

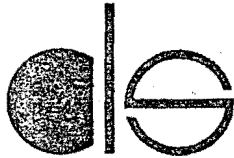
COLUMBIA ET AL KOTANEELEE

YT H-38

Core No. 1	8134 - 8169	35'
Core No. 2	11690 - 11750	60'
Core No. 3	12040 - 12-64	24'
Core No. 4	12260 - 12390	60'
Core No. 5	12450 - 12510	60'
Core No. 6	12708 - 12755	47'
Core No. 7	12755 - 12789	34'

Drill Stem Test No. 1	7725 - 7920	195'
Drill Stem Test No. 2	11630 - 11690	30'
Drill Stem Test No. 3	11680 - 11890	misrun
Drill Stem Test No. 4	11695 - 11890	misrun
Drill Stem Test No. 5	11620 - 11890	270'

	<u>Run No. 1</u>	<u>Run No. 2</u>	<u>Run No. 3</u>
CNL-FDC-GR	772 - 3020	3020 - 10804	10838 - 12780
DILL	772 - 3021	3020 - 10800	
BHCS	772 - 3018	3020 - 10756	10840 - 12788
Dual Laterlog			10840 - 12770
Sonic Wave Train			11450 - 12775
Open Hole Variable Density			11500 - 12776
Dipmeter			10840 - 12780



D&S PETROLEUM CONSULTANTS LTD.

DRILL STEM TEST REPORT

73F5

DST No. 1

Well COLUMBIA ET AL KOTANEELEE YT H38 Date August 10, 1977

Test Interval 7725 - 7920 Formation Mississippian

Testing Co. Johnston Type of Test Bottom Hole

Hole Size 12 1/4" Packer Size 11 1/2" Choke Size 1/2"

Auxiliary Equipment Safety joint, MFE Tool, Pump Out Sub, Surface Manifold

Time Record

Preflow 10 mins (1) ISI 30 (1) VO 64 mins (2) SI 128 mins

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

Gas Measurement

Preflow Description Strong initial puff, gas to surface in 6 minutes of preflow.

Blow Description Fair gas blow increasing to good in 10 minutes. Unloading mud in 25 minutes of flow period.

30 minutes - 1" choke, 50psi 1360 mcf

59 minutes - 1/8" choke, 31 psi 740 mcf unloading mud

Measured With _____

Fluid Recovery

Total Fluid 1350 ft Mud gas cut

Oil _____ Water _____

No. of samples _____ From _____

Samples Sent To _____

Pressure Readings

IHP 4008 (1) ISIP 3368 (1) FP 739 to 673 (2) SIP 2918

(2) FP _____ to _____ (3) FSIP 2918 FHP _____ BHT 186 ° F

Remarks Test satisfactory

John Dortch

Field Supervisor

Witness



JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
321 - 50th AVENUE S.E. CALGARY, ALBERTA T2G 2B3

District	Fort St. John Ticket No. E15042	Company	Columbia Gas Development of Canada Ltd.
Address	c/o D & S Consultants, 550 - 6 Avenue S.W.	Test No.	1 J.T. No. 1
	Calgary, Alberta T2P 0S2	Well Name	Columbia Gas Cotoneely
Field	Cotoneely	Number	YT H-38
Province	British Columbia	Date	August 10, 1977
Co. Rep.		Formation	
Technician	T. Thompson	Interval	7725 - 7920'
		Thickness	TD 7921'

TEST DATA			
Type of Test	Open hole, Bottom hole.		
Time Started in Hole	0330 Hrs.	Tool Opened	0828 Hrs.
First Flow	10 Min.	Initial Shut-In	30 Min.
Second Flow	64 Min.	Second Shut In	128 Min.
Third Flow	Min.	Final Shut In	Min.
Pulled Loose @	1330 Hrs.	Out of Hole	1900 Hrs.
Wt. Set/on Packers	30,000 #	Pulled Loose Wt.	#
Description of Blow During Test	Strong initial puff with gas to surface in 6 minutes on preflow. Fair gas blow on valve opening increasing to good in 10 minutes, began unloading mud in 25 minutes of flow period.		

TOOL SEQUENCE		
Tool	Length	O.D.
P.O. Sub	1.00	
D.P. Sub	.65	
MFE Tool	9.30	
Bypass Tool	2.85	
Safety Joint	1.75	
S.S. & Packer	11.50	11 1/2"
T.C. & Packer	6.00	11 1/2"
Total	33.05	
Packer Stub	1.50	
Perfs	9.00	
Recorder	4.25	
Recorder	4.30	
Sub	2.50	
Drill Collars	172.54	
Sub	.75	
Bull Nose	1.50	
Total Interval	196.34	

FLUID RECOVERY	Was Test Reverse Circulated	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Total Fluid Recovered	1,350		Ft.
Description of Fluid Recovered	1,350' Gas cut, drilling fluid.		

GAS BLOW MEASUREMENT			
Measured With Critical Flow Prover Gauge			2" I.D. Riser
Time	Size Choke	Reading psi	M Cubic Feet/Day
0918	1"	48	1300
0928	1"	52	1390
0938	1"	50	1360
Began unloading mud, choked back to 15 psi on gauge opened 4" valve to allow mud to escape.			
0948	1/8"	37	820
0958	1/8"	37	820
1009	1/8"	32	740
Still unloading mud.			

TOTAL LENGTH	
Elevation G.L.	2250 K.B. 2275
Bottom Hole Choke Size	1/2"
Fluid Cushion Type	Nil Amt.

REMARKS: Test satisfactory.
Lost approximately 15' of mud on preflow.

MUD AND HOLE DATA			
Mud Type	Gel Chem	W.L.	
Filter Cake	4 1/2/32"	Visc. 40	Wt. 9.8
Time Taken	2400 hours		
Contractor	Nabors Drilling	Rig No.	9
Drill Pipe Size	4 1/2" IF		
Drill Collar Size	4 1/2" XH &		
Drill Collar Length	406' &		
Main Hole Size	12 1/4" Rat Hole		

RESISTIVITY		SALT CONTENT	
Recovery Water	@	°F.	ppm.
Mud Pit sample filtrate	@	°F.	36.500 ppm.

Distribution of Reports 10 - Calgary Attention: Mr. L. Kerkoff

NOWSCC

WELL SERVICE LTD.

TREATMENT REPORT

007 2 7805

TYPE OF TREATMENT Pressure Test & Pumping				DATE June 21, 1977	
OWNER Columbia Oil & Gas		WELL NAME AND NUMBER		LOCATION H-38 Area 3 LSD ___ SEC ___ TWP ___ RGE ___ W ___	
PROVINCE Yukon		MAILING ADDRESS			
FORMATION			TUBING SIZE & DEPTH		PACKER DEPTH
CASING SIZE. WEIGHT & DEPTH		CASING VOLUME		ALLOWABLE PRESSURE	
		TUBING		CSG. TBG.	
O. H.		PERF.		SANDJET	
O. H. SIZE	SHOTS/FT	FROM	TO	CHECK ZONE TREATED	TREATING MATERIALS
					TYPE AMOUNT

PREVIOUS TREATMENT RECORD (SHOW DATES)

TIME A.M. OR P.M.	PRESSURE		BARRELS OF FLUID				ARRIVED AT LOCATION	A.M./P.M.
	CASING	TUBING	OUT OF TANKS	PER READING	IN FORMATION	PER MINUTE	REMARKS	
June 22							* Columbia Gas has recorder chart.	
9:00 A.M.		100					Mix & pump cement under rig matting	
1:00 P.M.		100					400 cu. ft. cement.	
							Stop pumping.	
June 23							Pressure test.	
12:00 A.M.		5000					Blind Rams - manifold valves.	
		5000					Pipe Rams - manifold valves.	
		5000					Pipe Rams - manifold valves.	
		5000					Manifold valves.	
		5000					Manifold valves.	
4:00 A.M.		2000					Hydrill.	
11:00 A.M.							Mix and pump cement under rig matting	
1:00 P.M.							100 cu. ft.	
3:30 P.M.							Pressure test 13 3/8 csg. 3022'.	
4:30 P.M.		3500					Hold 15 mins. test complete.	
June 24								
12:00 A.M.			2			2	Circulate csg. (depth of 3029).	
12:05 A.M.				2		1/4	Start pressure test.	
		1500	3 3/4			1/4		
		1650	4 1/4			1/4		
		1850	5 1/4			1/4		
		1730	6 1/4			1/4	Formation break down.	
		1700	6 3/4			1/4	Stop pumping.	
12:27 A.M.		1500					PSI bleed off. Rig out.	

JOHNSTON

Schlumberger

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

DRILL STEM TEST SPECIAL DATA ANALYSIS

Columbia Gas Development DST #5
Columbia Gas et al Kotaneelee H-38-60-10-124
E15088 'Nahanni 11,625 - 11,890' 11,890'
October 4, 1977

October 12, 1977

ATTENTION: JIM MACDONALD

Gentlemen:

The enclosed test appears to be a good mechanical drill stem test during which the tools functioned properly, and the formation produced enough reservoir fluid for proper identification. Reservoir pressure drawdown was sufficient and adequate shut-in build-ups occurred for reliable quantitative analysis.

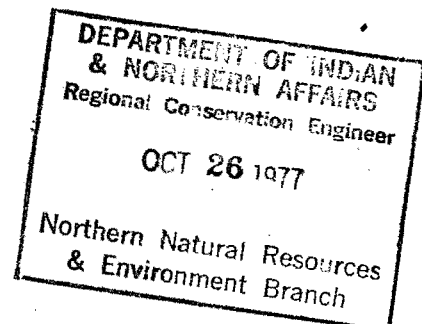
1. Flow Rate: A flow rate of 4700 MCF/day of gas was noted during this test.
2. Reservoir Pressure: Extrapolation of the initial shut-in pressure build-up indicates a maximum reservoir pressure of 5655 psig at recorder depth. Extrapolation of the final shut-in pressure build-up indicates a maximum reservoir pressure of 5638 psig at recorder depth. The difference between the initial and final shut-in pressure of 17 psi is insignificant.
3. Permeability: The calculated transmissibility factor of 5879 md.ft./cp. indicates an average effective permeability to gas of .59 md. for the reported 250 foot porous interval. The calculations were based on a slope of 1,060,000 psi²/log cycle obtained from the final shut-in build-up plot. It was assumed for these calculations: (a) gas gravity 0.70, (b) viscosity .025 cp., (c) and gas deviation factor 1.07. These figure were obtained from the available technical literature.
4. Well Bore Damage: The calculated damage ratio of 6.40 indicates that well bore damage is present at the time and conditions of this test. This value appears to be excessive and may be due to the partial penetration of the net productive interval by the test interval. If subsequent information confirms this possibility then the value D.T. should be discounted.
5. Radius of Investigation: The calculated radius of investigation of relatively low permeability effective to the reservoir fluid and well more damage is indicated. No unusual characteristics were noted from the analysis of the test data presented.

Yours truly,


Jose Cuesta

JC/jmh

2686



WELL: COLUMBIA GAS ET AL KOTANHELF H38 JTB

FLOW RATE PRIOR TO SHUT IN (MCF/DAY)		4700.000
COMPRESSIBILITY FACTOR Z		1.0700
HORNER PLOT SLOPE (PSI ² /LOG CYCLE)		1060000.
VISCOSITY (CP)		0.025
NET THICKNESS (FT)		250.000
MAX RESERVOIR PRESSURE (PSIG)		2655.0
FLOWING PRESSURE (PSIG)		895.0
FLOW TIME (MIN)		130.0
POROSITY		0.050
COMPRESSIBILITY (1/PSI)		0.00012000
WELL BORE RADIUS (IN)		4.25
WELL ELEVATION (FT)		2275.0
RECORDER DEPTH (FT)		11645.0
TEMPERATURE (DF)		297.0

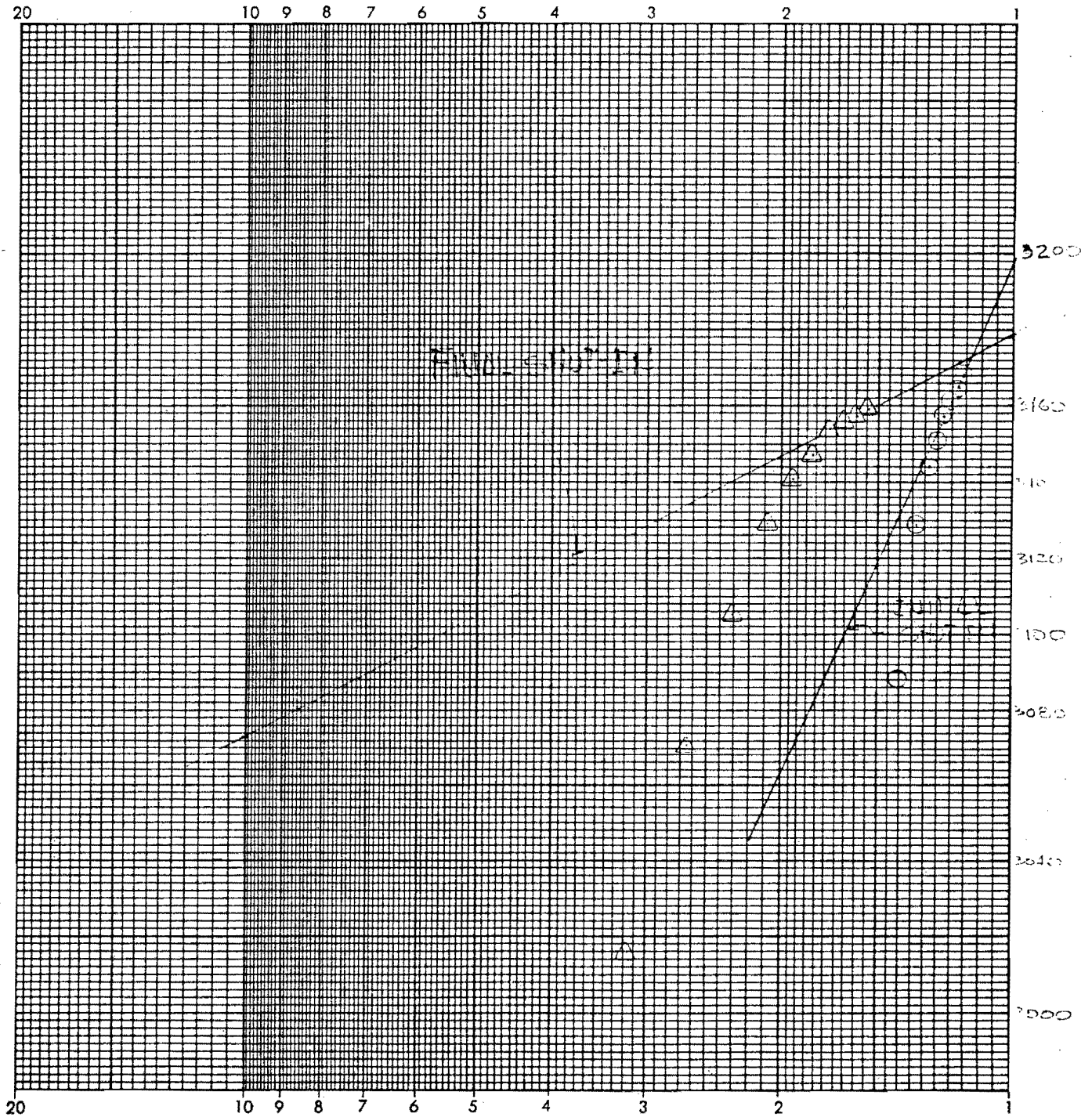
TRANSMISSIBILITY (MD-FT/CP)		5879.23
FLOW CAPACITY (MD-FT)		146.95
AVERAGE EFF. PERMEABILITY (MD)		0.50
DAMAGE RATIO		0.40
FLOW RATE WITH DAMAGE REMOVED (MCF/DAY)		30058.812
POTENTIOMETRIC SURFACE (FT)		3687.4
RADIUS OF INVESTIGATION (FT)		94.1

2686

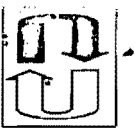


RESERVOIR PRESSURE PLOT

RECORDER No. LV1-2035 CAPACITY 7450 FIELD REPORT No. E15088
 MAXIMUM RESERVOIR PRESSURE P_o = 5655 psig INITIAL SHUT-IN = 5655
 SLOPE OF SHUT-IN CURVE M1 = 1060000 psig/LOG CYCLE FINAL SHUT-IN = 5635
 SLOPE M1 = P_i 3170000 P_{to} 3573000 = psig/LOG CYCLE 1060000
 SLOPE M2 = P_i P_{to} = psig/LOG CYCLE



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



JOHNSTON TESTERS

A DIVISION OF SCHLUMBERGER CANADA LIMITED
321 - 50th AVENUE S.E. CALGARY, ALBERTA T2G 2B3

District	Fort St. John	Ticket No.	E15088	Company	Columbia Gas Development Ltd.	
Address	c/o D & S Consultants, 600, 633 -6 Avenue S.W., Calgary, Alberta T2P 0S2			Well Name	Columbia Gas et al Kotaneelee	
Field	Kotaneelee			Number	H-38-60-10-124	
Province	British Columbia			Date	October 4, 1977	
Co. Rep.	J. Dortch			Formation	Nahanni	Thickness
Technician	T. Thompson			Interval	11,625 - 11,890	TD 11,890'

TEST DATA			
Type of Test	Open hole, Bottom hole.		
Time Started in Hole	0430 Hrs.	Tool Opened	1128 Hrs.
First Flow	10 Min.	Initial Shut-In	60 Min.
Second Flow	120 Min.	Second Shut In	240 Min.
Third Flow	Min.	Final Shut In	Min.
Pulled Loose @	1830 Hrs.	Out of Hole	0200 Hrs.
Wt. Set/on Packers	30,000 #	Pulled Loose Wt.	30,000 #
Description of Blow During Test	Good initial puff on preflow with gas to surface in 45 minutes of initial shut-in. Water to surface in 10 minutes of valve opening with good gas flow in 5 minutes. Increasing to strong gas and water blow in 20 minutes.		

TOOL SEQUENCE		
Tool	Length	O.D.
P.O. Sub	1.00	
D.P. Sub	.65	
MFE Tool	12.55	
Bypass Tool	2.85	
Recorder	4.40	
Safety Joint	1.75	
S.S. & Packer	9.30	7 1/2"
T.C. & Packer	5.35	7 1/2"
Packer	4.35	7 1/2"
Total	42.20	
Packer Stub	1.00	
Perfs	15.00	
Recorder	4.40	
Recorder	4.40	
Sub	1.00	
Drill Collars	236.48	
Sub	1.00	
Bull Nose & Perf	2.00	
Total Interval	265.28	

FLUID RECOVERY	Was Test Reverse Circulated	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Total Fluid Recovered	80	Ft.	
Description of Fluid Recovered	80' Gasified mud cut water.		

GAS BLOW MEASUREMENT			
Measured With Willis Choke			2" I.D. Riser
Time	Sfce. Choke	Reading Psi	M Cubic Feet/Day
1320	64	380	10,000 Wet gas flow
1330	64	350	9,300 Wet gas flow
1340	64	320	8,600 Wet gas flow
1350	64	280	7,100 Wet gas flow
1400	48	320	4,700 Wet gas flow
1410	48	320	4,700 Wet gas flow
1420	48	320	4,700 Wet gas flow
1430	48	320	4,700 Wet gas flow

TOTAL LENGTH		
Elevation G.L.	2250	K.B. 2275
Bottom Hole Choke Size	1/2"	
Fluid Cushion Type	Water	Amt. 3500'

REMARKS: Test satisfactory.

MUD AND HOLE DATA			
Mud Type	KCL	W.L.	
Filter Cake	Visc. 41	Wt. 9.9	
Time Taken	2400 hours		
Contractor	Nabors Drilling	Rig No.	9
Drill Pipe Size	4 1/2" IF		
Drill Collar Size	4 1/2" XH &		
Drill Collar Length	365' &		
Main Hole Size	Rat Hole 8 1/2"		

RESISTIVITY		Chloride	CONTENT
Recovery Water	@	°F. 44,500	ppm.
Mud Pit sample filtrate	@	°F.	ppm.

Distribution of Reports: 12 - Calgary Attention: MRS. WIEBE

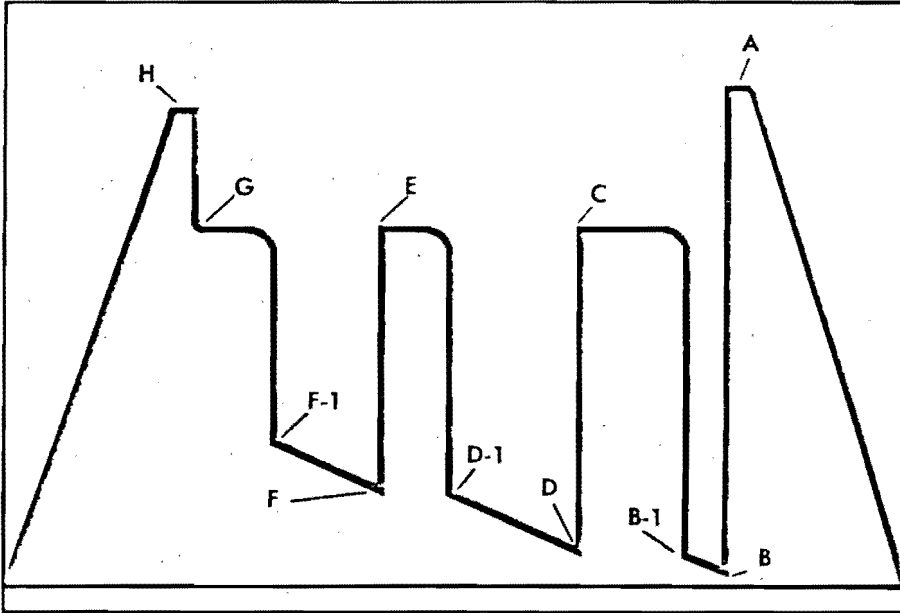
GUIDE TO IDENTIFICATION OF DRILL STEM TEST PRESSURE CHARTS

FIELD
REPORT NO.

E15088

RECORDER NO.

