hour. Mud Weight: 1070;
		Viscosity: 150.
May 21,	1979	
Day 33	494 m	10 m. Circulated and conditioned mud with lost circulation material.
		Pulled out of hole and laid down shank bit. Ran in hole with bottom
		hole assembly. Cleaned to bottom, drilled from 484 to 494 m. Drilling
		break at 491 to 492 m. Circulation lost. Mixed 24 m^3 lost circulation
		material pill. Pumped same and regained circulation. Drilled ahead
		with small circulation loss. Mud Weight: 1060; Viscosity: 100.
May 22,	1979	
Day 34	529 m	35 m. Drilling. Drilled ahead. Mixed mud and lost circulation
		material. Very small mud loss. Drilling Rate: 2.2; "D" Exponent:
		1.25; Lithology: 100% Sandstone. Mud Weight: 1070; Viscosity: 100;
		Surveys:- 500 m - 3-7/8°; 518 m - 3-3/4°
May 23,	1979	
Day 35	554 m	25 m. Drilling. Drilled to 546 m, lost circulation. Mixed and pumped
		lost circulation material. Regained circulation. Approximately 32 m^3
		of mud lost while drilling. 546 to 554 m. Drilling Rate: 1.5;
		"D" Exponent: 1.47; Lithology: 100% Sandstone, trace limestone,
		siltstone and chert.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
May 15, 1979		
Day 27	453 m	36 m. Drilling 444 mm hole. Cuttings Gas: 3 units; Background Gas: 1 unit; Drilling Rate: 1.3; Flowline Temperature: N/A; Shale Density: N/A; D Exponent: 1.46; Lithology: 60% Silty Sandstone, 20% Sandstone, 20% Limestone. Mud Weight: 1095; Viscosity: 37. Surveys:- 416 m - 3½°; 434 m - Misrun; 444 m - 3¼°
May 16, 1979		
Day 28	469 m	16 m. Drilling 444 mm hole. Background Gas: 1 unit; Cuttings Gas: 6-10 units; Drilling Rate: 1.0; Flowline Temperature: 32.8°C; Shale Density: N/A; "D" Exponent: 1.46; Lithology: 70% Silty Limestone; 30% Siltstone. Tripped for bit at 466 m. Changed out near bit reamer cutters. Changed corrosion rings. Ran in hole. Hole good on trip. Drilled ahead. Mud Weight: 1090; Viscosity: 37; Survey:- 466 m - 3-3/4°
May 17, 1979		
Day 29	483 m	14 m. Combating lost circulation. Drilled to 480 m. Drilling break 480-481 m. 6 min/m. Lost circulation completely. Mixed and pumped 4 LCM Pills, 20 m^3 each. Attempted to fill annulus. No luck. Annular fluid at approximately 20 m below table while pumping. Mud Weight: 1090; Viscosity: 200.
May 18, 1979		
Day 30	484 m	1 m. Combating lost circulation. Mixed LCM Pill. Pumped same. Drilled one metre while pumping pill. Pulled out of hole. Stand back bottomhole assembly. Ran in hole open ended. Mixed lost circulation pills and spotted same. Total of 4 pills approximately 96 m^3. Pumped down 400 gunny sacks. Regained some circulation at 1:00 a.m. Hole presently standing full. 30% circulation. Mud Weight: 1070; Viscosity: 200.
May 19, 1979		
Day 31	484 m	Combating lost circulation. Pumped pill #9 - 24 m^3. 30% returns. Mixed pill #10. Pulled out of hole. Ran in hole with 17½" shank bit. Pumped pill #10 - 24 m^3. Worked bit to bottom. Added peach pits. Drill pipe plugged. Pulled out of hole. Unplugged pipe. Removed

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
Day 19	(Cont'd)	inside choke and killed line valves to 7 000 kPa, OK. 15 Minutes,
		tested outside choke and killed line valves to 7 000 kPa.
May 8, 1979		
Day 20	249 m	4 m. Drilling 444 mm hole. Drilled float collar and cement shoe.
		Floated collar at 203 m, Shoed at 216 m. Cleaned 5 m of 444 mm hole,
		circulated bottoms up prior to leak off. Ran leak off test. Surface
		pressure 600 psi (4 137 kPa) with 9.0 ppg mud. Pulled out of hole to
		change BHA. Ran in hole. Reamed from 216 m to 245 m and drilled
		ahead. Installed corrosion rings in drill string. No. 1 motor is
		down (fan motor appears to be down). Mud Weight: 1030; Viscosity: 42.
May 9, 1979		
Day 21	267 m	18 m. Drilling. Tripped for bit. Flow checked. Minor water influx
		on trip. Mud Weight: 1060; Viscosity: 35. Surveys:- 256 m - 3°;
		265 m - 3°
May 10, 1979		
Day 22	300 m	33 m. Drilling 444 mm hole. Drilled ahead. Mud Weight: 1090;
		Viscosity: 38. Surveys:- 275 m - 3°; 290 m - 3¼°
May 11, 1979		
Day 23	327 m	27 m. Drilling 444 m hole. Mud Weight: 1090; Viscosity: 37.
		Survey:- 310 m - 3°
May 12, 1979		
Day 24	355 m	28 m. Drilling 444 mm hole. Tripped for bit. Slipped and cut line.
		Ran in hole, cleaned to bottom. Hole good, drilled ahead. Mud
May 13, 1979		Weight: 1090; Viscosity: 38. Survey:- 331 m - Misrun, 340 m - 3°
Day 25	386 m	31 m. Drilling 444 mm hole. Drilling ahead. Lithology: Sandstone.
		Mud Weight: 1090; Viscosity: 36. Surveys:- 360 m - 3-3/8°;
		375 m - 3½°
May 14, 1979		
Day 26	317 m	31 m. Drilling 444 mm hole. Background Gas: 1-2 units; Cuttings Gas:
		1-2 units; Drilling Rate; 2.0 m/hr.; Flowline Temperature: 35°C;
		Lithology: 100% Sandstone w/occasional siltstone. Drilled ahead.
		Mud Weight: 1075; Viscosity: 37. Survey:- 398 m - 3½°

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
Day 13	(Cont'd)	Dressed overshot, made up same and ran in hole. Latched onto fish.
		Laid down 3 - 6-3/4" p.c. and 1 - 9" drill collar and overshot.
		Changed bit. Made up bottom hole assembly. Repaired rig tongs.
		Hole good on trip. Mud Weight: 1090; Viscosity: 58.
May 2,	1979	
Day 14	216 m	Cleanout trip. Ran in hole, reamed ledges, 178 to 214 m with 660 mm
		bit. Reamed 440 to 660 mm to 216 m. Circulated hole clean. Dropped
		survey. Pulled out of hole. Made up 660 mm bit with 660 mm hole
		opener in tandem. Ran in hole to 142 m. Reamed ledges from 142 to
		183 m. Mud Weight: 1100; Viscosity: 51. Survey:- 216 m - 2-1/16°
May 3,	1979	
Day 15	216 m	Spot weld float shoe. Reamed ledges 183 to 216 m, circulated hole
		clean, tripped out, laid down shock sub, hole opener, bit, bit sub
		and crossover sub. Rigged to run 508 mm casing. Mud Weight: 1090;
		Viscosity: 53.
May 4,	1979	
Day 16	216 m	Prepare to run stinger in casing. Ran 508 mm casing to 216 m. Rigged
		up casing head and circulated casing. Rigged down casing head and
		prepared to run drill pipe stinger. Mud Weight: 1090; Viscosity: 43.
May 5,	1979	
Day 17	216 m	Weld on casing bowl. Ran drill pipe stinger and made up casing head.
		Circulated drill pipe and casing. Mixed cement and displaced. Good
		cement returns. Float held OK. Pulled out stinger. Waited on cement.
		Cut off conductor and casing. Welded on bowl.
May 6,	1979	
Day 18	216 m	Magnaflux hook and bails. Finished weld on casing bowl. Nippled up
		blow out preventers. Spotted choke manifold and flanged up.
May 7,	1979	
Day 19	216 m	Drilling on float collar. Inspected elevators, bails and hook.
		Tripped in with 444.5 mm bit. Inspected BHA. Laid down 1 x 11"
		drill collar (cracked pin), and 2 x 9" drill collars with cracked
		pins. Inspected kelly and swivel bail. Checked motor shut offs, OK.
		Rigged to pressure test, lines frozen. Tested casing, pipe rams, and

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DAILY OPERATIONS REPORT

WELL : COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
Day 7 (Cont'd)		one 7" drill collar and damaged 7" drill collar. Changed out bit with 444 mm bit. Moved jars down 3 drill collars. Ran in hole. Replaced joint of drill pipe next to drill collar. Ran in to bottom.
Apr. 26, 1979		
Day 8	186 m	14 m. Drilling 444 mm hole. Drilled to 176 m, surveyed and tripped for bit. Reamed 1 metre undergauge hole. Drilled ahead. Changed standpipe. Mud Weight: 1030; Viscosity: 50. Survey:- 176 m - 2½°
Apr. 27, 1979		
Day 9	204 m	18 m. Tripping for bit. Drilled to 191 m. Dropped survey. Tripped for bit. Drilled to 204 m, tripped for bit. Laid down jars. Formation - siltstone, very hard with occasional quartz and trace of pyrite. Mud Weight: 1070; Viscosity: 50. Survey:- 191 m - 2°
Apr. 28, 1979		
Day 10	245 m	41 m. Reaming undergauge hole. Tripped for bit, drilled to 245 m, pulled out of hole. Made up hole opener, and 17½" bit, ran in hole to 168 m, reamed to 172 m.
Apr. 29, 1979		
Day 11	193 m	Reaming. Reamed to 184 m, repaired pop valve on #1 pump, reamed to 185 m, tripped out of hole. Changed out hole opener cutters, remade up bit. Crossover sub in hole opener, picked up shock sub and ran in hole.
Apr. 30, 1979		
Day 12	210 m	Reaming. Reamed at 207 m, tripped out, laid down hole opener, made up bit sub and 26" bit. Ran in hole to 175 m, reamed ledges from 175 to 207 m, reamed to 210 m. Mud Weight: 1090; Viscosity: 52 Survey:- 205 m - 2½°
May 1, 1979		
Day 13	214 m	Making up bottom hole assembly. Reamed 210 to 214 m with 66 mm bit. Twisted off and lost 18 000 daN. Pulled out of hole. Top of fish at 144 m. Outside diameter top 214 m. Fish consisted of bit, bit sub, 1 - 11" drift collar, shock sub, 2 - 11" drill collars, crossover, 4 - 9" drill collars. Twisted off at pin. Laid down 2 - 9" drill collars, picked up 3 - 6-3/4" collars. Waited on overshot grapple.

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DAILY OPERATIONS REPORT

WELL: COLUMBIA ET AL KOTANEELEE YT I-48

DATE	DEPTH	DETAIL OF OPERATION
Apr 19, 1979		
Day 1	23 m	23 m. Drilling 660 mm hole. Installed centrifugue and finished rigging up. SPUDDED AT 1600 HOURS APRIL 18, 1979. Leak in conductor barrel. Leak gradually being gelled off. Mud Weight: 1030; Viscosity: 35.
Apr. 20, 1979		
Day 2	49 m	26 m. Drilling. Drilled to 33 m. Conductor pipe washing out. Rigged up cellar jet. Drilled ahead. Mud Weight: 1050; Viscosity: 43.
Apr. 21, 1979		
Day 3	94 m	45 m. Drilling 660 mm hole. Drilled to 67 m, tripped for bit. Bit balled. Cleaned up bit and ran back in hole. Mud Weight: 1070; Viscosity: 48. Surveys:- 57 m - ½°; 85 m - 1°
Apr. 22, 1979		
Day 4	115 m	21 m. Drilling 660 mm hole. Repaired #2 pump, drilled to 108 m, tripped for bit. Hole good, no fill. Drilled ahead. Mud Weight: 1070; Viscosity: 40. Survey:- 114 m - 1-3/4°
Apr. 23, 1979		
Day 5	156 m	41 m. Drilling 660 mm hole. Drilled ahead. Mud Weight: 1090; Viscosity: 45. Survey:- 142 m - 2½°
Apr. 24, 1979		
Day 6	172 m	16 m. Preparing to run in hole with fishing tools. Tripped for bit. Laid down shock sub. Shock sub leaking. Ran in hole with new bit. Hole good, no fill. Reamed 4 m under gauge hole. Drilled to 172 m and twisted off. Lost 10 daN weight. Circulated above fish, measured out. Fish consists of bit, bit sub, three 11" drill collars, crossover, six 9" drill collars, crossover, jars, crossover, one 7" drill collar with box twisted off. Total length: 98.34 m. Top of fish at 74 m. Mud Weight: 1090; Viscosity: 45. Survey:- 167 m - 2°
Apr. 25, 1979		
Day 7	172 m	Nil. Breaking circulation on bottom. Prepared fishing tools and waited on grapple. Ran in hole with overshot. Latched onto fish. Pulled out of hole. Laid down overshot, three 6½" drill collars,

SECTION IV

Logs

Submitted as received

SUMMARY OF LOGS RUN

LOG	INTERVAL	DATE RUN
Neutron Log	4000 - 4402	March 16/80
Compensated Neutron	3252 - 3946	January 29/80
Compensated Neutron	3259 - 4389	February 26/80
BHCS	216 - 1055	June 19/79
	1051 - 3263	December 13/79
	3252 - 3946	January 29/80
	3252 - 4419	February 14/80
Dual Laterlog	1051 - 3258	December 13/79
Dual Induction - SFL	216 - 1054	June 19/79
	3252 - 4418	February 14/80
Cement Bond Log - VDL	3249 - 4390	February 25/80
CN - Formation Density	1051 - 3263	December 13/79
	3252 - 4420	February 14/80
Continuous Dipmeter	1051 - 3263	December 14/79
	3650 - 4418	February 15/80
VDL	3650 - 4416	February 14/80
Completion Record		March 18/80
	4300 - 4404	March 16/80
	4199 - 4290	February 26/80

CORE LABORATORIES – CANADA LTD.

FULL DIAMETER CORE ANALYSIS

COMPANY	COLUMBIA GAS DEVELOPMENT OF CANADA LTD.	FORMATION	NAHANNI	PAGE	1 of 17
WELL	COLUMBIA KOTANEELEE YT1-48	CORING EQUIPMENT	DIAMOND	FILE	7004-8063
FIELD	KOTANEELEE, YUKON TERRITORIES	CORE DIAMETER (mm)	100	DATE	80 03 14
LOCATION		CORING FLUID	WATER BASE MUD	ANALYSTS	SD MW RG DL
ELEVATION					

CLEANING

Solvent	
Extraction Equipment	
Extraction Time	
Drying Equipment	GRAVITY OVEN
Drying Time	72 HOURS
Drying Temperature	132°C

ANALYSIS

- [ ] Pore Volume measured by Boyle's Law in a Hassler holder using helium
- [X] Grain Volume measured by Boyle's Law in a modified U.S.B.M. porosimeter using helium
- [X] Bulk Volume measured by calipering
- [ ] Fluid Saturations by retort on end pieces
- [ ] Water Saturations by Dean-Stark
- [ ] Oil Saturations weight difference in Dean-Stark
- [X] Glazed Surface removed by sand-blasting prior to horizontal permeability measurements

*	Broken core (mD90° used for summary purposes)
**	Permeability greater than 30 000 mD
a	Permeability measured on a small plug sample taken to ensure measurement of matrix permeability
b	Permeability measured on a small plug sample taken out of the full diameter sample because of the borken nature of the core.

– = <

AST = Appears similar to

DESCRIPTION

ss = Sandstone	dol = Dolomite
cgl = Conglomerate	f = fine
brec = Breccia	m = medium
sltst = Siltstone	c = coarse
sh = Shale	i = intergranular
ls = Limestone	xln = crystalline

DESCRIPTION

vug = vuggy(ular)	fos = fossil (iferous)
p-pv = pinpoint vugs	calc = calcite(areous)
sv = small vugs	anhy = anhydrite(ic)
lv = large vugs	cht = chert
v = very	chty = cherty
/ = with	fest = Ironstone
sl = slightly	pyrbit = pyrobitumen
tr = trace	glauc = glauconite(ic)
scat = scattered	pyr = pyrite(ic)
gr = grain(ed)	styl = stylolite(ic)
pbl = pebble	bk = break
suc = sucrosic	lam = laminated
slty = silty	fri = friable
shy = shaly	uncons = unconsolidated
arg = argillaceous	frac = fracture
sdy - sandy	h frac = horizontal fracture
lmy = limy	vert frac - vertical fracture
carb = carbonaceous	sp = small plug sample

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 1 3660.00 m -3665.70 m (REC. 3.85 m) (3 BOXES)													
1	3660.00-60.22	0.22	.16	4.60	0.93	1.07	1.012	0.040	0.009	2710	2820	-	-	dol i ppv sv vert frac
2	3660.22-60.43	0.21	.06	16.3	1.70	16.2	3.423	0.051	0.011	2640	2780	-	-	dol i ppv sv vert frac
3	3660.43-60.74	0.31	.22	0.29	0.25	0.08	0.091	0.042	0.013	2660	2780	-	-	dol i ppv sv frac
4	3660.74-61.13	0.39	.24	0.26	0.07	0.06	0.100	0.040	0.016	2660	2770	-	-	dol i ppv sv frac
5	3661.13-61.43	0.30	.18	0.67	0.55	0.35	0.202	0.043	0.013	2650	2770	-	-	dol i ppv sv frac
6	3661.43-61.65	0.22	.17	0.33	0.14	0.10	0.072	0.037	0.008	2680	2780	-	-	dol i ppv sv frac
7	3661.65-61.82	0.17	.15	0.89	0.40	0.18	0.152	0.042	0.007	2660	2780	-	-	dol i ppv sv frac
8	3661.82-61.98	0.16	.12	1.88	1.68	0.41	0.301	0.032	0.005	2660	2750	-	-	dol i ppv sv sdy frac
9	3661.98-62.20	0.22	.10	441.	3.67	16.7	97.020	0.037	0.008	2620	2720	-	-	dol i ppv sv sdy vert frac
10	3662.20-62.48	0.28	.22	2.98	0.84	1.08	0.834	0.027	0.007	2640	2720	-	-	dol i ppv sv sdy vert frac
11	3662.48-62.74	0.26	.25	18.7	6.95	2.77	4.862	0.046	0.012	2610	2740	-	-	dol i ppv svv lv sdy frac
12	3662.74-63.12	0.38	.21	2250.	5.54	214.	855.000	0.044	0.017	2590	2710	-	-	dol i ppv sv lv sdy vert frac
13	3663.12-63.47	0.35	.12	0.47	0.43	0.26	0.165	0.046	0.016	2610	2740	-	-	dol i ppv sv sdy frac
14	3663.47-63.64	0.17	.15	0.90	0.65	0.22	0.153	0.036	0.006	2640	2740	-	-	dol i ppv sv sdy frac
15	3663.64-63.85	0.21	.13	0.68	0.57	0.40	0.143	0.020	0.004	2670	2720	-	-	dol i sdy frac
LC	3663.85-65.70	1.85	-	-	-	-	-	-	-	-	-	-	-	Lost core
	CORE NO. 2 3665.70 m -3668.80 m (REC. 1.85 m) (2 BOXES)													
16	3665.70-65.95	0.25	.20	0.20	0.11	<.01	0.051	0.017	0.004	2690	2740	-	-	dol i ppv sdy frac
17	3665.95-66.25	0.30	.25	0.44	0.22	0.28	0.131	0.021	0.006	2680	2740	-	-	dol i ppv sdy vert frac
18	3666.25-66.50	0.25	.17	0.63	0.62	0.30	0.158	0.030	0.008	2640	2720	-	-	dol i ppv sdy frac
19	3666.50-66.81	0.31	.25	0.71	0.48	0.39	0.221	0.034	0.010	2630	2730	-	-	dol i sv sdy frac
20	3666.81-67.04	0.23	.12	0.92	0.46	<.01	0.212	0.041	0.009	2680	2790	-	-	dol i ppv frac
21	3667.04-67.55	0.51	.11	0.14	0.10	<.01	0.072	0.043	0.022	2750	2870	-	-	dol i ppv frac
LC	3667.55-68.80	1.25	-	-	-	-	-	-	-	-	-	-	-	Lost core