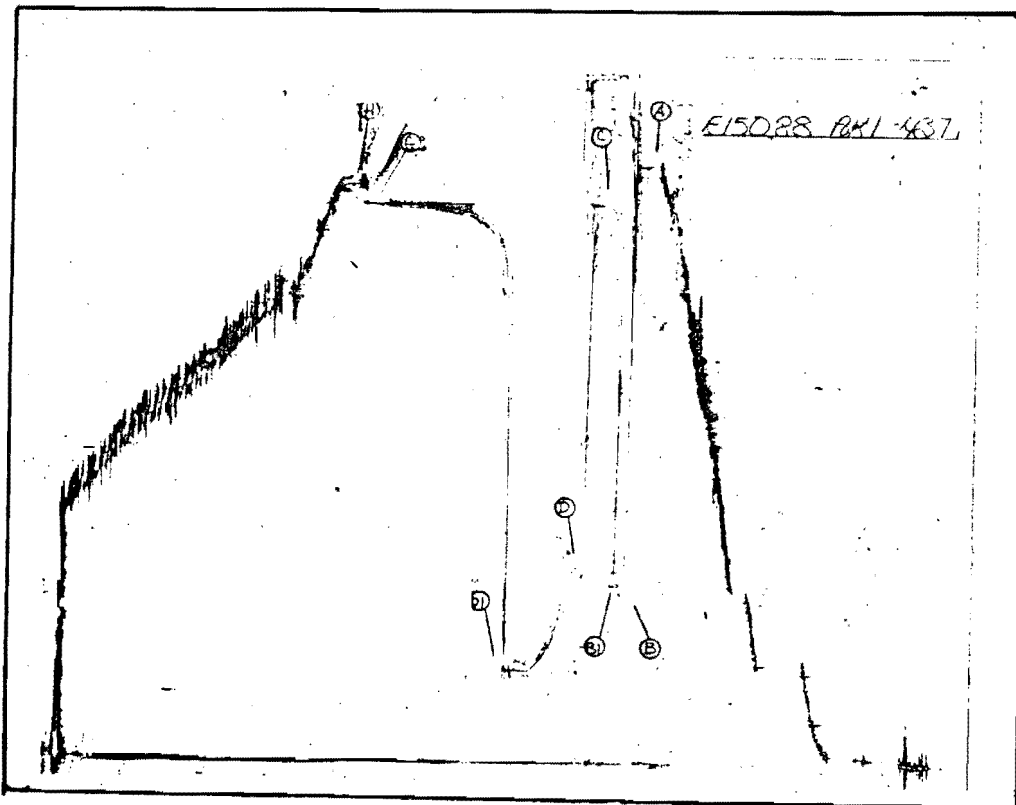
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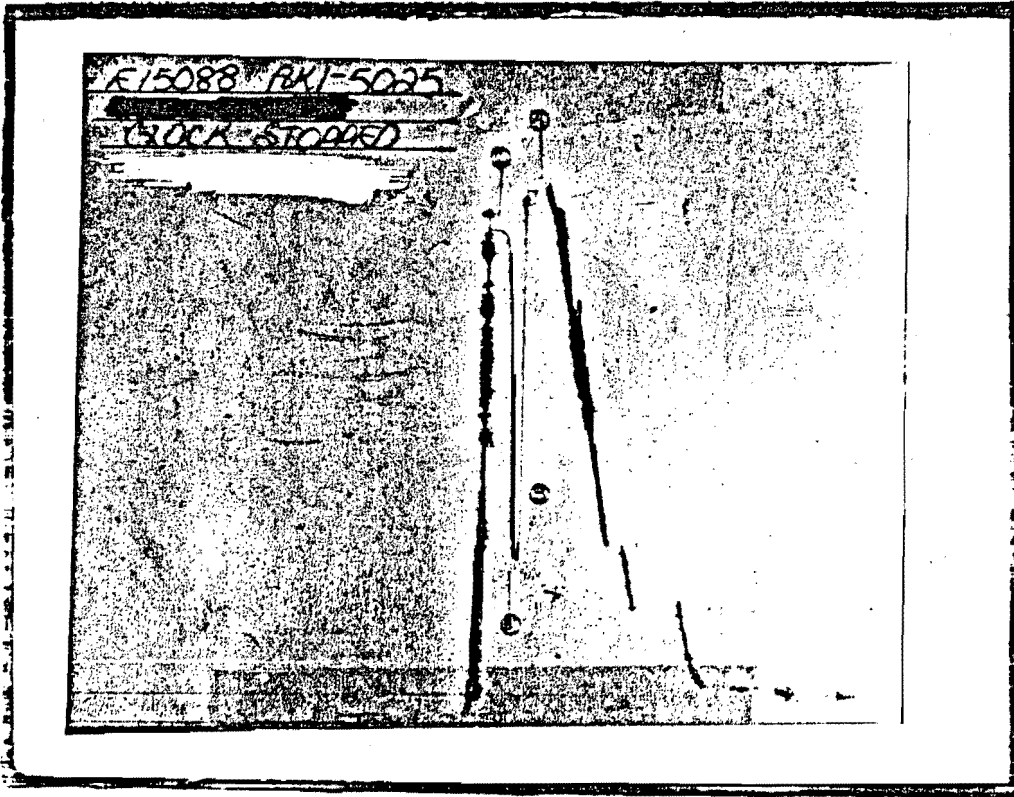
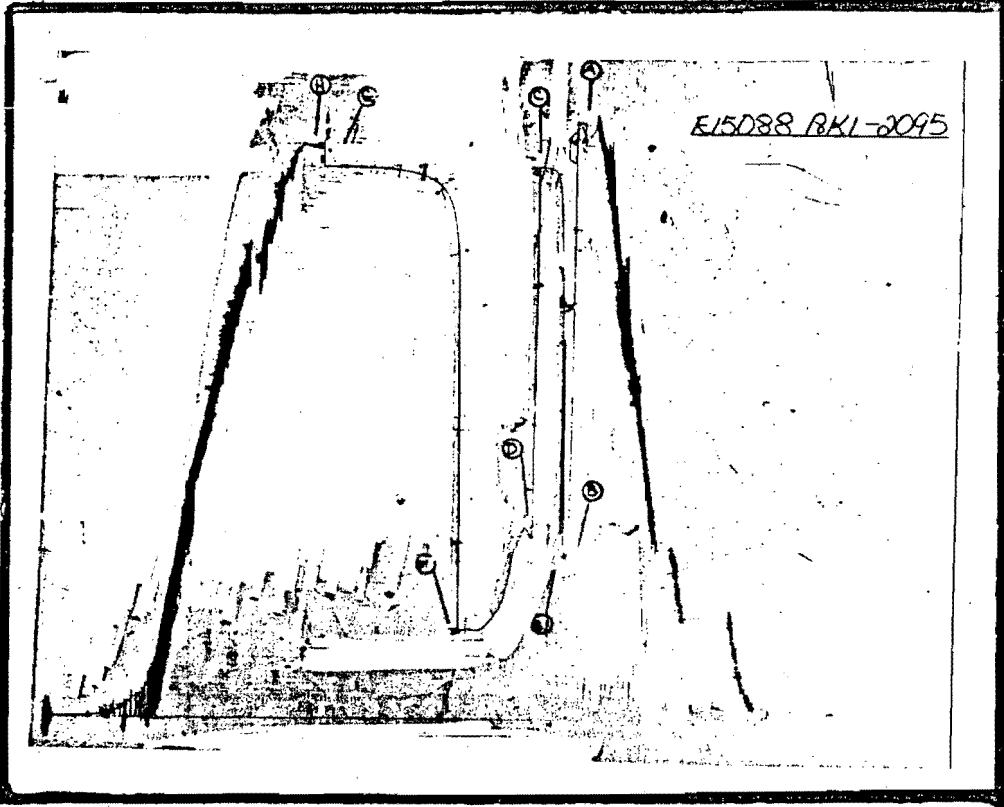


- A. Initial Hyd. Mud
- B. First Flow
- C. Initial Shut-In
- D. Second Flow
- E. Second Shut-In
- F. Third Flow
- G. Final Shut-In
- H. Final Hyd. Mud

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.





TEST DATA SHEET

SHEET No. 1

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
cleanup	2020			x			
	Dec 1						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS	
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE:			ORIFICE SIZE:						
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F M.R. SEP. BATH	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F M.R. SEP.				
1830	2020															
2020			1625													
2020																
2030	to 2120															
2120			1600													
2120																
2200	80		1200													
2245																
2250			1675													
2250																
2300	80		1000													
2400	90		2075													

REMARKS:

TEST DATA SHEET

SHEET No. 2

RUN No.	TIME ON	TIME OFF	CHOKESIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
cleanup	2020		20/64	x			
	Dec 1						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS	
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE:		ORIFICE SIZE:		TEMP. OF					
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	STATIC P.S.I.G.	DIFF H ₂ O	M.R.	SEP.				M.R.
0000	90		2075													
0030	to 0340															
0340			3500													
0340																
0345																
0400	70		3300													
0410																
0500	76		2850													
0510																
0600	80		2975													
0700	80		3200													
0800	80		3275													
0900	84		3190													
1000	86		3225													
1055																
1100	86		3125													
1200	96		2750													
1205																
1300	112		2125													
1400	122		2060													
1500	126		2033													
1600	134		2025													
1700	134		2023													
1800	137		2025													
1900	138		2028													
2000	140		2031													
2100	142		2035													
2200	144		2040													
2300	144		2045													
2400	144		2049													

REMARKS:

Shut in well. Choke plugged.

Shut in pressure.

Opened well to pit. Choke at 8/64.

Increased choke to 10/64.

Increased choke to 16/64.

Increased choke to 20/64.

Increased choke to 30/64.

Increased choke to 40/64.

TEST DATA SHEET

SHEET No. 3

RUN No. cleanup	TIME ON 2020	TIME OFF	CHOKE SIZE 40/64	TUBING x	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
	Dec 1						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.						LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS		
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE:			ORIFICE SIZE:								
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.	DIFF H ₂ O				TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
0000	144		2049															
0100	144		2053															
0200	148		2056															
0300	148		2061															
0400	148		2066															
0500	150		2070															
0600	150		2075															
0700	150		2078															
0800	150		2082															
0900	154		2085															
1000	154		2090															
1100	154		2093															
1200	154		2096															
1300	156		2100															
1400	156		2104															
1500	156		2106															
1600	157		2110															
1700	157		2114															
1800	157		2116															
1900	158		2118															
2000	158		2122															
2100	158		2124															
2200	158		2126															
2300	158		2129															
2400	158		2131															

REMARKS:

TEST DATA SHEET

SHEET No. 10

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
2	0530		22/64	x		10.00	
	Dec 8						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS		
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.000 x 4.026		ORIFICE SIZE:								
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. OF
								M.R.	SEP.	BATH			M.R.	SEP.			
0530			4433				Shut	in	pressure.								
0530							Opened	well	through separator with	2.000	x	4.026	orifice	plate.	Choke	at	20/64.
0535	to	0605					Shut	in	well flow line	leaking.							
0605			4433				Shut	in	pressure.								
0605							Opened	well	through separator with	2.000	x	4.026	orifice	plate.	Choke	at	22/64.
0620	to	0625					Shut	in	well. Separator	leaked.							
0625			4430				Shut	in	pressure.								
0625							Opened	well	through separator with	2.000	x	4.026	orifice	plate.	Choke	at	22/64.
0630	60		4102				840	196	-10								
0700	64		3845				840	172	-22					10.20			
0730	8		3808				840	190	-14								
0800	71		3779				840	186	-10					10.50			
0830	74		3760				840	184	-8								
0900	75		3750				850	180	-8					10.40			
0930	76		3740				840	176	-6								
1000	78		3735				840	174	-5					10.25			
1030	84		3730				840	174	-4								
1100	84		3725				840	176	-4					10.30			
1130	85		3732				840	176	-2								
1200	87		3722				850	174	0					10.30			
1230	88		3722				850	174	2								
1300	90		3721				840	182	4					10.40			
1330	90		3721				830	182	4								
1400	93		3724				850	174	5					10.25			
1430	93		3729				840	178	5								
1500	94		3742				830	168	5					10.00			
1530	94		3740				840	168	5								
1600	96		3740				850	160	7					10.00			
1630	96		3753				840	160	8								
1700	96		3753				Meter	frozen	off								

REMARKS:

TEST DATA SHEET

SHEET No. 11

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
2	0625	1830	22/64	x		1.03	
	Dec 8	Dec 8					

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 1.500 x 4.026					ORIFICE SIZE:						
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
1730	96		3753				Meter frozen.											
1800	97		3757				830	176	20									
1830	97		3755				Meter frozen.											
1830							Shut in well to record buildups.											
1840			4135															
1850			4175															
1900			4240															
1915			4297															
1930			4330															
2000			4385															
2030			4414															
2100			4430															
2130			4440															
2200			4446															
2230			4450															
2300			4452															
2330			4453															
2400			4454															

REMARKS: No fluid produced.

TEST DATA SHEET

SHEET No. 13

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
3	0630	1830	29/64	x		14.5	
	Dec 9	Dec 9					

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.						LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS		
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.500 x 4.026			ORIFICE SIZE:								
				LONG	INTERM.	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.	DIFF H ₂ O				TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
0630			4447				Shut in pressure.											
0630							Opened well through separator with 2.500 x 4.026 orifice plate.									Choke at 30/64.		
0700	90		3536				780	200	8									
0705							Decreased choke to 29/64.											
0730	96		3427				780	172	10									
0800	100		3362				780	178	14					15.50				
0830	106		3315				780	178	15									
0900	108		3294				780	164	25					15.40				
0930	111		3307				1080	104	31									
1000	112		3290						42	Meter frozen.								
1030	116		3270				1260	86	45									
1100	120		3260				1260	100	54					15.00				
1130	123		3250				1260	96	60									
1200	125		3245				1260	96	63					14.60				
1230	126		3240				1260	96	65									
1300	127		3235				1260	96	66					14.60				
1330	130		3233				Back pressure controller plugged.											
1400	130		3227				1200	102	68					14.60				
1430	130		3222				1200	102	70									
1500	133		3220				1210	100	72					14.50				
1530	133		3215				1210	102	73									
1600	133		3213				1210	102	73					14.60				
1630	134		3211				1210	102	74									
1700	136		3210				1210	102	76					14.60				
1730	136		3210				1210	102	76									
1800	137		3205				1210	100	77					14.50				
1830	137		3205				1210	100	77									
1830							Shut in well to record buildups.											
1840			3705															
1850			3885															

REMARKS:

TEST DATA SHEET

SHEET No. 16

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
4	0630	1830	36/64	x		18.8	
	Dec 10	Dec 10					

TIME	WELLHEAD READING					HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS		
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.750 x 4.026					ORIFICE SIZE:							
				LONG	INTERM.	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF					
									M.R.	SEP.	BATH			M.R.				SEP.	
0630			4456																
0630																			
0700	95		3255																
0730	106		3106																
0745																			
0800	110		2950																
0830	116		2870																
0900	121		2830																
0930	126		2800																
1000	130		2777																
1030	132		2760																
1100	136		2750																
1130	138		2737																
1200	140		2727																
1230	140		2720																
1300	142		2715																
1330	144		2707																
1400	144		2702																
1430	146		2697																
1500	147		2690																
1530	148		2690																
1600	148		2687																
1630	150		2685																
1700	150		2680																
1730	150		2678																
1800	150		2678																
1830	150		2678																

REMARKS:

Shut in pressure.
 Opened well through separator with 2.750 x 4.026 orifice plate. Choke at 35/64.
 Increased choke to 36/64.

TEST DATA SHEET

SHEET No. 17

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
extended	1830		30/64	x		14.80	
	Dec 10						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.500 x 4.026			ORIFICE SIZE:								
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
1830	to 1840						Decreased	choke	to 29/64.	Bypass	separator	and	changed	orifice	plate to			
							2.500	x 4.026.										
1900	141		2965				1080	104	72					14.00				
1930	150		3007				1090	104	88									
2000	148		3040				1080	108	74					14.20				
2010							Increased	choke	to 30/64.									
2030	148		3020				1080	116	80									
2100	148		3021				1080	120	80					14.50				
2130	148		3021				1080	120	88									
2200	148		3027				1080	120	88					14.50				
2230	148		3030				1080	124	88									
2300	148		3034				1080	124	88					14.80				
2330	148		3034				1080	124	88									
2400	148		3035				1080	124	88					14.80				

REMARKS:

TEST DATA SHEET

SHEET No. 18

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
ext.	1830		30/64	x		14.8	
	Dec 10						

TIME	WELLHEAD READING						HIGH STAGE SEPARATOR RDGS.						LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS	
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.500 x 4.026			ORIFICE SIZE:			STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F					M.MCF DAY
				LONG	INTERM.	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F		STATIC P.S.I.G.	DIFF H ₂ O			TEMP. °F					
									M.R.	SEP.					BATH	M.R.				
0000	148		3035				1080	124	88									14.80		
0030	148		3037				1080	124	90											
0100	148		3040				1080	124	90									14.80		
0130	148		3042				1080	124	90											
0200	148		3042				1080	124	90									14.80		
0230	148		3043				1080	124	90											
0300	148		3043				1080	124	90									14.80		
0330	148		3043				1080	124	90											
0400	148		3044				1080	124	90									14.80		
0430	148		3045				1080	124	90											
0500	148		3045				1080	124	90									14.80		
0530	148		3045				1080	124	90											
0600	150		3045				1080	124	90									14.80		
0630	150		3046				1080	124	90											
0700	150		3047				1080	124	90									14.80		
0730	150		3047				1080	124	90											
0800	150		3047				1080	124	90									14.80		
0830	150		3047				1080	124	90											
0900	150		3046				1080	126	93									15.00		
0930	150		3048				1080	126	93											
1000	150		3047				1080	126	93									15.00		
1030	149		3047				1080	126	90											
1100	149		3047				1080	126	90									15.00		
1130	150		3047				1080	126	92											
1200	150		3047				1080	126	92									15.00		
1230	150		3047				1080	126	92											
1300	150		3048				1080	126	92									15.00		
1330	150		3049				1080	126	92											
1400	150		3049				1080	122	92									14.80		
1430	150		3049				1080	124	92											

REMARKS:

TEST DATA SHEET

SHEET No. 19

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
ext.	1830		30/64	x		15.0	
	Dec 10						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.500 x 4.026					ORIFICE SIZE:						
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
1500	150		3049				1080	126	92								15.00	
1530	150		3049				1080	126	92									
1600	152		3049				1080	126	92									15.00
1630	152		3049				1080	128	93									
1700	152		3049				1080	128	93									15.10
1730	152		3050				1080	128	93									
1800	152		3050				1080	128	93									15.10
1830	152		3050				1080	128	93									
1900	152		3055				1140	120	95									15.00
1930	152		3054				1140	120	95									
2000	152		3054				1140	120	94									15.00
2030	152		3054				1140	120	94									
2100	152		3055				1140	120	94									15.00
2130	152		3054				1140	120	94									
2200	152		3055				1140	120	94									15.00
2230	152		3055				1140	120	94									
2300	152		3056				1140	120	96									15.00
2330	152		3056				1140	118	96									
2400	152		3056				1140	118	96									15.00

REMARKS:

TEST DATA SHEET

WELL No.

SHEET No. 20

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
ext.	1830	1310	30/64	x		1.51	
	Dec 10	Dec 12					

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 2.500 x 4.026					ORIFICE SIZE:						
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. °F	
									M.R.	SEP.	BATH						M.R.	SEP.
0000	152		3056			1140	118	96										
0030	152		3056			1140	118	96										
0100	152		3056			1140	118	96						15.00				
0130	152		3056			1140	118	96										
0200	152		3057			1140	118	96						15.00				
0230	152		3058			1140	118	96										
0300	152		3058			1140	118	96						15.00				
0330	152		3058			1140	118	96										
0400	152		3059			1140	118	96						15.00				
0430	152		3058			1140	118	96										
0500	154		3058			1140	118	98						15.00				
0530	154		3059			1140	118	98										
0600	154		3059			1140	120	98						15.00				
0630	154		3060			1140	120	98										
0700	154		3060			1140	120	98						15.00				
0730	153		3060			1140	120	98										
0800	154		3061			1140	118	98						15.00				
0830	154		3061			1140	120	98										
0900	154		3061			1180	112	98						15.10				
0930	154		3061			1150	122	99										
1000	154		3061			1150	120	98						15.10				
1030	154		3061			1140	120	98										
1100	154		3061			1140	122	98						15.10				
1130	154		3061			140	122	100										
1200	154		3061			1140	122	98						15.10				
1230	154		3061			1140	124	98										
1300	154		3061			1160	120	98						15.10				
1310						Shut in well to record buildups.												
1320			3634															
1330			3820															

REMARKS: Samples obtained at 1300 - 2 H.P. gas 3512, 3175
2 fluid.

TEST DATA SHEET

SHEET No. 21

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
buildups							

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE:			ORIFICE SIZE:								
				LONG	INTERM.	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. °F	
									M.R.	SEP.	BATH						M.R.	SEP.
1345			3945															
1400			4050															
1430			4150															
1500			4225															
1530			4277															
1600			4325															
1630			4350															
1700			4376															
1730			4390															
1800			4405															
1830			4410															
1900			4417															
1930			4422															
2000			4428															
2030			4432															
2100			4435															
2130			4437															
2200			4438															
2230			4439															
2300			4440															
2330			4441															
2400			4442															

REMARKS:

PORTA-TEST ENGINEERING LTD.
P.O. BOX 3510 STATION L, EDMONTON, ALBERTA T6C 0Y0

COMPANY Columbia Gas Development of Canada Ltd.
Columbia et al Kotaneelee YT H-38
WELL _____

Job #3575
DATE December 9, 1977

**FLUID METER AND
ACCUMULATOR DATA SHEET**
SHEET NO. 1

WATER METER		CONDENSATE METER		TIME ON:	RUN NO.
SERIAL NO.		SERIAL NO.		TIME OFF:	FLOW RATE
FACTOR 1.027		FACTOR			

TIME	WATER METER	GAIN	AVERAGE BBLs./DAY	ACCUMULATOR RDG.				AVERAGE BBLs./DAY	METER FACTOR	CONDENSATE METER	GAIN	AVERAGE BBLs./DAY
				IN.	BBLs.	MIN.	SEC.					
0630	40.10	OPGA										
1100	40.10	0										
1200	43.05	2.95										
1300	45.75	2.70										
1400	48.13	2.38										
1500	50.85	2.72										
1600	53.30	2.45										
1700	55.70	2.40										
1800	58.00	2.30	Correction factor 1.027/ 1 bbl.									
TOTALS		17.9										

REMARKS
SECONDS/DAY = 86,400
METER FACTOR = ACCUMULATOR PROD. ÷ METER PROD.
ACCUMULATOR BBLs./INCH. = () .00921 () .03818

PORTA-TEST ENGINEERING LTD.
 P.O. BOX 5510 STATION L, EDMONTON, ALBERTA T6C 0Y0

COMPANY Columbia Gas Development of Canada Ltd. Job # 3575

WELL Columbia et al Kotaneelee YT H-38 DATE December 10, 1977

**FLUID METER AND
 ACCUMULATOR DATA SHEET**
 SHEET NO. 2

WATER METER		CONDENSATE METER		TIME ON:	RUN NO.
SERIAL NO.		SERIAL NO.		TIME OFF:	FLOW RATE
FACTOR 1.027		FACTOR			

TIME	WATER METER	GAIN	AVERAGE BBLs./DAY	ACCUMULATOR RDG.				AVERAGE BBLs./DAY	METER FACTOR	CONDENSATE METER	GAIN	AVERAGE BBLs./DAY
				IN.	BBLs.	MIN.	SEC.					
0630	58.00											
0900	62.96	4.96										
1000	73.52	10.56										
1100	76.82	3.30										
1200	79.64	2.82										
1300	82.00	2.36										
1400	84.34	2.34										
1500	86.95	2.61										
1600	89.83	2.98										
1700	92.40	2.47										
1800	94.26	1.86										
1830	94.80	.64										
TOTALS		36.90										

REMARKS
 SECONDS/DAY = 86,400
 METER FACTOR = ACCUMULATOR PROD. ÷ METER PROD.
 ACCUMULATOR BBLs./INCH = () .00921 () .03818

PORTA-TEST ENGINEERING LTD.

P.O. BOX 5510 STATION L, EDMONTON, ALBERTA T6C 0Y0

COMPANY Columbia Gas Development of Canada Ltd.

Job # 3575

WELL Columbia et al Kotaneelee YT H-38

DATE December 11, 1977

FLUID METER AND
ACCUMULATOR DATA SHEET

SHEET NO. 4

WATER METER		CONDENSATE METER		TIME ON:	RUN NO.
SERIAL NO.		SERIAL NO.		TIME OFF:	FLOW RATE
FACTOR 1.027		FACTOR			

TIME	WATER METER	GAIN	AVERAGE BBLs./DAY	ACCUMULATOR RDG.				AVERAGE BBLs./DAY	METER FACTOR	CONDENSATE METER	GAIN	AVERAGE BBLs./DAY
				IN.	BBLs.	MIN.	SEC.					
0000	103.97	OPGA										
0100	106.07	2.10										
0200	108.50	2.43										
0300	110.72	2.22										
0400	113.10	2.38										
0500	115.05	1.95										
0600	117.20	2.15										
0700	120.14	2.94										
0800	122.31	2.17										
0900	124.36	2.05										
1000	126.50	2.14										
1100	128.61	2.11										
1200	130.80	2.19										
TOTALS		26.83										

REMARKS SECONDS/DAY = 86,400
METER FACTOR = ACCUMULATOR PROD. ÷ METER PROD.
ACCUMULATOR BBLs./INCH = () .00921 () .03818

PORTA-TEST ENGINEERING LTD.
 P.O. BOX 5510 STATION L, EDMONTON, ALBERTA T6C 0Y0

COMPANY Columbia Gas Development of Canada Ltd.

Job #: 3575

WELL Columbia et al. Kotaneelee YT H-38

DATE December 11, 1977

**FLUID METER AND
 ACCUMULATOR DATA SHEET**
 SHEET NO. 5

WATER METER		CONDENSATE METER		TIME ON:	RUN NO.
SERIAL NO.		SERIAL NO.		TIME OFF:	FLOW RATE
FACTOR 1.027		FACTOR			

TIME	WATER METER	GAIN	AVERAGE BBLs./DAY	ACCUMULATOR RDG.				AVERAGE BBLs./DAY	METER FACTOR	CONDENSATE METER	GAIN	AVERAGE BBLs./DAY
				IN.	BBLs.	MIN.	SEC.					
1200	130.80	OPGA										
1300	132.80	2.00										
1400	134.90	2.10										
1500	137.12	2.22										
1600	139.56	2.44										
1700	141.25	1.69										
1800	143.33	2.08										
1900	145.48	2.15										
2000	147.63	2.15										
2100	149.62	1.99										
2200	151.70	2.08										
2300	153.64	1.94										
2400	155.65	2.01										
TOTALS		24.85										

REMARKS
 SECONDS/DAY = 86,400
 METER FACTOR = ACCUMULATOR PROD. ÷ METER PROD.
 ACCUMULATOR BBLs./INCH = () .00921 () .03818

PORTA-TEST ENGINEERING LTD.
P.O. BOX 5510 STATION L, EDMONTON, ALBERTA T6C 0Y0

COMPANY Columbia Gas Development of Canada Ltd. Job # 3575
WELL Columbia et al Kotaneelee YT H-38 DATE December 12, 1977

**FLUID METER AND
ACCUMULATOR DATA SHEET**
SHEET NO. 6

WATER METER		CONDENSATE METER		TIME ON:	RUN NO.
SERIAL NO.		SERIAL NO.		TIME OFF:	FLOW RATE
FACTOR 1.027		FACTOR			

TIME	WATER METER	GAIN	AVERAGE BBL./DAY	ACCUMULATOR RDG.				AVERAGE BBL./DAY	METER FACTOR	CONDENSATE METER	GAIN	AVERAGE BBL./DAY
				IN.	BBL.	MIN.	SEC.					
0000	155.65	OPGA										
0100	157.70	2.05										
0200	159.54	1.84										
0300	162.36	2.82										
0400	164.65	2.29										
0500	166.35	1.70										
0600	168.48	2.13										
0700	170.34	1.86										
0800	172.21	1.87										
0900	174.65	2.44										
1000	176.17	1.52										
1100	178.06	1.89										
1200	180.07	2.01										
TOTALS		24.42										

REMARKS
SECONDS/DAY = 86,400
METER FACTOR = ACCUMULATOR PROD. ÷ METER PROD.
ACCUMULATOR BBL./INCH = () .00921 () .03018

SUBSURFACE PRESSURE MEASUREMENTS

COMPANY _____ WELL NAME _____
 DATE OF TEST Dec. 6-13, 1977 LOCATION YTH 38 PAGE 2 OF 7

Gauge No. 3075N

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

DATE	DEPTH BELOW CF ft	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig.	CORRECTION P & PC psig	CORRECTED PRESSURE psig	PRESSURE AT MID-POINT OF PERFORATIONS psig
	11593	0.0	1.1962	5691.4			
On bottom		1.00	1.1970	5695.3			
Dec. 6 @ 2235 Hrs.		2.00	1.1970	5695.3			
		4.00	1.1880	5652.3			
		6.75	1.1962	5691.4			
Start 1st Flow		0.0	1.1962	5691.4			
Dec. 7 @ 0520 Hrs.		0.50	1.1479	5460.9			
		1.00	1.1382	5414.6			
		2.00	1.1320	5385.0			
		3.00	1.1288	5369.7			
		4.00	1.1270	5361.1			
		6.00	1.1258	5355.4			
		8.00	1.1250	5351.6			
		10.00	1.1238	5345.8			
		12.17	1.1222	5338.2			
Well Shut-in		0.0	1.1222	5338.2			
Dec. 7 @ 1730 Hrs.		0.50	1.1688	5560.6			
		1.00	1.1792	5610.3			
		2.00	1.1873	5649.0			
		3.00	1.1912	5667.6			
		4.00	1.1928	5675.2			
		6.00	1.1941	5681.4			
		8.00	1.1950	5685.7			
		12.00	1.1960	5690.5			
Start 2nd Flow		0.0	1.1960	5690.5			
Dec. 8 @ 0530 Hrs.		0.50	1.0809	5141.1	-13.5	5127.6	
		1.00	1.0561	5022.7	-15.0	5007.7	
		1.50	1.0421	4955.9		4940.9	
		2.00	1.0339	4916.7		4901.7	
		3.00	1.0240	4869.5		4854.5	
		4.00	1.0180	4840.8		4825.8	
		6.00	1.0124	4814.1		4799.1	
		8.00	1.0128	4816.0		4801.0	
		10.00	1.0152	4827.5		4812.5	
		12.00	1.0169	4835.6		4820.6	
Well Shut-in		0.0	1.0169	4835.6	-15.0	4820.6	
Dec. 8 @ 1730 Hrs.		0.50	1.1113	5286.2	-13.5	5272.7	
		1.00	1.1392	5419.4		5405.9	
		1.50	1.1550	5494.8		5481.3	
		2.00	1.1655	5544.9		5531.4	
		3.00	1.1778	5603.6		5590.1	
		4.00	1.1840	5633.2		5619.7	
		6.00	1.1889	5656.6		5643.1	
		8.00	1.1920	5671.4		5657.9	
		10.00	1.1930	5676.2		5662.7	
		13.00	1.1940	5680.9		5667.4	
Start 3rd Flow		0.0	1.1940	5680.9	-13.5	5667.4	
Dec. 9 @ 0630 Hrs.		0.50	0.9628	4577.3	-15.0	4562.3	
		1.00	0.9328	4434.1	-15.0	4419.1	
		1.50	0.9180	4363.5	-15.0	4348.5	

SUBSURFACE PRESSURE MEASUREMENTS

COMPANY _____ WELL NAME _____
 DATE OF TEST Dec. 6-13, 1977 LOCATION YTH 38 PAGE 3 OF 7

Gauge No. 3075N

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

DATE	DEPTH BELOW CF ft.	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig	CORRECTION P ± PC psig	CORRECTED PRESSURE psig	PRESSURE AT MID-POINT OF PERFORATIONS psig
	11593	2.00	0.9112	4331.0	-15.0	4316.0	
		3.00	0.9032	4292.8		4277.8	
		4.00	0.8950	4253.7		4248.7	
		5.00	0.8895	4227.4		4212.4	
		6.00	0.8858	4209.8		4194.8	
		8.00	0.8803	4183.5		4168.5	
		10.00	0.8773	4169.2		4154.2	
		12.00	0.8762	4164.0		4149.0	
Well Shut-in		0.0	0.8762	4164.0		4149.0	
Dec. 9 @ 1830 Hrs.		0.50	1.0061	4784.0		4769.0	
		1.00	1.0632	5056.6	-15.0	5041.6	
		1.50	1.1009	5236.5	-13.5	5223.0	
		2.00	1.1230	5342.0		5328.5	
		3.00	1.1519	5480.0		5466.5	
		4.00	1.1667	5550.6		5537.1	
		5.00	1.1753	5591.7		5578.2	
		6.00	1.1810	5618.9		5615.4	
		8.00	1.1868	5646.6		5613.1	
		10.00	1.1895	5659.5		5646.0	
		12.00	1.1912	5667.6		5654.1	
Start 4th Flow		0.0	1.1912	5667.6	-13.5	5654.1	
Dec. 10 @ 0630 Hrs.		0.50	0.8580	4077.1	-15.0	4062.1	
		1.00	0.8171	3881.8	-15.0	3866.8	
		1.50	0.8000	3800.2	-13.7	3786.5	
		2.00	0.7882	3743.9		3730.2	
		3.00	0.7750	3680.9		3667.2	
		4.00	0.7669	3642.2		3628.5	
		5.00	0.7601	3609.8		3596.1	
		6.00	0.7563	3591.6		3577.9	
		8.00	0.7502	3562.5		3548.8	
		10.00	0.7470	3547.2		3533.5	
		12.00	0.7458	3541.5		3527.8	
Start Extended Flow		0.0	0.7458	3541.5		3527.8	
Dec. 10 @ 1830 Hrs.		0.50	0.8030	3814.5	-13.7	3800.8	
		1.00	0.8190	3890.9	-15.0	3875.9	
		1.50	0.8265	3926.7		3911.7	
		2.00	0.8271	3929.6		3914.6	
		3.00	0.8271	3929.6		3914.6	
		4.00	0.8281	3934.4		3919.4	
		6.00	0.8309	3947.7		3932.7	
		8.00	0.8319	3952.5		3937.5	
		12.00	0.8328	3956.8		3941.8	
		16.00	0.8331	3958.2		3943.2	
		20.00	0.8332	3958.7		3943.7	
		24.00	0.8338	3961.6		3946.6	
		32.00	0.8347	3965.9		3950.9	
		40.00	0.8353	3968.7		3953.7	
		42.67	0.8353	3968.7		3953.7	
Well Shut-in		0.0	0.8353	3968.7		3953.7	
Dec. 12 @ 1310 Hrs.		0.50	0.9589	4558.7	-15.0	4543.7	

SUBSURFACE PRESSURE MEASUREMENTS

COMPANY _____ WELL NAME _____
 DATE OF TEST Dec. 6-13, 1977 LOCATION YTH 38 PAGE 5 OF 7
 Gauge No. 7648 N

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

DATE	DEPTH BELOW CF ft	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig	CORRECTION P ± PC psig	CORRECTED PRESSURE psig	PRESSURE AT MID-POINT OF PERFORATIONS psig
	11600	0.0	1.0385	5697.9	-9.4	5688.5	
On bottom		1.00	1.0395	5703.4		5694.0	
Dec. 6 @ 2235 Hrs.		2.00	1.0395	5703.4		5694.0	
		4.00	1.0308	5655.5		5646.1	
		6.75	1.0381	5695.7		5686.3	
Start 1st Flow		0.0	1.0381	5695.7		5686.3	
Dec. 7 @ 0520 Hrs.		0.50	0.9961	5464.6		5455.2	
		1.00	0.9883	5421.7		5412.3	
		2.00	0.9833	5394.2		5384.8	
		3.00	0.9808	5380.5		5371.1	
		4.00	0.9787	5368.9		5359.5	
		6.00	0.9770	5359.6		5350.2	
		8.00	0.9768	5358.5		5349.1	
		10.00	0.9755	5351.3		5341.9	
		12.17	0.9749	5348.0		5338.6	
Well Shut-in		0.0	0.9749	5348.0		5338.6	
Dec. 7 @ 1730 Hrs.		0.50	1.0162	5575.2		5565.8	
		1.00	1.0242	5619.2		5609.8	
		2.00	1.0312	5657.7		5648.3	
		3.00	1.0341	5673.7		5664.3	
		4.00	1.0359	5683.6		5674.2	
		6.00	1.0371	5690.2		5680.8	
		8.00	1.0380	5695.1		5685.7	
		12.00	1.0383	5696.8		5687.4	
Start 2nd Flow		0.0	1.0383	5696.8		5687.4	
Dec. 8 @ 0530 Hrs.		0.50	0.9431	5173.1	-9.4	5163.7	
		1.00	0.9193	5042.2	-8.9	5033.3	
		1.50	0.9080	4980.1		4971.2	
		2.00	0.9002	4937.2		4928.3	
		3.00	0.8919	4891.5		4882.6	
		4.00	0.8862	4860.2		4851.3	
		6.00	0.8802	4827.2		4818.3	
		8.00	0.8805	4828.8		4819.9	
		10.00	0.8831	4843.1		4834.2	
		12.00	0.8841	4848.6		4839.7	
Well Shut-in		0.0	0.8841	4848.6	-8.9	4839.7	
Dec. 8 @ 1730 Hrs.		0.50	0.9712	5327.7	-9.4	5318.3	
		1.00	0.9942	5454.2		5444.8	
		1.50	1.0060	5519.1		5509.7	
		2.00	1.0138	5562.0		5552.6	
		3.00	1.0232	5613.7		5604.3	
		4.00	1.0281	5640.7		5631.3	
		6.00	1.0324	5664.9		5655.5	
		8.00	1.0352	5679.7		5670.3	
		10.00	1.0365	5686.9		5677.5	
		13.00	1.0372	5690.7		5681.3	
Start 3rd Flow		0.0	1.0372	5690.7	-9.4	5681.3	
Dec. 9 @ 0630 Hrs.		0.50	0.8561	4694.6	-8.9	4685.7	
		1.00	0.8219	4506.4	-8.9	4497.5	
		1.50	0.8069	4424.0	-9.2	4414.8	

SUBSURFACE PRESSURE MEASUREMENTS

COMPANY _____ WELL NAME _____
 DATE OF TEST Dec. 6-13, 1977 LOCATION YTH 38 PAGE 6 OF 7
 Gauge No. 7648N

CHART READINGS AND CALCULATIONS FOR BUILDUP OR DRAWDOWN TEST

DATE	DEPTH BELOW CF ft	TIME	DEFLECTION in/inches	CALCULATED PRESSURE psig	CORRECTION P ± PC psig	CORRECTED PRESSURE psig	PRESSURE AT MID-POINT OF PERFORATIONS psig
	11600	2.00	0.7972	4370.6	-9.2	4361.4	
		3.00	0.7918	4340.9		4331.7	
		4.00	0.7828	4291.4		4282.2	
		5.00	0.7765	4256.8		4247.6	
		6.00	0.7730	4237.5		4228.3	
		8.00	0.7682	4211.1		4201.9	
		10.00	0.7650	4193.5		4183.3	
		12.00	0.7639	4187.5		4177.3	
Well Shut-in		0.0	0.7639	4187.5	-9.2	4177.3	
Dec. 9 @ 1830 Hrs.		0.50	0.8928	4896.5	-8.9	4887.6	
		1.00	0.9420	5167.1	-9.4	5157.7	
		1.50	0.9668	5303.5		5294.1	
		2.00	0.9839	5397.5		5388.1	
		3.00	1.0021	5497.7		5488.3	
		4.00	1.0140	5563.1		5553.7	
		5.00	1.0210	5601.6		5592.2	
		6.00	1.0262	5630.2		5620.8	
		8.00	1.0301	5651.7		5642.3	
		10.00	1.0328	5666.5		5657.1	
		12.00	1.0338	5672.0		5662.6	
Start 4th Flow		0.0	1.0338	5672.0	-9.4	5662.6	
Dec. 10 @ 0630 Hrs.		0.50	0.7741	4243.6	-9.2	4234.4	
		1.00	0.7391	4051.1	-9.2	4041.9	
		1.50	0.7109	3896.0	-9.2	3886.8	
		2.00	0.6971	3820.1	-10.2	3819.9	
		3.00	0.6830	3742.5		3732.5	
		4.00	0.6728	3686.4		3676.2	
		5.00	0.6675	3657.3		3647.3	
		6.00	0.6630	3632.5		3622.3	
		8.00	0.6570	3599.5		3589.3	
		10.00	0.6539	3582.4		3572.2	
		12.00	0.6513	3568.1		3557.9	
Start Extended Flow		0.0	0.6513	3568.1	-10.2	3557.9	
Dec. 10 @ 1830 Hrs.		0.50	0.7013	3843.2	-9.2	3834.0	
		1.00	0.7152	3919.6		3910.4	
		1.50	0.7220	3957.0		3947.8	
		2.00	0.7210	3951.5		3942.3	
		3.00	0.7202	3947.1		3937.9	
		4.00	0.7221	3957.6		3948.4	
		6.00	0.7241	3968.6		3959.4	
		8.00	0.7251	3974.1		3964.9	
		12.00	0.7260	3979.0		3969.8	
		16.00	0.7262	3980.1		3970.9	
		20.00	0.7262	3980.1		3970.9	
		24.00	0.7262	3980.1		3970.9	
		32.00	0.7272	3985.6		3976.4	
		40.00	0.7278	3988.9		3979.7	
		42.67	0.7278	3988.9		3979.7	
Well Shut-in		0.0	0.7278	3988.9	-9.2	3979.7	
Dec. 12 @ 1310 Hrs.		0.50	0.8651	4744.1	-8.9	4735.2	



CHEMICAL & GEOLOGICAL LABORATORIES LTD.

EDMONTON

FORT ST. JOHN

CALGARY



CONTAINER IDENTITY

3512,3175

GAS ANALYSIS

LABORATORY NUMBER

077-3142

OPERATOR NAME AND ADDRESS

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

SAMPLE LOCATION

H-38

WELL OR SAMPLE LOCATION NAME

COLUMBIA ETAL KOTANEELEE H-38

ELEVATIONS GRD

FIELD OR AREA

KOTANEELEE

POOL OR ZONE

NAME OF SAMPLER

COMPANY

PORTA-TEST
ENGINEERING

TEST TYPE & NO.

TEST RECOVERY

TEST INTERVAL OR PERFS

POINT OF SAMPLE

AMT & TYPE OF CUSHION

MUD RESISTIVITY

SEPARATOR

@

TYPE OF PRODUCTION

PUMPING

FLOWING

GAS LIFT

SWAB

PRODUCTION RATES

WATER

BBL5/D

OIL

BBL5/D

GAS

MCF/D

PRESSURES - PSIG

TEMPERATURES (°F)

CONTAINER

CONTAINER

SEPARATOR

TREATER

RESERVOIR

WHEN SAMPLED

WHEN RECEIVED

SEPARATOR

TREATER

Source

WHEN SAMPLED

WHEN RECEIVED

DATE SAMPLED (D/M/Y)

12/12/77

DATE RECEIVED (D/M/Y)

12/12/77

DATE ANALYZED (D/M/Y)

18/12/77

ANALYST

KF

REMARKS

COMP	MOL % AIR FREE AS REC'D	MOL % AIR FREE ACID GAS FREE	CON GPM @ 60° F & 14.65 PSIA AIR FREE AS REC'D
H ₂	0.00	0.00	
He	0.00	0.00	
N ₂	3.62	4.49	
CO ₂	16.99	0.00	
H ₂ S	2.44	0.00	
C ₁	76.95	95.51	
C ₂	0.00	0.00	
C ₃	0.00	0.00	0.000
IC ₄	0.00	0.00	0.000
NC ₄	0.00	0.00	0.000
IC ₅	0.00	0.00	0.000
NC ₅	0.00	0.00	0.000
C ₆	0.00	0.00	0.000
C ₇	0.00	0.00	0.000
C ₈	0.00	0.00	0.000
C ₉	0.00	0.00	0.000
C ₁₀	0.00	0.00	0.000
TOTAL	100.00	100.00	0.000

GROSS HEATING VALUE BTU/FT³
@ 60°F AND 14.65 PSIA

MOISTURE AND ACID GAS FREE

MEASURED

CALCULATED

DETERMINED DEW POINT

VAPOUR PRESS. PENTANES PLUS

SPECIFIC GRAVITY

MOISTURE FREE AS SAMPLED

MOISTURE AND ACID GAS FREE

MEASURED

CALCULATED

MEASURED

CALCULATED

PSEUDO CRITICAL PROPERTIES (CALCULATED)

AS SAMPLED

ACID GAS FREE

pPc

pTc

pPc

pTc

749.6 psia

382.3 °R

665.0 psia

338.7 °R

H₂S Grains per 100 cu. ft. @ 60 F. & 14.65 p.s.i.a.

1528.9

MOL. WT. Total Gas

21.7

C₇+

0.0

GROSS HEATING VALUE (METRIC CALC.)

36.02 MJ/M³ @ 15 CEL & 101.325 kPa (abs)

H₂S onsite = 2.44 % by volume

DEC 29 1977

Non-renewable Resources Branch - Direction des ressources non renouvelables du Nord

Authority No. / Autorisation de forage	878	Date issued: / Date de délivrance:	1977-03-31
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Authorization is made hereby to change the name of the well, recorded in the well Name Register as --
 demandons l'autorisation de modifier le nom d'un puits, inscrit au Répertoire des puits sous le nom de --

Old name - Ancien nom:
 Columbia et al Kotaneelee YT H-38

Proposed new name - Nouveau nom proposé:
 TO:
 A: Columbia et al Kotaneelee YT B-38

WELL LOCATION - EMPLACEMENT DU Puits			
LOCATION: EMPLACEMENT:	Unit - Unité B	Section 38	Grid - Étendue quadrillée 60° 10' 124° 00'
	Latitude 60° 07' 14.115"	Longitude 124° 06' 32.213"	

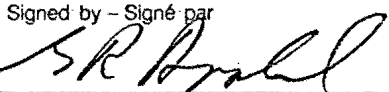
Unique Well Identifier - Code de l'ordinateur
 300B386010124000

Universal Well Location Reference - Références universelles d'emplacement du puits
 60.12059° 124.10895°

Reason for Changing Well Name - Motif de modification du nom du puits

Kotaneelee area was surveyed in and approved on CLSR Plans 65955 and 65969 and this survey indicates that the surface location referred to as H-38 should really be B-38.

Date at: Calgary this 8th day of September 19 80
 Daté à: ce jour de

Signed by - Signé par 	Title - Titre Manager, Drilling Operations	Company - Société Columbia Gas Development of Canada Ltd.
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BRANCH USE ONLY - À L'USAGE DE LA DIRECTION

APPROVED - APPROUVÉ - This application has been examined and approved: / Demande étudiée et approuvée:

Perforation Record

All shot with Schlumberger Hyperdome Tubing gun.

<u>Interval</u>	<u>No. Shots</u>	<u>Date</u>
11,641'-11,665'	49	Oct. 29, 1977
11,668'-11,687'	39	"
11,700'-11,720'	41	"
11,729'-11,742'	27	"
11,763'-11,780'	35	"
11,789'-11,792'	7	"
11,795'-11,798'	7	"
11,803'-11,806'	7	"
11,809'-11,818'	19	"
11,824'-11,831'	15	"
11,847'-11,854'	15	"
11,857'-11,867'	21	"
11,871'-11,874'	7	"
11,890'-11,900'	21	"

2686

COLUMBIA ET AL KOTANEELEE YT H38

November 29, 1977

Rigging up to do acid job. Delays due to weather, made one flight yesterday, started to rain, this morning fogged in and unable to fly.