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 3 3668.80 m -3672.10 m (REC. 1.55 m) (2 BOXES)													
23	3668.80-68.95	0.15	.05	0.78	0.07	0.44	0.118	0.004	0.001	2770	2780	-	-	dol i ppv vert frac
24	3668.95-69.27	0.32	.27	0.46	0.30	0.04	0.148	0.090	0.029	2480	2730	-	-	dol i ppv sv sdy frac
25	3669.27-69.49	0.22	.16	0.48	0.12	0.12	0.106	0.090	0.020	2690	2960	-	-	dol i ppv sv anhy fest frac
26	3669.49-69.77	0.28	.14	0.23	0.12	0.03	0.064	0.014	0.004	2670	2710	-	-	dol i ppv sv lv sdy frac
27	3669.77-70.08	0.31	.26	12.5	5.54	0.19	3.875	0.010	0.003	2700	2730	-	-	dol i ppv sv sdy frac
28	3670.08-70.35	0.27	.17	0.25	0.21	0.09	0.068	0.010	0.003	2680	2710	-	-	dol i ppv sv sdy frac
LC	3670.35-72.10	1.75	-	-	-	-	-	-	-	-	-	-	-	Lost core
DC	3672.10-23.50	51.40	-	-	-	-	-	-	-	-	-	-	-	Drilled core
	CORE NO. 4 3724.00 m -3741.00 m (REC. 18.35 m) (14 BOXES)													
29	3723.50-23.76	0.26	.21	4.09	1.97	0.12	1.063	0.025	0.006	2770	2840	-	-	dol i sv lv frac
30	3723.76-24.05	0.29	.15	3.46	0.60	0.31	1.003	0.046	0.013	2710	2840	-	-	dol i sv lv frac
31	3724.05-24.18	0.13	.09	4.88	2.11	0.34	0.634	0.038	0.005	2740	2850	-	-	dol i sv lv frac
32	3724.18-24.38	0.20	.09	0.79	0.44	0.39	0.157	0.025	0.005	2720	2790	-	-	dol i ppv scatsv lmy frac
33	3724.38-24.69	0.31	.19	4.08	2.23	0.15	1.265	0.025	0.008	2760	2840	-	-	dol i sv frac
34	3724.69-24.88	0.19	.07	24.8	1.08	0.30	4.712	0.067	0.013	2670	2860	-	-	dol i ppv sv lv frac
35	3724.88-25.20	0.32	.15	10.6	1.60	0.20	3.392	0.041	0.013	2680	2790	-	-	dol i ppv sv lmy frac
36	3725.20-25.42	0.22	.15	11.2	5.21	1.43	2.464	0.043	0.009	2730	2850	-	-	dol i ppv sv lv frac
37	3725.42-25.56	0.14	.12	8.29	2.42	0.21	1.161	0.066	0.009	2670	2850	-	-	dol i ppv sv lv frac
38	3725.56-25.71	0.15	.11	113.	1.14	0.48	16.950	0.063	0.009	2670	2850	-	-	dol i sv scatlv frac
39	3725.71-25.83	0.12	.07	*	0.04	*	0.005	0.023	0.003	2780	2840	-	-	dol i
40	3725.83-25.94	0.11	.06	-	-	-	-	0.060	0.007	2690	2860	-	-	Removed by clients request
41	3725.94-26.12	0.18	.13	4.42	0.48	0.24	0.796	0.033	0.006	2750	2840	-	-	dol i sv frac
42	3726.12-26.44	0.32	.09	6.41	4.07	1.47	2.051	0.020	0.006	2810	2870	-	-	dol i sv frac
43	3726.44-26.74	0.30	.05	0.48	0.43	0.45	0.143	0.024	0.007	2800	2870	-	-	dol i sv vert frac
44	3726.74-26.94	0.20	.10	0.21	0.09	<.01	0.042	0.040	0.008	2730	2840	-	-	dol i sv scatlv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-43
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 4 CONTINUED													
45	3726.94-27.20	0.26	.17	7.21	2.60	0.94	1.875	0.057	0.015	2680	2840	–	–	dol i sv lv frac
46	3727.20-27.42	0.22	.15	28.9	2.79	23.0	6.358	0.027	0.006	2770	2850	–	–	dol i sv scatlv vert frac
47	3727.42-27.71	0.29	.11	1.63	1.20	1.56	0.473	0.009	0.003	2830	2850	–	–	dol i vert frac
48	3727.71-28.01	0.30	.20	2.51	1.61	1.73	0.753	0.006	0.002	2830	2850	–	–	dol i vert frac
49	3728.01-28.27	0.26	.09	2.75	1.24	2.57	0.715	0.005	0.001	2840	2850	–	–	dol i vert frac
50	3728.27-28.45	0.18	.12	2.43	0.84	0.75	0.437	0.028	0.005	2780	2860	–	–	dol i sv frac
51	3728.45-28.56	0.11	.08	0.63	0.26	0.18	0.070	0.015	0.002	2810	2850	–	–	dol i scatsv frac
52	3728.56-28.70	0.14	.07	0.60	0.60	0.11	0.084	0.027	0.004	2790	2870	–	–	dol i ppv sv frac
53	3728.70-28.97	0.27	.08	1.82	1.18	0.77	0.491	0.016	0.004	2790	2830	–	–	dol i ppv sv frac
54	3728.97-29.13	0.16	.11	0.92	0.52	0.08	0.148	0.027	0.004	2780	2860	–	–	dol i ppv sv frac
55	3729.13-29.25	0.12	.09	0.54	0.54	0.38	0.065	0.022	0.003	2790	2850	–	–	dol i ppv sv frac
56	3729.25-29.43	0.18	.13	43.4	6.10	0.31	7.812	0.021	0.004	2790	2850	–	–	dol i ppv sv frac
57	3729.43-29.60	0.17	.12	0.29	0.19	0.07	0.050	0.031	0.005	2750	2840	–	–	dol i sv lv frac
58	3729.60-29.79	0.19	.14	2.41	0.49	0.89	0.458	0.025	0.005	2780	2850	–	–	dol i sv lv vert frac
59	3729.79-29.98	0.19	.12	1.84	0.37	1.82	0.350	0.021	0.004	2800	2860	–	–	dol i sv vert frac
60	3729.98-30.20	0.22	.17	2.64	1.07	1.03	0.581	0.024	0.005	2790	2860	–	–	dol i sv frac
61	3730.20-30.40	0.20	.11	1.34	0.62	0.26	0.268	0.024	0.005	2800	2860	–	–	dol i sv frac
62	3730.40-30.58	0.18	.12	0.14	0.11	0.08	0.025	0.016	0.003	2820	2870	–	–	dol i frac
63	3730.58-30.84	0.26	.09	0.60	0.05	<.01	0.157	0.017	0.004	2830	2870	–	–	dol i frac
64	3730.84-31.14	0.30	.19	2.28	1.83	2.13	0.684	0.016	0.005	2810	2860	–	–	dol i vert frac
65	3731.14-31.42	0.28	.04	4.84	2.20	0.37	1.355	0.032	0.009	2810	2900	–	–	dol i anhy frac
66	3731.42-31.53	0.11	.07	4.36	2.12	1.28	0.480	0.004	0.000	2860	2890	–	–	dol i frac
67	3731.53-31.65	0.12	.08	9.73	7.92	2.47	1.168	0.040	0.005	2760	2880	–	–	dol i ppv sv anhy frac
68	3731.65-31.81	0.16	.07	1.34	0.71	0.32	0.214	0.036	0.006	2770	2870	–	–	dol i ppv frac
69	3731.81-32.03	0.22	.06	22.6	12.9	1.74	4.972	0.033	0.007	2770	2870	–	–	dol i ppv frac
70	3732.03-32.31	0.28	.19	0.85	0.77	0.02	0.238	0.019	0.005	2790	2840	–	–	dol i ppv frac
71	3732.31-32.53	0.22	.11	38.4	7.72	1.52	8.448	0.031	0.007	2770	2860	–	–	dol i ppv sv frac
72	3732.53-32.70	0.17	.09	7.08	6.62	1.02	1.204	0.031	0.005	2770	2860	–	–	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-43
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 4 CONTINUED													
73	3732.70-32.84	0.14	.08	0.48	0.32	0.11	0.067	0.025	0.003	2800	2870	-	-	dol i ppv sv frac
74	3732.84-33.01	0.17	.12	0.25	0.14	0.05	0.044	0.025	0.004	2800	2870	-	-	dol i ppv sv frac
75	3733.01-33.22	0.21	.13	0.29	0.19	0.04	0.062	0.023	0.005	2770	2830	-	-	dol i ppv frac
76	3733.22-33.48	0.26	.09	0.58	0.50	0.41	0.151	0.025	0.006	2790	2860	-	-	dol i scatsv frac
77	3733.48-33.72	0.24	.19	0.47	0.44	0.30	0.112	0.035	0.008	2760	2860	-	-	dol i sv scatlv frac
78	3733.72-34.14	0.42	.09	2.97	0.22	2.76	1.247	0.014	0.006	2790	2830	-	-	dol i vert frac
79	3734.14-34.42	0.28	.08	*	0.06	*	0.016	0.011	0.003	2830	2850	-	-	dol i
80	3734.42-34.59	0.17	.11	0.59	0.45	0.19	0.101	0.019	0.003	2790	2850	-	-	dol i ppv sv frac
81	3734.59-34.81	0.22	.10	0.78	0.50	0.44	0.171	0.019	0.004	2800	2850	-	-	dol i sv frac
82	3734.81-35.03	0.22	.19	0.48	0.43	0.24	0.105	0.029	0.006	2770	2850	-	-	dol i sv scatlv frac
83	3735.03-35.23	0.20	.09	1.86	1.33	0.20	0.372	0.023	0.005	2800	2870	-	-	dol i sv frac
84	3735.23-35.44	0.21	.14	0.28	0.22	0.02	0.059	0.016	0.003	2800	2850	-	-	dol i scatsv frac
85	3735.44-35.60	0.16	.05	1.30	0.93	0.39	0.208	0.022	0.004	2790	2860	-	-	dol i sv scatlv frac
86	3735.60-35.84	0.24	.20	0.26	0.14	<.01	0.063	0.015	0.004	2820	2860	-	-	dol i scatsv frac
87	3735.84-36.07	0.23	.15	0.40	0.30	0.05	0.092	0.020	0.005	2790	2840	-	-	dol i ppv frac
88	3736.07-36.31	0.24	.12	0.16	0.13	<.01	0.038	0.017	0.004	2810	2860	-	-	dol i scatsv frac
89	3736.31-36.47	0.16	.10	0.96	0.79	0.49	0.154	0.029	0.005	2780	2870	-	-	dol i ppv sv scatlv frac
90	3736.47-36.63	0.16	.12	0.56	0.54	0.07	0.106	0.036	0.006	2750	2850	-	-	dol i ppv sv scatlv frac
91	3736.63-36.85	0.22	.07	0.47	0.40	0.24	0.103	0.015	0.003	2830	2880	-	-	dol i ppv scatsv frac
92	3736.85-37.07	0.22	.13	1.43	1.25	0.17	0.315	0.032	0.007	2780	2870	-	-	dol i ppv sv frac
93	3737.07-37.30	0.23	.16	21.6	10.9	0.04	4.968	0.020	0.005	2790	2850	-	-	dol i ppv sv frac
94	3737.30-37.47	0.17	.19	1.04	0.84	0.09	0.177	0.037	0.006	2740	2850	-	-	dol i ppv sv scatlv frac
95	3737.47-37.71	0.24	.12	3820.	1.12	2.48	916.800	0.055	0.016	2650	2840	-	-	dol i ppv sv lv vert frac
96	3737.71-37.91	0.20	.14	49.4	0.72	0.53	9.880	0.030	0.006	2750	2840	-	-	dol i ppv sv scatlv frac
97	3737.91-38.21	0.30	.17	39.1	2.89	0.39	11.730	0.046	0.014	2720	2850	-	-	dol i ppv sv scatlv frac
AST99	3738.21-38.49	0.28	-	42.7	17.3	0.78	11.956	0.018	0.005	2780	2830	-	-	dol i ppv frac
98	3738.49-38.72	0.23	.20	1.22	0.53	1.07	0.281	0.048	0.011	2760	2840	-	-	dol i ppv sv lv vert frac
99	3738.72-38.94	0.22	.19	42.7	17.3	0.78	9.394	0.018	0.004	2780	2830	-	-	dol i ppv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 4 CONTINUED													
100	3738.94-39.19	0.25	.18	1.28	0.73	0.13	0.320	0.020	0.005	2780	2840	–	–	dol i sv scatlv frac
101	3739.19-39.34	0.15	.09	0.54	0.31	0.47	0.081	0.016	0.002	2810	2850	–	–	dol i vert frac
102	3739.34-39.59	0.25	.19	1.59	1.38	0.51	0.398	0.017	0.004	2800	2840	–	–	dol i scatsv vert frac
103	3739.59-39.86	0.27	.15	0.89	0.64	0.85	0.241	0.024	0.007	2770	2840	–	–	dol i ppv scatsv vert frac
104	3739.86-40.01	0.15	.04	*	1.03	*	0.155	0.018	0.003	2840	2890	–	–	dol i
105	3740.01-40.37	0.36	.09	7.09	4.00	0.60	2.552	0.039	0.014	2740	2850	–	–	dol i ppv sv frac
106	3740.37-40.54	0.17	.06	3.20	0.58	0.39	0.544	0.045	0.008	2730	2860	–	–	dol i ppv sv frac
107	3740.54-40.78	0.24	.20	1.12	0.75	0.18	0.269	0.017	0.004	2800	2850	–	–	dol i frac
108	3740.78-41.11	0.33	.13	0.43	0.32	0.21	0.143	0.005	0.002	2840	2860	–	–	dol i frac
109	3741.11-41.26	0.15	.03	**	2.17	0.86	0.326	0.004	0.001	2830	2840	–	–	dol i frac
110	3741.26-41.41	0.15	.06	*	1.32	*	0.198	0.033	0.005	2740	2840	–	–	dol i sv scatlv
111	3741.41-41.58	0.17	.04	*	0.20	*	0.034	0.024	0.004	2780	2850	–	–	dol i ppv
112	3741.58-41.85	0.27	.04	*	40.9	*	11.043	0.018	0.005	2790	2840	–	–	dol i ppv scatsv
	CORE NO. 5 3741.00 m -3759.20 m (REC. 17.35 m) (13 BOXES)													
113	3741.85-42.13	0.28	.13	0.47	0.13	0.02	0.132	0.014	0.004	2810	2850	–	–	dol i ppv sv frac
114	3742.13-42.27	0.14	.09	0.76	0.71	0.05	0.103	0.030	0.004	2760	2840	–	–	dol i ppv sv frac
115	3742.27-42.54	0.27	.23	1.45	0.69	<.01	0.392	0.022	0.006	2770	2830	–	–	dol i sv frac
116	3742.54-42.82	0.28	.11	1.01	0.90	0.06	0.283	0.014	0.004	2780	2820	–	–	dol i ppv sv frac
117	3742.82-43.10	0.28	.09	1.38	1.19	0.26	0.336	0.024	0.007	2750	2820	–	–	dol i ppv sv frac
118	3743.10-43.32	0.22	.14	0.79	0.31	0.02	0.174	0.019	0.004	2700	2750	–	–	dol i carb styl
119	3743.32-43.58	0.26	.14	2.28	0.51	0.02	0.593	0.013	0.003	2810	2850	–	–	dol i frac
120	3743.58-43.77	0.19	.06	4.31	0.70	0.14	0.819	0.002	0.000	2820	2820	–	–	dol i frac
121	3743.77-43.98	0.21	.09	6.21	0.57	0.07	1.304	0.024	0.005	2760	2830	–	–	dol i carb frac
122	3743.98-44.41	0.43	.11	0.12	0.05	0.06	0.053	0.019	0.008	2790	2850	–	–	dol i carbbks frac
123	3744.41-44.61	0.20	.06	0.02	0.02	<.01	0.005	0.012	0.002	2820	2850	–	–	dol i sv frac
124	3744.61-44.77	0.16	.13	4.34	2.73	<.01	0.694	0.039	0.006	2720	2830	–	–	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