Moved 10,000 gallons 28% HCl acid and two 400 barrel tanks from Beaver Barge landing to H-38 well site. Heating acid with steam to 100°F. Schlumberger wire line unit and 2 Halliburton units moved over from Beaver River.

Will start rig motor and raise derrick. Haul in Haliburton iron, and set up flare lines and tie-in to flare manifold. Fill 400 barrel tank with displacement fluid and heat to 100°F with steam.

Estimated timing for acid job Thursday, December 1.

2688

ACC

COLUMBIA ET AL KOTANEELEE YT H38

November 30, 1977 (-25°F)

Rigging up to do acid job. Transferred acid to new 400 Barrel tank after 4" valve cracked. Lost approximately 4-5 barrels acid. Started rig motor and will raise derrick today.

Will pressure test all lines and flow well to pit and prepare to do acid job Thursday AM.

December 1, 1977

Preparing to do acid job. Acid and displacement fluid heated to 100°F. Haliburton preparing to pressure test lines. Schlumberger rigging up to run wireline if necessary.

KOTANEELEE YT H-38

Friday, December 2, 1977

8:00 A.M. - Flowing well to clean up
20/64 choke, 2900-3200 psig back pressure,
estimated rate 7-8 MMcf/d.

Heated acid to 102°F and cut 28% HCL to 15% with water, heated flush fluid to 112°F. Pressure tested Howco lines to 10,000 psig and Nowsco lines to 4000 psig (Nowsco used for back pressure on annulus). Set annulus relief valve at 4000 psig. Pumped 1000 gals. 15% HCL and additives, pump pressure 4500 increased to 6000 psig and broke back to 3000 psig. Displaced with 175 barrels water, pressure decreased from 3000 to 2500 by end of displacement. ISIP - 2500 psig and after 15 minutes 1000 psig. Rate held constant at 6 barrels throughout first stage.

Pumped 15,000 gallons 15% HCL with 450 gallons HAI-75, 90 gallons Pen-6, 25 gallons Howco suds, at 6 barrels per minute with 10 ball sealers per minute throughout. Displaced by 175 barrels water and diesel fuel. Injection pressures varied from 2500 - 3400 psig. ISIP 3000 psig, after 15 minutes 900 psig. Removed injection lines, frac head and opened well to flare pit. The following flow data was obtained:

<u>DATE</u>	<u>TIME</u>	<u>TBG. PRESS</u>	<u>TEMP</u>	<u>CHOKE</u>	<u>REMARKS</u>
Dec 1	8:20 PM	1625		20/64	Recovering diesel
	9:20	1600	80		
	10:00	1200	80		
	11:00	1600	80		
Dec 2	12:30 AM	1650	80		Choke plugged
	3:30	3500		8/64	diesel and acid
	4:00	3300	76	10/64	water
	5:00	2830	76	16/64	acid water
	6:00	2975		20/64	7-8 MMcf/d and acid water

KOTANEELEE YT H-38

Saturday December 3, 1977

Flowing well to flare pit on 40/64 choke. Approximate rate 20 MMcf per day along with some acid water. The flow data for the last 24 hours is as follows:

<u>DATE</u>	<u>TIME</u>	<u>TBG PRESS</u>	<u>TEMP</u>	<u>CHOKE</u>	<u>REMARKS</u>
Dec 2	10:00 AM	3225	83	20/64	7-8 MMcf plus
	11:00	3125	82	30/64	acid water
	12:00 noon	2750		40/64	
	1:30	2080	84	40/64	19 MMcf/d plus
	2:00	2060	122	40/64	acid water
	3:00	2033	126	40/64	
	4:00	2025	132	40/64	
	5:00	2023	134	40/64	
	6:00	2025	137	40/64	
	7:00	2028	138	40/64	
	8:00	2031	140	40/64	
	9:00	2035	142	40/64	
	10:00	2040	142	40/64	
	11:00	2045	142	40/64	
	12:00 mid.	2049	144	40/64	
Dec 3	1:00 AM	2053	144	40/64	20 MMcf/d plus
	2:00	2056	144	40/64	acid water
	3:00	2061	148	40/64	
	4:00	2066	148	40/64	
	5:00	2077	148	40/64	
	6:00	2075	148	40/64	
	7:00	2078	150	40/64	
	8:00	2082	150	40/64	

2386

KOTANEELEE YT H-38

Sunday December 4, 1977

Flowing well to flare pit on 40/64 choke, approximate rate 20 MMcf/d along with some acid water. Well appears to be cleaning up. The rates for last 24 hours are as follows:

<u>DATE</u>	<u>TIME</u>	<u>TBG PRESS</u>	<u>TEMP</u>	<u>CHOKE</u>	<u>REMARKS</u>
Dec 3	9:00 AM	2085	154	40/64	20 MMcf/d plus
	10:00	2090	154	40/64	acid water
	11:00	2093	154	40/64	
	12:00 noon	1096	154	40/64	
	1:00	2100	156	40/64	
	2:00	2104	156	40/64	
	3:00	2106	156	40/64	
	4:00	2110	156	40/64	
	5:00	2114	157	40/64	
	6:00	2116	157	40/64	
	7:00	2118	158	40/64	
	8:00	2122	158	40/64	
	9:00	2124	158	40/64	
	10:00	2126	158	40/64	
	11:00	2129	158	40/64	
	12:00 mid	2131	158	40/64	20 MMcf/d plus
Dec 4	1:00 AM	2137	159	40/64	light fresh
	2:00	2137	158	40/64	water spray
	3:00	2139	160	40/64	
	4:00	2140	160	40/64	
	5:00	2142	160	40/64	
	6:00	2144	160	40/64	
	7:00	2147	162	40/64	
	8:00	2149	162	40/64	
	9:00	2152	162	40/64	

Well shut in to run Gradient, set BH Pressure recorders for AOF test

KOTANEELEE YT H38

Monday December 5, 1977

Ran in hole with Baker F-S plug to set in lower F nipple at 11599. Plug caught and stuck at 11505. Pulled out of hole with wireline and ran back in with overshot and retrieved plug. Ran in with second F-S plug and set in F nipple at 11599 as per program. Preparing to run gradient. Temperature -25°F overnight.

KOTANEELEE YT H38

Tuesday December 6, 1977 (-45°F)

Waiting on bottom hole pressure recorders. Recorders coming on CPAir this afternoon. Ran in hole with BH pressure recorders, recorders hung up at 11505' and released. Recorders fell 94 feet to bottom plug at 11599'. Ran in hole with retrieval tool, (O.D. 1.67), no indicated restriction at 11505', retrieved recorders. Several joints on pressure recorders damaged.

COLUMBIA ET AL KOTANEELEE YT H38

Wednesday December 7, 1977 (-15°F)

Flowing well on first point of AOF test.
Wellhead pressure 4120 psig 4.93 MMcf/d. No liquid production.
Ran in hole with tandem pressure recorders, no indicated restrictions, set in F-S plug at 11,599'. Started flowing well at 5:30 AM.

Separator temp -25°F. Wellhead temperature 70°F.
Shut in wellhead pressure prior to flow 4425 psig.

Thursday December 8, 1977 (-20°F)

Flowing well on rate No. 2 of AOF test.

Started flowing at 6:30 A.M. Wellhead pressure 3379 psig. Choke 22/64. Rate 10.3 MMcf/d, 71°F wellhead, -10°F separator. No indicated water production.

Flowed on rate No. 1 for 12 hours, final pressure 4115 psig, rate 5.2 MMcf/d, wellhead temp 78°F, separator -8°F
No indicated water production. Shut well in for 13 hours
Wellhead pressure 4443 psig.

Friday December 9, 1977

Flowing well on point No. 3 of AOF test. Started flow at 6:30 AM. Choke 30/64, Wellhead pressure 3315 psig. Wellhead temperature 106°F, Separator temperature +15°F. 15.5 MMcf per day, no fluid production
Point No. 2 of AOF test - Choke 22/64, Wellhead Pressure 3753 psig, Wellhead temperature 96°F, Separator +8°F. 10.0 MMcf per day, no fluid production
12 hour shut-in pressure between Point #2 & #3 - 4447 psig.

COLUMBIA ET AL KOTANEELEE YT H38

Recap of AOF test Data

1. Flow rate No. 1 12 hours
Wellhead pressure 4115 Wellhead temp. 78°F,
Separator temp. -8°F, Rate 5.2 MMcf/d, fluid production - nil

Shut well in 12 hours, wellhead pressure 4443
2. Flow rate No. 2 12 hours
Choke 22/64 Wellhead pressure 3753, wellhead temp 96°F
Separator temp +8°F, rate 10.0 MMcf/d, fluid production nil

Shut well in 12 hours, wellhead pressure 4447
3. Flow rate No. 3 12 hours
Choke 30/64 Wellhead pressure 3205 wellhead temp 137°F
Separator temp +77°F, rate 14.5 MMcf/d fluid production
2.5 Bbls/hr, 3.87 B/MMcf

Shut well in 12 hours, wellhead pressure 4456 psig
4. Flow rate No. 4 12 hours
Choke 35/64 wellhead pressure 2678 wellhead temp 150°F
Separator temp 102°F Rate 18.8 MMcf/d Fluid production
2.3 Bbl/hr, 2.9 Bbl/MMcf.
5. Extended rate for stabilization
Choke 30/64 wellhead pressure 3061 wellhead temp 154°F
Separator temp 98°F Rate 15.0 MMcf/d fluid production
2.1 Bbl/hr, 3.4 Bbl/MMcf
6. Build up

KOTANEELEE YT H38

December 10, 1977 (-18°F)

Flowing well on point No. 4 of AOF test.

Choke 35/64, Wellhead Pressure 2830 psig, Wellhead Temp. 121°F
Sep. Temp. +55°F, Rate 19.6 MMcf/d, no readings on fluid

Point No. 3 of AOF

Choke 30/64, Wellhead Pressure 3205 psig, wellhead temp 137°F
sep. temp +77°F, Rate 14.5 MMcf/d, fluid production 3.87 Bbl/MM
Chlorides 5000 PPM

Well built up to 4456 psig after point No. 3

December 11, 1977 (-15°F)

Flowing well on extended rate of AOF test. Started on extended
rate at 6:30 PM December 10.

Choke 30/64, Wellhead pressure 3047, wellhead temp 150°F ,
Sep. temp 93°F, rate 18.8 MMcf/d, fluid production 2.9 Bbl/MM

Point No. 4 of AOF

Choke 35/64, Wellhead pressure 2678 psig, wellhead temp 150°F
Sep. temp 102°F, Rate 18.8 MMcf/d, fluid production 2.9 Bbl/MM

December 12, 1977 (-20°F)

Flowing well on extended rate of AOF test

Choke 30/64, wellhead pressure 3061, wellhead temp 154°F,
Sep temp, 98°F, Rate 15.0 MMcf/d, fluid production 2.1 B/h
3.4 Bbl/MM

Waiting on Chem & Geo. to run H₂S concentration. Unable to
fly yesterday.

December 13, 1977 (-15°F)

Preparing to run in and pull bottomhole pressure recorders, and
run gradient. Shut well in for build-up at 1:00 PM December 12

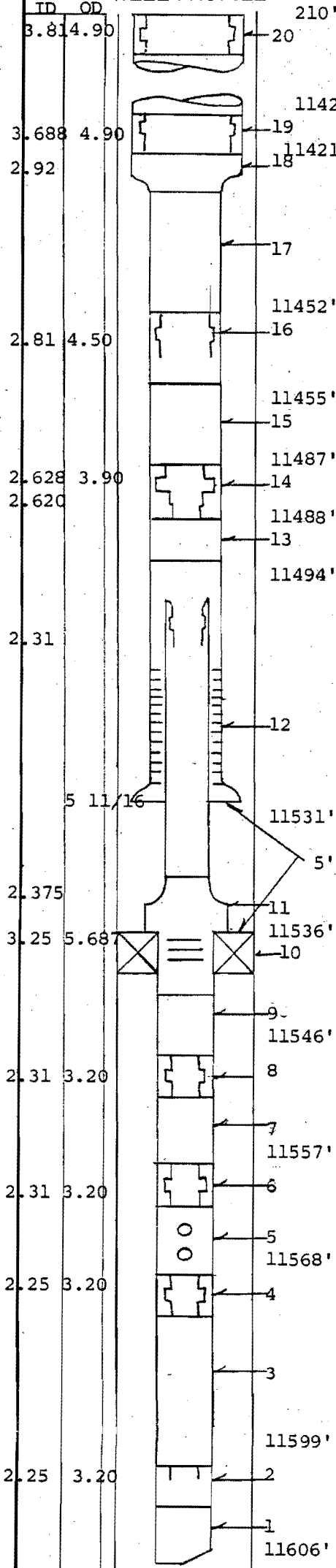
Final rate 15.1 Mmcf/d wellhead pressure 3061 psig, wellhead
temp 154°F, sep temp 98°F, fluid production 3.4 Bbl/MM

wellsite H₂S concentration 2.44%

Build-up pressures recorded at wellhead

Midnite	4442 psig	5:00 AM	4446
2:00 AM	4444 psig	6:00 AM	4446
3:00 AM	4445 psig	7:00 AM	4447
4:00 AM	4445 psig	8:00 AM	4445

WELL PROFILE



OPERATOR Columbia Gas

WELL # COLUMBIA ET AL KOTANEELLEE

YT H38

FIELD _____

COUNTY _____

STATE YUKON

DATE _____

NEW COMPLETION WORKOVER

CASING	LINER	TUBING		
		1	2	3
SIZE <u>7</u>		4 1/2		
WEIGHT <u>29-32</u>		1275		
GRADE <u>K-55</u>		CS		
THREAD _____		Hydril		
DEPTH <u>12,681</u>		11,540		

ITEM NO.	EQUIPMENT AND SERVICES	ESTIMATE length
1	2 7/8 CS Hydril Mule Shoe Pup	6.00
2	BFC 2 7/8 CS Hydril x 2.25 F Nipple	.80
3	2 7/8 CS Hydril Jt. Tbg	30.39
4	BFC 2 7/8 CS Hydril x 2.25 F Nipple	.80
5	2 7/8 CS Hydril Perf Pup	9.80
6	BFC 2 7/8 CS Hydril x 2.31 F Nipple	.80
7	2 7/8 CS Hydril Pup	9.94
8	BFC 2 7/8 CS Hydril X 2.31 F Nipple	.80
9	2 7/8 CS Hydril Pup	7.75
10	Baker Model D Prod Packer 84-32# 415.01 set at 11540'	
11	Baker Model E Anchor Seal Assembly with 2 pem Seal unit 80-32# 443-48 2 7/8 EUE Mod Bx X 2 7/8 CS Hydril PN	3.15
12	Baker ER-1 Xtra long Tbg seal Receptacle 3 1/2 CS Hydril Bx X 2 7/8 EUE Pn	37.00
	5 11/16 x 33 x 23 x 30 2.31 F Profile	
13	3 1/2 CS Hydril Pup	5.94
14	BFC 3 1/2 CS Hydril x 2.628 R Nipple	.91
15	3 1/2 CS Hydril Tbg Jt	32.45
16	BFC 3 1/2 CS Hydril Model L Sliding Sleeve w/ 2.81 F Profile	2.97
17	3 1/2 CS Hydril Tbg Jt	29.64
18	4 1/2 CS Hydril Bx X 3 1/2 CS Hydril XO Sub	.89
19	BFC 4 1/2 CS Hydril X 3.688 F Nipple	1.00
20	BFC 4 1/2 CS Hydril X 3.81 F Nipple	1.00

COMMENTS: _____

TOTAL ESTIMATE _____

ID's & OD's checked on surface

11599'

2

11606'

PREPARED BY G.N. Hagen OFFICE Dowell, Ft. St. John PHONE 785-4467

CORE LABORATORIES - CANADA, LTD.

COLUMBIA GAS DEVELOPMENT
 Company OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT H-38
 Field KOTANEELEE, NORTHWEST TERRITORIES
 Location 60° 07' 16" N.L.
 124° 06' 03" W.L.

Formation NAHANNI
 Drilling Fluid WATER BASE MUD
 Elevation
 Analysis FULL DIAMETER
 Remarks

Page 1 of 11
 File 7004-7571
 Date Report NOVEMBER 21, 1977
 Analysts BK JL JC TC MW CP

AST - APPEARANCE SIMILAR TO
 * - BROKEN CORE (AS USED FOR SUMMARY PURPOSES)
 ** - PERMEABILITY * 3000 MD

PS - PERMEABILITY
 FS - FINE SAND
 MS - MEDIUM SAND
 CS - COARSE SAND

CONG - CONGLOMERATE
 GOL - GYLOMITE
 SH - SHALE
 LMT - LIMST

SHY - SHALY
 JBK - BREAK
 BIT - BITUMEN
 CARB - CARBONACEOUS

A - ANHYDRITE
 FOSS - FOSSILIFEROUS
 KLN - CRYSTALLINE
 LAM - LAMINATIONS

V - VUCULAR
 LV - LARGE VUGS
 SV - SMALL VUGS
 PPV - PIN POINT VUGS

I - INTERGRANULAR
 STV - STRIATED
 HF - HORIZONTAL FRACTURE
 VF - VERTICAL FRACTURE

SS - SMALL PLUG SAMPLE
 SL - SLOTTED
 W - WASH
 N - WITH

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	

CORED INTERVAL 11690.0' - 12789.0'

CORE NO. 2 11690.0' - 11750.0' (REC. 59.0') (16 BOXES)

1	11690.0-91.0	1.0	0.37	0.30	-0.01	0.37	1.7	1.70	2.77	2.82			SV PPV F
2	11691.0-92.2	1.2	1.21	0.53	-0.01	1.45	1.9	2.28	2.77	2.82			SV PPV F
3	11692.2-93.5	1.3	0.69	0.08	-0.01	0.90	1.0	1.30	2.79	2.82			PPV F
4	11693.5-94.4	0.9	0.06	0.03	-0.01	0.05	0.8	0.72	2.79	2.82			SV
5	11694.4-95.4	1.0	0.21	-0.01	-0.01	0.21	1.0	1.00	2.78	2.81			SV F
6	11695.4-96.3	0.9	1.13	0.36	-0.01	1.02	1.4	1.26	2.77	2.81			SV F
7	11696.3-97.6	1.3	0.59	0.21	0.10	0.76	1.3	1.69	2.79	2.83			SV F
8	11697.6-98.7	1.1	557.00	11.60	0.31	612.70	8.1	8.91	2.59	2.82			LV SV F
9	11698.7-99.9	1.2	1.24	1.10	-0.01	1.49	2.5	3.00	2.74	2.81			SV F
10	11699.9-01.2	1.3	0.57	0.38	-0.01	0.74	1.6	2.08	2.76	2.81			SV F
11	11701.2-02.3	1.1	0.53	0.41	-0.01	0.58	2.7	2.97	2.73	2.81			SV F
12	11702.3-03.4	1.1	1.54	0.98	-0.01	1.69	2.4	2.64	2.76	2.83			SV F
13	11703.4-04.4	1.0	1.82	1.46	-0.01	1.82	2.6	2.60	2.75	2.83			SV F
14	11704.4-05.1	0.7	0.80	0.58	-0.01	0.56	0.8	0.56	2.81	2.83			DENSE F
15	11705.1-06.0	0.9	5.72	0.58	-0.01	5.15	1.4	1.26	2.79	2.83			SV F
16	11706.0-07.0	1.0	1.08	0.78	-0.01	1.08	5.3	5.30	2.69	2.84			SV F
17	11707.0-07.7	0.7	10.40	1.91	-0.01	7.28	2.2	1.54	2.75	2.81			SV F
18	11707.7-08.5	0.8	0.27	0.24	-0.01	0.21	2.7	2.16	2.75	2.82			SV F
19	11708.5-09.5	1.0	19.80	3.98	-0.01	19.80	2.1	2.10	2.76	2.83			SV F
20	11709.5-10.7	1.2	16.40	0.08	-0.01	19.68	1.9	2.28	2.76	2.81			SV F
21	11710.7-11.7	1.0	8.94	1.89	0.06	8.94	2.6	2.60	2.76	2.83			SV F
22	11711.7-12.7	1.0	27.30	5.60	0.11	27.30	4.1	4.10	2.71	2.83			SV F
23	11712.7-13.6	0.9	2.55	2.33	0.07	2.30	3.0	2.70	2.76	2.85			SV F
24	11713.6-14.7	1.1	1.33	0.52	-0.01	1.46	2.0	2.20	2.77	2.83			SV PPV F
25	11714.7-15.7	1.0	1.30	1.11	-0.01	1.30	1.8	1.80	2.77	2.82			SV F
26	11715.7-16.2	0.5	9.02	0.71	0.07	4.51	3.7	1.85	2.73	2.84			SV PPV F

11.6

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
 OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT H-38

Formation NAHANNI
 Drilling Fluid WATER BASE MUD

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 File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90 ^o	KV				Bulk	Grain	Oil	Total Water	
11.6 CORE NO. 2 CONTINUED													
27	11716.2-17.0	0.8	**	3.69	0.28	2.95	10.6	8.48	2.53	2.83			LV SV F
28	11717.0-18.1	1.1	1.15	1.05	-0.01	1.27	4.5	4.95	2.68	2.81			SV F
29	11718.1-19.1	1.0	10.90	4.61	-0.01	10.90	4.7	4.70	2.68	2.81			SV F
30	11719.1-20.3	1.2	7.09	1.53	0.17	8.51	3.3	3.96	2.73	2.82			SV PPV F
31	11720.3-21.3	1.0	1.71	0.06	0.35	1.71	7.3	7.30	2.62	2.83			LV SV F
32	11721.3-22.0	0.7	**	2.21	0.05	1.55	7.3	5.11	2.63	2.84			LV SV F
33	11722.0-22.9	0.9	0.33	-0.01	0.07	0.29	1.1	0.99	2.79	2.82			SV F
34	11722.9-23.8	0.9	7.94	3.64	0.11	7.15	2.7	2.43	2.74	2.82			SV F
35	11723.8-24.8	1.0	1.83	1.78	0.16	1.83	2.7	2.70	2.75	2.82			SV F
36	11724.8-25.7	0.9	0.57	0.30	0.09	0.51	2.4	2.16	2.75	2.82			SV F
37	11725.7-26.6	0.9	1.32	0.21	-0.01	1.19	1.8	1.62	2.76	2.81			SV F
38	11726.6-27.6	1.0	5.75	0.31	0.18	5.75	3.6	3.60	2.71	2.81			SV F
39	11727.6-28.5	0.9	1.09	0.14	0.11	0.98	6.5	5.85	2.62	2.80			SV F
40	11728.5-29.4	0.9	4.86	-0.01	0.14	4.37	4.3	3.87	2.70	2.83			SV F
41	11729.4-30.9	1.5	0.81	0.50	0.16	1.22	1.1	1.65	2.79	2.82			PPV F
42	11730.9-31.9	1.0	0.37	-0.01	-0.01	0.37	1.8	1.80	2.75	2.80			PPV F
43	11731.9-32.4	0.5	3.92	3.82	0.08	1.96	3.8	1.90	2.72	2.83			SV F
44	11732.4-33.3	0.9	2.83	1.08	0.07	2.55	3.9	3.51	2.73	2.84			SV F
45	11733.3-34.1	0.8	**	4.91	0.08	3.93	8.8	7.04	2.59	2.84			LV SV F
46	11734.1-35.1	1.0	0.28	0.20	-0.01	0.28	1.8	1.80	2.77	2.82			SV PPV F
47	11735.1-36.2	1.1	0.78	0.49	-0.01	0.86	1.5	1.65	2.80	2.84			SV PPV F
48	11736.2-37.4	1.2	1.47	0.66	0.13	1.76	2.8	3.36	2.74	2.83			SV F
49	11737.4-38.5	1.1	1.28	0.38	0.08	1.41	3.1	3.41	2.73	2.82			SV PPV F
50	11738.5-39.6	1.1	7.27	5.67	0.52	8.00	5.5	6.05	2.60	2.75			SV PPV F
51	11739.6-40.5	0.9	5.23	4.29	-0.01	4.71	2.5	2.25	2.75	2.82			SV F
52	11740.5-41.6	1.1	1.14	0.32	0.16	1.25	1.7	1.87	2.78	2.83			SV F
53	11741.6-42.7	1.1	0.13	-0.01	-0.01	0.14	1.4	1.54	2.79	2.83			SV PPV F
54	11742.7-43.6	0.9	22.80	15.70	0.95	20.52	3.1	2.79	2.76	2.85			SV PPV F
SS 55	11743.6-44.6	1.0	0.36	-	-	0.36	2.0	2.00	-	-			I RUBBLE
SS 56	11744.6-45.5	0.9	0.11	-	-	0.10	2.2	1.98	-	-			I RUBBLE
57	11745.5-47.2	1.7	0.38	-0.01	-0.01	0.65	1.4	2.38	2.77	2.81			PPV F
58	11747.2-49.0	1.8	1.21	0.73	-0.01	2.18	1.5	2.70	2.76	2.80			SV PPV F

29.6

29.6 @ 4.11 % -> 121.8 pft
 29.6 @ 26.16 % 774.27

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
 OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT-H-38
 Formation NAHANNI
 Drilling Fluid WATER BASE MUD

Page 3 of 11
 File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	

CORE NO. 2 CONTINUED

-	11749.0-50.0	1.0	-	-	-	-	-	-	-	-	-	-	LOST CORE
-	11750.0-40.0	290.0	-	-	-	-	-	-	-	-	-	-	DRILLED

CORE NO. 3 12040.0' - 12064.0' (REC. 22.0') (6 BOXES)

59	12040.0-40.9	0.9	0.49	0.31	0.08	0.44	2.7✓	2.43	2.78	2.86			SV PPV F
60	12040.9-41.9	1.0	**	0.59	0.16	0.59	4.7✓	4.70	2.74	2.88			LV SV F
61	12041.9-42.9	1.0	12.00	3.68	0.14	12.00	2.0✓	2.00	2.80	2.86			SV F
62	12042.9-43.8	0.9	0.63	0.61	0.14	0.57	1.2	1.08	2.82	2.86			SV F
63	12043.8-44.8	1.0	15.20	8.47	0.70	15.20	5.0✓	5.00	2.71	2.86			SV F
64	12044.8-45.7	0.9	28.00	0.22	2.14	25.20	4.6✓	4.14	2.72	2.86			SV VF
65	12045.7-46.7	1.0	253.00	4.67	1.10	253.00	3.9✓	3.90	2.74	2.85			SV VF
66	12046.7-48.1	1.4	0.22	-0.01	0.18	0.31	3.1	4.34	2.76	2.85			SV PPV F
67	12048.1-49.6	1.5	**	0.07	0.73	0.11	8.6	12.90	2.61	2.85			LV SV F
68	12049.6-50.6	1.0	4.83	0.44	0.38	4.83	6.3✓	6.30	2.67	2.85			SV F
69	12050.6-51.5	0.9	119.00	0.07	9.01	107.10	6.5✓	5.85	2.67	2.86			SV F
70	12051.5-52.6	1.1	2.95	0.49	-0.01	3.25	5.3✓	5.83	2.70	2.86			SV F
71	12052.6-53.2	0.6	0.92	0.58	0.15	0.55	1.5	0.90	2.81	2.85			SV F
72	12053.2-54.0	0.8	2.18	1.51	2.21	1.74	2.5✓	2.00	2.78	2.85			SV VF
73	12054.0-55.1	1.1	1.12	0.65	0.37	1.23	1.2	1.32	2.82	2.85			I F
74	12055.1-56.3	1.2	3.63	1.31	0.11	4.36	0.9	1.08	2.82	2.85			SV F
SS 75	12056.3-57.3	1.0	0.65	-	-	0.65	1.6	1.60	-	-			I RUBBLE
SS 76	12057.3-58.2	0.9	0.61	-	-	0.55	4.1	3.69	-	-			I RUBBLE
SS 57	12058.2-59.2	1.0	0.18	-	-	0.18	1.7	1.70	-	-			I RUBBLE
SS 78	12059.2-60.1	0.9	0.26	-	-	0.23	1.5	1.35	-	-			PPV RUBBLE
SS 79	12060.1-61.1	1.0	0.25	-	-	0.25	1.1	1.10	-	-			I RUBBLE
SS 80	12061.1-62.0	0.9	0.26	-	-	0.23	1.8	1.62	-	-			I RUBBLE
-	12062.0-64.0	2.0	-	-	-	-	-	-	-	-			LOST CORE
-	12064.0-60.0	196.0	-	-	-	-	-	-	-	-			DRILLED

CORE NO. 4 12260.0' - 12320.0' (REC. 60.0') (16 BOXES)

81	12260.0-61.1	1.1	0.41	0.39	0.13	0.45	1.5	1.65	2.81	2.86			SV F
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11.2 @ 5.028% → 56.31 φH
 11.2 @ 3.282% → 423.57 PH.

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
OF CANADA LTD.
Well COLUMBIA ET AL KOTANEELEE YT H-38

Formation NAHANNI
Drilling Fluid WATER BASE MUD

Page 4 of 11
File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90 ⁰	KV				Bulk	Grain	Oil	Total Water	

CORE NO. 4 CONTINUED

82	12261.1-62.0	0.9	1.65	0.75	0.07	1.49	2.0	1.80	2.80	2.86			SV F
83	12262.0-63.2	2.9 1.2	13.10	10.40	0.56	15.72	2.3	2.76	2.79	2.86			SV F
84	12263.2-64.0	0.8	2.99	1.87	0.69	2.39	2.3	1.84	2.79	2.86			SV F
85	12264.0-65.0	1.0	7.10	2.33	0.34	7.10	1.8	1.80	2.80	2.86			SV F
86	12265.0-65.8	0.8	3.81	2.84	0.64	3.05	2.7	2.16	2.78	2.86			SV F
87	12265.8-66.7	3.8 0.9	5.64	3.64	0.24	5.08	2.5	2.25	2.79	2.86			SV F
88	12266.7-67.8	1.1	13.60	6.12	-0.01	14.96	2.5	2.75	2.83	2.90			SV F
89	12267.8-68.8	1.0	30.30	1.99	-0.01	30.30	2.7	2.70	2.78	2.86			SV F
90	12268.8-69.8	1.0	21.80	0.95	0.06	21.80	1.7	1.70	2.81	2.86			SV F
91	12269.8-70.7	9 0.9	1.24	0.98	0.05	1.12	2.5	2.25	2.81	2.89			SV F
92	12270.7-71.7	1.0	3.61	1.31	0.12	3.61	1.4	1.40	2.81	2.85			SV F
93	12271.7-72.6	0.9	10.30	5.76	0.05	9.27	1.5	1.35	2.81	2.85			SV F
94	12272.6-73.5	0.9	0.89	0.82	0.94	0.80	1.2	1.08	2.82	2.86			SV F
95	12273.5-74.4	9 0.9	60.30	18.20	0.40	54.27	3.1	2.79	2.77	2.86			SV F
96	12274.4-75.4	1.0	0.57	0.36	-0.01	0.57	1.1	1.10	2.82	2.85			SV F
97	12275.4-76.1	7 0.7	0.71	0.52	0.04	0.49	4.0	2.80	2.74	2.86			SV F
98	12276.1-76.9	0.8	1.57	1.22	-0.01	1.26	1.0	0.80	2.82	2.85			SV F
99	12276.9-78.3	1.4	3.90	1.53	0.81	5.46	3.8	5.32	2.75	2.86			SV VF
100	12278.3-79.2	0.9	0.95	0.61	-0.01	0.85	0.4	0.36	2.85	2.87			DENSE F
101	12279.2-79.9	7 0.7	5.88	0.04	0.15	4.12	2.4	1.68	2.79	2.86			SV F
102	12279.9-81.0	1.1	0.93	0.68	0.95	1.03	1.4	1.54	2.82	2.86			SV F
103	12281.0-82.0	1.0	0.11	0.08	0.12	0.11	0.9	0.90	2.84	2.86			SV F
104	12282.0-82.0	1.0	5.06	3.09	0.42	5.06	4.5	4.50	2.73	2.86			SV F
105	12283.0-84.1	2.9 1.1	0.94	0.86	0.10	1.03	2.4	2.64	2.79	2.86			SV F
106	12284.1-84.9	0.8	58.00	9.05	1.03	46.40	3.8	3.04	2.75	2.86			SV F
107	12284.9-86.3	1.4	26.70	24.40	0.05	37.38	0.9	1.26	2.83	2.86			DENSE F
-	12286.3-91.4	5.1	-	-	-	-	-	-	-	-			DENSE
108	12291.4-92.8	1.4	0.68	0.68	0.98	0.96	1.4	1.96	2.82	2.86			I F
109	12292.8-94.5	1.7	0.63	0.29	0.11	1.07	1.2	1.20	2.83	2.87			I F
110	12294.5-95.1	6 0.6	3.06	0.73	0.26	1.84	3.0	1.80	2.78	2.87			SV F
-	12295.1-96.3	1.2	-	-	-	-	-	-	-	-			DENSE
111	12296.3-96.9	0.6	0.08	0.05	-0.01	0.05	3.8	2.28	2.75	2.86			SV F
112	12296.9-98.0	1.1	12.30	1.02	0.10	13.53	1.2	1.32	2.83	2.87			DENSE F

14.8

43.08

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
 OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT H-38

Formation NAHANNI
 Drilling Fluid WATER BASE MUD

Page 5 of 11
 File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	

CORE NO. 4 CONTINUED

113	12298.0-98.7	0.7	1.67	1.52	-0.01	1.17	4.6	3.22	2.72	2.86		SV F
114	12298.7-99.5	0.8	25.50	13.50	-0.23	20.40	7.8	6.24	2.64	2.87		SV F
115	12299.5-00.5	1.0	3.56	1.09	0.28	3.56	3.7	3.70	2.75	2.86		SV F
116	12300.5-01.4	0.9	0.36	0.26	0.33	0.32	2.7	2.43	2.78	2.86		SV F
117	12301.4-02.3	0.9	2.09	1.41	0.79	1.88	1.5	1.35	2.81	2.86		SV F
-	12302.3-05.5	3.2	-	-	-	-	-	-	-	-		DENSE
118	12305.5-07.5	2.0	7.02	1.05	0.46	14.04	1.3	2.60	2.82	2.86		SV F
-	12307.5-08.7	1.2	-	-	-	-	-	-	-	-		DENSE
119	12308.7-10.2	1.5	4.78	1.93	0.66	7.17	1.2	1.80	2.83	2.86		I F
120	12310.2-11.5	1.3	4.76	2.89	1.27	6.19	1.9	2.47	2.80	2.86		SV F
121	12311.5-13.0	1.5	11.80	7.21	0.58	17.70	3.5	5.25	2.76	2.86		SV F
122	12313.0-14.2	1.2	1.88	0.87	0.23	2.26	4.3	5.16	2.73	2.85		SV F
123	12314.2-15.3	1.1	0.77	0.56	0.42	0.85	3.4	3.74	2.75	2.85		SV F
124	12315.3-16.2	0.9	108.00	9.61	1.28	97.20	7.4	6.66	2.65	2.86		SV F
125	12316.2-17.2	1.0	*	6.43	*	6.43	2.9	2.90	2.77	2.86		SV OVF
126	12317.2-18.6	1.4	10.60	4.82	1.59	14.84	2.5	3.50	2.79	2.86		SV F
127	12318.6-20.0	1.4	27.00	13.20	3.41	37.80	6.4	8.96	2.67	2.86		SV F
-	12320.0-50.0	130.0	-	-	-	-	-	-	-	-		DRILLED

24.7 CORE NO. 5 12450.0' - 12510.0' (REC. 60.0') (17 BOXES)

128	12450.0-51.6	1.6	22.10	6.58	10.10	35.36	2.9	4.64	2.78	2.86		SV F
129	12451.6-52.8	1.2	14.80	6.89	1.23	17.76	3.3	3.96	2.76	2.86		SV F
130	12452.8-53.8	1.0	105.00	21.90	0.70	105.00	2.9	2.90	2.77	2.86		SV F
131	12453.8-54.7	0.9	3.60	2.25	0.50	3.24	2.7	2.43	2.77	2.85		SV F
132	12454.7-55.7	1.0	86.00	19.80	0.47	86.00	3.6	3.60	2.75	2.85		SV F
133	12455.7-56.3	0.6	18.10	3.50	1.49	10.86	5.2	3.12	2.72	2.87		SV F
134	12456.3-57.3	1.0	8.97	4.89	0.74	8.97	3.2	3.20	2.76	2.86		SV F
135	12457.3-58.5	1.2	3.49	3.49	1.56	4.19	3.1	3.72	2.75	2.85		SV F
136	12458.5-59.3	0.8	5.41	3.94	1.38	4.33	3.4	2.72	2.75	2.85		SV F
137	12459.3-60.5	1.2	2.84	2.34	1.08	3.41	3.4	4.08	2.76	2.86		SV F
138	12460.5-61.6	1.1	7.34	5.92	3.08	8.07	2.6	2.86	2.77	2.85		SV F
139	12461.6-62.7	1.1	42.70	11.80	1.85	46.97	3.0	3.30	2.77	2.85		SV F

43.08
 24.7 @ 3.59% → 88.67 g/g
 24.7 @ 15.95% → 394.14 g/g

40.53

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
 OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT H-38

Formation NAHANNI
 Drilling Fluid WATER BASE MUD

Page 6 of 11
 File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	
CORE NO. 5 CONTINUED													
140	12462.7-63.3	0.6	3.87	2.66	2.13	2.32	3.5	2.10	2.75	2.85			SV F
141	12463.3-64.4	1.1	2.84	1.87	1.08	3.12	4.2	4.62	2.73	2.85			SV F
142	12464.4-65.6	1.2	2.13	1.75	0.91	2.56	3.5	4.20	2.76	2.86			SV F
143	12465.6-66.6	1.0	2.21	0.63	1.90	2.21	2.8	2.80	2.77	2.85			SV F
144	12466.6-67.5	0.9	4.37	3.43	4.43	3.93	3.1	2.79	2.77	2.86			SV F
145	12467.5-68.5	1.0	5.03	4.43	3.45	5.03	4.2	4.20	2.74	2.86			SV F
146	12468.5-69.5	1.0	**	3.42	0.81	3.42	4.7	4.70	2.72	2.86			LV SV F
147	12469.5-70.5	1.0	0.88	0.80	0.36	0.88	3.3	3.30	2.76	2.86			SV F
148	12470.5-71.4	0.9	3.33	2.70	1.13	3.00	4.1	3.69	2.74	2.85			SV F
149	12471.4-72.2	0.8	1.34	1.11	0.23	1.07	2.9	2.32	2.78	2.86			SV F
150	12472.2-73.0	0.8	8.00	5.15	1.09	6.40	3.5	2.80	2.76	2.86			SV F
151	12473.0-73.8	0.8	56.10	40.60	0.46	44.88	2.3	1.84	2.79	2.86			PPV F
-	12473.8-76.4	2.6	-	-	-	-	-	-	-	-			DENSE
152	12476.4-77.1	0.7	10.80	8.34	0.30	7.56	2.9	2.03	2.79	2.88			SV F
-	12477.1-78.7	1.6	-	-	-	-	-	-	-	-			DENSE
153	12478.7-80.1	1.4	**	0.51	23.00	0.71	5.0	7.00	2.72	2.86			LV SV F
-	12480.1-82.2	2.1	-	-	-	-	-	-	-	-			DENSE
154	12482.2-83.3	1.1	7.82	2.16	1.22	8.60	3.2	3.52	2.77	2.87			SV F
155	12483.3-84.3	1.0	2.11	2.07	12.00	2.11	2.7	2.70	2.77	2.85			I VF
156	12484.3-85.2	0.9	4.79	2.47	2.30	4.31	3.3	2.97	2.77	2.87			SV F
157	12485.2-86.2	1.0	7.98	4.87	3.17	7.98	2.9	2.90	2.78	2.86			SV F
158	12486.2-87.1	0.9	9.92	7.16	0.59	8.93	2.5	2.25	2.79	2.86			SV F
159	12487.1-87.9	0.8	12.40	8.07	2.13	9.92	2.5	2.00	2.77	2.85			SV PPV F
160	12487.9-88.8	0.9	5.47	5.36	1.89	4.92	3.3	2.97	2.76	2.86			SV F
161	12488.8-89.8	1.0	40.30	30.70	3.33	40.30	3.1	3.10	2.76	2.85			SV F
162	12489.8-90.6	0.8	22.60	22.60	3.29	18.08	3.3	2.64	2.76	2.86			SV F
163	12490.6-91.5	0.9	25.70	16.00	1.30	23.13	6.5	5.85	2.67	2.86			SV F
164	12491.5-92.4	0.9	60.40	26.50	4.52	54.36	3.3	2.97	2.76	2.85			SV F
165	12492.4-93.3	0.9	6.61	3.87	2.37	5.95	2.9	2.61	2.77	2.86			SV F
166	12493.3-94.2	0.9	2.47	1.55	0.28	2.22	3.3	2.97	2.76	2.85			SV F
167	12494.2-95.4	1.2	5.46	3.14	1.48	6.55	2.7	3.24	2.78	2.85			SV F
168	12495.4-96.6	1.2	43.80	9.56	4.35	52.56	1.5	1.80	2.82	2.87			SV VF

127

40.53

38.4

131.61

CORE LABORATORIES - CANADA, LTD.

Company COLUMBIA GAS DEVELOPMENT
 OF CANADA LTD.
 Well COLUMBIA ET AL KOTANEELEE YT H-38

Formation NAHANNI
 Drilling Fluid WATER BASE MUD

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 File 7004-7571

Sample Number	Interval Represented, Feet		Permeability to Air, Millidarcys			Permeability Feet	Porosity, Per Cent	Porosity Feet	Density, gm./cc.		Residual Saturations, Per Cent Pore Space		Visual Examination
	Depth	Thick	K Max	K90°	KV				Bulk	Grain	Oil	Total Water	
	38.4 CORE NO. 5 CONTINUED												
169	12496.6-98.2	1.6	21.20	19.10	45.70	33.92	2.3	3.68	2.79	2.86			PPV VF
170	12498.2-99.1	0.9	5.06	3.78	2.09	4.55	1.4	1.26	2.81	2.86			I F
-	12499.1-04.9	5.8	-	-	-	-	-	-	-	-			DENSE
171	12504.9-05.9	1.0	2.97	0.56	0.04	2.97	0.2	0.20	2.85	2.86			DENSE F
172	12505.9-06.7	0.8	14.40	9.18	3.69	11.52	2.3	1.84	2.79	2.86			SV F
173	12506.7-07.7	4.1 1.0	10.50	8.03	1.07	10.50	2.5	2.50	2.78	2.85			SV F
174	12507.7-08.7	1.0	21.60	18.60	2.72	21.60	2.7	2.70	2.78	2.86			SV F
175	12508.7-10.0	1.3	4.59	4.48	3.97	5.97	3.3	4.29	2.76	2.86			SV VF
-	12510.0-08.0	198.0	-	-	-	-	-	-	-	-			DRILLED

44.1 @ 3.32% → 146.63 6.12

COLUMBIA GAS DEVELOPMENT
 COMPANY OF CANADA LTD.
 WELL COLUMBIA ET AL KOTANEELEE YT H-38
 FIELD KOTANEELEE, NORTHWEST TERRITORIES
 LOCATION 60° 07' 16" N.L.
 124° 06' 03" W.L.