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FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m³		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 5 CONTINUED													
125	3744.77-44.93	0.16	.12	4.09	0.60	0.03	0.654	0.027	0.004	2780	2860	–	–	dol i sv frac
126	3744.93-45.17	0.24	.18	0.38	0.25	0.05	0.092	0.022	0.005	2780	2840	–	–	dol i sv scatlv frac
127	3745.17-45.47	0.30	.13	0.20	0.13	0.03	0.060	0.017	0.005	2800	2840	–	–	dol i frac
128	3745.47-45.69	0.22	.08	1.79	0.35	0.56	0.394	0.039	0.008	2720	2830	–	–	dol i sv scatlv vert frac
129	3745.69-45.89	0.20	.16	1.01	0.77	0.07	0.202	0.023	0.005	2790	2860	–	–	dol i ppv sv frac
130	3745.89-46.23	0.34	.17	1.21	0.45	0.04	0.411	0.018	0.006	2790	2850	–	–	dol i styl
131	3746.23-46.42	0.19	.15	0.70	0.46	0.03	0.133	0.030	0.006	2760	2850	–	–	dol i ppv sv frac
132	3746.42-46.70	0.28	.22	2.29	0.42	0.18	0.641	0.020	0.006	2790	2850	–	–	dol i sv frac
133	3746.70-47.06	0.36	.17	0.25	0.20	0.05	0.090	0.016	0.006	2800	2850	–	–	dol i sv frac
134	3747.06-47.26	0.20	.05	0.99	0.56	0.27	0.199	0.021	0.004	2790	2850	–	–	dol i sv frac
135	3747.26-47.51	0.25	.10	8.71	3.30	1.08	2.178	0.022	0.005	2790	2850	–	–	dol i frac
136	3747.51-47.79	0.28	.11	1.38	0.81	0.46	0.386	0.018	0.005	2790	2840	–	–	dol i frac
137	3747.79-48.05	0.26	.09	23.3	9.58	0.24	6.058	0.029	0.008	2760	2850	–	–	dol i sv scatlv frac
138	3748.05-48.33	0.28	.21	7.20	2.13	4.03	2.016	0.038	0.011	2730	2830	–	–	dol i sv vert frac
139	3748.33-48.56	0.23	.12	0.50	0.33	0.41	0.115	0.028	0.006	2770	2850	–	–	dol i ppv vert frac
140	3748.56-48.86	0.30	.13	1.28	1.10	0.58	0.384	0.013	0.004	2850	2890	–	–	dol i ppv frac
141	3748.86-48.99	0.13	.05	9.62	4.36	1.63	1.251	0.019	0.003	2800	2850	–	–	dol i ppv frac
142	3748.99-49.19	0.20	.05	*	13.0	*	2.600	0.015	0.003	2790	2830	–	–	dol i sv frac
143	3749.19-49.40	0.21	.07	0.08	0.05	<.01	0.017	0.029	0.006	2780	2860	–	–	dol i ppv sv frac
144	3749.40-49.69	0.29	.20	2.28	1.62	0.38	0.661	0.027	0.008	2760	2840	–	–	dol i sv frac
145	3749.69-49.89	0.20	.08	0.11	0.10	0.02	0.023	0.002	0.000	2830	2830	–	–	dol i frac
146	3749.89-50.17	0.28	.11	5.09	3.37	1.19	1.425	0.018	0.005	2790	2840	–	–	dol i scatlv frac
147	3750.17-50.30	0.13	.10	0.22	0.19	0.04	0.028	0.019	0.002	2790	2850	–	–	dol i ppv sv frac
148	3750.30-50.44	0.14	.10	0.30	0.18	0.02	0.042	0.019	0.003	2800	2850	–	–	dol i ppv sv frac
149	3750.44-50.65	0.21	.18	2.13	0.56	0.04	0.447	0.019	0.004	2790	2850	–	–	dol i ppv sv frac
150	3750.65-50.85	0.20	.10	0.51	0.47	0.12	0.101	0.014	0.003	2810	2850	–	–	dol i ppv sv frac
151	3750.85-51.04	0.19	.11	0.60	0.44	0.25	0.114	0.028	0.005	2780	2850	–	–	dol i ppv sv frac
152	3751.04-51.21	0.17	.07	5.19	4.65	0.28	0.882	0.036	0.006	2760	2860	–	–	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
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CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m³		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 5 CONTINUED													
153	3751.21-51.40	0.19	.17	451.	0.42	0.44	85.690	0.030	0.006	2770	2860	–	–	dol i ppv sv vert frac
154	3751.40-51.58	0.18	.18	1.60	1.60	0.16	0.288	0.024	0.004	2760	2830	–	–	dol i ppv sv frac
155	3751.58-51.79	0.21	.09	1.18	1.08	0.78	0.248	0.046	0.010	2730	2860	–	–	dol i ppv sv frac
156	3751.79-51.99	0.20	.12	1.72	1.04	0.34	0.344	0.031	0.006	2770	2860	–	–	dol i ppv sv frac
157	3751.99-52.11	0.12	.10	0.84	0.75	0.44	0.101	0.036	0.004	2750	2850	–	–	dol i ppv sv frac
158	3752.11-52.27	0.16	.11	19.0	3.03	0.13	3.040	0.018	0.003	2800	2850	–	–	dol i ppv frac
159	3752.27-52.41	0.14	.10	38.9	21.8	0.93	5.446	0.030	0.004	2770	2850	–	–	dol i ppv sv frac
160	3752.41-52.59	0.18	.11	1.85	0.51	1.74	0.333	0.028	0.005	2770	2850	–	–	dol i ppv sv vert frac
161	3752.59-52.81	0.22	.08	1.67	1.17	0.51	0.367	0.019	0.004	2780	2840	–	–	dol i ppv frac
162	3752.81-53.06	0.25	.14	2.71	2.12	0.54	0.678	0.021	0.005	2800	2860	–	–	dol i ppv sv frac
163	3753.06-53.34	0.28	.14	0.77	0.42	<.01	0.217	0.014	0.004	2820	2860	–	–	dol i frac
164	3753.34-53.54	0.20	.06	23.4	22.9	2.88	4.680	0.045	0.009	2710	2840	–	–	dol i ppv sv lv frac
165	3753.54-53.68	0.14	.04	31.2	21.8	0.30	4.368	0.041	0.006	2750	2860	–	–	dol i ppv sv frac
166	3753.68-53.88	0.20	.05	48.1	12.3	0.28	9.620	0.043	0.009	2720	2840	–	–	dol i ppv sv frac
167	3753.88-54.04	0.16	.14	32.0	6.05	0.32	5.120	0.043	0.007	2730	2850	–	–	dol i ppv sv lv frac
168	3754.04-54.15	0.11	.09	15.2	3.33	0.60	1.672	0.014	0.001	2810	2850	–	–	dol i ppv sv frac
169	3754.15-54.29	0.14	.12	391.	1.07	0.32	54.740	0.045	0.006	2720	2840	–	–	dol i ppv sv lv frac
170	3754.29-54.58	0.29	.13	0.85	0.69	0.03	0.246	0.020	0.006	2790	2850	–	–	dol i ppv sv frac
171	3754.58-54.84	0.26	.15	2.39	1.74	0.62	0.621	0.028	0.007	2760	2840	–	–	dol i ppv sv frac
172	3754.84-55.13	0.29	.15	0.21	0.21	0.02	0.062	0.021	0.006	2780	2840	–	–	dol i ppv sv frac
173	3755.13-55.31	0.18	.14	5.16	4.42	0.12	0.929	0.019	0.003	2790	2850	–	–	dol i ppv sv frac
174	3755.31-55.44	0.13	.12	1.77	0.45	0.13	0.230	0.017	0.002	2800	2840	–	–	dol i ppv sv frac
175	3755.44-55.61	0.17	.07	0.81	0.29	0.69	0.138	0.051	0.009	2730	2880	–	–	dol i ppv sv lv vert frac
176	3755.61-55.73	0.12	.04	50.9	10.7	0.27	6.108	0.051	0.006	2740	2890	–	–	dol i ppv sv frac
177	3755.73-55.84	0.11	.13	1.58	1.14	0.37	0.174	0.021	0.002	2790	2840	–	–	dol i ppv sv frac
178	3755.84-55.93	0.09	.06	2520.	4.32	0.59	226.800	0.054	0.005	2710	2860	–	–	dol i ppv sv frac
179	3755.93-56.10	0.17	.08	0.73	0.23	0.11	0.125	0.007	0.001	2810	2840	–	–	dol i frac
180	3756.10-56.32	0.22	.18	2.85	1.53	0.27	0.627	0.011	0.002	2810	2840	–	–	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
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CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 5 CONTINUED													
181	3756.32-56.52	0.20	.05	2.49	1.49	0.69	0.498	0.019	0.004	2820	2880	–	–	dol i ppv sv frac
182	3756.52-56.70	0.18	.10	5.24	1.30	0.17	0.943	0.054	0.010	2700	2850	–	–	dol i ppv sv frac
183	3756.70-56.87	0.17	.14	44.9	4.68	1.37	7.633	0.040	0.007	2730	2850	–	–	dol i ppv sv lv frac
184	3756.87-57.01	0.14	.10	2.57	2.16	1.09	0.360	0.027	0.004	2770	2840	–	–	dol i lv frac
185	3757.01-57.29	0.28	.08	84.3	36.6	2.19	23.604	0.051	0.014	2700	2840	–	–	dol i ppv sv lv frac
186	3757.29-57.51	0.22	.17	3.08	2.88	0.41	0.678	0.026	0.006	2770	2850	–	–	dol i ppv sv frac
187	3757.51-57.69	0.18	.07	89.2	6.46	3.31	16.056	0.030	0.005	2690	2780	–	–	dol i sv frac
188	3757.69-57.84	0.15	.10	1.05	0.64	0.75	0.158	0.024	0.004	2770	2840	–	–	dol i ppv sv vert frac
189	3757.84-58.13	0.29	.16	31.4	11.8	1.74	9.106	0.032	0.009	2760	2850	–	–	dol i ppv sv frac
190	3758.13-58.31	0.18	.14	3.01	2.23	2.14	0.542	0.051	0.009	2700	2840	–	–	dol i ppv sv lv frac
191	3758.31-58.48	0.17	.15	2.62	1.66	0.65	0.445	0.025	0.004	2780	2850	–	–	dol i ppv sv scatlv frac
192	3758.48-58.60	0.12	.09	53.4	12.9	10.3	6.408	0.064	0.008	2690	2880	–	–	dol i ppv sv lv frac
193	3758.60-58.81	0.21	.10	13.0	7.34	2.55	2.730	0.029	0.006	2760	2850	–	–	dol i ppv sv vert frac
194	3758.81-59.05	0.24	.21	1.38	0.69	0.81	0.331	0.035	0.008	2740	2840	–	–	dol i ppv sv scatlv vert frac
195	3759.05-59.20	0.15	.04	2.60	2.36	0.11	0.390	0.040	0.006	2750	2860	–	–	dol i ppv sv frac
	CORE NO. 6 3759.20 m -3771.60 m (REC. 11.15 m) (8 BOXES)													
196	3759.20-59.41	0.21	.18	0.52	0.30	0.02	0.108	0.026	0.005	2790	2860	–	–	dol i ppv sv frac
197	3759.41-59.74	0.33	.18	0.21	0.16	0.19	0.069	0.037	0.012	2750	2860	–	–	dol i ppv sv scatlv vert frac
198	3759.74-59.94	0.20	.16	0.29	0.17	0.04	0.059	0.021	0.004	2790	2850	–	–	dol i ppv sv frac
199	3759.94-60.09	0.15	.12	1.31	0.59	0.15	0.197	0.021	0.003	2790	2850	–	–	dol i sv frac
200	3760.09-60.25	0.16	.09	1.32	0.86	0.11	0.211	0.026	0.004	2780	2860	–	–	dol i ppv sv scatlv frac
201	3760.25-60.41	0.16	.14	0.80	0.04	<.01	0.129	0.016	0.003	2810	2860	–	–	dol i frac
202	3760.41-60.64	0.23	.11	0.41	0.12	0.01	0.095	0.009	0.002	2820	2850	–	–	dol i frac
203	3760.64-60.84	0.20	.11	1.08	0.84	0.28	0.216	0.012	0.002	2820	2850	–	–	dol i frac
204	3760.84-61.12	0.28	.21	1040.	37.2	0.07	291.200	0.019	0.005	2780	2840	–	–	dol i sv lv styl frac
205	3761.12-61.29	0.17	.08	0.75	0.49	0.17	0.128	0.022	0.004	2780	2850	–	–	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
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CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m³		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 6 CONTINUED													
206	3761.29-61.45	0.16	.06	4.11	0.47	0.05	0.658	0.033	0.005	2770	2870	-	-	dol i ppv scatsv frac
207	3761.45-61.73	0.28	.14	0.33	0.28	0.15	0.093	0.013	0.004	2810	2850	-	-	(A)dol i ppv frac
208	3761.73-61.90	0.17	.13	1330.	0.47	0.04	226.100	0.046	0.008	2720	2850	-	-	dol i ppv sv lv frac
209	3761.90-62.21	0.31	.18	3.69	2.26	0.15	1.144	0.032	0.010	2770	2860	-	-	dol i ppv sv frac
210	3762.21-62.42	0.21	.19	0.35	0.22	0.08	0.074	0.031	0.007	2750	2840	-	-	dol i ppv sv scatlv frac
211	3762.42-62.59	0.17	.15	0.74	0.46	0.03	0.125	0.018	0.003	2800	2850	-	-	dol i ppv sv frac
212	3762.59-62.85	0.26	.16	2.31	1.18	0.05	0.601	0.028	0.007	2770	2850	-	-	dol i ppv sv scatlv frac
213	3762.85-63.05	0.21	.17	0.17	0.15	0.07	0.035	0.021	0.004	2790	2850	-	-	dol i ppv sv scatlv frac
214	3763.05-63.17	0.11	.10	0.85	0.53	0.03	0.093	0.044	0.005	2730	2850	-	-	dol i ppv lv frac
215	3763.17-63.41	0.24	.12	**	15.2	0.10	3.648	0.066	0.016	2670	2850	-	-	dol i ppv sv lv frac
216	3763.41-63.54	0.13	.11	0.77	0.67	0.08	0.099	0.021	0.003	2780	2840	-	-	dol i ppv sv frac
217	3763.54-63.72	0.18	.05	0.51	0.37	0.04	0.091	0.031	0.006	2740	2830	-	-	dol i ppv sv frac
218	3763.72-63.90	0.18	.11	0.76	0.61	0.12	0.137	0.031	0.005	2760	2850	-	-	dol i ppv sv lv frac
219	3763.90-64.17	0.27	.22	0.58	0.41	0.24	0.157	0.024	0.006	2770	2840	-	-	dol i ppv sv lv frac
220	3764.17-64.44	0.27	.14	19.8	11.6	0.16	5.346	0.038	0.010	2730	2840	-	-	dol i ppv sv frac
221	3764.44-64.59	0.15	.09	3.10	1.49	0.04	0.465	0.046	0.007	2700	2830	-	-	dol i ppv sv frac
222	3764.59-64.81	0.22	.08	0.78	0.47	0.12	0.171	0.029	0.006	2740	2820	-	-	dol i ppv sv frac
223	3764.81-64.94	0.13	.10	35.3	6.69	1.81	4.589	0.054	0.007	2700	2850	-	-	dol i ppv sv lv frac
224	3764.94-65.17	0.23	.17	0.93	0.46	0.45	0.213	0.032	0.007	2750	2840	-	-	dol i ppv sv scatlv frac
225	3765.17-65.44	0.27	.23	1.73	0.72	0.10	0.467	0.026	0.007	2760	2840	-	-	dol i ppv sv scatlv frac
226	3765.44-65.68	0.24	.13	0.49	0.45	0.07	0.117	0.024	0.006	2770	2840	-	-	dol i ppv sv frac
227	3765.68-65.86	0.18	.07	1.02	0.58	0.04	0.184	0.036	0.006	2770	2870	-	-	dol i ppv sv frac
228	3765.86-66.00	0.14	.12	1.01	0.63	0.13	0.141	0.023	0.003	2790	2860	-	-	dol i ppv sv frac
229	3766.00-66.20	0.20	.16	**	1.16	0.85	0.232	0.053	0.011	2650	2800	-	-	dol i ppv sv lv frac
230	3766.20-66.41	0.21	.16	3.42	2.10	0.02	0.718	0.025	0.005	2780	2860	-	-	dol i ppv sv frac
231	3766.41-66.56	0.15	.06	22.9	4.37	0.43	3.435	0.026	0.004	2770	2840	-	-	dol i ppv frac
232	3766.56-66.82	0.26	.13	0.60	0.33	0.02	0.157	0.021	0.005	2780	2840	-	-	dol i ppv sv frac
233	3766.82-67.00	0.18	.14	266.	52.4	0.38	47.880	0.021	0.004	2780	2840	-	-	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

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WELL COLUMBIA KOTANEELEE YT1-48
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CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 6 CONTINUED													
234	3767.00-67.30	0.30	.05	0.76	0.38	0.13	0.229	0.022	0.006	2790	2850	-	-	dol i ppv frac
235	3767.30-67.52	0.22	.13	0.49	0.39	0.18	0.107	0.033	0.007	2750	2840	-	-	dol i ppv sv frac
236	3767.52-67.76	0.24	.08	1.43	1.40	0.24	0.343	0.016	0.004	2790	2830	-	-	dol i ppv frac
237	3767.76-68.09	0.33	.09	10.9	2.96	<.01	3.597	0.020	0.007	2810	2860	-	-	dol i ppv sv frac
238	3768.09-68.32	0.23	.08	1.16	0.41	0.39	0.267	0.033	0.008	2760	2850	-	-	dol i sv lv frac
239	3768.32-68.69	0.37	.06	16.2	9.10	0.36	5.994	0.018	0.007	2820	2870	-	-	dol i ppv sv frac
240	3768.69-68.91	0.22	.07	0.41	0.18	0.11	0.090	0.020	0.004	2800	2860	-	-	dol i ppv sv frac
241	3768.91-69.23	0.32	.16	11.3	3.68	2.45	3.616	0.028	0.009	2770	2850	-	-	dol i ppv sv frac
242	3769.23-69.44	0.21	.12	*	1.49	*	0.313	0.020	0.004	2780	2840	-	-	dol i ppv sv
243	3769.44-69.72	0.28	.08	283.	0.28	14.5	79.240	0.012	0.003	2810	2840	-	-	dol i ppv sv vert frac
244	3769.72-70.35	0.63	.05	**	4.68	0.54	2.948	0.036	0.023	2730	2830	-	-	dol i ppv sv frac
LC	3770.35-71.60	1.25	-	-	-	-	-	-	-	-	-	-	-	Lost core
DC	3771.60-74.15	2.55	-	-	-	-	-	-	-	-	-	-	-	Drilled core
	CORE NO. 7 3774.20 m -3776.20 m (REC. 2.05 m) (2 BOXES)													
245	3774.15-74.37	0.22	.10	58.9	0.33	0.12	12.958	0.054	0.012	2690	2850	-	-	dol i ppv sv lv frac
246	3774.37-74.47	0.10	.08	0.92	0.72	0.55	0.092	0.045	0.004	2710	2840	-	-	dol i ppv sv scatlv frac
247	3774.47-74.68	0.21	.11	0.80	0.12	0.15	0.168	0.025	0.005	2750	2820	-	-	dol i ppv sv vert frac
248	3774.68-74.89	0.21	.07	*	0.16	*	0.033	0.045	0.009	2710	2840	-	-	dol i ppv sv
249	3774.89-75.11	0.22	.10	*	39.8	*	8.756	0.104	0.023	2570	2860	-	-	dol i ppv sv lv
250	3775.11-75.35	0.25	.17	135.	6.75	0.66	33.750	0.038	0.009	2740	2850	-	-	dol i ppv sv lv frac
251	3775.35-75.56	0.20	.08	5.93	0.51	0.52	1.186	0.044	0.009	2710	2830	-	-	dol i ppv sv lv vert frac
252	3775.56-76.20	0.64	.13	0.74	0.11	0.02	0.474	0.024	0.015	2780	2850	-	-	dol i ppv sv frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-43
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
	CORE NO. 8 3776.20 m -3782.40 m (REC. 2.80 m) (3 BOXES)													
253	3776.20-76.36	0.16	.09	*	0.74	*	0.119	0.025	0.004	2790	2860	-	-	dol i ppv
254	3776.36-76.54	0.18	.07	408.	84.5	104.	73.440	0.050	0.009	2740	2880	-	-	dol i ppv sv scatlv vert frac
255	3776.54-76.73	0.19	.17	10.1	1.68	<.01	1.919	0.015	0.003	2810	2850	-	-	dol i ppv frac
256	3776.73-76.95	0.22	.21	82.2	0.13	0.09	18.084	0.019	0.004	2790	2850	-	-	dol i ppv sv scatlv frac
257	3776.95-77.12	0.17	.08	*	1750.	*	297.500	0.015	0.002	2790	2830	-	-	dol i ppv sv frac
258	3777.12-77.41	0.29	.12	*	0.11	*	0.031	0.042	0.012	2750	2870	-	-	dol i ppv sv lv
259	3777.41-77.73	0.32	.13	453.	4.25	0.26	144.950	0.018	0.006	2800	2850	-	-	dol i ppv sv frac
260	3777.73-78.05	0.32	.08	0.71	0.07	0.20	0.225	0.014	0.005	2800	2840	-	-	dol i ppv vert frac
261	3778.05-78.29	0.24	.07	7.69	0.99	0.07	1.846	0.044	0.011	2730	2850	-	-	dol i ppv sv lv frac
262	3778.29-78.45	0.16	.11	0.84	0.42	0.73	0.134	0.034	0.005	2740	2840	-	-	dol i ppv sv lv vert frac
SP 263	3778.45-79.00	0.55	-	<.01	-	-	-	0.007	0.004	-	2850	-	-	dol i anhy
LC	3779.00-82.40	3.40	-	-	-	-	-	-	-	-	-	-	-	Lost core
DC	3782.40-10.40	128.00	-	-	-	-	-	-	-	-	-	-	-	Drilled core