FORMATION NAHANNI
 DRILLING FLUID WATER BASE MUD
 ELEVATION
 ANALYSIS FULL DIAMETER
 REMARKS

PAGE 8 of 11
 FILE 7004-7571
 DATE REPORT NOV. 21/77
 ANALYSTS BK JL JC TE
 MW CP

*ST - APPEARS SIMILAR TO
 *B - BROKEN CORE (NO USED FOR SUMMARY PURPOSES)
 ** - PERMEABILITY > 30000 MD.
 - PERMEABILITY <
 FS - FINE SAND
 MS - MEDIUM SAND
 CS - COARSE SAND
 CONG - CONGLOMERATE
 DOL - DOLOMITE
 SH - SHALE
 LMV - LIMY
 SHY - SHALY
 BK - BREAK
 ST - PROBITUMEN
 CARB - CARBONACEOUS
 A - ANHYDRITE
 POSS - POSSIBLIFEROUS
 ALN - CRYSTALLINE
 LAM - LAMINATIONS
 V - VUGULAR
 LV - LARGE VUGS
 SV - SMALL VUGS
 PPV - PIN POINT VUGS
 I - INTERGRANULAR
 STY - STYCOLITIC
 HF - HORIZONTAL FRACTURE
 VF - VERTICAL FRACTURE
 SB - SMALL PLUG SAMPLE
 SL - SLIGHTLY
 VV - VERY
 W - WITH

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		PERMEABILITY TO AIR, MILLIDARCS			PERMEABILITY FEET	POROSITY PER CENT	POROSITY FEET	DENSITY, gm./cc.		VISUAL EXAMINATION
	DEPTH	THICK	%MAX	K90°	KV				BULK	GRAIN	
CORE NO. 6 12708.0' - 12755.0' (REC. 47.0') (13 BOXES)											
176	12708.0-09.3	1.3	1.54	1.16	-0.01	2.00	6.3	8.19	2.66	2.84	FEW LV SV PPV I A
177	12709.3-10.0	0.7	-0.01	-0.01	-0.0	-	1.2	0.84	2.85	2.88	I A
178	12710.0-11.0	1.0	0.01	0.01	-0.01	0.01	1.0	1.00	2.82	2.85	I A
179	12711.0-11.8	0.8	-0.01	-0.01	-0.01	-	1.0	0.30	2.84	2.87	FEW PPV I A
180	12711.8-13.2	1.4	0.01	0.01	-0.01	0.01	2.2	3.08	2.79	2.85	I A
181	12713.2-14.8	1.6	0.05	0.02	-0.01	0.08	2.3	3.68	2.78	2.85	I A
182	12714.8-16.2	1.4	0.03	0.02	-0.01	0.04	3.6	5.04	2.77	2.88	I A
183	12716.2-17.6	1.4	1.48	0.70	-0.01	2.07	2.0	2.80	2.81	2.87	SV PPV I A
184	12717.6-18.9	1.3	1.00	1.00	0.44	1.30	1.7	2.21	2.81	2.86	FEW LV SV PPV CALCITE A
185	12718.9-19.9	1.0	3.56	2.87	0.32	3.56	2.5	2.50	2.80	2.87	SV PPV I A STY
186	12719.9-20.4	0.5	1.99	1.72	0.37	1.00	2.4	1.20	2.79	2.86	FEW LV SV PPV A
187	12720.4-21.8	1.4	0.10	0.01	-0.01	0.14	1.1	1.54	2.83	2.86	I A
188	12721.8-23.2	1.4	0.01	-0.01	-0.01	0.01	0.9	1.26	2.82	2.85	I
189	12723.2-24.4	1.2	1.42	0.14	-0.01	1.70	2.4	2.88	2.81	2.88	FEW PPV I A STY
190	12724.4-25.3	0.9	1.14	0.36	0.86	1.03	2.2	1.98	2.80	2.86	FEW LV SV PPV A VF
191	12725.3-26.2	0.9	4.16	3.89	1.63	3.74	4.2	3.78	2.73	2.85	FEW LV SV PPV A
192	12726.2-27.2	1.0	1.79	1.32	0.95	1.79	2.8	2.80	2.74	2.82	FEW LV SV PPV A
193	12727.2-28.6	1.4	0.88	0.80	-0.01	1.23	1.0	1.40	2.82	2.84	SV PPV A
194	12728.6-30.5	1.9	0.92	0.81	-0.01	1.75	1.1	2.09	2.84	2.87	FEW SV PPV I A
195	12730.5-31.5	1.0	7.00	5.37	1.05	7.00	5.5	5.50	3.14	3.32	LV SV PPV A
196	12731.5-32.4	0.9	3.33	1.12	0.80	3.00	2.1	1.89	2.80	2.86	FEW SV PPV I A
197	12732.4-34.6	2.2	24.10	0.78	0.08	53.02	0.5	1.10	2.82	2.84	FEW SV I VF A
198	12734.6-36.0	1.4	0.46	0.45	0.22	0.64	1.9	2.66	2.81	2.86	SV PPV I A
199	12736.0-37.4	1.4	1.25	1.09	0.42	1.75	3.2	4.48	2.74	2.83	LV SV PPV A
200	12737.4-38.8	1.4	4.98	4.70	1.90	6.97	1.9	2.66	2.80	2.86	SV PPV I A
201	12738.8-39.5	0.7	16.40	16.40	0.36	11.48	2.9	2.03	2.75	2.83	FEW LV SV PPV A
202	12739.5-40.9	1.4	1.53	1.16	-0.01	2.14	1.7	2.38	2.81	2.86	SV PPV I A

12.5

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
 WELL COLUMBIA ET AL KOTANEELEE YT H-38

PAGE 9 of 11
 FILE 7004-7571

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		PERMEABILITY TO AIR, MILLIDARCY			PERMEABILITY FEET	POROSITY PER CENT	POROSITY FEET	DENSITY, gm./cc.		VISUAL EXAMINATION
	DEPTH	THICK	KMAX	K90°	KV				BULK	GRAIN	
<i>12.5</i> CORE NO. 6 CONTINUED											
AST 202	12740.9-42.1	1.2	1.53	1.16	-0.01	1.84	1.7	2.04	2.81	2.86	SV PPV I A
203	12742.1-43.3	1.2	*	4.16	*	4.99	12.9	15.48	2.48	2.85	LV SV PPV OVF A
204	12743.3-43.7	0.4	7.30	6.57	0.06	2.92	0.5	0.20	2.83	2.84	FEW PPV I A
205	12743.7-44.4	0.7	1.08	0.70	-0.01	0.76	1.3	0.91	2.83	2.87	SV PPV I STY PYRITE A
206	12744.4-45.4	1.0	1.70	1.37	-0.01	1.70	1.2	1.20	2.82	2.86	FEW SV PPV I PYRITE A
207	12745.4-46.3	0.9	0.63	0.42	0.07	0.57	1.6	1.44	2.81	2.86	FEW PPV I STY A
208	12746.3-47.3	1.0	5.55	1.39	0.36	5.55	0.9	0.90	2.83	2.85	FEW PPV I STY VF A
209	12747.3-48.3	1.0	0.73	0.51	0.04	0.73	2.1	2.10	2.81	2.87	FEW PPV I A
210	12748.3-49.0	0.7	6.38	3.89	0.06	4.47	0.6	0.42	2.82	2.84	FEW SV PPV I A
211	12749.0-50.3	1.3	9.65	9.13	0.11	12.55	6.5	8.45	2.66	2.84	LV SV PPV A
212	12750.3-51.8	1.5	8808.00	2.56	0.21	13212.00	4.6	6.90	2.72	2.85	LV SV PPV A
213	12751.8-52.9	1.1	**	3.25	0.21	3.58	8.4	9.24	2.60	2.84	LV SV PPV A
214	12752.9-53.4	0.5	1.12	1.02	0.15	0.56	1.6	0.80	2.82	2.87	FEW SV PPV I A
215	12753.4-55.0	1.6	*	17.10	5.06	27.36	0.3	0.48	2.83	2.84	I A HF
<i>17.6</i> CORE NO. 7 12755.0' - 12789.0 (REC. 34.0') (10 BOXES) <i>17.6 @ 4.3 % 75.626 ft</i>											
216	12755.0-56.9	1.9	0.08	0.02	-0.01	0.15	0.9	1.71	2.82	2.85	I A
217	12756.9-58.8	1.9	0.03	0.01	-0.01	0.06	2.4	4.56	2.82	2.89	I A
218	12758.8-60.7	1.9	1.78	1.09	-0.01	3.38	2.7	5.13	2.78	2.86	FEW SV I HF A
219	12760.7-62.4	1.7	0.07	0.03	1.23	0.12	1.9	3.23	2.82	2.87	I VF A
220	12762.4-63.0	0.6	3.37	1.25	0.22	2.02	4.8	2.88	2.72	2.86	FEW LV SV PPV STY A
221	12763.0-63.8	0.8	6.75	2.90	0.34	5.40	1.3	1.04	2.82	2.86	SV PPV I A
222	12763.8-64.4	0.6	5.09	0.57	0.36	3.05	1.6	0.96	2.81	2.86	SV PPV I A
223	12764.4-65.8	1.4	2.41	0.83	-0.01	3.37	1.2	1.68	2.83	2.86	FEW SV PPV I A
224	12765.8-66.3	0.5	1.59	1.31	0.09	0.80	1.3	0.65	2.82	2.86	FEW SV PPV I A
225	12766.3-66.9	0.6	12.20	1.70	0.06	7.32	2.1	1.26	2.80	2.86	FEW LV SV PPV HF A
226	12766.9-67.7	0.8	0.50	0.37	-0.01	0.40	3.4	2.72	2.76	2.86	FEW LV SV PPV A
227	12767.7-68.3	0.6	0.68	0.64	0.05	0.41	1.1	0.66	2.84	2.87	FEW PPV I STY A

CORE LABORATORIES - CANADA LTD.

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
WELL COLUMBIA ET AL KOTANEELEE YT H-38

PAGE 10 of 11
FILE 7004-7571

SAMPLE NUMBER	INTERVAL REPRESENTED, FEET		PERMEABILITY TO AIR, MILLIDARCYS			PERMEABILITY FEET	POROSITY PERCENT	POROSITY FEET	DENSITY, gm/cc		VISUAL EXAMINATION
	DEPTH	THICK	KMAX	K90°	KV				BULK	GRAIN	
CORE NO. 7 CONTINUED											
228	12768.3-69.0	0.7	1.54	1.12	0.15	1.08	1.3	0.91	2.78	2.82	FEW LV PPV I A
229	12769.0-70.0	1.0	2.33	0.93	0.15	2.33	1.5	1.50	2.79	2.83	SV PPV I A
230	12770.0-71.0	1.0	23.60	18.30	-0.01	23.60	1.3	1.30	2.83	2.86	FEW SV PPV I HF A
231	12771.0-71.8	0.8	2.10	2.10	0.13	1.68	1.6	1.28	2.82	2.86	SV PPV I STY A
232	12771.8-72.4	0.6	1.76	0.71	0.37	1.06	1.7	1.02	2.81	2.86	FEW PPV I STY A
233	12772.4-73.2	0.8	4.14	2.16	0.17	3.31	1.8	1.44	2.82	2.87	FEW LV SV PPV I A
234	12773.2-74.0	0.8	2.10	1.32	1.49	1.68	1.8	1.44	2.82	2.87	FEW LV SV PPV I A
235	12774.0-75.0	1.0	2.00	1.53	0.96	2.00	0.2	0.20	2.82	2.83	FEW PPV I A
236	12775.0-75.8	0.8	*	0.35	*	0.28	0.2	0.16	2.81	2.82	FEW SV I OVF A
237	12775.8-76.6	0.8	0.61	0.56	0.31	0.49	1.6	1.28	2.81	2.85	SV PPV I A
238	12776.6-77.3	0.7	1.10	0.85	0.31	0.77	2.4	1.68	2.80	2.87	SV PPV I A
239	12777.3-77.9	0.6	*	1.07	*	0.64	3.8	2.28	2.77	2.88	SV PPV I OVF A
240	12777.9-78.6	0.7	0.61	0.39	0.36	0.43	3.9	2.73	2.71	2.83	FEW LV SV PPV I A
241	12778.6-79.6	1.0	0.93	0.50	0.06	0.93	5.5	5.50	2.70	2.86	LV SV PPV A
242	12779.6-80.3	0.7	2.27	1.86	0.70	1.59	4.7	3.29	2.72	2.86	LV SV PPV I A
243	12780.3-81.2	0.9	30720.00	1.71	1.09	27648.00	3.4	3.06	2.73	2.83	LV SV PPV I A
244	12781.2-82.4	1.2	**	9.60	0.76	11.52	4.5	5.40	2.67	2.80	LV SV PPV I CALCITE A
245	12782.4-83.5	1.1	0.70	0.66	0.17	0.77	2.0	2.20	2.76	2.82	FEW LV SV PPV I CALCITE A
246	12783.5-84.6	1.1	9.10	2.73	0.14	10.01	2.5	2.75	2.76	2.83	LV SV PPV I A
247	12784.6-85.7	1.1	28.80	11.60	*	31.68	3.2	3.52	2.73	2.82	SV PPV I STY A
248	12785.7-86.4	0.7	73.70	41.90	1.25	51.59	3.3	2.31	2.75	2.84	LV SV PPV A
249	12786.4-87.7	1.3	**	12.80	1.12	16.64	1.7	2.21	2.77	2.82	LV SV PPV I A
250	12787.7-89.0	1.3	1.02	0.92	0.06	1.33	3.3	4.29	2.77	2.86	SV PPV I A

9.3
12.4

12.4 @ 3.5 % → 43.35 %

CORE LABORATORIES - CANADA, LTD.

Petroleum Reservoir Engineering

WELL: COLUMBIA ET AL KOTANEELEE YT H-38

PAGE: 11 of 11

FORMATION: NAHANNI

SUMMARY INTERVAL: 11690.0 - 12789.0

FILE: 7004-7571

TOTAL FOOTAGE: 1099.0

FOOTAGE ANALYZED 259.2

FOOTAGE NOT ANALYZED: TOTAL: 839.8 DENSE 22.8 LOST 3.0 DRILLED 814.0 *NABR 0.0 RUBBLE 0.0

SUMMARY
OF
ANALYZED CORE:

TOTAL

BY
PERM
RANGES:

LESS THAN 0.10 Md.

0.10 0.49 Md.

0.50 0.99 Md.

1.00 9.99 Md.

GREATER THAN 9.99 Md.

	FOOTAGE	% OF ANALYZED CORE	WEIGHTED AVERAGE POROS. %	POROSITY FEET	WEIGHTED AVERAGE PERM. MD.	PERM. FEET	WEIGHTED AVERAGE RESID OIL %	WEIGHTED AVERAGE TOT. WATER %
TOTAL	259.2	100.0	2.8	720.87	168.87	43770.77	0.0	0.0
BY PERM RANGES:								
LESS THAN 0.10 Md.	16.8	6.5	2.4	41.10	0.04	0.70	0.0	0.0
0.10 0.49 Md.	23.1	8.9	1.7	39.23	0.29	6.59	0.0	0.0
0.50 0.99 Md.	36.1	13.9	2.1	75.71	0.72	25.99	0.0	0.0
1.00 9.99 Md.	126.5	48.8	3.1	388.60	3.65	462.12	0.0	0.0
GREATER THAN 9.99 Md.	56.7	21.9	3.1	176.23	763.23	43275.10	0.0	0.0

*NOT ANALYZED BY REQUEST

2686

12058.3 - 12083.6

12039.6 -

12058.33

0087W

NORTHERN NON-RENEWABLE RESOURCES BRANCH
DIRECTION DES RESSOURCES NON-REMBOURSABLES DU NORD

WORK-OVER REPORT NO.

RAPPORT DE RECONDITIONNEMENT N°

Form to be submitted in duplicate not later than thirty days after completion of a work-over, to the District Conservation Engineer Department of Indian Affairs and Northern Development.

Faire parvenir cette formule en trois exemplaires, au plus tard trente jours après l'achèvement d'un reconditionnement à l'ingénieur en conservation du district ministère des Affaires Indiennes et du Nord canadien.

If additional space is required use back of form or attach additional sheets.

Au besoin utiliser le verso de la formule ou annexer des feuilles additionnelles.

WELL NAME - NOM DU PUITS Columbia et al Kotaneelee YT H-38	DATE WORK-OVER COMMENCED DATE DU DÉBUT DU RECONDITIONNEMENT February 8, 1980
---	--

DATE WORK-OVER COMPLETED DATE DE L'ACHÈVEMENT DU RECONDITIONNEMENT February 10, 1980	DEPTH INTERVAL(S) WORKED - INTERVALLE(S) DE PROFONDEURS 3675.2m-3682.9m 3669.5m-3675.2m
--	---

WORK DONE BY - TRAVAUX EXÉCUTÉS PAR
Schlumberger Canada Limited

REASON FOR WORK-OVER - MOTIF DU RECONDITIONNEMENT
To perforate lower pay zone to increase productivity of the well.

CHRONOLOGICAL SUMMARY OF WORK DONE - RÉSUMÉ CHRONOLOGIQUE DES TRAVAUX
(If more space is required attach additional sheet - Au besoin, annexer une feuille additionnelle)

Ran in and perforated from 3675.2m to 3682.9 with 13 shots/meter with 54mm Hyperdome tubing gun. Shot with a total of 101 shots. Ran in and perforated from 3669.5m to 3675.2 m with a 42.9 mm Hyperdome tubing gun with 13 shots/meter with a total of 74 shots. Ran Schlumberger Full Bore Flow Meter from below bottom perforations to centre of top perforations, making 3 sets of passes (up and down), with a flow rate of 218064m³ (7.7 MMcf/day) throughout.

RESULT OF WORK-OVER - RÉSULTAT DU RECONDITIONNEMENT

Based on the Flow Meter log, the productivity of the well has been increased. The Flow Meter log also indicated that there were a number of other perforations that were not producing and it is planned to do a major acid job to clean up all the perforations in the future.

COMPANY - SOCIÉTÉ COLUMBIA GAS DEVELOPMENT OF CANADA LTD.	DATE February 28, 1980
SIGNED BY - SIGNÉ PAR 	TITLE - TITRE Senior Engineer



D&S PETROLEUM FIELD SERVICES LTD.

700 Ford Tower, 633-6th Avenue S.W., Calgary, Alberta T2P 2Y5
Telephone: (403) 264-9380 Cable Address: Denescons Calgary
Twx No. 610 821 - 4912

Columbia Gas Development of Canada
1000 Standard Life Building,
Calgary, Alberta

Attention: Mr. Jim McDonald

Dear Sir:-

Re: Columbia et al Kotaneeslee YT H-38
AOF Test

A four point modified isochronal back pressure test was conducted on the Nahanni formation of the subject well during the month of December 1977. The results of the test are as follows:

1. The Sandface AOF at stabilized flow conditions is calculated to be 25.258 MMcf/d
2. The value for "n" at the sandface was calculated to be 0.718
3. The value for "c" at the sandface was calculated to be 0.1010×10^{-3} MMcf per day/psia²

The test results and procedures are included in this report as well as conclusions, calculations, AOF plot and printout, deliverability curve, buildup plot, and all pertinent data.

If I can be of any further assistance, please do not hesitate to call.

Yours very truly,
D&S PETROLEUM FIELD SERVICES LTD.,

R. H. Lane
R. H. Lane, P. Eng.

RHL/mlw
encls

TEST PROCEDURE

A modified isochronal back pressure test was conducted on the well during the month of December 1977. Prior to commencing the test the well was acidized and then flowed on a clean up for approximately 60 hours followed by a shut in period of approximately 59 hours.

The four point test consisted of four flow periods of 12 hours duration with each flow period being followed by a 12 hour shut in period. After the fourth flow period the well was placed on an extended flow for 42½ hours to achieve a stabilized flow rate.

The well was produced up 4½" tubing through a 4" x 2 3/4" hole size variable choke, a three phase separator with a 4.026" meter run and then flared to atmosphere. Fluid produced was metered through a 1" water meter and then flared to the pit. Methanol was also injected at the wellhead upstream of the wellhead choke.

All wellhead pressure measurements were measured with a dead weight tester. A static gradient was run before commencing the test and all subsurface measurements were made with subsurface pressure recorders set at 11025' K.B. A static gradient could not be run after the test as the bellows on the subsurface pressure recorders appeared to be damaged.

COMMENTS

As previously stated, methanol was injected upstream of the wellhead choke to prevent freezing problems through the choke. Separator temperatures were too low on the first two rates to measure fluid (freezing of meter). On the third, fourth and extended flow rates the well produced between 2.9 and 3.4 Bbls/MMcf of water containing approximately 5000 PPM chlorides. This water is considered to be water of condensation.

A wellsite test for H₂S was conducted during the extended flow rate and measured at 2.44 mole %. A routine gas analysis was also conducted and the results of that analysis are included in this report.

The attached computer printout illustrates the sandface and wellhead AOFs'.

WELL COLUMBIA ET AL KUTANEELEE YT H-18

GAS WELL BCK PRESSURE TEST RESULTS

SPECIFIC GAS GRAVITY 0.749
 DEPTH 11770. FEET
 AMBIENT TEMPERATURE 0. DEG F
 FORMATION TEMPERATURE 319. DEG F
 CRITICAL PRESSURE 749. PSIA
 CRITICAL TEMPERATURE 382. DEG R
 H2S CONTENT 2.44 MOL %
 CO2 CONTENT 16.99 MOL %
 TUBING ID 3.96 INCH
 TUBING OD 0.00 INCH
 STABILIZED WELLHEAD PRESSURE 4261. PSIA
 STABILIZED FORMATION PRESSURE 5717. PSIA

NOTE - FLOW THROUGH TUBING

METER TYPES CFP-CRITICAL FLOW PROVER MTR-ORIFICE METER

GAS RATE MMCFD	FLOW METER TYPE	SIZE IN	FLOW METER		WH HW IN	WH WHP DEGF	WHP BHP PSIA	BHP BHP PSIA	2 2		2 2	
			ORIF IN	PRES PSIA					TEMP DEGF	FLOW STAT PSIA	FLOW STAT (PF -PS) PSIA2	FLOW STAT (PC -PW) PSIA2
5.668	MTR	4.026	1.500	794.	-9.	160.	79.4078	4376.5367	5716.	3867966.	2519575.	
10.136	MTR	4.026	2.000	854.	20.	160.	97.3678	4396.4868	5710.	8906676.	5795358.	
14.813	MTR	4.026	2.500	1224.	77.	100.	137.3164	4432.4206	5691.	14697046.	9630607.	
17.990	MTR	4.026	2.750	1174.	102.	106.	150.2656	4440.3586	5681.	19414366.	12656140.	
15.267	MTR	4.026	2.500	1174.	98.	120.	154.3019	4444.4008	5681.	16209698.	10638075. **	

ISOCHRONAL TEST EVALUATION - LEAST SQUARES FIT OF BACK PRESSURE EQUATION

WELLHEAD COEFFICIENTS

N = 0.717 C = 0.1450E-03 MMCFD/PSIA2
 A O F = 23.244 MMCFD

SANDFACE COEFFICIENTS

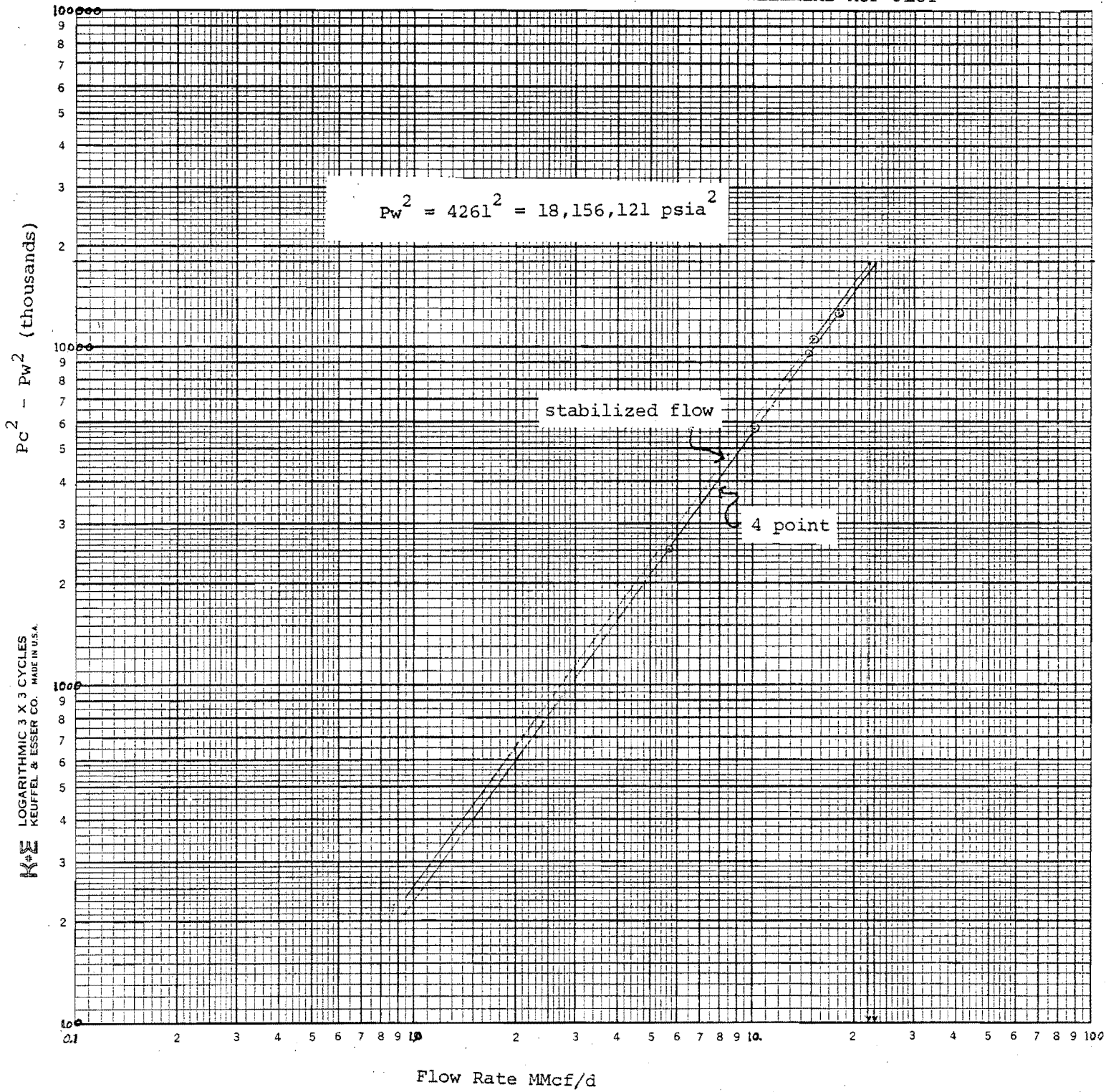
N = 0.718 C = 0.1044E-03 MMCFD/PSIA2
 A O F = 26.126 MMCFD

** AT STABILIZED FLOW CONDITIONS -

N = 0.717 C = 0.1397E-03 MMCFD/PSIA2
 A O F = 22.398 MMCFD

N = 0.718 C = 0.1010E-03 MMCFD/PSIA2
 A O F = 25.268 MMCFD

COLUMBIA ET AL KOTANEELEE YT H-38
WELLHEAD AOF PLOT



COLUMBIA ET AL KOTANEELEE YT H-38
SANDFACE ACF PLOT

46 7403

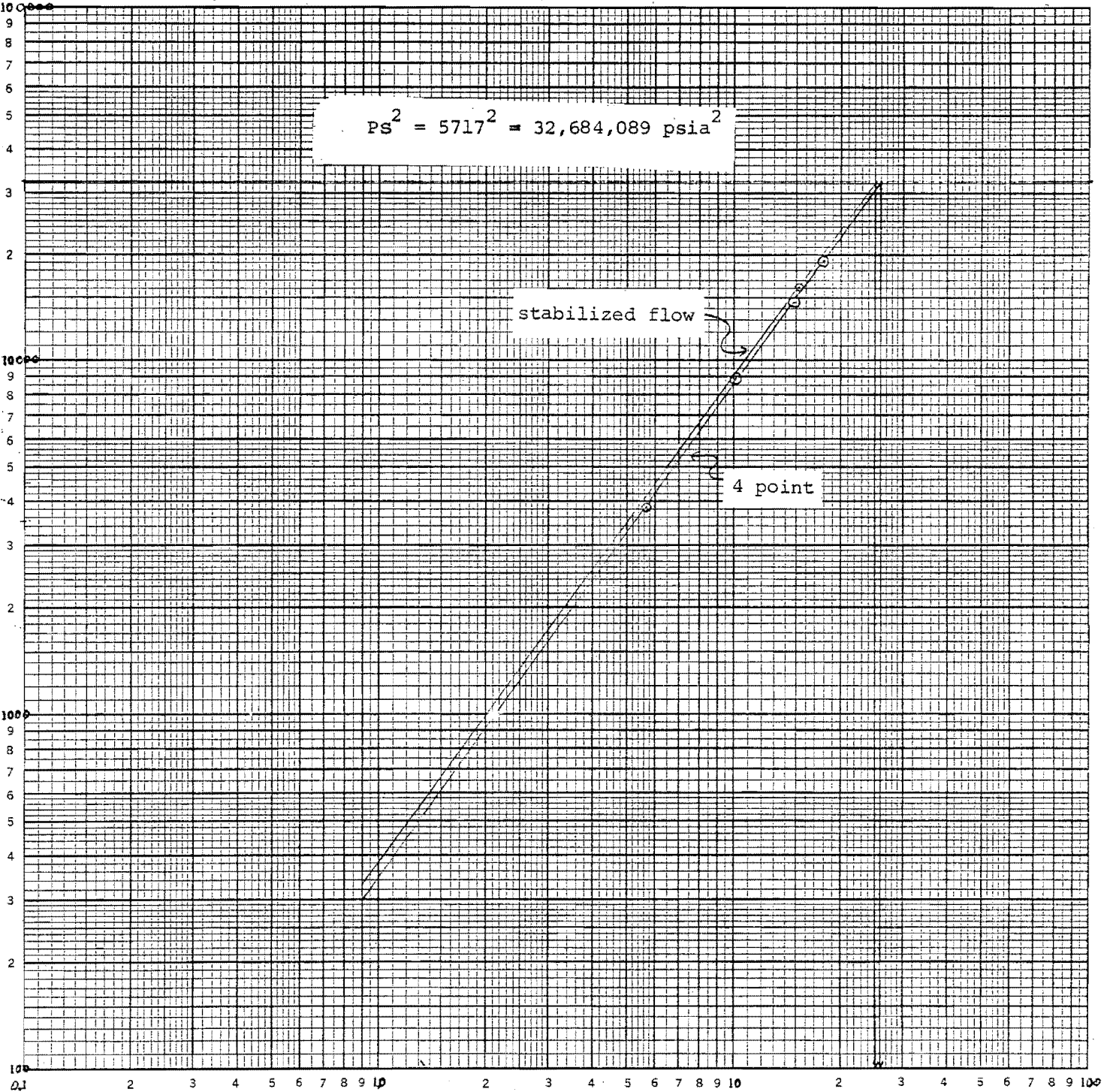
$pf^2 - ps^2$ (thousands)

LOGARITHMIC 3 X 3 CY
KEUFFEL & ESSER CO. MA

$$ps^2 = 5717^2 = 32,684,089 \text{ psia}^2$$

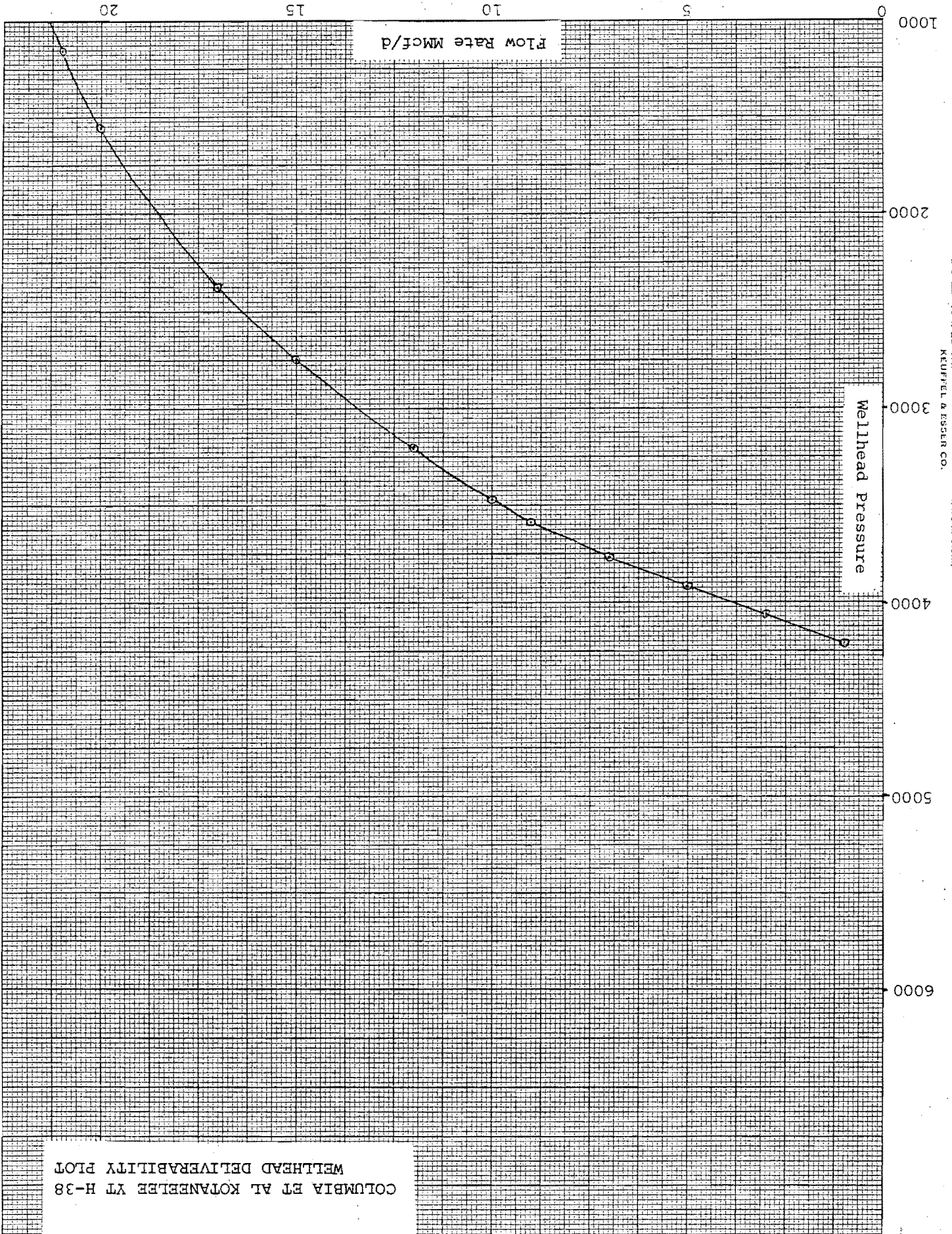
stabilized flow

4 point



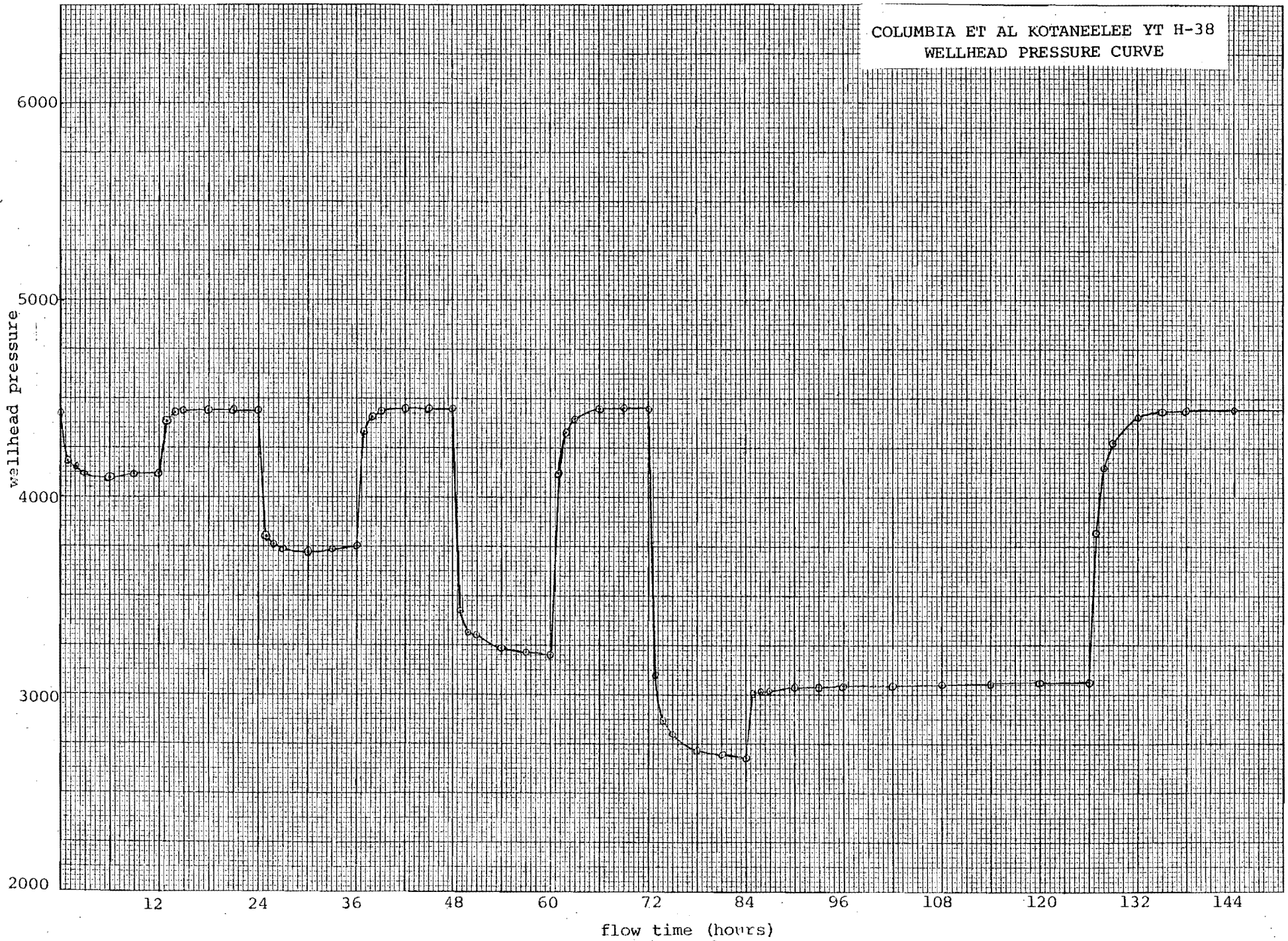
Flow Rate MMcf/d

K&E 10 X 10 TO THE CENTIMETER 46 1510
19 X 2.5 CM. KEUFEL & ESSER CO. MADE IN U.S.A.

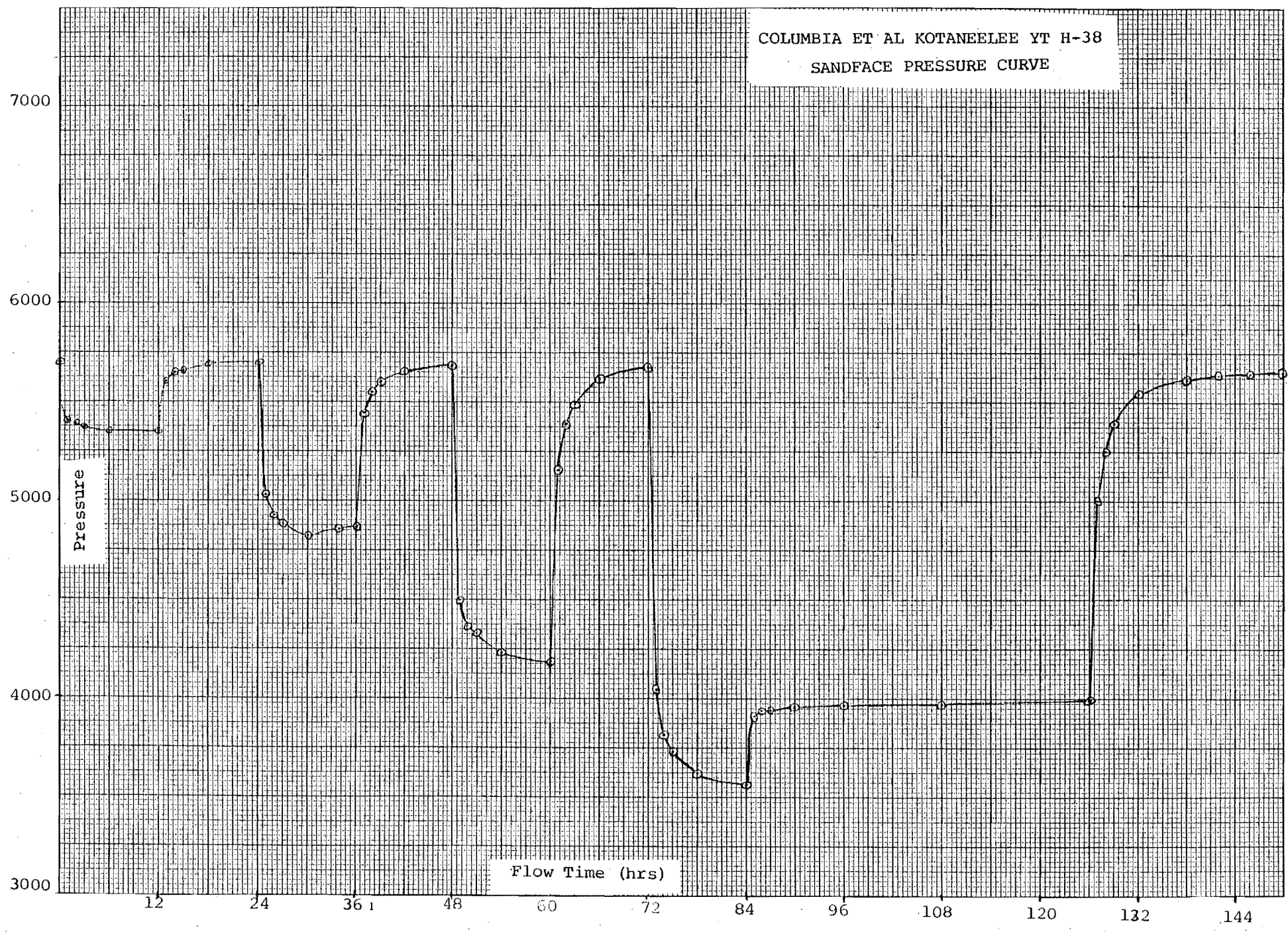


COLUMBIA FT AL KOTANEELEE VT H-38
WELLHEAD DELIVERABILITY PLOT

COLUMBIA ET AL KOTANEELEE YT H-38
WELLHEAD PRESSURE CURVE



COLUMBIA ET AL KOTANEELEE YT H-38
SANDFACE PRESSURE CURVE



Reservoir Parameters

Net Gas pay ft (perfs)	310
Average porosity, %	2.02
Water Saturation	25
Gas Viscosity cp.	.0241
Reservoir Pressure, psia	5717
Reservoir temperature °F	319
Specific Gravity	.747
Critical Pressure psia	749.6
Critical Temp. °R	382.3
Z Factor	1.071
Sour Gas Correction	21

Build-up Characteristics

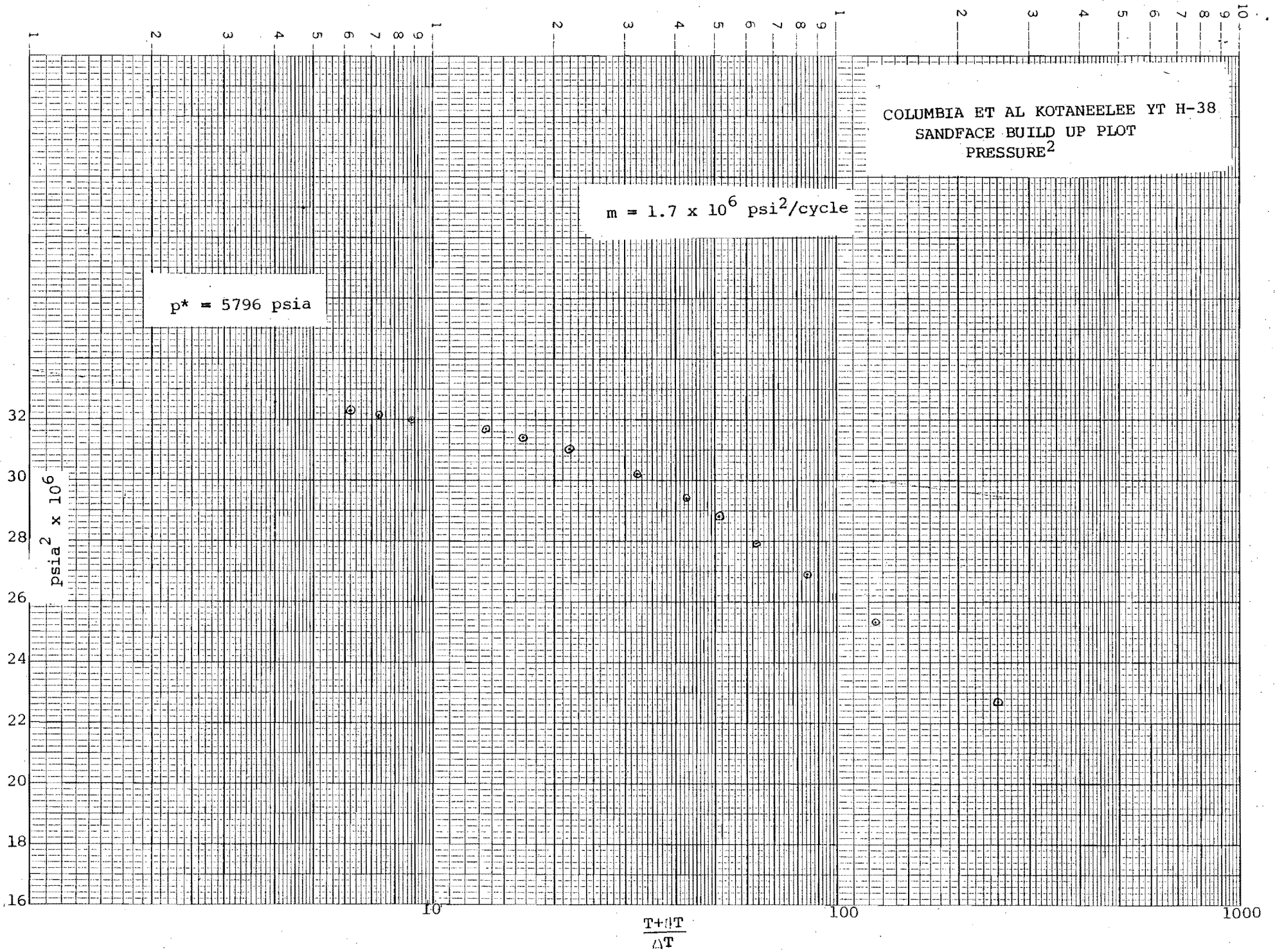
Kh md-ft	290
K md	.94
Skin Effect 5'	3.66
ΔP^2 skin psi	5.41×10^6
Flow Efficiency %	67

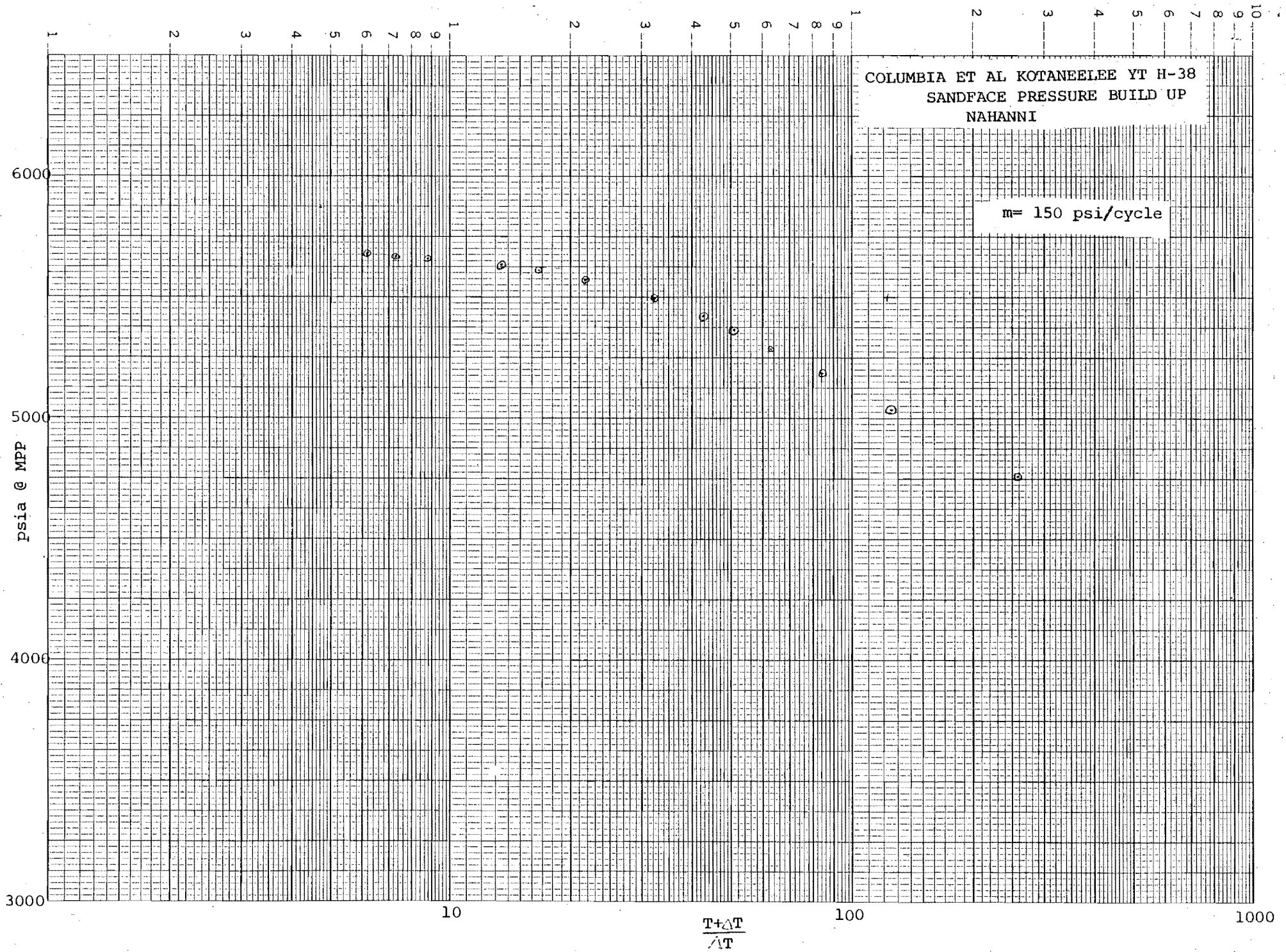
From the buildup test there is some evidence of apparent formation damage, reducing the flow capacity. Since formation porosity is very low and the flow rate quite high, this damage could be due in part to the effects of turbulence. Further stimulation treatment might be considered since it effectively enlarges the wellbore, reducing velocity, and thereby reducing the effects of turbulence.