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
		CORE NO. 9 3910.40 m - 2912.60 m (REC. 1.70 m) (2 BOXES)												
264	3910.40-10.79	0.39	0.08	9.92	9.73	0.66	3.869	0.027	0.011	2760	2840	-	-	dol i frac
265	3910.79-11.03	0.24	0.07	65.6	44.4	7.27	15.744	0.070	0.017	2650	2850	-	-	dol i p-pv sv lv frac
266	3911.03-11.15	0.12	0.05	23.0	0.73	1.16	2.760	0.054	0.006	2690	2840	-	-	dol i p-pv sv lv vert frac
267	3911.15-11.32	0.17	0.13	32.3	16.2	0.05	5.491	0.032	0.005	2730	2820	-	-	dol i sv frac
268	3911.32-11.51	0.19	0.04	5.06	1.03	0.58	0.961	0.038	0.007	2730	2840	-	-	dol i p-pv sv frac
269	3911.51-11.64	0.13	0.08	3.37	2.89	0.33	0.438	0.038	0.005	2730	2830	-	-	dol i p-pv sv frac
270	3911.64-12.10	0.46	0.06	0.51	0.25	0.43	0.235	0.060	0.028	2680	2850	-	-	dol i p-pv sv vert frac
LC	3912.10-12.60	0.50	-	-	-	-	-	-	-	-	-	-	-	lost core
		CORE NO. 10 3912.60 m - 3916.00 m (REC. 1.70 m) (2 BOXES)												
271	3912.60-12.90	0.30	0.05	40.0	9.17	0.74	12.000	0.056	0.017	2700	2860	-	-	dol i p-pv sv frac
272	3912.90-12.98	0.08	0.04	1.55	1.21	0.64	0.124	0.060	0.005	2710	2880	-	-	dol i p-pv sv frac
273	3912.98-13.16	0.18	0.06	8.32	7.13	0.67	1.498	0.045	0.008	2720	2850	-	-	dol i p-pv sv frac
274	3913.16-13.25	0.09	0.04	2080.	2080.	0.01	187.200	0.047	0.004	2710	2840	-	-	dol i p-pv sv frac
275	3913.25-13.42	0.17	0.13	18.2	16.0	0.85	3.094	0.039	0.007	2730	2840	-	-	dol i p-pv sv scat lv frac
276	3913.42-13.65	0.23	0.09	20.2	17.8	0.18	4.646	0.037	0.009	2760	2860	-	-	dol i p-pv sv scat lv frac
277	3913.65-14.30	0.65	0.04	2180.	160.	1.74	1417.000	0.011	0.000	2800	2830	-	-	dol i p-pv frac
LC	3914.30-16.00	1.70	-	-	-	-	-	-	-	-	-	-	-	lost core
DC	3916.00-49.20	33.2	-	-	-	-	-	-	-	-	-	-	-	drilled core
		CORE NO. 11 3949.20 m - 3956.80 m (REC. 7.50 m) (6 BOXES)												
278	3949.20-49.39	0.19	0.08	1.18	0.04	0.03	0.224	0.010	0.002	2820	2850	-	-	dol i frac
279	3949.39-49.61	0.22	0.06	0.09	0.07	-0.01	0.020	0.018	0.004	2810	2870	-	-	dol i frac
280	3949.61-49.80	0.19	0.07	0.98	0.62	0.89	0.185	0.023	0.004	2810	2870	-	-	dol i p-pv vert frac
281	3949.80-49.93	0.13	0.08	2.68	0.56	1.52	0.804	0.021	0.006	2790	2850	-	-	dol i p-pv scat sv vert frac
282	3949.93-50.11	0.18	0.12	22.6	0.94	0.46	4.068	0.026	0.005	2790	2870	-	-	dol i p-pv sv frac
283	3950.11-50.36	0.25	0.13	83.9	2.51	7.45	20.975	0.018	0.005	2800	2850	-	-	dol i p-pv sv vert frac
284	3950.36-50.54	0.18	0.14	314.	0.51	22.5	56.520	0.033	0.006	2760	2850	-	-	dol i sv vert frac
285	3950.54-50.78	0.24	0.17	47.0	0.22	0.69	11.280	0.032	0.008	2760	2850	-	-	dol i p-pv scat sv vert frac

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION YT1-48

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
		CORE NO. 12 CONTINUED												
DC	4036.00-36.60	0.60	-	-	-	-	-	-	-	-	-	-	-	drilled core
		CORE NO. 13 4036.60 m - 4043.60 m (REC. 6.65 m) (5 BOXES)												
312	4036.60-36.91	0.31	0.13	2.42	1.49	0.89	0.750	0.017	0.005	2810	2860	-	-	dol i frac
313	4036.91-37.21	0.30	0.09	0.31	0.15	0.25	0.092	0.018	0.005	2820	2870	-	-	dol i vert frac
314	4037.21-37.64	0.43	0.09	0.20	0.17	0.02	0.085	0.010	0.004	2820	2850	-	-	dol i frac
315	4037.64-37.93	0.29	0.07	*	1.81	*	0.525	0.007	0.002	2860	2880	-	-	dol i
316	4037.93-38.14	0.21	0.10	4.38	2.96	0.87	0.920	0.010	0.002	2830	2860	-	-	dol i frac
b317	4038.14-38.31	0.17	0.06	-0.01	-	-	-	0.015	0.003	2800	2840	-	-	dol i
b318	4038.31-38.54	0.23	0.04	0.04	-	-	0.009	0.010	0.002	2830	2860	-	-	dol i frac
319	4038.54-38.89	0.35	0.15	9.83	1.11	4.59	3.441	0.030	0.011	2780	2860	-	-	dol i lv vert frac
b320	4038.89-39.19	0.30	0.07	-0.01	-	-	-	0.010	0.011	2840	2870	-	-	dol i
321	4039.19-39.48	0.29	0.07	37.1	25.5	13.0	10.759	0.012	0.003	2830	2860	-	-	dol i sv frac
322	4039.48-39.80	0.32	0.06	11.5	5.40	2.31	3.680	0.045	0.014	2730	2860	-	-	dol i p-pv sv frac
323	4039.80-39.91	0.11	0.09	2.00	1.28	0.83	0.220	0.027	0.003	2780	2860	-	-	dol i p-pv scat sv frac
324	4039.91-40.09	0.18	0.11	3.06	1.76	0.90	0.551	0.070	0.013	2650	2850	-	-	dol i p-pv sv scat lv frac
325	4040.09-40.27	0.18	0.14	17.8	8.34	2.74	3.204	0.046	0.008	2720	2850	-	-	dol i p-pv sv lv frac
326	4040.27-40.49	0.22	0.07	19.2	1.92	2.71	4.224	0.021	0.005	2790	2850	-	-	dol i p-pv sv vert frac
327	4040.49-40.81	0.32	0.09	87.0	2.04	1.59	27.840	0.012	0.004	2830	2860	-	-	dol i p-pv sv frac
328	4040.81-40.96	0.15	0.09	3.91	2.25	0.32	0.586	0.020	0.003	2790	2850	-	-	dol i p-pv frac
329	4040.96-41.18	0.22	0.06	24.1	19.5	1.73	5.302	0.011	0.002	2810	2840	-	-	dol i scat p-pv frac
330	4041.18-41.46	0.28	0.06	3.02	1.94	0.28	0.846	0.010	0.003	2820	2850	-	-	dol i scat sv frac
331	4041.46-41.62	0.16	0.05	-0.01	-	-	-	0.012	0.002	2790	2820	-	-	dol i
332	4041.62-41.87	0.25	0.06	-0.01	-	-	-	0.011	0.003	2800	2830	-	-	dol i
333	4041.87-42.23	0.36	0.09	25.4	22.0	5.70	9.144	0.030	0.011	2730	2820	-	-	dol i scat sv frac
b334	4042.23-42.59	0.36	0.02	-0.01	-	-	-	0.003	0.000	2840	2850	-	-	dol i
335	4042.59-43.25	0.66	0.06	3.20	0.43	1.40	2.112	0.008	0.005	2840	2860	-	-	dol i vert frac
LC	4043.25-43.60	0.35	-	-	-	-	-	-	-	-	-	-	-	lost core

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION YT1-48

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
		CORE NO. 11 CONTINUED												
286	3950.78-51.06	0.28	0.17	4.53	0.60	0.10	1.268	0.025	0.007	2780	2860	-	-	dol i p-pv frac
287	3951.06-51.19	0.13	0.09	0.09	0.09	-0.01	0.012	0.016	0.002	2820	2870	-	-	dol i p-pv frac
288	3951.19-51.33	0.14	0.07	0.89	0.62	0.16	0.125	0.019	0.003	2800	2860	-	-	dol i p-pv frac
289	3951.33-51.51	0.18	0.06	5.00	2.03	0.02	0.900	0.008	0.001	2820	2850	-	-	dol i frac
290	3951.51-51.71	0.20	0.09	0.01	0.01	-0.01	0.003	0.007	0.001	2840	2860	-	-	dol i frac
291	3951.71-51.90	0.19	0.06	0.27	0.02	1.07	0.051	0.014	0.003	2850	2890	-	-	dol i frac
292	3951.90-52.22	0.32	0.13	4.50	0.43	-0.01	1.440	0.012	0.004	2820	2860	-	-	dol i frac
293	3952.22-52.40	0.18	0.11	-0.01	-0.01	-0.01	0.000	0.016	0.003	2810	2860	-	-	dol i
294	3952.40-52.65	0.25	0.07	0.82	0.24	-0.01	0.205	0.017	0.004	2830	2880	-	-	dol i frac
295	3952.65-52.95	0.30	0.06	2.47	2.19	0.20	0.741	0.004	0.001	2870	2880	-	-	dol i frac
296	2952.95-53.35	0.40	0.11	11.7	10.7	-0.01	4.680	0.018	0.007	2810	2860	-	-	dol i p-pv frac
b297	3953.35-53.99	0.64	0.05	0.04	-	-	0.002	0.007	0.000	2820	2840	-	-	dol i frac
298	3953.99-54.22	0.23	0.04	22.9	10.9	2.59	5:267	0.008	0.002	2850	2870	-	-	dol i frac
299	3954.22-54.53	0.31	0.26	0.04	0.02	-0.01	0.013	0.007	0.002	2840	2860	-	-	dol i frac
300	3954.53-54.73	0.20	0.13	0.01	-0.01	-0.01	0.002	0.005	0.001	2840	2850	-	-	dol i frac
301	3954.73-54.99	0.26	0.12	-0.01	-0.01	-0.01	0.000	0.009	0.002	2840	2860	-	-	dol i
302	3954.99-55.17	0.18	0.15	-0.01	-0.01	-0.01	0.000	0.012	0.002	2830	2870	-	-	dol i
b303	3955.17-55.47	0.30	0.05	-0.01	-	-	-	0.026	0.008	2800	2870	-	-	dol i p-pv
304	3955.47-55.67	0.20	0.14	187.	3.39	0.03	37.400	0.010	0.002	2830	2860	-	-	dol i frac
305	3955.67-55.97	0.30	0.23	1.40	1.34	0.05	0.420	0.015	0.005	2830	2870	-	-	dol i frac
b306	3955.97-56.20	0.23	0.04	-0.01	-	-	-	0.012	0.003	2840	2880	-	-	dol i
307	3956.20-56.48	0.28	0.10	*	0.26	*	0.073	0.010	0.003	2830	2860	-	-	dol i
308	3956.48-56.70	0.22	0.06	*	0.21	*	0.046	0.004	0.001	2860	2880	-	-	dol i
LC	3956.70-56.80	0.10	-	-	-	-	-	-	-	-	-	-	-	lost core
DC	3956.80-35.00	78.2	-	-	-	-	-	-	-	-	-	-	-	drilled core
		CORE NO. 12 4035.00 m - 4036.00 m (REC. 1.00 m) (1 BOX)												
309	4035.00-35.49	0.49	0.14	0.65	0.19	0.45	0.316	0.031	0.015	2780	2870	-	-	dol i p-pv vert frac
310	4035.49-35.60	0.11	0.09	1.44	1.00	1.09	0.158	0.020	0.002	2800	2860	-	-	dol i p-pv vert frac
b311	4035.60-36.00	0.40	0.06	-0.01	-	-	-	0.024	0.010	2790	2860	-	-	dol i

CORE LABORATORIES – CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA KOTANEELEE YT1-48
LOCATION YT1-48

FORMATION NAHANNI
ANALYSTS SD MW RG DL

FILE 7004-8063
DATE 80 03 14

CORE ANALYSIS RESULTS

Sample Number	Depth Metres (m)	m Rep.	Sample Length m	Permeability to Air Millidarcys			Perm. x m	Porosity	Porosity x m	Density : kg/m^3		Residual Saturation (Fraction of Pore Volume)		Visual Examination
				mD Max.	mD 90°	mD V				Bulk	Grain	Oil	Water	
		CORE NO. 14	4043.60 m - 4046.00 m	(REC. 1.85 m)	(2 BOXES)									
b336	4043.60-44.15	0.55	0.04	0.04	-	-	0.022	0.011	0.006	2860	2890	-	-	part ru dol i
b337	4044.15-44.80	0.65	0.03	-0.01	-	-	-	0.009	0.006	2800	2830	-	-	dol i
b338	4044.80-45.45	0.65	0.03	-0.01	-	-	-	0.007	0.005	2810	2830	-	-	dol i
LC	4045.45-46.00	0.55	-	-	-	-	-	-	-	-	-	-	-	lost core
--	4046.00-58.20	112.20	-	-	-	-	-	-	-	-	-	-	-	drilled
		CORE NO. 15	4158.20 m - 4165.20 m	(REC. 6.30 m)	(5 BOXES)									
339	4158.20-58.55	0.35	0.17	31.0	0.66	0.03	10.850	0.030	0.011	2780	2860	-	-	dol i p-pv sv frac
340	4158.55-58.97	0.42	0.23	2.88	1.08	-0.01	1.210	0.017	0.007	2800	2850	-	-	dol i scat p-pv scat sv frac
341	4158.97-59.30	0.33	0.10	6.10	5.27	0.05	2.013	0.015	0.005	2830	2870	-	-	dol i frac
342	4159.30-59.56	0.26	0.10	1.74	1.14	0.25	0.452	0.033	0.009	2770	2870	-	-	dol i p-pv sv frac
343	4159.56-59.81	0.25	0.22	11.4	11.1	2.80	2.850	0.033	0.008	2760	2850	-	-	dol i p-pv sv frac
344	4159.81-60.38	0.57	0.11	6.03	0.22	0.22	3.437	0.014	0.008	2830	2860	-	-	dol i frac
b345	4160.38-61.13	0.75	0.04	-0.01	-	-	-	0.038	0.029	2840	2960	-	-	part ru dol i
b346	4161.13-61.88	0.75	0.03	-0.01	-	-	-	0.009	0.007	2870	2890	-	-	part ru dol i
b347	4161.88-62.33	0.45	0.03	-0.01	-	-	-	0.018	0.008	2860	2910	-	-	part ru dol i
348	4162.33-62.73	0.40	0.08	27.1	19.6	8.31	11.080	0.013	0.005	2830	2860	-	-	part ru dol i frac
349	4162.73-63.30	0.57	0.07	34.0	0.38	21.2	19.380	0.011	0.006	2850	2890	-	-	part ru dol i vert frac
350	4163.30-63.79	0.49	0.11	*	0.82	*	0.402	0.010	0.005	2840	2870	-	-	part ru dol i frac
351	4163.79-64.09	0.30	0.07	16.4	4.45	0.85	4.920	0.016	0.005	2830	2880	-	-	part ru dol i frac
b352	4164.09-64.50	0.41	0.03	0.02	-	-	0.008	0.059	0.024	2730	2900	-	-	part ru dol i
LC	4164.50-65.20	0.70	-	-	-	-	-	-	-	-	-	-	-	lost core
--	4165.20-24.40	359.20	-	-	-	-	-	-	-	-	-	-	-	drilled
		CORE NO. 16	4424.40 m - 4429.40 m	(REC. 2.70 m)	(3 BOXES)									
353	4424.40-25.60	1.20	0.06	3.17	0.94	0.17	0.3804	0.021	0.025	2820	2880	-	-	part ru dol i p-pv frac
354	4425.60-26.30	0.70	0.05	0.43	0.17	0.01	0.301	0.009	0.006	2840	2860	-	-	part ru dol i frac
b355	4426.30-27.10	0.80	0.05	-0.01	-	-	-	0.026	0.021	2800	2870	-	-	part ru dol i
LC	4427.10-29.40	2.30	-	-	-	-	-	-	-	-	-	-	-	lost core

CORE LABORATORIES - CANADA LTD.

WELL p COLUMBIA KOTANEELEE YT1-48

FORMATION NAHANNI

SUMMARY INTERVAL 3660.00 - 3910.40

FILE 7004-8063

TOTAL 250.40

METRES ANALYZED 58.95

METRES NOT ANALYZED: TOTAL 191.45 DENSE .00 LOST 9.50 DRILLED 181.95 *NABR .00 RUBBLE .00

SUMMARY OF ANALYZED CORE:

	METRES	FRACTION OF ANALYZED CORE	WEIGHTED AVERAGE POROSITY	POROSITY METRES	WEIGHTED AV. HORIZONTAL PERMEABILITY	PERMEABILITY METRES	WEIGHTED AVERAGE RESID. OIL	WEIGHTED AVERAGE TOT. WATER
TOTAL	58.95	1.000	.028	1.651	64.818	3821.042	.000	.000
BY PERM RANGES								
LESS THAN 0.01 mD	.66	.011	.017	.011	.000	.000	.000	.000
0.01 0.09 mD	.81	.014	.017	.014	.053	.043	.000	.000
0.10 0.49 mD	12.13	.206	.027	.331	.309	3.750	.000	.000
0.50 0.99 mD	10.80	.183	.025	.270	.740	7.987	.000	.000
1.0 9.99 mD	21.86	.371	.027	.581	3.052	66.712	.000	.000
GREATER THAN 9.99 mD	12.69	.215	.035	.444	294.921	3742.550	.000	.000

*NOT ANALYZED BY REQUEST

CORE LABORATORIES - CANADA LTD. *Petroleum Reservoir Engineering*

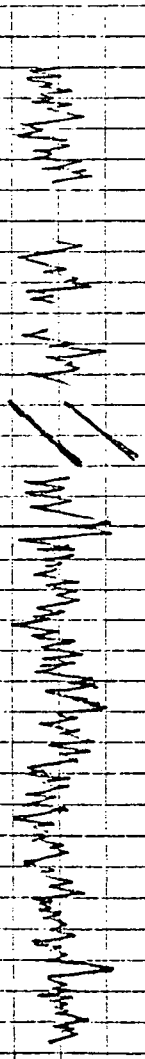
COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD. FIELD KOTANEELEE FILE 7004-8063

WELL COLUMBIA KOTANEELEE YT1-48 DATE

LOCATION PROV YUKON TERRITORIES ELEV.