SANDFACE PRESSURE BUILDUP
PRESSURE DATA

Cumulative Production, Mcf	78,400
Flow Rate, Mcf/d	15,000
Pseudo Time, hours	125.4

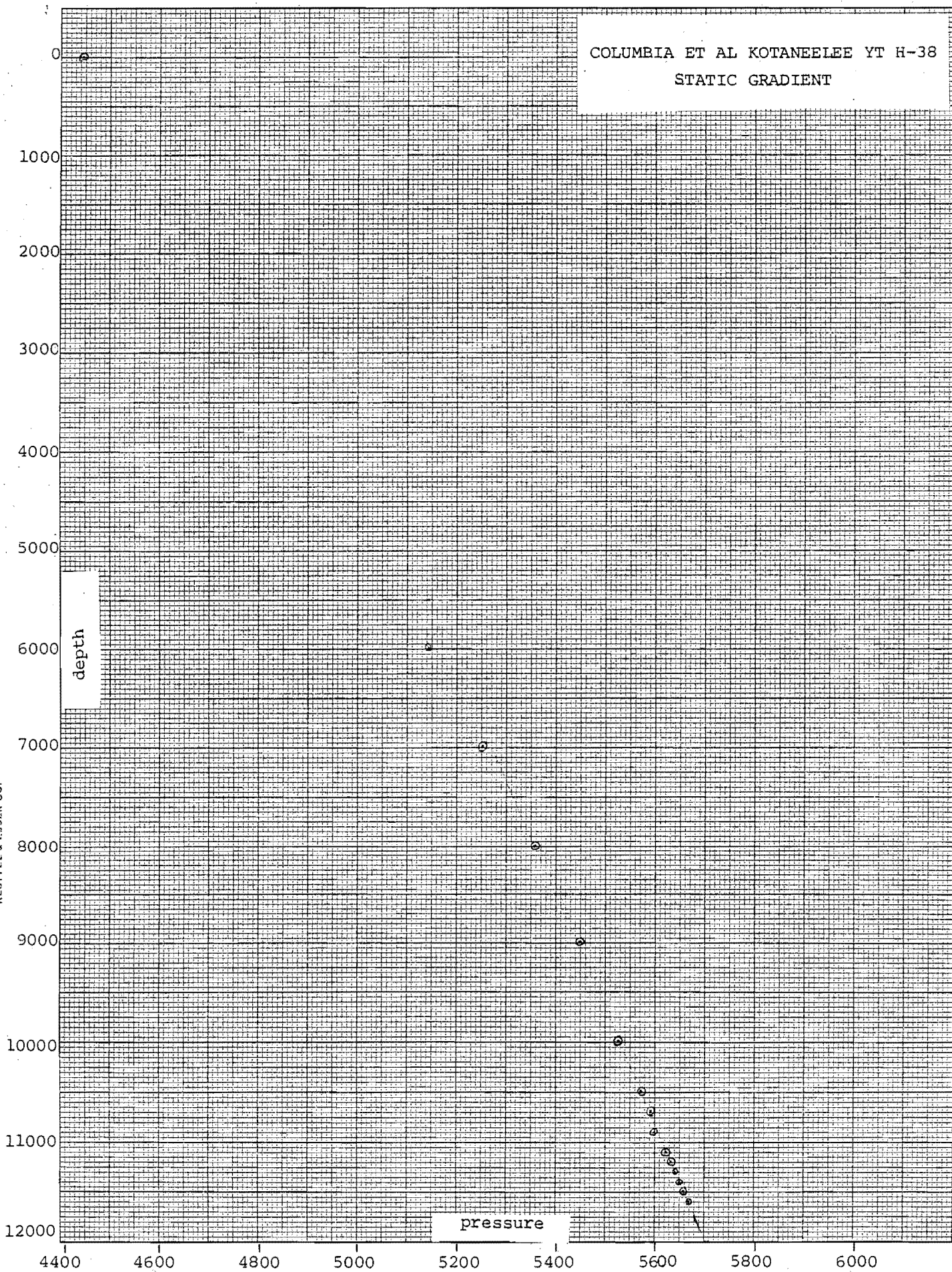
<u>T</u>	<u>T+ΔT/ΔT</u>	<u>Ps@MPP</u>	<u>psia</u>	<u>Ps² psia²</u>
		<u>psig</u>	<u>psia</u>	
0	0	3994	4008	16,064,064
.5	251.8	4750	4764	22,695,699
1	126.4	5020	5034	25,341,156
1.5	84.6	5171	5185	26,884,225
2	63.7	5271	5285	27,931,225
2.5	51.2	5353	5367	28,804,689
3	42.8	5409	5423	29,408,929
4	32.4	5485	5499	30,239,001
6	21.9	5558	5572	31,047,184
8	16.7	5592	5606	31,427,236
10	13.5	5618	5632	31,719,424
16	8.8	5647	5661	32,046,921
20	7.3	5661	5671	32,160,241
24	6.2	5667	5681	32,273,761





10 X 10 TO THE CENTIMETER 46 1510
10 X 2.5 CM.
KEUFFEL & ESSER CO.

COLUMBIA ET AL KOTANEELEE YT H-38
STATIC GRADIENT



UNITED DIRECTIONAL DRILLING LTD

RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUR SFA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG SEV DEG/100	TOTAL		VERTICAL SECTION		
						RECTANGULAR NORTH/SOUTH	COORDINATES EAST/WEST			
3023	3023.00	773.00	ASSUMED VERTICAL TO 3023			0.	N	0.	E	0.
3125	3124.95	874.95	3 0	N 86 W	2.94	.19	N	2.66	W	1.89
3219	3218.78	968.78	4 0	N 88 W	1.07	.47	N	8.39	W	5.79
3313	3312.52	1062.52	4 30	N 78 W	.95	1.35	N	15.28	W	10.89
3407	3406.20	1156.20	5 0	N 78 W	.53	2.97	N	22.89	W	16.97
3500	3498.88	1248.88	4 30	N 73 W	.70	4.88	N	30.34	W	23.22
3594	3592.55	1342.55	5 0	N 68 W	.69	7.49	N	37.67	W	29.93
3688	3686.16	1436.16	5 30	N 73 W	.72	10.35	N	45.78	W	37.32
3782	3779.73	1529.73	5 30	N 78 W	.51	12.60	N	54.49	W	44.64
3876	3873.19	1623.19	6 48	N 83 W	1.49	14.21	N	64.42	W	52.29
3969	3965.54	1715.54	6 48	N 70 W	1.65	16.77	N	75.06	W	61.04
4063	4058.81	1808.81	7 30	N 78 W	1.29	19.95	N	86.29	W	70.69
4157	4151.89	1901.89	8 30	N 73 W	1.30	23.25	N	98.93	W	81.34
4251	4244.83	1994.83	8 45	N 78 W	.84	26.77	N	112.57	W	92.80
4345	4337.77	2087.77	8 30	N 68 W	1.62	30.86	N	126.01	W	104.56
4438	4429.69	2179.69	9 0	N 76 W	1.41	35.20	N	139.44	W	116.50
4532	4522.60	2272.60	8 30	N 73 W	.72	39.01	N	153.22	W	128.27
4626	4615.57	2365.57	8 30	N 63 W	1.57	44.19	N	166.05	W	140.48
4720	4708.60	2458.60	8 0	N 53 W	1.61	51.28	N	177.46	W	153.25
4814	4801.80	2551.80	7 0	N 56 W	1.14	58.42	N	187.44	W	165.13
4907	4894.12	2644.12	7 0	N 38 W	2.35	66.06	N	195.63	W	176.24
5001	4987.44	2737.44	6 48	N 22 W	2.05	75.73	N	201.24	W	187.26
5015	5001.35	2751.35	6 45	N 18 W	3.39	77.28	N	201.80	W	188.81
5110	5095.69	2845.69	6 45	N 20 W	.25	87.84	N	205.44	W	199.23
5225	5209.86	2959.86	7 0	N 16 W	.47	100.92	N	209.68	W	211.99
5350	5333.80	3083.80	8 0	N 0 E	1.84	116.95	N	211.78	W	225.63
5415	5398.15	3148.15	8 15	N 4 E	.95	126.12	N	211.45	W	232.45
5470	5452.57	3202.57	8 30	N 0 E	1.15	134.12	N	211.18	W	238.41
5530	5511.92	3261.92	8 20	N 1 E	.37	142.91	N	211.10	W	245.09

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
 COLUMBIA FT AL KOTANEELEE YT H-38
 WILDCAT
 YUKON TERRITORY

DATE OF SURVEY OCTOBER 28, 1977
 VERTICAL SECTION DIRECTION CLOSURE
 32 DEG EAST CORRECTION APPLIED

MAGNETIC DIRECTIONAL SINGLE SHOT

UNITED DIRECTIONAL DRILLING LTD
 RECORD OF SURVEY

MEASURED DEPTH	TRUE	SUR	COURSE	COURSE	DOG-LEG	TOTAL		VERTICAL SECTION
	VERTICAL DEPTH	SEA TVD	INCLINATION DEG MIN	DIRECTION DEG	SEV DEG/100	RECTANGULAR NORTH/SOUTH	COORDINATES EAST/WEST	
5660	5640.57	3390.57	8 15	N 0 F	.48	161.60 N	210.69 W	259.16
5780	5759.40	3509.40	7 45	N 0 E	.42	178.30 N	210.69 W	271.97
5820	5799.06	3549.06	7 15	N 2 W	1.41	183.52 N	210.78 W	276.03
5885	5863.56	3613.56	7 0	N 4 W	.54	191.57 N	211.20 W	282.47
5940	5918.15	3668.15	7 0	N 12 W	1.77	198.20 N	212.13 W	288.14
6040	6017.40	3767.40	7 0	N 12 W	.01	210.12 N	214.66 W	298.91
6100	6076.96	3826.96	6 53	N 15 W	.63	217.16 N	216.35 W	305.40
6175	6151.41	3901.41	7 0	N 15 W	.16	225.92 N	218.70 W	313.62
6220	6196.08	3946.08	7 0	N 17 W	.54	231.19 N	220.21 W	318.63
6290	6265.57	4015.57	6 45	N 18 W	.40	239.18 N	222.73 W	326.37
6345	6320.18	4070.18	7 0	N 21 W	.80	245.39 N	224.93 W	332.54
6410	6384.67	4134.67	7 20	N 19 W	.64	253.01 N	227.70 W	340.16
6475	6449.16	4199.16	7 0	N 23 W	.92	260.57 N	230.60 W	347.83
6535	6508.70	4258.70	7 15	N 21 W	.59	267.47 N	233.38 W	354.90
6600	6573.20	4323.20	7 0	N 21 W	.38	275.00 N	236.27 W	362.53
6660	6632.72	4382.72	7 30	N 25 W	1.18	281.96 N	239.23 W	369.77
6725	6697.14	4447.14	7 45	N 26 W	.44	289.75 N	242.95 W	378.12
6785	6756.65	4506.65	7 0	N 24 W	1.32	296.72 N	246.21 W	385.57
6850	6821.18	4571.18	6 45	N 20 W	.83	303.93 N	249.13 W	392.96
6910	6880.73	4630.73	7 15	N 24 W	1.16	310.70 N	251.87 W	399.92
6970	6940.24	4690.24	7 30	N 22 W	.60	317.79 N	254.88 W	407.29
7035	7004.68	4754.68	7 30	N 23 W	.20	325.63 N	258.13 W	415.38
7095	7064.15	4814.15	7 45	N 24 W	.47	332.93 N	261.30 W	423.02
7160	7128.53	4878.53	8 8	N 28 W	1.03	340.99 N	265.24 W	431.73
7225	7192.88	4942.88	8 0	N 29 W	.30	349.01 N	269.59 W	440.67
7290	7257.23	5007.23	8 15	N 28 W	.44	357.08 N	273.98 W	449.67
7415	7380.86	5130.86	8 45	N 28 W	.40	373.40 N	282.65 W	467.75
7475	7440.18	5190.18	8 30	N 29 W	.49	381.31 N	286.94 W	476.57
7535	7499.54	5249.54	8 15	N 28 W	.48	388.98 N	291.11 W	485.13
7600	7563.92	5313.92	7 30	N 32 W	1.43	396.70 N	295.55 W	493.90

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

COLUMBIA FT AL KOTANEELEE YT H-38

WILDCAT

YUKON TERRITORY

PAGE: 3

DATE OF SURVEY OCTOBER 28, 1977

VERTICAL SECTION DIRECTION CLOSURE

32 DEG EAST CORRECTION APPLIED

MAGNETIC DIRECTIONAL SINGLE SHOT

UNITED DIRECTIONAL DRILLING LTD

RECORD OF SURVEY

MEASURED DEPTH	TRUE VERTICAL DEPTH	SUR SEA TVD	COURSE INCLINATION DEG MIN	COURSE DIRECTION DEG	DOG-LEG SEV DEG/100	RECTANGULAR NORTH/SOUTH	TOTAL COORDINATES EAST/WEST	VERTICAL SECTION
7700	7663.10	5413.10	7 15	N 32 W	.25	407.59 N	302.35 W	506.61
7790	7752.38	5502.38	7 15	N 32 W	0.	417.22 N	308.37 W	517.86
7870	7831.80	5581.80	6 30	N 32 W	.94	425.34 N	313.45 W	527.34
7940	7901.34	5651.34	6 45	N 40 W	1.36	431.85 N	318.19 W	535.38
8030	7990.76	5740.76	6 15	N 42 W	.61	439.54 N	324.87 W	545.57
8120	8080.22	5830.22	6 15	N 43 W	.12	446.77 N	331.49 W	555.35
8160	8119.99	5869.99	6 0	N 45 W	.82	449.84 N	334.45 W	559.61
8255	8214.52	5964.52	5 30	N 48 W	.61	456.39 N	341.35 W	569.06
8325	8284.22	6034.22	5 0	N 50 W	.76	460.60 N	346.18 W	575.39
8475	8433.68	6183.68	4 45	N 50 W	.17	468.79 N	355.94 W	587.94
8620	8578.26	6328.26	4 0	N 42 W	.67	476.41 N	363.92 W	598.91
8750	8707.92	6457.92	4 15	N 36 W	.38	483.68 N	369.79 W	608.24
8910	8867.53	6617.53	3 45	N 31 W	.38	492.96 N	375.97 W	619.33
9100	9057.13	6807.13	3 45	N 41 W	.34	502.97 N	383.24 W	631.68
9230	9186.85	6936.85	3 45	N 43 W	.10	509.29 N	388.93 W	640.17
9290	9246.73	6996.73	3 30	N 43 W	.42	512.07 N	391.52 W	643.96
9490	9446.38	7196.38	3 15	N 48 W	.19	520.32 N	399.90 W	655.67
9610	9566.07	7316.06	5 0	N 46 W	1.46	526.23 N	406.19 W	664.24
9740	9695.62	7445.62	4 30	N 45 W	.39	533.78 N	413.87 W	674.95
9950	9905.01	7655.01	4 15	N 40 W	.22	545.56 N	424.70 W	690.94
10120	10074.45	7824.45	5 0	N 45 W	.50	555.63 N	433.98 W	704.62
10403	10356.43	8106.43	4 45	N 45 W	.09	572.63 N	450.99 W	728.57
10677	10629.54	8379.54	4 30	N 45 W	.09	588.25 N	466.61 W	750.58
10840	10792.03	8542.03	4 30	N 45 W	0.	597.30 N	475.65 W	763.32
10920	10871.82	8621.82	3 53	N 45 W	.77	601.43 N	479.79 W	769.15
11025	10976.50	8726.50	5 0	N 45 W	1.06	607.18 N	485.54 W	777.25
11254	11204.44	8954.44	6 0	N 45 W	.44	622.70 N	501.06 W	799.11
11362	11311.80	9061.80	6 30	N 45 W	.46	631.02 N	509.37 W	810.82
11422	11371.40	9121.40	6 45	N 45 W	.42	635.91 N	514.27 W	817.72

COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

COLUMBIA FT AL KOTANFELFF YT H-38

WILDCAT

YUKON TERRITORY

MAGNETIC DIRECTIONAL SINGLE SHOT

PAGE 4

DATE OF SURVEY OCTOBER 28, 1977

VERTICAL SECTION DIRECTION CLOSURE

32 DEG EAST CORRECTION APPLIED

UNITED DIRECTIONAL DRILLING LTD

RECORD OF SURVEY

MEASURED DEPTH	TRUE	SUB	COURSE	COURSE	DOG-LEG	TOTAL		VERTICAL SECTION
	VERTICAL DEPTH	SEA TVD	INCLINATION DEG MIN	DIRECTION DEG	SEV DEG/100	RECTANGULAR NORTH/SOUTH	COORDINATES EAST/WEST	
12040	11985.61	9735.61	6 15	N 45 W	.00	684.20 N	562.55 W	885.73
12260	12204.25	9954.25	6 30	N 45 W	.11	701.47 N	579.83 W	910.07
12450	12392.89	10142.89	7 15	N 45 W	.39	717.55 N	595.91 W	932.72
12789	12729.18	10479.18	7 15	N 45 W	0.	747.80 N	626.16 W	975.34

** 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 = 975.34 FEET AT NORTH 39 DEG. 56 MIN. WEST (TRUE)

START OF SURVEY WAS 2250.00 FEET ABOVE SEA LEVEL

- Note:
- 1) The well bore is assumed vertical to 3023'M.D. for calculation purposes. Drift angle surveys only were conducted in this portion of the well bore and its' exact position cannot be determined in this calculation.
 - 2) The direction of all surveys below 9950' has been extrapolated on a North-45°-West bearing. It is assumed drift angle surveys only were conducted below this depth, and that the direction of the well bore remained relatively constant in the North/West quadrant.

TEST DATA SHEET

SHEET No. 4

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
cleanup	2020		40/64				
	Dec 1						

TIME	WELLHEAD READING						HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS	
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE:		TEMP. OF			ORIFICE SIZE:		TEMP. OF					
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	M.R.	SEP.	BATH	STATIC P.S.I.G.	DIFF H ₂ O	M.R.	SEP.				
0000	158		2131																
0100	159		2134																
0200	158		2137																
0300	160		2139																
0400	160		2140																
0500	160		2142																
0600	160		2144																
0700	162		2147																
0800	162		2149																
0900	162		2152																
0900							Shut in well to run recorders and rigged in separator.												
1500			4350	gauge															

REMARKS:

TEST DATA SHEET

SHEET No. 7

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
1	0520		13/64	x		5.24	
	Dec 7						

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.						LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS		
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 1.500 x 4.026			ORIFICE SIZE:								
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. °F			STATIC P.S.I.G.	DIFF H ₂ O				TEMP. °F	
									M.R.	SEP.	BATH						M.R.	SEP.
0000	to 0800																	
0300			4425															
0030																		
0310																		
0330			4415															
0400			4420															
0430			4420															
0500			4421															
0520			4423															
0520																		
0530	62		4265				780	176	16									
0600	64		4186				780	190	0					5.30				
0630	64		4180				780	162	-10									
0700	65		4160				780	160	-25					4.90				
0730	70		4145				780	162	-30									
0800	70		4129				780	168	-25					5.50				
0830	70		4119				780	162	-22									
0900	70		4107				780	160	-20					5.40				
0930	71		4097				780	164	-15									
1000	71		4094				780	144	-10					4.69				
1030	72		4110				780	152	-7									
1100	74		4104				800	136	-7									
1130	74		4095				780	136	-7									
1200	75		4107				780	160	-7					5.24				
1230	75		4109				780	168	-7									
1300	76		4112				780	169	-6					5.35				
1330	76		4115				780	168	-6									
1400	76		4115				780	164	-6					5.28				
1430	78		4114				780	164	-6									
1500	78		4114				780	162	-8					5.24				

REMARKS:

Waited for Wireline to rig out.

Shut in pressure.

Opened well through separator with 1.500 x 4.026 orifice plate. Choke 18/64.

Shut in well to repair leak in separator.

Shut in pressure.

Opened well through separator with 1.500 x 4.026 orifice plate. Choke at 13/64.

Meter froze off.

TEST DATA SHEET

SHEET No. 8

RUN No.	TIME ON	TIME OFF	CHOKE SIZE	TUBING	ANNULUS	FLOW RATE High Stage	FLOW RATE Low Stage
1	0520	1730	13/64	x		5.20	
	Dec 7	Dec 7					

TIME	WELLHEAD READING			HIGH STAGE SEPARATOR RDGS.					LOW STAGE SEPARATOR RDGS.				FLOW RATE MMCF DAY	WIND SPEED AND DIR.	REMARKS			
	FLOW TEMP.	FLOW PROVER	TUBING	CASING STRINGS			ORIFICE SIZE: 1.500 x 4.026					ORIFICE SIZE:						
				LONG	INTERM	SURFACE	STATIC P.S.I.G.	DIFF H ₂ O	TEMP. OF			STATIC P.S.I.G.				DIFF H ₂ O	TEMP. OF	
									M.R.	SEP.	BATH						M.R.	SEP.
1530	78		4117				780	160	-8									
1600	78		4117				780	160	-10					5.24				
1630	79		4120				780	156	-9									
1700	79		4120				780	158	-9					5.20				
1730	79		4122				780	160	-9									
1730							Shut in well to record buildups.											
1740			4273															
1750			4310															
1800			4337															
1815			4362															
1830			4382															
1900			4418															
1930			4431															
2000			4441															
2030			4442															
2100			4443															
2130			4443															
2200			4442															
2230			4442															
2300			4441															
2330			4440															
2400			4440															

REMARKS: No fluid produced.