CORE-GAMMA CORRELATION

T.C. 11 SECS. **VERTICAL SCALE: 10cm = 24m** SENS. 5000 CPM



CORE NO. 1 3660.00 m - 3665.70 m REC 3.85 m

3660.00 m

CORE NO. 2 3665.70 m - 3668.80 m REC 1.85 m

CORE NO. 3 3668.80 m - 3672.10 m REC 1.55 m

3670.00 m

DRILLED CORE 3672.10 m - 3723.50 m

CORE NO. 4 3724.00 m - 3741.00 m REC 18.35 m

3725.00 m

3740.00 m

CORE LABORATORIES - CANADA LTD. *Petroleum Reservoir Engineering*

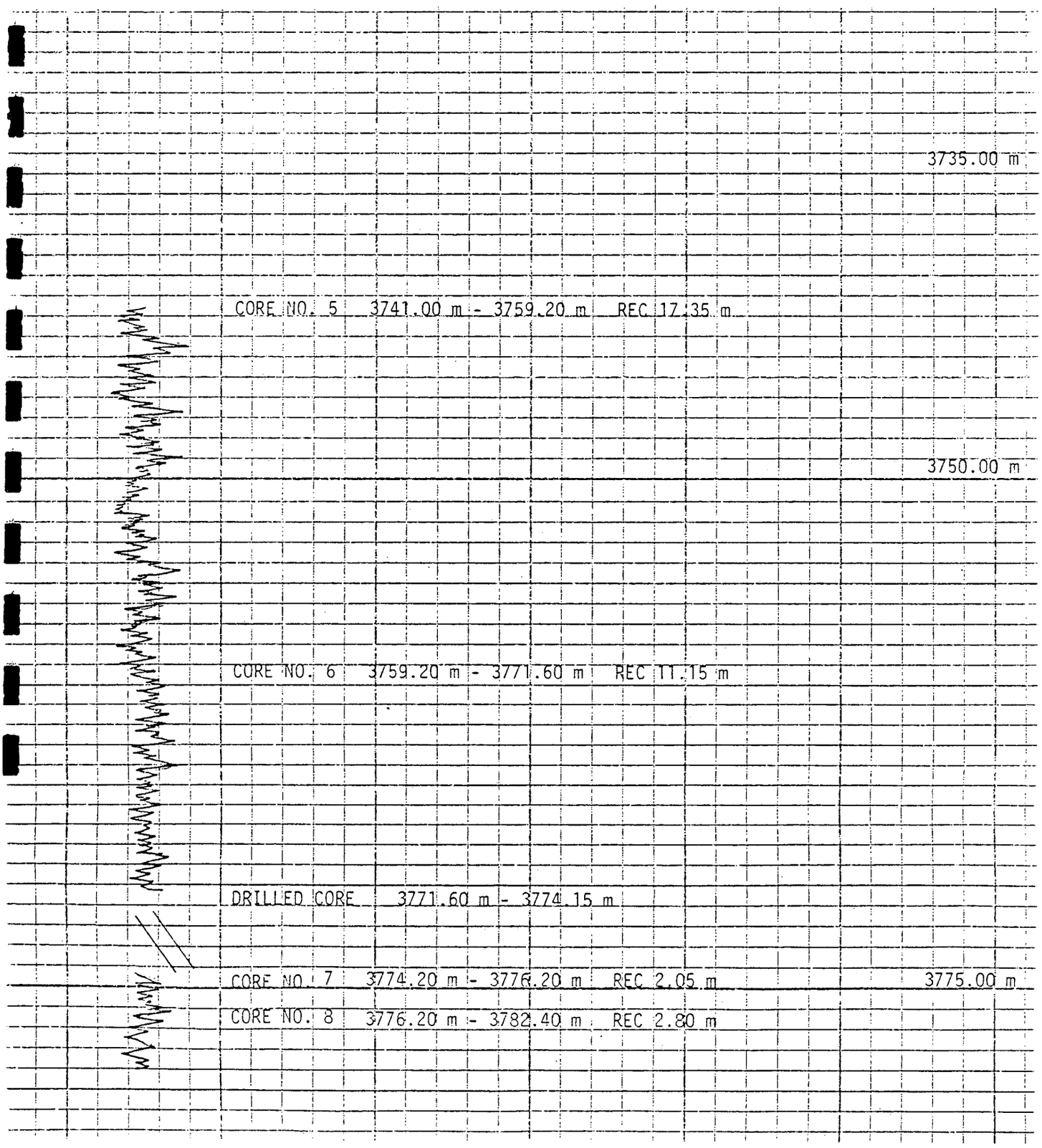
COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD. FIELD KOTANEELEE FILE 7004-8063

WELL COLUMBIA KOTANEELEE YT1-48 DATE

LOCATION PROV YUKON TERRITORIES ELEV.

CORE-GAMMA CORRELATION

T.C. 11 SECS. VERTICAL SCALE: 10cm = 24m SENS. 5000 CPM



CORE LABORATORIES - CANADA LTD. *Petroleum Reservoir Engineering*

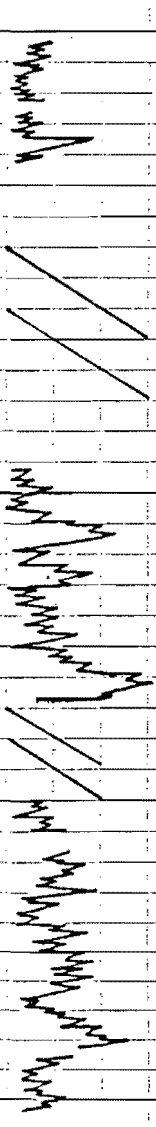
COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD. FIELD KOTANEELEE FILE 7004-8063

WELL COLUMBIA KOTANEELEE YT1-48 DATE

LOCATION PROV YUKON TERRITORIES ELEV.

CORE-GAMMA CORRELATION

T.C. 11 SECS. **VERTICAL SCALE: 10cm = 24m** SENS. 5000 CPM



3910.00 m

CORE NO. 9 3910.40 m - 3912.60 m REC. 1.70 m

CORE NO. 10 3912.60 m - 3916.00 m REC. 1.70 m

3915.00 m

DRILLED 3916.00 m - 3949.20 m

3945.00 m

CORE NO. 11 3949.20 m - 3956.80 m REC. 7.50 m

3950.00 m

3955.00 m

DRILLED 3956.80 m - 4035.00 m

CORE NO. 12 4035.00 m - 4036.00 m REC. 1.00 m

4035.00 m

CORE NO. 13 4036.60 m - 4043.60 m REC. 6.65 m

CORE NO. 14 4043.60 m - 4046.00 m REC. 1.85

4045.00 m

CORE LABORATORIES · CANADA LTD. *Petroleum Reservoir Engineering*

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD. FIELD KOTANEELEE FILE 7004-8063

WELL COLUMBIA KOTANEELE YT1 - 48 DATE

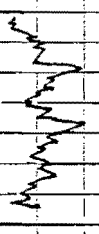
LOCATION PROV YUKON TERRITORIES ELEV.

CORE-GAMMA CORRELATION

T.C. 11 SECS VERTICAL SCALE: 10cm = 24m SENS 5000 CPM

4150.00 m

CORE NO 15 4158.20 m - 4165.20 m REC 6.30



4175.00 m

CORE LABORATORIES · CANADA LTD. *Petroleum Reservoir Engineering*

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD. FIELD KOTANEELEE FILE 7004-8063

WELL COLUMBIA KOTANEELE YT1-48 DATE

LOCATION PROV YUKON TERRITORIES ELEV.

CORE-GAMMA CORRELATION

T.C. 11 SECS. VERTICAL SCALE: 10cm = 24m SENS. 5000 CPM

CORE NO. 16 4424.40 m - 4429.40 m REC. 2.70 4425.00 m

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER ANALYSIS

CONTAINER IDENTITY

LABORATORY NUMBER: E80-3837-3

LICENCE NUMBER

OPERATOR NAME: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

C P A NUMBER

WELL NAME: COLUMBIA KOTANEELEE YT 1-48

ELEVATIONS K.B. (metres) GRD.

FIELD OR AREA	POOL OR ZONE	NAME OF SAMPLER	COMPANY
KOTANEELEE	ARNICA		JOHNSTON TESTERS

TEST TYPE	NO.	TEST RECOVERY
DST	4	

MULTIPLE RECOVERY: Y X N

SAMPLING POINT: UNIDENTIFIED

AMT. & TYPE OF CUSHION

MUD RESISTIVITY @ 25°C

Test Interval (metres): 4390 - 4402

TYPE OF PRODUCTION: PUMPING FLOWING GAS LIFT SWAB

PRODUCTION RATES: WATER m^3/d OIL m^3/d GAS $10^3 m^3/d$

Perforations (metres)

	SEPARATOR	TREATER	RESERVOIR	SOURCE
GAUGE PRESSURE kPa				
TEMPERATURE °C				

DATE SAMPLED (Y-M-D)	DATE RECEIVED (Y-M-D)	DATE REPORTED (Y-M-D)	ANALYST	OTHER INFORMATION
	80/04/21	80/05/09	A.L.	NO FURTHER INFO SUPPLIED

ION	$m \cdot V^{-1}$ g·m^{-3}	Mass Fraction	c mol·m^{-3}	ION	$m \cdot V^{-1}$ g·m^{-3}	Mass Fraction	c mol·m^{-3}
Na	1 969	0.2473	85.64	Cl	1 330	0.1671	37.51
K	445	0.0559	11.39	Br			
Ca	186	0.0234	4.64	I			
Mg	24	0.0030	0.99	HCO_3	2 855	0.3586	46.82
Ba				SO_4	1 152	0.1447	11.98
Sr				CO_3	0	0.0000	0.00
Fe	TRACE			OH	0	0.0000	0.00
				H_2S	NIL		

TOTAL SOLIDS $m \cdot V^{-1}$ g·m^{-3}

EVAPORATED @ 110°C	EVAPORATED @ 180°C
8 285	
AT IGNITION	CALCULATED
6 465	7 961

ORGANICS: MUCH

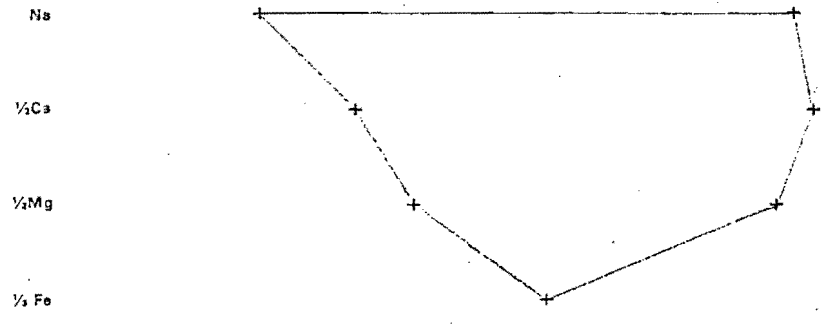
RELATIVE DENSITY	REFRACTIVE INDEX
1.005 @ 25°C	1.3339 @ 25°C

OBSERVED pH	RESISTIVITY (Ohm·m)
7.9 @ 23 °C	1.03 @ 25°C

REMARKS

The sample consisted of muddy water.

LOGARITHMIC PATTERN c/mol·m^{-3}



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COLUMBIA GAS DEVELOPMENT OF CANADA LTD. LABORATORY REPORT NUMBER: E80-3837

E80-3837-1 - Sampled from Top
RESISTIVITY: 2.91 Ohm/meters @ 25°C.
31.1% inhibitor, 68.9% muddy water.

E80-3837-2 - Sampled from Bottom
RESISTIVITY: 1.14 Ohm/meters @ 25°C.
Muddy water.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER ANALYSIS

CONTAINER IDENTITY:

LABORATORY NUMBER: E80-3838-3

LICENCE NUMBER:

OPERATOR NAME: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

C.P.A. NUMBER:

WELL NAME: COLUMBIA KOTANEELEE YT 1-48

ELEVATIONS K.B. (metres) GRD.:

FIELD OR AREA	POOL OR ZONE	NAME OF SAMPLER	COMPANY
KOTANEELEE	ARNICA		JOHNSTON TESTER

TEST TYPE	NO.	TEST RECOVERY
DST	6	627 m

MULTIPLE RECOVERY (Y/N): X

SAMPLING POINT	AMT. & TYPE OF CUSHION	MUD RESISTIVITY
FLOWLINE	3000' WATER	@ 29°C

Test Interval (metres): 4266 - 4274

Perforations (metres):

TYPE OF PRODUCTION: PUMPING | FLOWING | GAS LIFT | SWAB

PRODUCTION RATES: WATER m^3/d | OIL m^3/d | GAS $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SOURCE
GAUGE PRESSURE kPa				
TEMPERATURE °C				

DATE SAMPLED (Y-M-D)	DATE RECEIVED (Y-M-D)	DATE REPORTED (Y-M-D)	ANALYST	OTHER INFORMATION
80/03/22	80/04/21	80/05/09	A.L.	

ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$	ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$
Na	454	0.1996	19.77	Cl	62	0.0273	1.75
K	15	0.0066	0.38	Br			
Ca	79	0.0347	1.97	I			
Mg	52	0.0229	2.14	HCO_3	1 571	0.6909	25.76
Ba				SO_4	41	0.0180	0.43
Sr				CO_3	0	0.0000	0.00
Fe	TRACE			OH	0	0.0000	0.00
				H_2S	NIL		

TOTAL SOLIDS $m \cdot V^{-1}$ $g \cdot m^{-3}$

EVAPORATED @ 110°C	EVAPORATED @ 180°C
1 365	
AT IGNITION	**CALCULATED**
210	2 274

ORGANICS: NIL

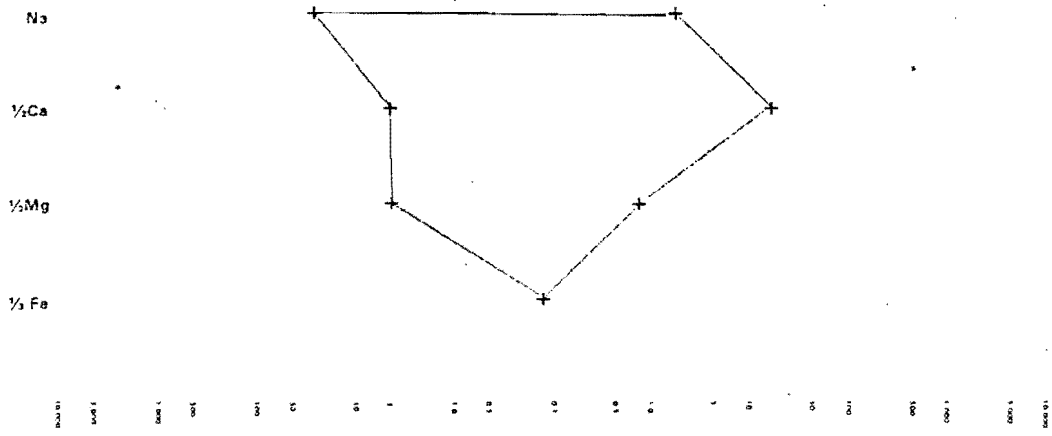
RELATIVE DENSITY	REFRACTIVE INDEX
1.001 @ 29°C	1.3332 @ 29°C

OBSERVED pH	RESISTIVITY (Ohm m)
7.3 @ 23 °C	6.20 @ 29°C

REMARKS

The sample consisted of murky fresh water.

LOGARITHMIC PATTERN c / $mol \cdot m^{-3}$



Continued.../2

COLUMBIA GAS DEVELOPMENT OF CANADA LTD. LABORATORY REPORT NUMBER: E80-3838

E80-3838-1 - Sampled from Top of Fluid
RESISTIVITY: 7.54 Ohm/meters @ 25°C.
Murky fresh water.

E80-3838-2 - Sampled from Top of Tool
RESISTIVITY: 7.99 Ohm/meters @ 25°C.
Murky fresh water.

E80-3838-4 - Sampled from Flareline
RESISTIVITY: 8.45 Ohm/meters @ 25°C.
Murky fresh water.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER ANALYSIS

CONTAINER IDENTITY

LABORATORY NUMBER: E80-3839

LICENCE NUMBER

OPERATOR NAME: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

C.P.A. NUMBER

WELL NAME: COLUMBIA KOTANEELEE YT 1-48

ELEVATIONS K.B. (metres) GRD.

FIELD OR AREA: KOTANEELEE

POOL OR ZONE: ARNICA

NAME OF SAMPLER

COMPANY: JOHNSTON TESTER

TEST TYPE: DST NO.: 7

TEST RECOVERY: 114 m MUD, 28.5 m WATER

MULTIPLE RECOVERY Y N: X

SAMPLING POINT: TOP OF REC. - 127 m ABOVE TOOL

AMT. & TYPE OF CUSHION: 1200' WATER

MUD RESISTIVITY @ 25°C

Test Interval (metres): 4266 - 4274

Perforations (metres)

TYPE OF PRODUCTION: PUMPING FLOWING GAS LIFT SWAB

PRODUCTION RATES: WATER m^3/d OIL m^3/d GAS $10^3 m^3/d$

GAUGE PRESSURE kPa: SEPARATOR TREATER RESERVOIR SOURCE

TEMPERATURE °C: SEPARATOR TREATER RESERVOIR SOURCE

DATE SAMPLED (Y-M-D)	DATE RECEIVED (Y-M-D)	DATE REPORTED (Y-M-D)	ANALYST	OTHER INFORMATION
80/03/23	80/04/21	80/05/09	A.L.	

ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$	ION	$m \cdot V^{-1}$ $g \cdot m^{-3}$	Mass Fraction	c $mol \cdot m^{-3}$
Na	646	0.3825	28.11	Cl	201	0.1190	5.67
K	34	0.0201	0.87	Br			
Ca	11	0.0065	0.28	I			
Mg	0	0.0000	0.00	HCO_3	0	0.0000	0.00
Ba				SO_4	259	0.1533	2.70
Sr				CO_3	516	0.3056	8.59
Fe	TRACE			OH	22	0.0130	1.29
				H_2S	NIL		

TOTAL SOLIDS $m \cdot V^{-1}$ $g \cdot m^{-3}$

EVAPORATED @ 110°C	EVAPORATED @ 180°C
2 220	
AT IGNITION	CALCULATED
1 560	1 689

ORGANICS: TRACE

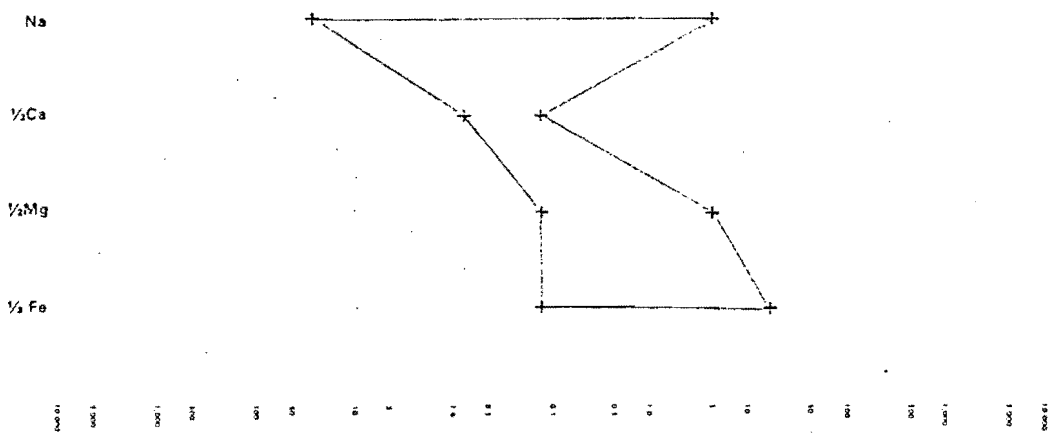
RELATIVE DENSITY	REFRACTIVE INDEX
1.002 @ 25°C	1.3332 @ 25°C

OBSERVED pH	RESISTIVITY (Ohm-m)
9.7 @ 23 °C	4.08 @ 25°C

REMARKS

The sample consisted of muddy fresh water.

LOGARITHMIC PATTERN c / $mol \cdot m^{-3}$



CHEMICAL & GEOLOGICAL LABORATORIES LTD.

14203-129 AVENUE EDMONTON, ALBERTA T5L 4N9 TELEPHONE (403) 454-1504

DATE REPORTED: APRIL 30, 1980 LABORATORY REPORT NUMBER: E80-3459

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

WELL NAME: COLUMBIA KOTANEELEE YT. I-48 TEST INTERVALS: 4266 - 4274 m
TEST TYPE: DST #7 ANALYST: E.M. HOWARD
TEST RECOVERY: MATERIAL PLUGGING TOOL IN DRILL PIPE.
ZONE: ARNICA

The sample, as received, was crushed and mixed for analysis.

COMPONENTS	% BY WT.
IRON SULFIDE	1.55
MANGANESE OXIDE	TRACE
ZINC OXIDE	0.15
LEAD OXIDE	0.10
CALCIUM CARBONATE	7.40
MAGNESIUM CARBONATE	4.75
BARIUM CARBONATE	2.45
STRONTIUM CARBONATE	0.05
SODIUM CHLORIDE	0.45
POTASSIUM CHLORIDE	0.35
SILICA	11.45
ALUMINUM OXIDE	0.90
BARIUM SULFATE	68.65
ORGANIC & VOLATILE:	2.85
TOTAL	101.10

REMARKS:

It is probable that calcium carbonate deposited from formation water and intimately mixed with barite resulted in plugging. Mica flakes (possibly added to control lost circulation) would act as a reinforcing agent.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

WATER ANALYSIS

CONTAINER IDENTITY: 4282 - 4869

LABORATORY NUMBER: E80-3840-2

LICENCE NUMBER:

OPERATOR NAME: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

C.P.A. NUMBER:

WELL NAME: COLUMBIA ET AL KOTANEELEE YT-I-48

ELEVATIONS K.B. (metres) GRD:

FIELD OR AREA: KOTANEELEE

POOL OR ZONE: NAHANNI

NAME OF SAMPLER:

*COMPANY: PORTA-TEST ENGINEERING LTD

TEST TYPE: PRODUCTION TEST

NO.:

TEST RECOVERY:

MULTIPLE RECOVERY: Y N

SAMPLING POINT:

AMT. & TYPE OF CUSHION:

MUD RESISTIVITY @ 25°C:

Test Interval (metres):

Perforations (metres):

TYPE OF PRODUCTION: PUMPING FLOWING GAS LIFT SWAB

PRODUCTION RATES: WATER m^3/d OIL m^3/d GAS $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SOURCE
GAUGE PRESSURE kPa				8997
TEMPERATURE °C				68

DATE SAMPLED (Y-M-D)	DATE RECEIVED (Y-M-D)	DATE REPORTED (Y-M-D)	ANALYST	OTHER INFORMATION
80/04/07	80/04/21	80/05/25	J.CZUROSKI/A.LUCYK	SAMPLED AT 20:15 HRS.

ION	$m \cdot V^{-1} / g \cdot m^{-3}$	Mass Fraction	$c / mol \cdot m^{-3}$	ION	$m \cdot V^{-1} / g \cdot m^{-3}$	Mass Fraction	$c / mol \cdot m^{-3}$
Na	796	0.0606	34.64	Cl	7 980	0.6075	225.04
K	360	0.0274	9.22	Br			
Ca	3 491	0.2657	87.10	I			
Mg	160	0.0122	6.58	HCO_3	251	0.0191	4.12
Ba				SO_4	99	0.0075	1.03
Sr				CO_3	0	0.0000	0.00
Fe	TRACE			OH	0	0.0000	0.00
				H_2S			

TOTAL SOLIDS $m \cdot V^{-1} / g \cdot m^{-3}$

EVAPORATED @ 110°C	EVAPORATED @ 180°C
15 250	
AT IGNITION	CALCULATED
12 200	13 137

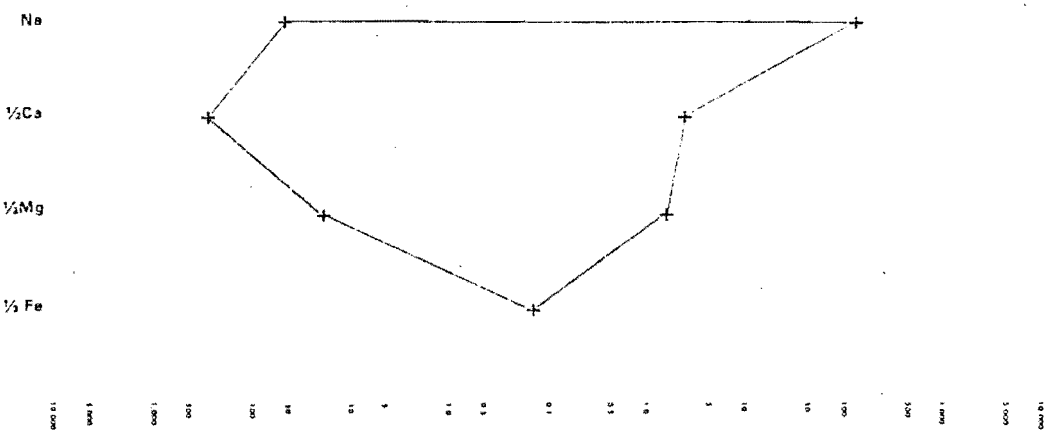
ORGANICS: PRESENT

RELATIVE DENSITY		REFRACTIVE INDEX	
1.009	@ 25°C	1.3354	@ 25°C

OBSERVED pH			RESISTIVITY (Ohm·m)	
7.3	@ 26	°C	0.423	@ 25°C

REMARKS

LOGARITHMIC PATTERN $c / mol \cdot m^{-3}$



NOTE

The gas samples that were taken by Johnson Testers during the drill stem tests were delivered to Edmonton by Johnson and they have been unable to locate these samples. As a result, there are no gas analyses available.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON FORT ST. JOHN CALGARY

GAS ANALYSIS

CONTAINER IDENTITY: 4282 - 4869

LABORATORY NUMBER: E80-3840-1

LICENCE NUMBER:

OPERATOR NAME: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

LOCATION NUMBER: YT-I-48

WELL NAME: COLUMBIA ET AL KOTANEELEE YT-I-48

ELEVATIONS K.B. (metres) GRD.:

FIELD OR AREA: KOTANEELEE

POOL OR ZONE: NAHANNI

NAME OF SAMPLER:

COMPANY: PORTA-TEST ENGINEERING LTD

TEST TYPE: NO.:

TEST RECOVERY: PRODUCTION TEST

MULTIPLE RECOVERY: Y N

SAMPLING POINT:

AMT. & TYPE OF CUSHION:

MUD RESISTIVITY: @ 29°

Test Interval (metres):

Perforations (metres):

TYPE OF PRODUCTION: PUMPING | FLOWING | GAS LIFT | SWAB

PRODUCTION RATES: WATER m^3/d | OIL m^3/d | GAS $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SOURCE	SAMPLED	CONTAINER RECEIVED
GAUGE PRESSURE kPa				8997		9000
TEMPERATURE °C				68		21

DATE SAMPLED (Y-M-D): 80/04/07

DATE RECEIVED (Y-M-D): 80/04/21

DATE REPORTED (Y-M-D): 80/05/25

ANALYST: J.CZUROSKI/A.LUCYK

OTHER INFORMATION: SAMPLED AT 20:15 HRS.

COMP.	MOLE FRACTION AIR FREE AS RECEIVED	MOLE FRACTION AIR FREE ACID GAS FREE	PETROLEUM LIQUID CONTENT $\frac{c}{mm^3}$
H_2	0.0006	0.0007	
He	0.0006	0.0007	
N_2	0.0324	0.0385	
CO_2	0.1376	0.0000	
H_2S	0.0216	0.0000	
C_1	0.8057	0.9583	
C_2	0.0015	0.0018	
C_3	0.0000	0.0000	0.0
IC_4	0.0000	0.0000	0.0
NC_4	0.0000	0.0000	0.0
IC_5	0.0000	0.0000	0.0
NC_5	0.0000	0.0000	0.0
C_6	0.0000	0.0000	0.0
C_7	0.0000	0.0000	0.0
C_8	0.0000	0.0000	0.0
C_9	0.0000	0.0000	0.0
C_{10+}	0.0000	0.0000	0.0
TOTAL	1.0000	1.0000	0.0

GROSS HEATING VALUE MJ/m^3 15°C AND 101.325 kPa

MOISTURE AND ACID GAS FREE — MEASURED: | CALCULATED: 36.24

DETERMINED DEW POINT: °C

VAPOUR PRESSURE PENTANES PLUS: 0 kPa

RELATIVE DENSITY

MOISTURE FREE AS SAMPLED MEASURED	MOISTURE FREE AS SAMPLED CALCULATED	MOISTURE AND ACID GAS FREE MEASURED	MOISTURE AND ACID GAS FREE CALCULATED
0.718	0.714		0.570

PSEUDO CRITICAL PROPERTIES (CALCULATED)

AS SAMPLED pPc (abs)	AS SAMPLED pTc	ACID GAS FREE pPc (abs)	ACID GAS FREE pTc
5068 kPa	208.4 K	4587 kPa	188.6 K

H_2S g/m^3: 31.13

RELATIVE MOLECULAR MASS — Total Gas: 20.68 | C_{7+}: 0.00

C6+ ML/MOL 0.000

GROSS HEATING VALUE AS PER AGA REPORT #5

31.06 MAJ/M3 @ 15C AND 101.325 KPA

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

STANDARD LIFE BUILDING
639 - 5TH AVENUE S.W.
CALGARY, ALBERTA, CANADA T2P 0M9
(403) 261-8680

TUBING SUMMARY

Well Columbia et al Kotaneelee YT I-48 Date April 1, 1980

KB Elevation 834.95 KB to CSG FLG 8.06 KB to TBG TOP 7.31

Casing OD 178mm (7") WT 43.2-47.6 kg/m MIN DIA 151.61mm

Set At 4423 PBD 4026 PERFS 3654-3840

Tubing OD 89mm (3½") WT 13.8kg/m(9.3#) Type CS Hydril Make

No. Joints on Location 389 Tally 3746.78

No. Joints Run 373 Tally 3591.94

PERMANENT STRING FROM BOTTOM UP

No. Joints	Description	Measured Length	KB Depth	Remarks
1	73mm CS Hydril mule shoe	1.21	3643.52	
1	73mmx2.25 Baker "R" nipple	.24	3642.07	
1	73mm CS Hydril pup joint	3.00	3639.07	
1	73mm CS Hydril pup joint	2.84	3636.23	
1	73mmx2.25 Baker "F" nipple	.24	3635.99	
1	73mm CS Hydril perf. joint	2.94	3633.05	
1	73mmx2.31 Baker "F" nipple	.24	3632.81	
1	73mm CS Hydril pup joint	2.99	3629.82	
1	73mmx2.31 Baker "F" nipple	.24	3629.58	
2	73mm CS Hydril pup joint	5.97	3623.61	
1	Baker Seal Assembly	.85	3622.76	

Total String Length	
KB to Tubing Top	
String Depth KB	

Remarks

Field Supervisor R. L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

STANDARD LIFE BUILDING
639 - 5TH AVENUE S.W.
CALGARY, ALBERTA, CANADA T2P 0M9
(403) 261-8680

TUBING SUMMARY

Well Columbia et al Kotaneelee YT I-48 Date April 1, 1980

KB Elevation _____ KB to CSG FLG _____ KB to TBG TOP _____

Casing OD _____ WT _____ MIN DIA _____

Set At _____ PBD _____ PERFS _____

Tubing OD _____ WT _____ Type _____ Make _____

No. Joints on Location _____ Tally _____

No. Joints Run _____ Tally _____

PERMANENT STRING FROM BOTTOM UP

No. Joints	Description	Measured Length	KB Depth	Remarks
1	89mm Baker ERA Receptacle			
	w/ 2 7/8" CS Hydril Pin x			Receptacle open
	3½" Hydril PH-6 box	11.41	3608.35	3 meters
1	Changeover sub 3½" PH-6			
	pin x 3½" CS Hydril box	.23	3608.12	
1	89mm CS Hydril tubing	9.67	3598.45	
1	89mm x 2.62 "R" nipple	.25	3598.20	
1	89mm CS Hydril tubing	9.15	3589.05	
1	89mm Baker sliding sleeve	.88	3588.17	
370	89mm CS Hydril tubing	3563.44	24.73	
3	89mm CS Hydril pups	7.04	17.69	

Total String Length

KB to Tubing Top

String Depth KB

Remarks Receptacle latched into Baker Model F-1 Packer set at 3622m. Mandel opened 3 meters, packer depth by tubing tally.

Field Supervisor R. L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

STANDARD LIFE BUILDING
639 - 5TH AVENUE S.W.
CALGARY, ALBERTA, CANADA T2P 0M9
(403) 261-8680

TUBING SUMMARY

Well Columbia et al Kotaneelee YT I-48 Date April 1, 1980

KB Elevation _____ KB to CSG FLG _____ KB to TBG TOP _____

Casing OD _____ WT _____ MIN DIA _____

Set At _____ PBD _____ PERFS _____

Tubing OD _____ WT _____ Type _____ Make _____

No. Joints on Location _____ Tally _____

No. Joints Run _____ Tally _____

PERMANENT STRING FROM BOTTOM UP

No. Joints	Description	Measured Length	KB Depth	Remarks
1	89mm CS Hydril double pin			
	pup	.70	16.99	
1	89mm CS Hydril tubing pin up	9.68	7.31	

Total String Length	3633.10
KB to Tubing Top	7.31
String Depth KB	3640.41

Remarks _____

Field Supervisor R. L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

Page 1 of 1

WELL: COLUMBIA ET AL KOTANEELEE YT I-48 DATE: 79 05 04 19

Size: 508 mm Weight: 140 kg/m #/Ft. Thread: Buttress Grade: H-40 Make: Mannesman

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	11 05	21		41		61		81	
2	11 23	22		42		62		82	
3	11 14	23		43		63		83	
4	11 90	24		44		64		84	
5	11 43	25		45		65		85	
6	12 54	26		46		66		86	
7	11 52	27		47		67		87	
8	10 53	28		48		68		88	
9	11 08	29		49		69		89	
10	11 10	30		50		70		90	
TOTAL	113 52	TOTAL		TOTAL		TOTAL		TOTAL	

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	11 76	31		51		71		91	
12	11 34	32		52		72		92	
13	11 53	33		53		73		93	
14	11 07	34		54		74		94	
15	12 34	35		55		75		95	
16	11 60	36		56		76		96	
17	11 12	37		57		77		97	
18	11 18	38		58		78		98	
19	10 92	39		59		79		99	
20		40		60		80		100	
TOTAL	102 86	TOTAL		TOTAL		TOTAL		TOTAL	

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH	
1-10	113 52	19	216	38
11-20	102 86	Shoe & F. collar	1	22
21-30			217	60
31-40			8	88
41-50			208	72
51-60				
61-70				
71-80				
81-90				
91-100				
TOTAL	216 38			

BROUGHT FORWARD
PAGE TOTAL
TOTAL ON LOCATION
TOTAL LEFT OUT (incl. L.J.)
TOTAL PERMANENTLY IN HOLE

* Left out
** Damaged

(Note transfer of left out joints to where and by whom.)
REMARKS: (Use separate page for each weight, grade or thread.) ** 5 joints damaged 60.48 m - Marked with red paint.
* 1 joints OK - Spare - 12.45 m - marked with yellow paint above joints returned to casing yard at air strip by W. Green.

Tallied by V. Arndt

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: COLUMBIA ET AL KOTANEELEE YT I-48 DATE: 79 07 22 19 ___

Size: 339.7 Weight: 107.1 #/Ft. ___ Thread: Buttress Grade: N80 Make: JAP

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	12 07	21	12 01	41	12 00	51	11 59	81	12 08
2	11 85	22	11 90	42	12 07	62	11 84	82	11 80
3	12 10	23	12 07	43	11 93	63	11 63	83	12 06
4	12 07	24	12 07	44	12 06	64	11 77	84	12 08
5	12 01	25	11 36	45	12 08	65	12 07	85	11 78
6	11 81	26	11 78	46	12 07	66	12 08	86	12 07
7	12 08	27	12 07	47	12 08	67	11 84	87	12 07
8	12 07	28	12 07	48	12 09	68	12 07	88	12 07
9	12 08	29	12 00	49	11 83	69	12 08	89	11 75
10	12 08	30	11 73	50	11 63	70	11 68	90	12 07
TOTAL	120 22	TOTAL	119 06	TOTAL	119 84	TOTAL	118 65	TOTAL	119 83
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	12 07	31	12 07	51	12 07	71	11 86	91	12 02
12	11 73	32	12 07	52	12 07	72	11 95	92	
13	*12 09	33	11 87	53	12 07	73	12 07	93	
14	12 06	34	11 60	54	12 07	74	11 90	94	
15	11 94	35	11 80	55	12 07	75	11 70	95	
16	**12 07	36	12 00	56	11 95	76	12 07	96	
17	**12 08	37	12 07	57	12 08	77	11 73	97	
18	12 06	38	12 00	58	11 68	78	11 68	98	
19	12 06	39	12 07	59	12 07	79	11 98	99	
20	12 07	40	11 82	60	12 07	80	11 71	100	
TOTAL	120 23	TOTAL	119 37	TOTAL	120 20	TOTAL	118 65	TOTAL	12 02

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH	
1-10	120 22			BROUGHT FORWARD
11-20	120 23		1088 07	PAGE TOTAL
21-30	119 06		1088 07	TOTAL ON LOCATION
31-40	119 37		36 24	TOTAL LEFT OUT (incl. L.J.)
41-50	119 84			TOTAL PERMANENTLY IN HOLE
51-60	120 20			
61-70	118 65			
71-80	118 65			
81-90	119 83			
91-100	12 02			
TOTAL	1088 07			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.) 3 joints left out.

Transferred to pipe yard material, transfer No. 768.

Tallied by Kuechle/Gilbertson

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: December 1 1979

Size: 244.5mm Weight: 69.9 kg/m ~~Grade~~ 8 rd Thread: MN80 LT&C Grade: _____ Make: _____

Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
1	11	985	21	11	735	41	12	120	61	11	800	81	11	880
2	12	180	22	12	135	42	12	030	62	11	815	82	11	970
3	12	050	23	11	900	43	12	100	63	11	955	83	11	965
4	12	200	24	11	970	44	11	970	64	12	065	84	11	650
5	11	925	25	12	040	45	12	145	65	12	025	85	11	930
6	11	810	26	12	175	46	11	780	66	11	885	86	12	050
7	12	025	27	12	220	47	12	165	67	12	010	87	11	990
8	11	820	28	11	850	48	11	870	68	12	030	88	11	935
9	12	120	29	11	980	49	11	815	69	12	205	89	11	690
10	12	065	30	12	250	50	11	925	70	12	080	90 *	12	030
TOTAL	120	180	TOTAL	120	255	TOTAL	119	920	TOTAL	119	870	TOTAL	119	090
Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
11	11	870	31	11	975	51	12	270	71	11	600	91	12	050
12	12	030	32	12	035	52	12	250	72	11	850	92	11	925
13	12	030	33	11	940	53	12	030	73	11	590	93	12	185
14	12	050	34	11	995	54	12	105	74	12	090	94	11	665
15	12	000	35	12	000	55	12	000	75	12	135	95	12	070
16	12	170	36	12	030	56	12	040	76	12	180	96	11	860
17	12	050	37	11	870	57	12	110	77	12	090	97	11	895
18	11	965	38	11	865	58	11	910	78	12	065	98	12	175
19	12	075	39	11	950	59	12	015	79	12	010	99	12	045
20	12	050	40	11	870	60	11	825	80	12	070	100	12	190
TOTAL	120	290	TOTAL	119	530	TOTAL	120	555	TOTAL	119	680	TOTAL	120	060

TALLY SUMMARY

GROUP NO.	LENGTH	
1-10	120	180
11-20	120	290
21-30	120	255
31-40	119	530
41-50	119	920
51-60	120	555
61-70	119	870
71-80	119	680
81-90	119	090
91-100	120	060
TOTAL	1199	430

	JTS	LENGTH	
BROUGHT FORWARD			
PAGE TOTAL			
TOTAL ON LOCATION			
TOTAL LEFT OUT (incl. L.J.)			
TOTAL PERMANENTLY IN HOLE			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

Jts. #1-131 inclusive are 8 rd, 69.9 kg/m

Jts. #132 - 289 inclusive are Buttress 64.7 kg/m

* Out of string

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: December 1 19 79

Size: 244.5mm Weight: 69.9 & 64.7 ~~xxx~~ kg/m Thread: 8 rd and Buttress Grade: MN-80 Make:

Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
1	12	100	21	11	980	41	11	930	61	11	625	81	11	740
2	12	045	22	12	000	42	11	820	62	11	870	82	11	930
3	12	150	23	12	045	43	11	180	63	11	680	83	11	870
4	12	095	24	12	010	44	11	635	64	11	805	84	11	715
5	11	945	25	12	980	45	11	760	65	11	710	85	11	830
6	12	030	26	12	065	46	11	845	66	12	065	86	11	720
7	12	040	27	12	325	47	11	795	67	12	070	87	11	480
8	11	315	28	11	965	48	11	915	68	12	070	88	11	970
9	11	960	29	12	000	49 *	11	990	69	11	890	89	11	775
10	12	040	30	12	200	50	11	645	70	12	030	90	11	775
TOTAL	119	720	TOTAL	121	570	TOTAL	117	515	TOTAL	118	815	TOTAL	117	805
Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
11	12	030	31	12	050	51	11	780	71	11	730	91	11	735
12	11	765	32	11	560	52	11	720	72	11	845	92	11	580
13	12	055	33	11	380	53	12	080	73	11	775	93	11	730
14 *	11	785	34	11	575	54	11	800	74	11	315	94	11	665
15	12	035	35	11	945	55	11	710	75	11	880	95	11	450
16	12	250	36	11	655	56	11	850	76	11	750	96	11	890
17	12	025	37	11	660	57	11	680	77 DV Tool	11	880	97	11	750
18	12	050	38	11	420	58	10	815	78	11	760	98	11	580
19	11	900	39	11	975	59	11	820	79	11	735	99	11	765
20	12	165	40	11	635	60	11	600	80	11	755	100	12	035
TOTAL	120	060	TOTAL	116	855	TOTAL	116	855	TOTAL	117	425	TOTAL	117	180

TALLY SUMMARY

GROUP NO.	LENGTH	
1-10	119	720
11-20	120	060
21-30	121	570
31-40	116	855
41-50	117	515
51-60	116	855
61-70	118	815
71-80	117	425
81-90	117	805
91-100	117	180
TOTAL	1183	800

	JTS	LENGTH	
BROUGHT FORWARD			
PAGE TOTAL			
TOTAL ON LOCATION			
TOTAL LEFT OUT (incl. L.J.)			
TOTAL PERMANENTLY IN HOLE			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

Jts. #1 - 131 inclusive are 8 rd and Jts. #132 - 289 inclusive are Buttress

* Out

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: December 1 19 79

Size: 244.5mm Weight: 64.7 kg/m ~~Kt.~~ Thread: Buttress Grade: MN80 Make: _____

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	11 950	21	11 460	41	11 750	61	11 860	81 *	11 750
2	11 756	22	11 720	42	11 565	62	11 695	82 *	11 845
3	11 745	23	11 600	43	12 100	63	11 440	83 *	11 815
4	11 835	24	11 670	44	12 070	64 *	12 080	84 *	11 750
5	11 420	25	11 240	45	11 715	65	12 090	85 *	12 085
6	12 525	26	10 960	46	11 675	66	11 785	86 *	12 080
7	11 830	27	11 720	47	11 870	67	11 850	87 *	11 795
8	12 030	28	11 660	48	11 725	68	11 795	88 *	11 960
9	11 455	29 *	11 810	49	11 785	69	11 915	89 *	11 950
10	11 600	30	11 710	50	11 590	70	11 550	90	
TOTAL	118 146	TOTAL	115 550	TOTAL	117 845	TOTAL	118 060	TOTAL	107 030
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	11 950	31	12 090	51	11 765	71	12 058	91	
12	11 725	32	11 895	52	11 610	72	11 740	92	
13	11 800	33	11 760	53	11 745	73	11 385	93	
14	11 970	34	11 900	54	12 085	74	11 350	94	
15	11 610	35	11 835	55	11 870	75	11 750	95	
16	11 845	36	11 815	56	11 865	76	11 825	96	
17	11 660	37	11 740	57	12 080	77	11 630	97	
18	11 850	38	11 750	58	11 465	78	12 100	98	
19	11 910	39	11 935	59	11 660	79	11 740	99	
20	11 845	40	11 805	60	11 985	80	11 415	100	
TOTAL	118 165	TOTAL	118 525	TOTAL	118 130	TOTAL	116 993	TOTAL	

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH
1-10	118 146		
11-20	118 165		
21-30	115 550		
31-40	118 525		
41-50	117 845		
51-60	118 130		
61-70	118 060		
71-80	116 993		
81-90	107 030		
91-100			
TOTAL	1048 444		

BROUGHT FORWARD

PAGE TOTAL

TOTAL ON LOCATION

TOTAL LEFT OUT (incl. L.J.)

TOTAL PERMANENTLY IN HOLE

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

This page is all Buttress thread

* Out of string

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: February 15 19 80

Size: 177.8mm Weight: 47.6 kg/m ~~Wt.~~ Thread: 8 rd Grade: MN 80 Make: Sumitomo

Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Numoer	LENGTH		Joint Number	LENGTH	
1	11	993	21	11	913	41	12	020	61	11	828	81	11	926
2	11	985	22	11	996	42	11	946	62	11	723	82	11	587
3	11	943	23	11	930	43	11	816	63	11	796	83	11	998
4	11	986	24	11	893	44	11	862	64	11	731	84	12	018
5	11	845	25	12	012	45	11	833	65	11	454	85	11	879
6	11	930	26	11	528	46	12	011	66	11	918	86	11	860
7	12	053	27	11	962	47	12	035	67	12	030	87	11	955
8	11	842	28	11	937	48	11	261	68	11	862	88	11	855
9	11	962	29	11	902	49	12	032	69	11	815	89	11	859
10	11	990	30	11	948	50	11	985	70	11	971	90	11	390
TOTAL	119	529	TOTAL	119	021	TOTAL	118	801	TOTAL	118	128	TOTAL	118	327
Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Numoer	LENGTH		Joint Number	LENGTH	
11	11	829	31	11	930	51	11	780	71	11	946	91	12	030
12	11	984	32	11	950	52	11	528	72	12	029	92	12	033
13	12	051	33	11	799	53	12	040	73	11	609	93	11	858
14	11	676	34	12	013	54	12	005	74	12	022	94	12	045
15	12	003	35	11	955	55	11	876	75	11	980	95	12	052
16	12	055	36	12	000	56	11	327	76	11	386	96	11	018
17	11	326	37	11	906	57	11	434	77	11	850	97	12	008
18	11	970	38	11	909	58	11	806	78	11	846	98	11	562
19	12	054	39	11	861	59	11	836	79	12	018	99	12	060
20	11	922	40	11	380	60	11	984	80	11	868	100	11	895
TOTAL	118	870	TOTAL	118	703	TOTAL	117	616	TOTAL	118	554	TOTAL	118	561

DV TOOL →

TALLY SUMMARY

GROUP NO.	LENGTH		JTS	LENGTH		
1-10	119	529	332	4010	383	BROUGHT FORWARD
11-20	118	870	100	1186	110	PAGE TOTAL
21-30	119	021	432	5196	493	TOTAL ON LOCATION
31-40	118	703	64	763	541	TOTAL LEFT OUT (incl. L.J.)
41-50	118	801	368	4432	952	TOTAL PERMANENTLY IN HOLE
51-60	117	616				
61-70	118	128				
71-80	118	554				
81-90	118	327				
91-100	118	561				
TOTAL	1186	110				

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.) Baker Stage Cement collar installed between jts. 96&97 - @ 3291.415

Baker float shoe - .530 m

Baker float collar - .550 m

2 Crossover subs - .425 m

Baker Stage Cementer - .700 m

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Kotaneelee YT I-48 DATE: February 15 1980

Size: 177.8mm Weight: 47.6 kg/m xxx. Thread: 8 rd Grade: MN 80 Make: Sumitomo

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	12 016	21	12 034	41	11 862	61	11 780	81 *	11 416
2	11 563	22	11 738	42	11 854	62	11 847	82 *	11 989
3	12 000	23	11 989	43	11 915	63	12 016	83 *	12 038
4	11 600	24	12 040	44	12 040	64	11 988	84 *	11 482
5	11 492	25	11 699	45	12 037	65	12 037	85 *	11 745
6	12 035	26	11 885	46	12 032	66	11 790	86 *	11 967
7	11 985	27	11 886	47	11 075	67	11 746	87 *	11 960
8	11 460	28	11 822	48	11 875	68 *	11 590	88 *	12 042
9	11 835	29	11 768	49	11 599	69 *	11 747	89 *	11 839
10	12 029	30	11 772	50	11 890	70 *	11 968	90 *	11 642
TOTAL	118 015	TOTAL	118 633	TOTAL	118 179	TOTAL	118 509	TOTAL	118 120
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	11 830	31	12 028	51	11 837	71 *	11 850	91 *	11 987
12	12 040	32	11 946	52	11 986	72 *	11 729	92 *	11 785
13	11 984	33	11 740	53	12 024	73 *	12 027	93 *	11 780
14	11 896	34	11 778	54	11 910	74 *	11 644	94 *	11 885
15	11 909	35	12 037	55	11 950	75 *	11 892	95 *	12 050
16	11 722	36	11 872	56	12 043	76 *	11 556	96 *	11 852
17	11 925	37	11 882	57	11 762	77 *	11 805	97 *	11 763
18	12 026	38	11 850	58	11 964	78 *	11 996	98 *	12 000
19	11 950	39	11 975	59	12 011	79 *	11 770	99 *	12 032
20	11 906	40	11 953	60	11 862	80 *	11 940	100 *	11 996
TOTAL	119 188	TOTAL	119 061	TOTAL	119 349	TOTAL	118 209	TOTAL	119 130

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH
1-10	118 015		
11-20	119 188		
21-30	118 633		
31-40	119 061		
41-50	118 179		
51-60	119 349		
61-70	118 509		
71-80	118 209		
81-90	118 120'		
91-100	119 130		
TOTAL	1186 393		

BROUGHT FORWARD		
PAGE TOTAL		
TOTAL ON LOCATION		
TOTAL LEFT OUT (incl. L.J.)		
TOTAL PERMANENTLY IN HOLE		

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

This page is all 47.6 kg/m, 8 rd.

Joints #168 to #200 inclusive left out of string.

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Kotaneelee YT I-48 DATE: February 15 1980

Size: 177.8mm Weight: ___ #/Ft. ___ Thread: 8 rd & Butt Grade: N80 Make: ___

Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
1 *	12	044	21	11	845	41	11	997	61	13	200	81	11	872
2 *	11	984	22	11	538	42	12	538	62	11	412	82	13	288
3 *	11	896	23	11	982	43	13	486	63	12	905	83	13	456
4 *	11	907	24	13	014	44	12	580	* 64	12	415	84	13	453
5 *	12	010	25	13	412	45	10	510	65	11	694	85	13	338
6 *	11	949	26	12	328	46	12	570	66	11	266	86	10	293
7 *	12	039	27	13	107	47	11	559	67	10	680	87	10	043
8 *	11	973	28	10	440	48	13	425	68	13	419	88	11	075
9 *	11	960	29	11	383	49	12	976	69	12	160	89	12	752
10 *	11	922	30	12	026	50	12	847	70	11	564	90	12	109
TOTAL	119	684	TOTAL	121	075	TOTAL	124	488	TOTAL	120	715	TOTAL	121	679

43.1 kg/m

Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH		Joint Number	LENGTH	
11 *	12	036	31	12	932	51	12	079	71	13	364	91	11	854
12 *	12	039	32	12	561	52	13	442	72	11	473	92	11	675
13 *	11	814	33	11	006	53	12	458	73	12	267	93	12	362
14 *	12	013	34	12	399	54	11	086	74	12	653	94	12	308
15 *	11	804	35	13	142	55	13	559	75	12	288	95	11	074
16 *	12	024	36	11	410	56	12	367	76	13	744	96	13	345
17 *	11	927	37	11	286	57	13	368	77	12	550	97	13	332
18 *	11	879	38	12	194	58	12	247	78	10	341	98	10	582
19 *	11	772	39	11	578	59	12	290	79	13	167	99	11	320
20 43.1 kg/m	13	632	40	13	151	60	13	398	80	11	890	100	10	805
TOTAL	120	940	TOTAL	121	659	TOTAL	126	294	TOTAL	123	737	TOTAL	118	657

47.6 kg/m

TALLY SUMMARY

GROUP NO.	LENGTH	
1-10	119	684
11-20	120	940
21-30	121	075
31-40	121	659
41-50	124	488
51-60	126	294
61-70	120	715
71-80	123	737
81-90	121	679
91-100	118	657
TOTAL	1218	928

	JTS	LENGTH	
BROUGHT FORWARD			
PAGE TOTAL			
TOTAL ON LOCATION			
TOTAL LEFT OUT (incl. L.J.)			
TOTAL PERMANENTLY IN HOLE			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

Jts. #300 - #319 inclusive are 47.6 kg/m

Jts. #320 - #400 inclusive are 43.1 kg/m

Jts. #264 left out of string

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Kotaneelee YT I-48 DATE: February 15 19 80

Size: 177.8mm Weight: 43.1 kg/m ~~XXX~~ Thread: Buttress Grade: N-80 Make:

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	13 500	21	12 124	41	12 698	61	11 772	81	12 095
2	13 758	22	12 694	42	11 796	62	11 532	82	12 110
3	12 607	23	12 460	43	12 328	63	13 876	83	12 193
4	11 921	24	11 100	44	12 819	64	11 482	84	11 816
5	12 414	25	11 752	45	11 049	65	12 786	85	12 490
6	12 731	26	13 176	46	12 352	66	11 284	86	13 572
7	11 891	27	12 138	47	13 078	67	11 030	87 *	13 070
8	13 104	28	11 792	48	11 848	68	12 724	88	12 200
9	10 915	29	11 700	49	12 990	69	12 834	89	12 952
10	11 587	30	11 629	50	12 352	70	12 942	90	12 684
TOTAL	124 428	TOTAL	120 565	TOTAL	123 310	TOTAL	122 262	TOTAL	125 182
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	12 940	31	11 824	51	12 548	71	13 434	91	11 922
12	13 464	32	12 440	52	11 425	72	10 730	92	12 578
13	13 290	33	11 190	53	13 075	73	12 695	93	11 315
14	12 040	34	11 280	54	11 638	74	11 285	94	13 216
15	11 903	35	11 615	55	12 737	75	12 472	95	13 218
16	10 772	36	13 216	56	12 120	76	12 700	96	13 059
17	10 942	37	11 801	57	12 583	77	13 074	97	13 056
18	12 535	38	10 957	58	12 237	78	11 795	98 *	11 935
19	12 416	39	12 134	59	13 182	79	12 724	99 *	13 281
20	12 100	40	11 820	60	11 320	80	11 442	100 *	12 595
TOTAL	122 402	TOTAL	118 277	TOTAL	122 865	TOTAL	122 351	TOTAL	126 175

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH
1-10	124 428		
11-20	122 402		
21-30	120 565		
31-40	118 277		
41-50	123 310		
51-60	122 865		
61-70	122 262		
71-80	122 351		
81-90	125 182		
91-100	126 175		
TOTAL	1227 817		

	JTS	LENGTH
BROUGHT FORWARD		
PAGE TOTAL		
TOTAL ON LOCATION		
TOTAL LEFT OUT (incl. L.J.)		
TOTAL PERMANENTLY IN HOLE		

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

Jts. #387 left out of string

Jts. 398 to 406 incl. left out of string

This page is all 43.1 kg/m

Tallied by: Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Kotaneelee YT I-48 DATE: February 15 19 80

Size: 177.8mm Weight: ~~52.1 kg/m~~ 43.1 #/Ft. Thread: Buttress Grade: N80 Make:

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1 *	10 788	21	11 305	41		61		81	
2 *	12 586	22	11 845	42		62		82	
3 *	12 285	23	11 845	43		63		83	
4 *	11 852	24	11 922	44		64		84	
5 *	12 361	25	11 962	45		65		85	
6 *	11 345	26	11 830	46		66		86	
7	11 905	27	11 904	47		67		87	
8	11 825	28	11 585	48		68		88	
9	11 541	29	11 905	49		69		89	
10	11 908	30	11 762	50		70		90	
TOTAL	118 396	TOTAL	117 865	TOTAL		TOTAL		TOTAL	
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	11 750	31	11 968	51		71		91	
12	11 592	32 *	11 272	52		72		92	
13	11 820	33		53		73		93	
14	11 608	34		54		74		94	
15	11 934	35		55		75		95	
16	11 984	36		56		76		96	
17	11 385	37		57		77		97	
18	11 922	38		58		78		98	
19	11 775	39		59		79		99	
20	11 974	40		60		80		100	
TOTAL	117 744	TOTAL	23 240	TOTAL		TOTAL		TOTAL	

~~52.1 kg/m~~ 43.1 kg/m

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH	
1-10	118 396			BROUGHT FORWARD
11-20	117 744			PAGE TOTAL
21-30	117 865			TOTAL ON LOCATION
31-40	23 240			TOTAL LEFT OUT (incl. L.J.)
41-50				TOTAL PERMANENTLY IN HOLE
51-60				
61-70				
71-80				
81-90				
91-100				
TOTAL	377 245			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

Jt #432 left out of string (52.1 kg/m)

Tallied by Joe MacDonald

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: March 31 19 80

Size: _____ Weight: _____ #/Ft. 9.3 Thread: CS Grade: L-80 Make: Hydril

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	9 67	21	9 26	41	9 59	61	9 71	81	9 67
2	9 15	22	9 69	42	9 72	62	9 70	82	9 70
3	9 70	23	9 58	43	9 74	63	9 69	83	9 69
4	9 69	24	9 66	44	9 57	64	9 70	84	9 16
5	9 69	25	9 15	45	9 70	65	9 69	85	9 69
6	9 71	26	9 72	46	9 70	66	9 71	86	9 70
7	9 68	27	9 66	47	9 70	67	9 62	87	9 71
8	9 69	28	9 70	48	9 70	68	9 70	88	9 70
9	9 68	29	9 69	49	9 71	69	9 15	89	9 73
10	9 71	30	9 70	50	9 70	70	8 85	90	9 68
TOTAL	96 37	TOTAL	95 81	TOTAL	96 83	TOTAL	95 52	TOTAL	96 43
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	9 71	31	9 71	51	9 70	71	9 59	91	9 59
12	9 70	32	9 60	52	9 70	72	9 74	92	8 67
13	9 69	33	9 69	53	9 70	73	9 70	93	9 68
14	9 72	34	9 64	54	9 70	74	9 69	94	9 57
15	9 69	35	9 65	55	9 70	75	9 70	95	9 60
16	9 70	36	9 67	56	9 69	76	9 67	96	9 68
17	9 70	37	9 67	57	9 70	77	9 71	97	9 68
18	9 58	38	9 71	58	9 71	78	9 70	98	9 75
19	9 72	39	9 67	59	9 59	79	9 57	99	9 72
20	8 96	40	9 70	60	9 71	80	9 70	100	9 69
TOTAL	95 90	TOTAL	96 71	TOTAL	96 90	TOTAL	96 77	TOTAL	95 63

TALLY SUMMARY

GROUP NO.	LENGTH
1-10	96 37
11-20	95 90
21-30	95 81
31-40	96 71
41-50	96 83
51-60	96 90
61-70	95 52
71-80	96 77
81-90	96 43
91-100	95 63
TOTAL	962 87

	JTS	LENGTH
BROUGHT FORWARD		
PAGE TOTAL		
TOTAL ON LOCATION		
TOTAL LEFT OUT (incl. L.J.)		
TOTAL PERMANENTLY IN HOLE		

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

389 joints 3746.78 m

Tallied by R. L. Toole

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: March 31 1980

Size: _____ Weight: _____ #/Ft. _____ Thread: _____ Grade: _____ Make: _____

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	9 67	21	9 72	41	9 59	61	9 75	81	9 66
2	9 57	22	9 73	42	8 91	62	9 67	82	9 72
3	9 70	23	9 70	43	9 68	63	9 68	83	9 71
4	9 67	24	9 58	44	9 73	64	9 70	84	9 19
5	9 73	25	9 72	45	9 55	65	9 74	85	9 68
6	9 65	26	9 54	46	9 72	66	9 71	86	9 69
7	9 71	27	9 69	47	9 68	67	9 68	87 OUT	9 67
8	9 61	28	9 71	48	9 64	68	9 67	88	9 71
9	9 71	29	9 58	49	9 62	69	9 68	89	9 70
10	9 70	30	9 61	50	9 58	70	9 43	90	9 64
TOTAL	96 72	TOTAL	96 58	TOTAL	95 70	TOTAL	96 71	TOTAL	96 37
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	9 65	31	9 71	51	9 70	71	9 69	91	9 69
12	9 58	32	9 57	52	9 67	72	9 70	92	9 70
13	9 69	33	9 75	53	9 67	73	9 71	93	9 70
14	9 62	34	9 61	54	9 58	74	9 68	94	9 74
15	9 60	35	9 61	55	9 67	75	9 69	95	9 67
16	9 58	36	9 71	56	9 15	76	9 71	96	9 69
17	9 70	37	9 60	57	9 71	77	9 63	97	9 70
18	9 67	38	9 57	58	9 71	78	9 21	98	9 69
19	9 71	39	9 66	59	9 70	79	9 63	99	9 72
20	9 76	40	9 57	60	9 69	80	9 69	100	9 69
TOTAL	96 56	TOTAL	96 36	TOTAL	96 25	TOTAL	96 44	TOTAL	96 99

TALLY SUMMARY

GROUP NO.	LENGTH
1-10	96 72
11-20	96 56
21-30	96 58
31-40	96 36
41-50	95 70
51-60	96 25
51-70	96 71
71-80	96 44
81-90	96 37
91-100	96 99
TOTAL	964 68

	JTS	LENGTH
BROUGHT FORWARD		
PAGE TOTAL		
TOTAL ON LOCATION		
TOTAL LEFT OUT (incl. L.J.)		
TOTAL PERMANENTLY IN HOLE		

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.) _____

Tallied by _____

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: April 1 19 80

Size: _____ Weight: _____ #/Ft. _____ Thread: _____ Grade: _____ Make: _____

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	9 71	21	9 70	41	9 71	61	9 72	81	9 69
2	9 69	22	9 72	42	9 68	62	9 69	82	9 71
3	9 69	23	9 72	43	9 69	63	9 68	83	9 71
4	9 71	24	9 71	44	9 72	64	9 69	84	9 68
5	9 70	25	9 15	45	9 63	65	9 71	85	9 75
6	9 68	26	8 97	46	9 23	66	9 70	86	9 71
7	9 70	27	9 70	47	9 70	67	9 70	87	9 71
8	9 70	28	9 68	48	9 75	68	9 69	88	9 71
9	9 72	29	9 28	49	9 71	69	9 72	89	9 70
10	9 69	30	9 13	50	9 70	70	9 70	90	9 10
TOTAL	96 99	TOTAL	94 76	TOTAL	96 52	TOTAL	97 00	TOTAL	96 47
Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	9 67	31	9 71	51	9 69	71	9 71	91	9 70
12	9 69	32	9 71	52	9 64	72	9 72	92	9 65
13	9 69	33	9 69	53	9 72	73	9 20	93	9 69
14	8 91	34	9 71	54	9 68	74	9 69	94	9 74
15	9 20	35	9 71	55	9 70	75	9 70	95	9 70
16	9 72	36	9 17	56	9 70	76	9 69	96	9 67
17	9 68	37	9 70	57	9 71	77	9 72	97	9 68
18	9 70	38	9 72	58	9 70	78	9 70	98	9 69
19	9 24	39	9 70	59	9 72	79	9 23	99	9 70
20	9 70	40	9 71	60	9 71	80	9 74	100	9 69
TOTAL	95 20	TOTAL	96 53	TOTAL	96 97	TOTAL	96 10	TOTAL	96 91

TALLY SUMMARY

GROUP NO.	LENGTH
1-10	96 99
11-20	95 20
21-30	94 76
31-40	96 53
41-50	96 52
51-60	96 97
61-70	97 00
71-80	96 10
81-90	96 47
91-100	96 91
TOTAL	963 45

	JTS	LENGTH	
BROUGHT FORWARD			
PAGE TOTAL			
TOTAL ON LOCATION			
TOTAL LEFT OUT (incl. L.J.)			
TOTAL PERMANENTLY IN HOLE			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.) _____

Tallied by _____

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

TUBULAR TALLY

WELL: Columbia et al Kotaneelee YT I-48 DATE: _____ 19___

Size: _____ Weight: _____ #/Ft. _____ Thread: _____ Grade: _____ Make: _____

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
1	9 72	21	9 69	41	9 68	61	9 69	81 *	9 70
2	9 70	22	9 70	42	9 65	62	9 70	82 *	9 26
3	9 70	23	9 13	43	9 70	63	9 70	83 *	9 70
4	9 71	24	9 71	44	9 65	64	9 69	84 *	9 72
5	9 77	25	9 68	45	9 70	65	9 69	85 *	9 74
6	9 70	26	9 70	46	9 23	66	8 92	86 *	9 72
7	9 70	27	9 71	47	9 72	67	9 24	87 *	9 72
8	9 71	28	9 66	48	9 70	68	9 70	88 *	9 70
9 *	9 71	29	9 68	49	9 69	69	9 70	89	9 68
10	9 70	30	9 65	50	9 68	70	9 72	90	
TOTAL	97 12	TOTAL	96 31	TOTAL	96 40	TOTAL	95 75	TOTAL	86 94

Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH	Joint Number	LENGTH
11	9 69	31	9 68	51	9 67	71	9 72	91	
12	9 71	32	9 69	52	9 71	72	9 71	92	
13	9 64	33	9 70	53	9 66	73	8 93	93	
14	9 25	34	9 19	54	9 67	74	9 75	94	
15	9 68	35	9 69	55	8 72	75	9 68	95	
16	9 71	36	9 70	56	9 74	76 *	9 71	96	
17	8 84	37	9 21	57	9 68	77 *	9 70	97	
18	9 70	38	9 70	58	9 70	78 *	9 71	98	
19	9 70	39	9 69	59	9 16	79 *	9 70	99	
20	9 67	40	9 70	60	9 70	80 *	9 70	100	
TOTAL	95 59	TOTAL	95 95	TOTAL	95 41	TOTAL	96 31	TOTAL	

TALLY SUMMARY

GROUP NO.	LENGTH	JTS	LENGTH	
1-10	97 12			BROUGHT FORWARD
11-20	95 59			PAGE TOTAL
21-30	96 31	389	3746 78	TOTAL ON LOCATION
31-40	95 95	16	154 84	TOTAL LEFT OUT (incl. L.J.)
41-50	96 40	373	3591 94	TOTAL PERMANENTLY IN HOLE
51-60	95 41			
61-70	95 75			
71-80	96 31			
81-90	86 94			
91-100				
TOTAL	855 78			

* Left out

** Damaged

(Note transfer of left out joints to where and by whom.)

REMARKS: (Use separate page for each weight, grade or thread.)

389 jts. - 3746.78

373 jts. - 3591.94

Tallied by MacDonald & Toole

PERFORATION RECORD

DATE	FROM	TO	REMARKS
2/26/80	4266m	4274m	4 Hyperjet shots/m 90°
3/17/80	4390	4402	" " "
3/20/80	4266	4274	" " "
3/24/80	4050	4073	" " "
3/25/80	3625	3627	" " "
3/30/80	3654	3681	" " 180°
3/30/80	3745.5	3756	" " "
3/30/80	3801	3807	" " "
3/30/80	3826.5	3840	" " "
3/31/80	3767	3781	" " "

CEMENTING RECORD

DATE	FROM	TO	REMARKS
3/28/80	3625		Cement squeeze through perforations 3625 to 3627 Halliburton EZE drill cement retainer 6.6 Tonnes OWG
3/25/80		4027	Baker bridge plug only

NOWSCO WELL SERVICES LTD.

TREATMENT REPORT FRACTURING

DATE 1980-06-13
OUR SERVICE ORDER # 53090

TYPE OF TREATMENT: Gelled Acid Frac

OWNER: Columbia Gas Dev. of Canada
WELL NAME AND NUMBER: Columbia et al Kotaneelee
LOCATION: Y-T-I-48

PROVINCE: Yukon
MAILING ADDRESS: 639 - 5 Avenue S.W., Calgary, Alberta T2P 0M9

FORMATION: Wahanni
TUBING SIZE: 88.9 mm
LINEAR DENSITY / DEPTH: 3600
PACKER DEPTH: 3600

CASING SIZE: 177.8 mm
LINEAR DENSITY: 47.68 kg/m
CASING: 14.2
TUBING: X
ALLOWABLE PRESSURE: CSG 25,000 kPa, TBG 63,000 kPa

O.H. SIZE	SHOTS	FROM	TO	CHECK ZONE TREATED
mm	3	3654 m	3781 m	

TREATING FLUID ADDITIVES:

Additive	Amount	Unit
G-309	6 kg/m³	
AI-350	20	X or L per 1000 L (X)
WS-50	1	X or L per 1000 L (X)
DL-12	4	X or L per 1000 L (X)
KCL	30	kg X per 1000 L (X)
CO_2 on flush at 90 m³/m³		
50 Ball Sealers F-654-6		X per X

KILOWATTS USED: 1800
TOTAL FLUID: 177.5

INJECTION RATES: TREATING 1.6-3.3; FLUSH 3.3; AVERAGE 2.9

PRESSURES: BREAKDOWN 47,000 kPa; MINIMUM 20,000; MAXIMUM 47,000 kPa; ISIP 35,000 kPa; 10,000 kPa; 15 MIN. 400

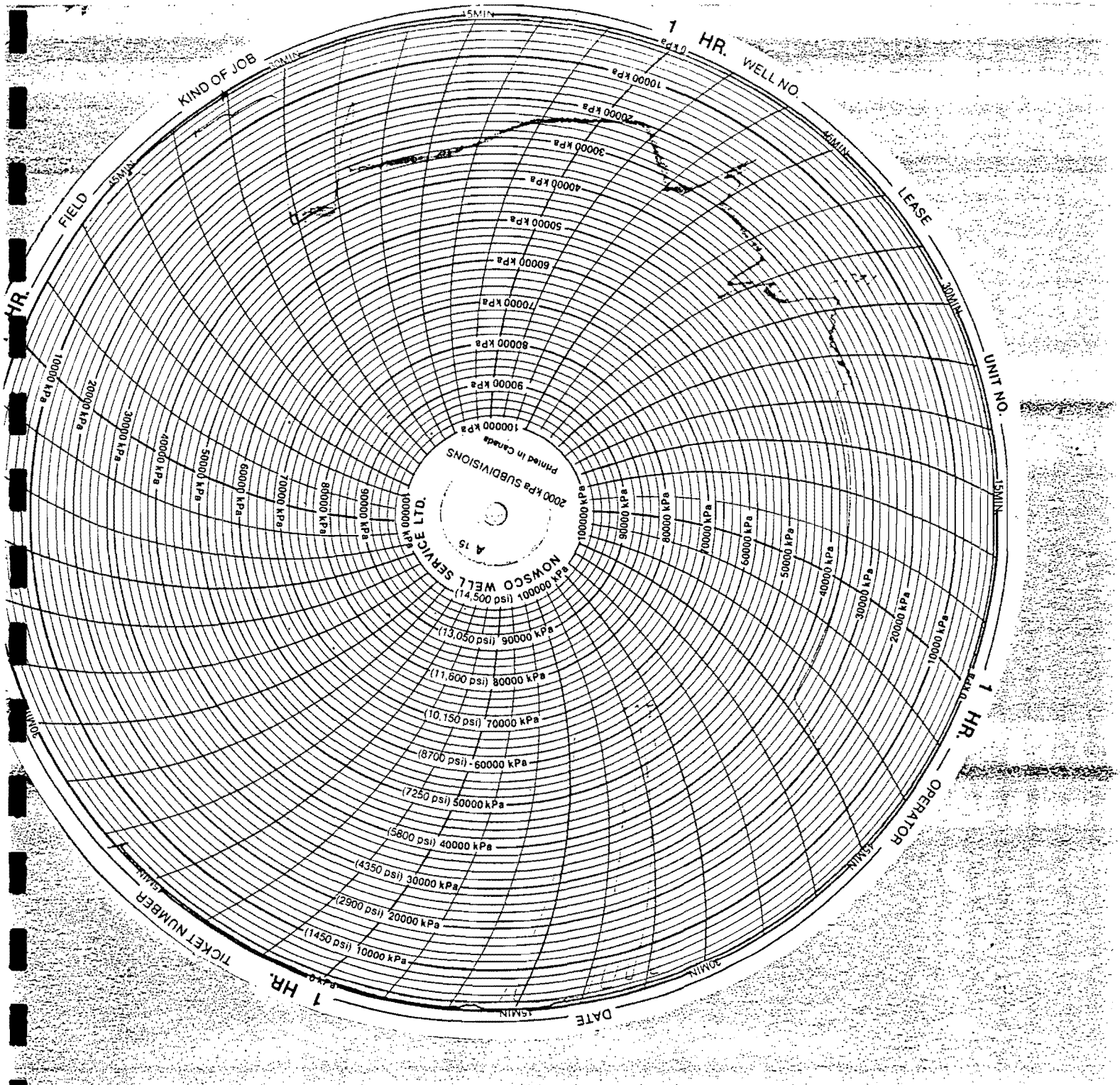
PROPPING AGENT: MESH / VOLUME

14.2 — BREAKDOWN 149.1

14.2

TIME	PRESSURE CASING	PRESSURE TUBING	FLUID			RATE	REMARKS
06:00							Arrive on location, rig up, down tubing.
08:00							Wait on water and hot oiler.
10:00							Mix chemicals.
15:00							Set pop valve at 25,000 kPa.
16:58	21000						Pressure annulus to 21,000 kPa.
16:25	21000						Pressure test Nowsco lines to 66,500 kPa.
16:50	21000						Have safety meeting.
17:24	21000	30000					Start acid hole fill.
17:25	21000	30000	2.0	2.0		2.0	Start balls, one every 3 BBL or .5m³.
17:32	21000	24000	14.0	12.0		1.6	Hole full, pick up rate.
17:45	21000	30000	50.0	38.0	38	2.8	Pumper slowing rate on acid fix on job.
17:47	21000	22000	54.6	4.6	42.6	2.3	Pick up rate.
18:05	21000	26000	109	54.4	97	2.8	Still on acid and balls.
18:24	21000	32200	163.3	54.3	151.3	3.0	End acid and balls onto water flush and CO_2 at 90m³
18:30	21000	35000	177.5	14.2	165.5	3.3	End flush, stop pumps.
18:50							Rig out and move to next location.

NOWSCO REPRESENTATIVE


1 HR.
WELL NO.
LEASE
UNIT NO.
OPERATOR
DATE
TICKET NUMBER
1 HR.
HR.
FIELD
KIND OF JOB
15MIN
30MIN
45MIN
0 kPa
10000 kPa
20000 kPa
30000 kPa
40000 kPa
50000 kPa
60000 kPa
70000 kPa
80000 kPa
90000 kPa
100000 kPa
2000 kPa SUBDIVISIONS
Printed in Canada
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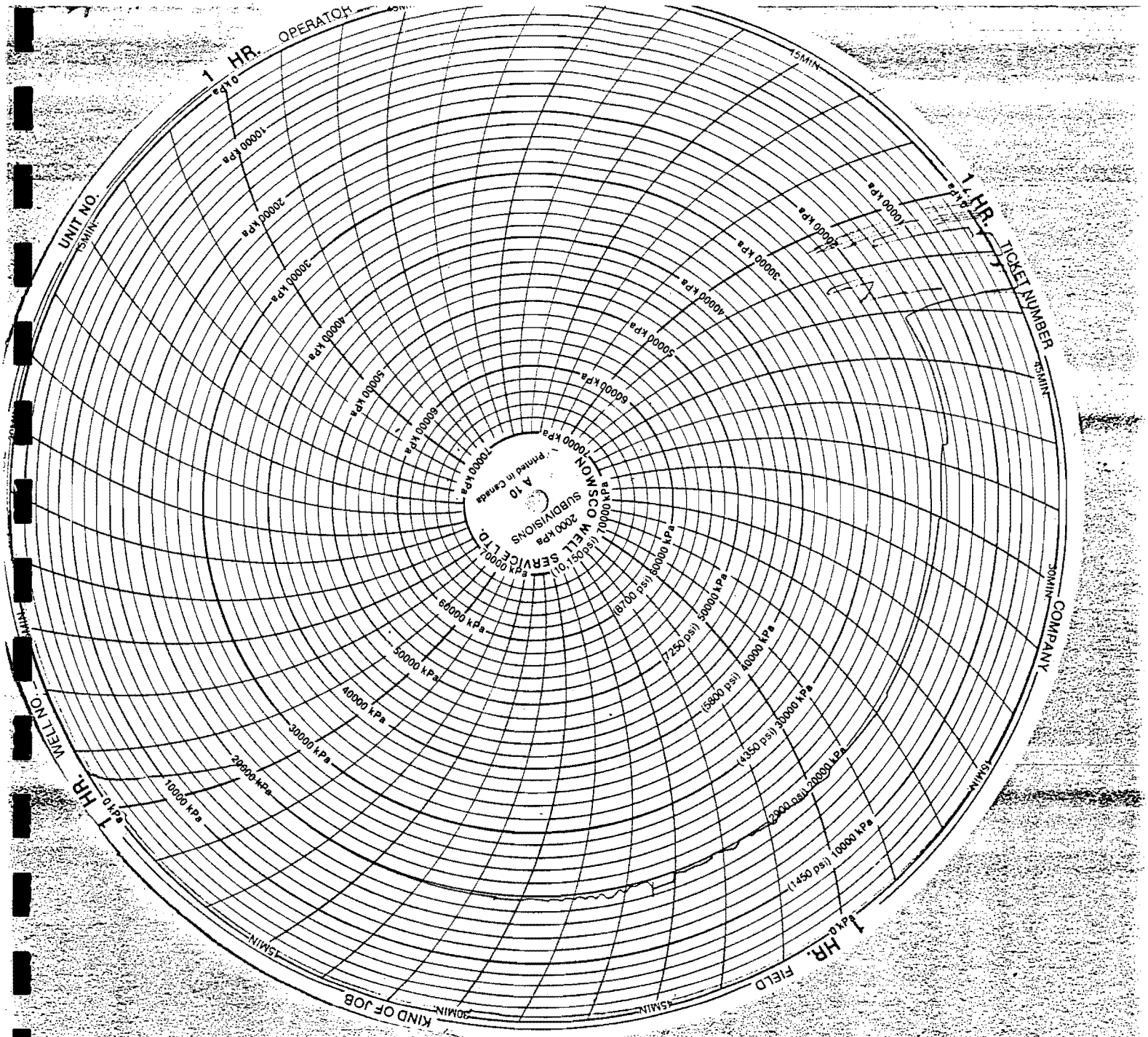
NOWSCO WELL SERVICE LTD.
(14,500 psi) 100000 kPa
(13,050 psi) 90000 kPa
(11,600 psi) 80000 kPa
(10,150 psi) 70000 kPa
(8700 psi) 60000 kPa
(7250 psi) 50000 kPa
(5800 psi) 40000 kPa
(4350 psi) 30000 kPa
(2900 psi) 20000 kPa
(1450 psi) 10000 kPa


1 HR.
OPERATOR
0 kPa
10000 kPa
20000 kPa
30000 kPa
40000 kPa
50000 kPa
60000 kPa
70000 kPa
15MIN
UNIT NO.
15MIN
1 HR.
TICKET NUMBER
15MIN
30MIN
COMPANY
15MIN
1 HR.
WELL NO.
0 kPa
10000 kPa
20000 kPa
30000 kPa
40000 kPa
50000 kPa
60000 kPa
70000 kPa
15MIN
KIND OF JOB
30MIN
15MIN
1 HR.
FIELD
0 kPa
(1450 psi) 10000 kPa
(2900 psi) 20000 kPa
(4350 psi) 30000 kPa
(5800 psi) 40000 kPa
(7250 psi) 50000 kPa
(8700 psi) 60000 kPa
70000 kPa
(10,150 psi) 70000 kPa
2000 kPa
SUBDIVISIONS
SCHLUMBERGER WELL SERVICES LTD.
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